

Giardiasis

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To identify sources of major public health concern (for example, a public water supply or a day care facility) and to stop transmission from such a source and prevent future recurrences.
2. To identify whether the case may be a source of infection for other persons (for example, a diapered child or day-care attendee), and, if so, to prevent further transmission.

B. Laboratory And Physician Reporting Requirements

Laboratories and physicians are required to report within one working day of identification/diagnosis.

C. Local Health Department Reporting and Follow-Up Responsibilities

1. Report all confirmed and presumptive (but *not* suspect) cases to the OHS by the end of the calendar week of initial physician/lab report. Use the Giardiasis form available at our web page. Submit as much information as available at the time of report.
2. Additional case investigation is optional, *unless* the case is ≤ 3 and attends day care, *or* the number of recent reports suggest that an outbreak may be occurring. Under those circumstances, begin investigation within one working day. Use the same form, but fill it in completely. Send a copy of the completed form to the OHS within seven days of initial report. Notify the State (ACDP) by phone, e-mail or fax if an outbreak is suspected.

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Giardia intestinalis (AKA *G. lamblia*, *G. duodenalis*), a protozoan parasite. *Giardia* has two life cycle stages: cyst and trophozoite. The relatively hardy cyst is the infectious form; it can remain viable in the environment for weeks or even months. After ingestion, cysts develop in the upper small intestine into trophozoites, which are the motile, feeding, reproducing, and symptom-causing form of the parasite. Infected persons shed trophozoites or cysts (or both) in stool. Persons with profuse diarrhea tend to shed mostly trophozoites, which are not infectious. Many if not most infected persons are asymptomatic, but these are, by and large, the ones shedding the infectious cysts.

B. Description of Illness

Symptoms are variable, but typically include watery, foul-smelling diarrhea that may persist for weeks, is often intermittent, and accompanied by abdominal cramps and a “bloated” feeling, with excess gas. Diarrhea is not always present: nausea, bloating and abdominal pain may be the extent of the symptoms. Because fat absorption is impaired, stools may have a higher than usual fat content (steatorrhea) and thus tend to float. In fact, most infections are asymptomatic. The nature of acquired immunity (if any) is uncertain. Some people with regular exposure may develop some degree of resistance to illness.

C. Reservoirs

Humans and some animals are hosts for this parasite. Overall, humans are certainly the most important source of other human infections. Many animals other than man have been found to be infected, although the importance of most non-human reservoirs is hotly debated. Deer, elk, beaver, and other wildlife may be important in contaminating surface water supplies; domestic animals (e.g., dogs) may be a source for some human exposures.

D. Modes of Transmission

Transmission is fecal-oral. Examples include:

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1. contact with infected persons (e.g., asymptomatic children shedding cysts);
2. drinking fecally contaminated and inadequately treated water;
3. ingestion of fecally contaminated recreational water (rivers, lakes, etc.);
4. eating food contaminated by animals or food handlers (rarely documented).

E. Incubation Period

Variable, 5–30 days (or more); median 7–10 days.

F. Period of Communicability

Persons are infectious as long as cysts are being shed, which may be days to years; the typical period is poorly defined and moreover may be intermittent. To reiterate, asymptotically infected persons tend to be much more infectious than persons with diarrhea.

G. Treatment

Metronidazole (Flagyl®) is considered the most effective treatment; furazolidone (Furoxone®) may be considered for kids because it is available in liquid form; and paromomycin is not absorbed so it is useful for treatment of pregnant women. Quinacrine hydrochloride (Atabrine®) is generally not available in the US, but as a service, may be available from Medical Center Pharmacy, New Haven, CT (203/688-6816) or Panorama Compounding Pharmacy, Van Nuys, CA (800/247-9767). Treatment failure is not uncommon (~10% of the time), but is not thought to indicate resistance *per se*. A repeat course of the same or a different medication may be indicated.

3. CASE DEFINITIONS, DIAGNOSIS, AND LABORATORY SERVICES

A. Confirmed Case Definition

Confirmation requires identification of *Giardia* in feces or duodenal contents, which is not always easy to do (especially with only one stool specimen), or a positive *Giardia*-specific antigen test.

B. Presumptive Case Definition

Diarrheal disease lasting ≥ 5 days in a person epidemiologically linked to a confirmed case.

C. Suspect Case (*not reportable to OHS*)

Anyone with an undiagnosed diarrheal illness lasting ≥ 5 days.

D. Services Available at the Oregon State Public Health Laboratory

The OSPHL does stool examinations for *Giardia* (see OSPHL's *Guide to Services*). Specimens must be submitted in the parasitology kit containing the formalin preservative. Add enough fecal material to reach the red "Fill Line" marked on the container, and thoroughly mix it into the preservative. All specimens must be properly packaged in double containers with absorbent material around them. It is not necessary to refrigerate these specimens; they are dead! Use the Bacteriology/Parasitology form (#75).

If serial specimens are submitted, they will be examined in the order in which they were collected. If the first stool is positive, the second and third will not be examined. If the first stool is negative, but the second is positive, the third will not be examined.

