



Alberta Public Health Disease Management Guidelines

Giardiasis



This publication is issued under the Open Government Licence – Alberta (<http://open.alberta.ca/licence>). Please note that the terms of this licence do not apply to any third-party materials included in this publication.

This publication is available online at <https://open.alberta.ca/publications/giardiasis>

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without written permission of Alberta Health, Government of Alberta.

© Copyright of this document and its contents belongs to the Government of Alberta.

For further information on the use of this guideline contact:

Health.CD@gov.ab.ca

Health and Wellness Promotion Branch

Public Health and Compliance Branch

Alberta Health

Giardiasis | Alberta Health, Government of Alberta

© 2021 Government of Alberta | November 2021



Contents

Case Definition	4
Confirmed Case	4
Probable Case	4
Reporting Requirements	5
Physicians, Health Practitioners and Others	5
Laboratories	5
Alberta Health Services and First Nations Inuit Health Branch	5
Epidemiology	6
Etiology	6
Clinical Presentation.....	6
Diagnosis	6
Treatment.....	6
Reservoir.....	6
Transmission.....	7
Incubation Period	7
Period of Communicability.....	7
Host Susceptibility	7
Incidence.....	7
Public Health Management	8
Key Investigation	8
Management of a Case	9
Management of Contacts	9
Preventive Measures.....	10
Appendix 1: Revision History	11
References	12

Case Definition

Confirmed Case

Laboratory confirmation of infection with or without clinical illness^(A):

- Microscopic detection of *Giardia* trophozoites and/or cysts in stool, duodenal fluid or duodenal/small bowel biopsy specimens

OR

- Detection of *Giardia* antigen in stool by a *Giardia*-specific immunodiagnostic test (e.g., EIA)

OR

- Detection of *Giardia* nucleic acid (e.g., PCR) in an appropriate clinical specimen (e.g., stool, fluid or tissue)

Probable Case

Clinical illness^(A) in a person who is epidemiologically linked to a confirmed case

^(A) Clinical illness: diarrhea, abdominal cramps, bloating, weight loss, fatigue or malabsorption.

Reporting Requirements

Physicians, Health Practitioners and Others

Physicians, health practitioners and others shall notify the Medical Officer of Health (MOH) (or designate) of the zone, of all confirmed and probable cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).

Laboratories

All laboratories shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two business days) to the MOH (or designate) of the zone and the Chief Medical Officer of Health (CMOH) (or designate).

Alberta Health Services and First Nations Inuit Health Branch

- The MOH (or designate) of the zone where the case currently resides shall forward the initial Notifiable Disease Report (NDR) of all confirmed and probable cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
- The MOH (or designate) shall report all outbreaks to CMOH (or designate) via the [Alberta Outbreak Report Form \(AORF\)](#) as soon as possible using existing processes (e.g., CDOM or fax).
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two business days):
 - name,
 - date of birth,
 - out-of-province health care number,
 - out-of-province address and phone number,
 - positive laboratory report, and
 - other relevant clinical/epidemiological information.

Epidemiology

Etiology

Giardia lamblia (also called *G. intestinalis*, *G. duodenalis* or beaver fever) is a parasite that infects the biliary tract and upper small intestine.⁽¹⁾ It exists in trophozoite (free living) form and cyst form.⁽²⁾ The cyst is the infective form and is sporadically excreted in feces.

Clinical Presentation

The majority of giardiasis cases are asymptomatic, some of whom will spontaneously clear infection, others who will become cyst passers.⁽²⁻⁴⁾ Approximately one-third of people may suffer from the acute onset of intermittent acute watery diarrhea, steatorrhea, abdominal cramps and distention, flatulence, and anorexia.⁽¹⁾ Weight loss can be a main clinical feature distinguishing a person with giardia infection from another infection.⁽²⁾ Most infections resolve spontaneously within six weeks.⁽⁵⁾

