



Giardiasis

Disease Plan

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Last updated: May 14, 2015, by Laine McCullough

Questions about this disease plan?

Contact the Utah Department of Health Bureau of Epidemiology: 801-538-6191.

✓ WHY GIARDIASIS IS IMPORTANT TO PUBLIC HEALTH

Giardia is a parasite that is found worldwide and in every region of the United States. When ingested, this parasite causes the diarrheal illness giardiasis. Approximately 20,000 cases are reported annually in the U.S.; however, giardiasis is highly underreported, so the actual number of cases that occur each year may be much greater. On average, Utah has less than 300 reported cases per year, and outbreaks are not uncommon. Giardiasis is easily transmissible and can result in severe and chronic illness. Correct diagnosis, early detection of cases, and interview of ill persons is crucial in identifying sources of illness and preventing future cases and outbreaks.

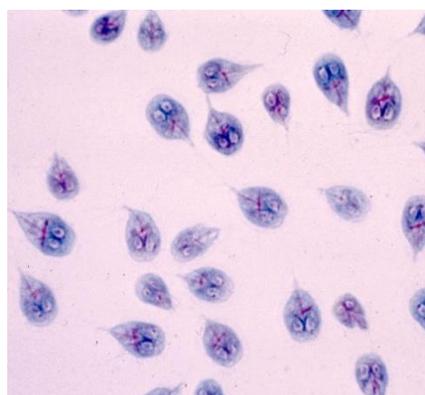
✓ DISEASE AND EPIDEMIOLOGY

Clinical Description

Infection with *Giardia* may present as either asymptomatic cyst passage, acute self-limited diarrhea, or a chronic syndrome of diarrhea, malabsorption, and weight loss. Asymptomatic infection may result in cyst shedding that can last six months or more. Common symptoms of acute self-limited giardiasis include diarrhea, malaise, foul-smelling and fatty stools, abdominal cramps and bloating, nausea, and weight loss. These symptoms may last two to four weeks. Chronic giardiasis involves many of the same symptoms, but also includes malabsorption, fatigue, and a more profound weight loss. These symptoms may be intermittent. Humoral immune deficiencies predispose to chronic giardiasis. There is usually no extraintestinal infection, but rarely *Giardia* can spread to the biliary tract from the duodenum.

Causative Agent

Giardiasis is an infection caused by the protozoan parasite *Giardia lamblia*. The parasite has two forms: the infectious cysts and the invasive trophozoite. The cysts can survive in cold, moist environments for several months, and they are instantly infectious once they are shed from their host. Infected persons can shed both trophozoites and cysts in stool. *Giardia* is moderately resistant to chlorine, and it can be destroyed by being boiled or heated.



Giardia trophozoites (CDC Photo, 2012)

Differential Diagnosis

The differential diagnosis for giardiasis includes cryptosporidiosis, travelers' diarrhea, lactose intolerance, tropical sprue, Crohn's disease, *Dientamoeba fragilis* infection, irritable bowel syndrome, and other diarrheal syndromes caused by viruses, noninvasive bacteria, and other protozoans.

Laboratory Identification

Diagnosis is generally made by the identification of trophozoites or cysts in direct smear examination, such as the ova and parasite (O&P) test. Immunoassays, such as direct immunofluorescent assays (DFA), immunochromatographic assays, and enzyme immunoassays (EIA) are also available and have greater sensitivity. Rapid tests are also commonly used. To enhance detection, the specimen should be processed as soon as possible after collection. To rule out diagnosis, at least three negative results are needed from different specimens collected every other day.

UPHL: The Utah Public Health Laboratory (UPHL) does not test for *Giardia*. Local laboratories test for *Giardia* using either an ELISA, microscopy based, or rapid test.

Treatment

There are several medications available to treat giardiasis including metronidazole, tinidazole, and nitazoxanide (Alinia). Metronidazole is the preferred therapy and can be used in children and adults. Treatment is not recommended for asymptomatic carriers unless there is a potential to transmit the infection to an immunocompromised individual, a pregnant woman, or those in a high risk setting, such as daycare.

Case Fatality

Giardiasis is not typically associated with mortality, even in the immunocompromised.