4. ROUTINE CASE INVESTIGATION

Routine investigation should include completion of case identification, demographics, and basis of diagnosis sections of the Case Investigation Form (essentially, page 1 of said form). Further investigation of cases is not required unless:

1. the case is ≤ 3 years old and attends day care where there are diapered children; *or*
2. the number of recent reports (or other evidence) suggests that an outbreak might be occurring.

Should either circumstance obtain, refer to §6, *Managing Special Situations*.

5. CONTROLLING FURTHER SPREAD

A. Education

1. Provide basic instruction in fecal-oral modes of transmission, environmental disinfection, and personal hygiene, emphasizing proper hand washing techniques.
2. As relevant, discuss the risks of drinking unfiltered or untreated surface water, including private water supplies or water from streams or lakes while camping or hiking. Generally, persons should be educated about the risks of both giardiasis and cryptosporidiosis. While some chemical disinfectants are effective against *Giardia*, most are ineffective against *Cryptosporidium*. Bringing water to a full, rolling boil is sufficient to kill both parasites. Many backpacking-type filters are also available that remove *Giardia* cysts and the smaller *Cryptosporidium* oocysts. Filters must be able to remove particles >2 µm in diameter and must be properly maintained.

B. Isolation

Standard precautions (hand washing) are adequate to minimize the risk of further transmission.

B. Isolation and Work or Day Care Restrictions

1. As of March 2002, restrictions are no longer imposed routinely on persons with Giardiasis who attend or work at schools, child-care centers, health-care facilities or as food handlers *unless they have diarrhea*. Anyone who has illness of unknown etiology accompanied by diarrhea or vomiting should be excluded until cause is determined and appropriate therapy, as indicated, is initiated. (See OAR Division 19, 333-019-0010 for more information of those diarrheal diseases for which restriction still applies).
2. Apparent ongoing disease transmission (identification of epi-linked cases) required consideration of additional intervention (see §6, *Managing Special Situations*).

D. Follow up of Cases — generally not indicated.

E. Protection of Contacts— not applicable.

F. Environmental Measures

As indicated, e.g., day-care inspections, education on disinfecting surfaces, evaluation of drinking water supplies, etc. Remind day-care staff to keep cleaning products safely out of their clients' reach, preferably in a locked cupboard, but not where they will be forgotten and not used.

6. MANAGING SPECIAL SITUATIONS

A. Case is ≤3 and Attends Day Care

1. If the center includes diapered children, interview the operator and inspect attendance records to identify other possible cases among children or staff in the past three months.
2. Instruct the operator and staff about proper food handling, hand washing after diaper handling or poop clean-up. Commercial products that meet the Environmental Protection Agency's (EPA's) standards for "hospital grade" germicides may be used for cleaning surfaces. A cheap disinfectant for use in bathrooms and diapering areas is 1 tablespoon of household bleach to 1 quart of water. This solution of bleach and water is easy to mix, and is safe if handled properly. Like other household disinfectants, it can be irritating to the skin, eyes, nose, and mouth if used from a spray bottle. Because bleach and water is weakened by organic material, evaporation, heat, and sunlight, solutions should be dated when mixed and replaced every few days.
3. If other suspect cases are identified, do stool exams on symptomatic children who share the same classroom, play area, diapering area, or have other contact with the confirmed case(s): 3 specimens collected on different days is best. The need to check asymptomatic children should be determined by the circumstances of the outbreak investigation.
4. Treatment of asymptomatic children, even in the setting of a day-care outbreak, is not recommended. It may lower prevalence in the short term, but it doesn't help in the long term, and exposes these children to potentially toxic antimicrobials. That said, should an outbreak rage on in spite of the above measures, wider-testing of attendees and adult care-givers and treatment of all identified in-

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ected may be warranted.

5. Look for possible cases among family members of infected children. Stool exams are indicated for symptomatic household members or other children who attend day care.
6. The day-care operator should be instructed to call the LHD immediately if new cases of diarrhea occur. The facility should be called or visited once each week for six weeks after onset of the last case to verify that surveillance and appropriate preventive measures are being carried out. Newly symptomatic children should be managed as outlined above.

B. Reported Incidence is Significantly Higher than Usual

If the number of reported cases in your county or area is higher than usual for the time of year, or for a particular age group, or sex, race/ethnicity, etc. (you know, all that epi stuff—time, person, place?), conduct routine follow-up investigations for all cases reported, working back to include all cases reported at least 2 weeks before the apparent upswing.

Interview cases and others who may be able to provide pertinent information. Ask about possible exposures in the 4 to 25 days before onset, including:

1. name, diagnosis, and phone number or address of any acquaintance or household member with a similar illness (*N.B.*— anyone meeting the presumptive case definition should be reported and investigated in the same manner as a confirmed case);
2. attendance or work at a day-care facility by the case or household member of the case;
3. source(s) of drinking water, including water at home and work, as well as streams, lakes or other untreated sources;
4. recreational water exposures: lakes, rivers, swimming pools, water slides, etc.;
5. travel outside the area.

Talk to the CD epidemiologists at ACDP (503-731-4024). Your heads-up on an increase in cases will at least get you some sympathy, if not useful suggestions for what to do next.

C. Common-Source Outbreak Suspected

Consult with the Acute and Communicable Disease Prevention Staff at the OHS.