Chronic giardiasis is characterized by profound malaise and weariness and gastrointestinal discomfort that is exacerbated by eating.⁽²⁾ As the disease progresses the stool becomes greasy, foul-smelling, and may float. Periods of diarrhea may alternate with constipation until the individual has been treated or the symptoms resolve spontaneously. One of the most distinguishing features of illness is the prolonged duration of diarrhea. The malabsorption of fats and fat soluble vitamins can occur with prolonged illness.^(4,6) Chronic infections can last months to years.^(4,7)

Extraintestinal invasion does not usually occur with giardiasis; however, complications such as reactive arthritis, dehydration, growth retardation/failure to thrive and damage to duodenal and jejunal mucosal cells can occur.^(1,8,9) Other complications of giardiasis include lactose intolerance, chronic fatigue and irritable bowel syndrome that can remain years after infection has resolved.⁽¹⁰⁻¹⁵⁾

Diagnosis

Giardiasis should be considered in persons with prolonged diarrhea, especially when associated with malabsorption or weight loss. The diagnosis is most often made by examination of stool for ova and parasites (O&P), looking for trophozoites or cysts. The time from ingestion of cysts to detection of cysts in the stool may be longer than the incubation period, thus stool examination at the time of onset of symptoms may be negative.

Antigen detection in stool by EIA is useful for screening large numbers of specimens and is more sensitive than the O&P exam for identifying *Giardia*.

PCR testing is extremely sensitive and specific for the detection of the giardia parasite, although it may miss concurrent or alternative infections by other organisms.

Treatment

- Symptomatic cases should be treated with antibiotics.⁽¹⁾
- Treatment of asymptomatic carriers is generally not recommended unless it is to prevent disease transmission to a high risk household contact (e.g., child under five years of age, pregnant woman, immunocompromised, hypogammaglobulinemia, cystic fibrosis).^(16,17)

Reservoir

Giardia can be found in humans, domestic and wild animals, water sources that have become contaminated by human and animal feces, and contaminated food.⁽¹⁾

Transmission

The transmission of *Giardia* most commonly occurs through the ingestion of untreated water and occasionally from swimming in contaminated water sources.^(1,2) Infection may also be acquired via consumption of fecally-contaminated food.

Person-to-person transmission (e.g., fecal-oral) is the second most common mode of spread. Contaminated soil and fomites can also have infectious cysts present.^(7,18)

The infectious dose is generally less than 10 cysts. Persons infected with *Giardia* excrete large numbers (1–10 billion) of infectious cysts.^(19,20)

Giardia cysts survive for weeks to months in cold water and are resistant to normal water treatment methods such as chlorination and ozonolysis.^(21,22) Cysts are susceptible to boiling or freezing.^(3,5)

Incubation Period

The incubation period ranges from three to 25 or more days, but is usually between seven to 10 days.⁽¹⁾

Period of Communicability

Giardiasis is communicable during the entire period of infection, which may last months.^(1,2) Five to 15% of individuals become asymptomatic cyst shedders.⁽²⁾

Host Susceptibility

Susceptibility is universal; however, those at higher risk include:^(1,2,17,23,24)

- travelers to/recent immigrants from countries where giardiasis is common,
- people in child care settings,
- men who have sex with men,
- persons in care institutions,
- patients who have had previous gastric surgery and/or reduced gastric acidity, and
- backpackers, hikers, campers and others who drink untreated water (e.g., river water).

Persons with immunodeficiencies (e.g., HIV or AIDS) can experience a more serious and prolonged illness or may be more difficult to treat.^(1,2) Children younger than five years of age and pregnant women, may have severe illness characterized by weight loss and require hospitalization. Breast milk can be protective and even cytotoxic against *Giardia*.⁽²⁾

Incidence

Giardia lamblia is the most common intestinal parasite reported worldwide each year.^(1,2,17)

Giardiasis is notifiable in both Alberta and in Canada. From 2010 to 2016, the number of cases of giardiasis cases reported in Alberta has been fewer than 500 cases per year.⁽²⁵⁾ Approximately 50–60% of cases occur in travellers or recent immigrants.

Refer to the [Interactive Health Data Application \(IHDA\)](#) for more information.