Reservoir

Humans and some wild and domestic animals (dogs, cats, cattle, beavers, rodents, muskrats, deer, and elk) are reservoirs. The importance of most non-human reservoirs is unclear; overall, humans are the most important source of other human infections. Wildlife (e.g., deer, elk, and beaver) may be important in contaminating surface water supplies; domestic animals (e.g., dogs) may be a source for some human exposures.

Transmission

In order for infection occur, the susceptible host must ingest water or other materials contaminated with *Giardia*. Important methods of transmission include:

1. **Waterborne:** Ingesting contaminated recreational water (rivers, lakes, swimming pools) or inadequately treated water.
2. **Person-to-person:** Includes fecal-oral transmission through contact with infected persons (e.g., those in the same household, or child care facility, or certain types of sexual contact, such as oral-anal contact).
3. **Foodborne:** Eating food contaminated by animals or food handlers, or eating raw foods rinsed off with contaminated water.

An infected human might excrete 1-10 billion cysts daily, and this excretion can continue for several months. Outbreaks of giardiasis have been associated with fecally-contaminated drinking and recreational water, contaminated food, and daycare centers.

The infectious dose is very low; ingestion of 10-25 cysts can lead to giardiasis. Once infected, the host can shed both the infectious cysts and the trophozoites. The cysts can remain infective and survive in the environment for months. The cysts are hardy in cold water and readily survive in mountain streams.

Susceptibility

Anyone can get giardiasis. Groups at increased risk for infection include travelers, international adoptees or refugees, people in child care settings, people who swallow contaminated drinking water, backpackers or campers who drink untreated water from lakes or rivers, people who have contact with infected animals, men who have sex with men, and those who are in close contact with someone who has the disease. Children are infected more frequently than adults.

Incubation Period

Symptoms usually appear 3-25 days or longer after exposure; the median incubation period is 7-10 days.

Period of Communicability

The disease is communicable for as long as the infected person excretes the organism, which may be many months, including several weeks after symptoms resolve. Cysts may remain infective outside the body for several months.

Epidemiology

Giardiasis has a worldwide distribution, but it is more common in areas with poor sanitary conditions and insufficient water treatment facilities. In developed countries, nearly 2% of adults and 6-8% of children get infected. The prevalence is significantly higher in developing regions of the world where nearly 33% are infected. Giardiasis is the most common intestinal parasitic disease affecting humans in the U.S, with approximately 20,000 cases reported each year.

Most community-wide outbreaks have resulted from a contaminated water supply. From 1971 to 2006, there were 123 drinking water outbreaks that resulted in 28,127 cases of giardiasis in the U.S. Outbreaks also occur in child care centers or institutional care settings as a result of person-to-person transmission. Outbreaks have been associated with food or food-handlers, but are less common.

From 2010-2014, there have been between 231 and 323 (median 278) cases of giardiasis reported each year in Utah, with cases peaking in the summer and early fall months. Common exposures reported by Utah residents include recreational water exposure, outdoor exposure, international travel, and recent immigrant or refugee status. Giardiasis is easily transmissible and prevention and control measures are crucial.

✓ PUBLIC HEALTH CONTROL MEASURES

Public Health Responsibility

- Investigate all cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, community partners (e.g., pool operators and child care centers), clinicians, and first responders regarding disease transmission and prevention.
- Identify cases and sources to prevent further transmission.
- Identify clusters or outbreaks of this disease and determine the source.

Prevention

Personal Preventive Measures/Education

To avoid exposure and transmission, individuals should:

- Wash their hands thoroughly with soap and water for at least 20 seconds:
 - Frequently when ill with diarrhea, or when caring for someone with diarrhea;
 - After using the toilet or helping someone use the toilet;
 - After changing diapers (wash their own hands as well as the child's hands and dispose of diapers in a closed-lid garbage can);
 - Before eating or preparing food;
 - After gardening; and
 - After contact with animals or animal waste.

Hand washing with soap and water is preferred over hand sanitizer. Hand sanitizer is effective against trophozoites passed in the stool, but not against the cyst form that exists in the environment.

- Keep *Giardia* organisms and other germs out of pools, hot tubs, splash pads, lakes, streams, ponds, etc. by taking the following steps:
 - Avoid swallowing recreational water, including pool or natural water.
 - Avoid swimming while ill with diarrhea, and for at least two weeks after diarrhea resolves. Infected persons may continue to shed the parasite during this time. This measure is essential for children in diapers.
 - Shower with soap and water before entering recreational water, including swimming pools and hot tubs. Wash thoroughly, especially rectal and genital areas, before entering swimming water, water parks, or other public bathing areas.
 - Take children on frequent bathroom breaks and check diapers often.
 - Change diapers in the bathroom or a diaper-changing area, not at pool or waterside.
- Do not drink untreated water from lakes, rivers, springs, ponds, streams, or shallow wells. Bringing water to a full, rolling boil for one minute is sufficient to kill *Giardia*. Several filters are also available that remove *Giardia* cysts (e.g., a filter with absolute less than or equal to one micron filter). Additionally, some chemical disinfectants, such as chlorine dioxide, are effective against *Giardia*.

- Adhere to local advisories to boil water.
- Do not drink poorly treated water, or use ice made from water, during community outbreaks caused by contaminated drinking water.

Discuss transmission risks that may result from oral-anal sexual contact. Latex barrier protection (e.g., dental dam) may prevent the spread of *Giardia* to a case's sexual partners and may prevent exposure to and transmission of other fecal-oral pathogens.

International Travel

Travelers to developing countries should:

- "Boil it, cook it, peel it, or forget it."
- Drink only boiled water or bottled carbonated beverages, keeping in mind that bottled carbonated water is safer than bottled non-carbonated water.
- Ask for drinks without ice, unless the ice is made from boiled water. Avoid popsicles and flavored ice that may have been made with contaminated water.
- Eat foods that have been thoroughly cooked and are still hot and steaming.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well.
- Peel their own raw fruits or vegetables, and not eat the peelings.
- Avoid foods and beverages from street vendors.

Chemoprophylaxis

None.

Vaccine

None.

Isolation and Quarantine Requirements

Isolation: Food handlers with giardiasis must be excluded from work until diarrhea has resolved. Children should not attend school as long as they have diarrhea. Persons diagnosed with giardiasis should not use recreational waters for two weeks after symptoms resolve.

NOTE: A food handler is any person directly preparing or handling food. This can include a patient care or childcare provider.

Hospital: Standard and contact precautions.

Quarantine: Contacts with diarrhea that are food-handling facility employees shall be considered the same as a case and should be handled in the same manner. No restrictions otherwise.

NOTE: In certain circumstances, cases, ill contacts, and/or asymptomatic contacts who are food handlers may be required to have negative stool samples prior to returning to work. The local health department will decide which cases and/or contacts will need negative stool samples

prior to returning to work, and whether one or two negative samples is necessary. If a case or contact has been treated with an antimicrobial agent, the stool specimen should not be collected until at least 48 hours after cessation of therapy. If two negative stool samples are determined to be necessary, they should be taken at least 24 hours apart.

✓ CASE INVESTIGATION

Reporting

Report any illness to public health authorities that meets any of the following criteria:

1. Any person who has a positive laboratory test for any *Giardia* species. These tests may include any of the following:
 - a. Detection of *Giardia* organisms in stool, intestinal fluid, tissue samples, or biopsy specimens.
 - b. Detection of *Giardia* antigen in immunodiagnostic methods.
 - c. Detection of *Giardia*-specific nucleic acid in stool, intestinal fluid, tissue samples, or biopsy specimens.
2. Any person with at least one gastrointestinal symptom of illness such as diarrhea, abdominal cramping, fever, nausea, vomiting, or anorexia and who is either:
 - a. A contact of a confirmed case of giardiasis, or
 - b. A member of a risk group as defined by public health authorities during an outbreak.
3. A person whose healthcare record contains a diagnosis of giardiasis.

Other recommended reporting procedures:

- All cases of giardiasis should be reported.
- Reporting should be ongoing and routine.
- Frequency of reporting should follow the state health department's routine schedule; in Utah, cases should be reported within three working days of identification.

Reporting Table:

Table of criteria to determine whether a case should be reported to public health authorities.