Public Health Management

Key Investigation

- Confirm that the case meets the case definition.
- Obtain a history of illness including the date of onset, and signs and symptoms.
- Identify any underlying medical conditions that may increase host susceptibility.
- Determine the occupation of the case and if in a **sensitive situation or occupation (SSO)** that may pose a higher risk of transmission to others. See Table 1 for a definition of SSO.
- Determine the possible source of infection of all confirmed and probable cases taking into consideration the incubation period^(B), reservoir, and mode of transmission. Assessment may include determining, obtaining or identifying:
 - a detailed food history including recent consumption of potentially contaminated food or water and the time of consumption,
 - attendance at daycare or institutions,
 - contact with sewage contaminated recreational water,
 - consumption of untreated surface water,
 - recent visit to a farm or petting zoo,
 - exposure to fowl, domestic or wild animals including identifying recent illness in pets or acquisition of a puppy, kitten, etc. into the household, and
 - occupational exposure (e.g., animal or meat handling),
 - recent travel or immigration,
 - residing in areas with poor sanitation including improper water treatment and sewage disposal, either in Canada or abroad, and/or
 - high risk sexual practices, especially contact with feces.
- Assess for history of similar symptoms in other members of the household.
- Suspected contaminated food may be held or destroyed to prevent consumption.
- Identify contacts, especially those in SSO that may pose a risk of transmission to others. (Refer to Table 1). Contacts include:
 - persons living in the household,
 - children and child care workers at a child care facility (daycare, dayhome, or other child care site), and
 - individuals exposed to the same source (if identified).

Table 1: Sensitive Situations or Occupations (SSO)⁽¹⁾

SSO	Definition
Food handler	<ul style="list-style-type: none"> • Touches unwrapped food to be consumed, <u>and/or</u> • Handles equipment or utensils that touch unwrapped food to be consumed.*
Health care, child care or other staff	<ul style="list-style-type: none"> • Has contact through serving food to highly susceptible persons or persons in whom an intestinal infection would have particularly serious consequences. • Provides direct patient care and is involved in the care of young children, elderly or dependent persons.
Child attending a child care facility or similar facilities	<ul style="list-style-type: none"> • Is diapered or unable to implement good standards of personal hygiene.
Any individual (older child or adult)	<ul style="list-style-type: none"> • Is unable to implement good standards of personal hygiene (e.g., those with disabilities/challenges that may impact ability to perform good hand hygiene) and is involved in an activity that may promote disease transmission.

* NOTE: Generally, food handlers who do not touch food, equipment or utensils in this way are not considered to pose a transmission risk; however, circumstances for each case should be assessed on an individual basis.

^(B) The incubation period of giardiasis is usually 7–10 days. However, individual cases can vary, thus requiring flexibility when determining where and how the disease was likely acquired.

Management of a Case

- All cases should be advised of the following:
 - how the disease is transmitted, appropriate personal hygiene, routine infection prevention and control practices, and contact precautions,
 - to avoid food preparation until symptoms have resolved,
 - to practice safer sex and avoid sexual practices that facilitate fecal-oral transmission, and
 - to avoid public recreational water (e.g., swimming pools) until after treatment is completed and diarrhea has resolved.⁽¹⁷⁾
- Contact precautions should be used in health care settings where children or adults have poor hygiene or incontinence that cannot be contained.
- Refer to Table 2 for case exclusion criteria. For a summary of all enteric exclusions refer to [Enteric Transmission Risk Assessment and Exclusion Table](#).

Table 2: Case Exclusion

Cases	Category	Exclusion Criteria
Symptomatic	SSO	<ul style="list-style-type: none"> • The MOH may by order exclude the case until 48 hours after appropriate antibiotic treatment has been completed and stools have returned to normal or the MOH is satisfied that the case is no longer infectious. <ul style="list-style-type: none"> – The case must be symptom free for 48 hours after stopping any antidiarrheal medication (if taken). – Lifting of exclusions is not conditional upon submission of stool specimens to demonstrate clearance of the organism. – Specimens may still be submitted on a case-by-case basis in consultation with the MOH. • If possible, consideration may be given to temporary redeployment away from activities that involve increased risk of transmission.
Asymptomatic	SSO	<ul style="list-style-type: none"> • Generally not required unless otherwise recommended by the MOH.
Symptomatic	Non-SSO	<ul style="list-style-type: none"> • No exclusion required; however, all cases of gastroenteritis or enteritis should be regarded as potentially infectious and should remain home from work, school or daycare until 48 hours after diarrhea has stopped.
Asymptomatic	Non-SSO	<ul style="list-style-type: none"> • No exclusion required.