Criterion	Giardiasis
<i>Clinical Evidence</i>	
Diarrhea	O
Abdominal cramps	O
Vomiting	O
Fever	O
Nausea	O
Anorexia	O
Healthcare record contains a diagnosis of giardiasis	S

<i>Laboratory Evidence</i>	
<i>Giardia</i> organisms in stool, intestinal fluid, tissue samples, or biopsy specimens	S
<i>Giardia</i> antigens in stool or intestinal fluid	S
<i>Giardia</i> specific nucleic acid in stool, intestinal fluid, tissue samples or biopsy specimens	S
<i>Epidemiologic Evidence</i>	
Contact of a confirmed case of giardiasis	O
Member of a risk group as defined by the public health authorities during an outbreak	O

Notes:

S = This criterion alone is Sufficient to identify a case for reporting.

O = At least one of these "O" (Optional) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column is required to identify a case for reporting.

Case Definition

Giardiasis (2011)

Clinical Description

An illness caused by the protozoan *Giardia lamblia* (aka *G. intestinalis* or *G. duodenalis*) and characterized by gastrointestinal symptoms such as diarrhea, abdominal cramps, bloating, weight loss, or malabsorption.

Laboratory Criteria

Laboratory-confirmed giardiasis shall be defined as the detection of *Giardia* organisms, antigen, or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological sample.

Case Classification

Confirmed: A case that meets the clinical description and the criteria for laboratory-confirmation as described above. When available, molecular characterization (e.g., assemblage designation) should be reported.

Probable: A case that meets the clinical description and that is epidemiologically linked to a confirmed case.

Classification Table

Criteria for the case classification for a case of giardiasis.

Criterion	Confirmed	Probable
<i>Clinical Evidence</i>		
Diarrhea		O
Abdominal cramps		O
Vomiting		O
Fever		O

Nausea		O
Anorexia		O
Healthcare record contains a diagnosis of giardiasis		S
<i>Laboratory Evidence</i>		
<i>Giardia</i> organisms in stool, intestinal fluid, tissue samples, or biopsy specimens	S	
<i>Giardia</i> antigens in stool or intestinal fluid	S	
<i>Giardia</i> -specific nucleic acid in stool, intestinal fluid, tissue samples, or biopsy specimens	S	
<i>Epidemiologic Evidence</i>		
Contact of a confirmed case of giardiasis		O
Member of a risk group as defined by the public health authorities during an outbreak		O

Notes:

S = This criterion alone is Sufficient to classify a case.

O = At least one of these "O" (Optional) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to classify a case.

Case Investigation Process

All probable and confirmed cases should be interviewed with the giardiasis case report form. Food handlers should be excluded from work until diarrhea has resolved. Children with diarrhea should be excluded from child care and school settings until diarrhea has resolved. Negative stool specimens may also be required. People with giardial diarrhea should be advised to avoid swimming in public pools for two weeks after the diarrhea has resolved.

Outbreaks

CDC defines a food-borne outbreak as, "an incident in which two or more persons experience a similar illness resulting from the ingestion of a common food." In order to confirm an outbreak of giardiasis, there must be at least two ill persons and *Giardia* isolated from stool, duodenal contents, or small-bowel biopsy specimen or *Giardia* antigen detected in stool. Outbreaks of *Giardia* are typically associated with ingestion of contaminated water—recreational water or improperly treated or untreated water. *Giardia* has become one of the most common causes of waterborne disease. Because the parasite is moderately chlorine-resistant, chlorinated pools may not protect against transmission.

Identify Case Contacts

Contacts of giardiasis cases may include household contacts, daycare and school attendees and workers, and pool employees and swimmers. These contacts may be identified through

interview of the case-patient, or through physician notes. More information about management of case contacts are listed in the Case Contact Management section below.

Case Contact Management

Daycare

Since giardiasis may be transmitted from person-to-person through fecal-oral transmission, it is important to follow up on cases of giardiasis in a daycare setting carefully. General recommendations include:

- Children with giardiasis who have diarrhea should be excluded until their diarrhea is resolved.
- Children with giardiasis who have no diarrhea and are not otherwise ill may be excluded or may remain in the program if special precautions are taken.
- Since most staff in childcare programs are considered food handlers, those with giardiasis in their stool (symptomatic or not) can remain on site, but must not prepare food or feed children until their diarrhea has resolved. Negative stool specimens may be required.

School

Since giardiasis may be transmitted from person-to-person through fecal-oral transmission, it is important to follow up on cases of giardiasis in a school setting carefully. General recommendations include:

- Students of staff with giardiasis who have diarrhea should be excluded until their diarrhea is resolved.
- Students or staff with giardiasis who do not handle food, have no diarrhea or mild diarrhea, and are not otherwise sick, may remain in school at the discretion of school administrators and local public health authorities if special precautions are taken.
- Students or staff who handle food and have giardiasis infection (symptomatic or not) must not prepare food until their diarrhea has resolved. Negative stool specimens may be required.

Community Residential Programs

Actions taken in response to a case of giardiasis in a community residential program will depend on the type of program and the level of functioning of the residents.

In long-term care facilities, residents with giardiasis should be placed on standard (including enteric) precautions until their symptoms subside. Staff members who provide direct patient care (e.g., feed patients, give mouth or denture care, or give medications) are considered food handlers and should be treated as such. In addition, staff members with giardiasis who are not food handlers should not work until their diarrhea has resolved.

In residential facilities for the developmentally disabled, staff and clients with giardiasis must refrain from handling or preparing food for other residents until their diarrhea has subsided. Negative stool specimens may be required. In addition, staff members with giardiasis who are not food handlers should consider not working until their diarrhea has resolved.

✓ ACKNOWLEDGEMENTS

This document is a revision of the Utah Department of Health disease plan for giardiasis. We would like to acknowledge the Washington State Department of Health and Massachusetts Department of Public Health for select content of this document.

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✓ VERSION CONTROL

Updated Dec 2014 – CSTE reporting criteria, case definition, and case classification swim lanes included.

Updated March 2015 – "Why is Giardiasis Important to Public Health" section added. Symptoms and illness duration updated in "Clinical Description" section. "Differential Diagnosis" section updated to include specific diseases. "Laboratory Identification" updated to include recent changes in general laboratory practices for *Giardia*. "Treatment" updated to include information for asymptomatic carriers. "Transmission" updated to include examples and infectious dose. "Epidemiology" section updated to include Utah trends. Prevention measures and recommendations updated and reorganized. Isolation requirements updated to include children. "Case Investigation Process" restricts additional high risk settings. "Identify Case Contacts" section updated and separated from "Case Contact Management." "Acknowledgements," "Version Control," and "Minimum Data Set" sections added.

Updated May 2015 - Removed "Neonatal Infection/Maternal Infant Transmission" data entry information due to the fact that it is not necessary for this disease.

✓ UT-NEDSS Minimum/Required Fields by Tab

Demographic

- Last Name
- First Name
- State
- County
- Date of Birth
- Area Code
- Phone Number
- Birth Gender
- Ethnicity
- Race
- Is the patient a recent refugee or immigrant?
 - (if yes) How long has the patient been in the U.S.?

Clinical

- Disease
- Onset Date
- Date Diagnosed
- Died
- Date of Death
- Diagnostic Facility

Laboratory

- Test Type
- Test Result
- Accession Number

Contacts

- Does case's infection appear secondary to another person's infection?

Epidemiological

- Food Handler
- Group Living
- Day Care Association
- Occupation
- Imported From
- Risk Factors
- Risk Factor Notes

Investigation

- Date 25 Days before disease onset:
- Date 3 days before disease onset:
- Did the patient travel outside the USA during the exposure period?
- Source of drinking water at home: (check all that apply)
- Has recent plumbing or construction work been done on water system?
- Did the patient drink from, swim/play in or have exposure to any of the following water sources during the exposure period?
- Specify details (dates, locations, etc.):
- Did the patient drink from, swim/play in or have exposure to any other water sources not listed during the exposure period?
- Specify details (dates, locations, etc.):

Reporting

- Date first reported to public health

Administrative

- State Case Status (completed by UDOH)
- Outbreak Associated
- Outbreak Name