Management of Contacts

- Contacts should be instructed on disease transmission, appropriate personal hygiene, routine practices, and contact precautions.
- Symptomatic contacts should be assessed by a physician.
 - Contacts with positive stool specimens should be managed and treated as cases.
- Refer to Table 3 for contact exclusion criteria.

Table 3: Contact Exclusion

Contacts	Category	Exclusion Criteria
Symptomatic	SSO	<ul style="list-style-type: none"> • Same as a case. • Ensure the contact is assessed by their physician.
Symptomatic	Non-SSO	<ul style="list-style-type: none"> • No exclusion required however, all cases of gastroenteritis or enteritis should be regarded as potentially infectious and should remain home from work, school or daycare until 48 hours after diarrhea has stopped. • Refer to their physician for assessment and testing, if required.
Asymptomatic	All	<ul style="list-style-type: none"> • No exclusion – contacts should monitor themselves for gastrointestinal symptoms, maintain good hand hygiene and food handling practices and seek medical attention if symptoms develop.

Preventive Measures

- Educate the **public** about the following:^(1,17)
 - personal hygiene, especially the sanitary disposal of items containing feces,
 - careful hand washing after defecation and sexual contact, and before preparing or eating food,
 - washing cutting boards, counter tops and utensils with soap and water after contact with raw meat
 - cooking meats thoroughly,
 - washing hands after contact with animals, animal feces, and animal environments, especially where the animals are ill with diarrhea,
 - methods of personal protective measures, in particular the correct and consistent use of condoms and discuss risk of sexual practices that permit fecal-oral contact,
 - accessing and drinking safe water supplies, and
 - testing private water supplies for presence of bacterial/parasitic contamination, if suspected.
- Educate **food handlers** about:^(1,17)
 - proper food and equipment handling, preparation, and hygiene, especially in avoiding cross-contamination from raw meat products, and
 - thorough hand washing before and after meal preparation.
- Educate **campers, backpackers, and others** to avoid drinking water directly from streams. Water should be boiled for at least one minute before it is used for drinking, food preparation, and oral hygiene.^(1,17)

Appendix 1: Revision History

Revision Date	Document Section	Description of Revision
November 2021	General	<ul style="list-style-type: none"> Updated Template Diagnosis and Treatment moved to Epidemiology Updated web links
	Reporting	<ul style="list-style-type: none"> Added a bullet on outbreak reporting
	Management of Case and Contacts	<ul style="list-style-type: none"> Specified where terminology is SSO and included information in tables Updated Exclusions to align with decisions agreed to in Enteric Transmission Risk Assessment and Exclusion Table Re-worded to align with other enteric diseases
	Preventive Measures	<ul style="list-style-type: none"> Reworded to align with other enteric diseases

References

1. Heymann DL, editor. *Control of Communicable Diseases Manual*. 20th ed. Washington, DC: American Public Health Association; 2015.
2. Hill DR, Nash TE. *Giardia lamblia*. In: Mandell GL, Bennett J, Dolin R, editors. *Mandell, Douglas and Bennett's principles and practice of infectious diseases*. Eighth. Philadelphia, P.A.: Elsevier Sanders; 2015. p. 3154–60.
3. Public Health Agency of Canada. *Giardia Lamblia* [Internet]. 2012. Available from: www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/giardia-lamblia-eng.php
4. Wolfe MS. Giardiasis. *Clin Microbiol Rev* [Internet]. American Society for Microbiology (ASM); 1992 Jan [cited 2016 Oct 6];5(1):93–100. Available from: www.ncbi.nlm.nih.gov/pubmed/1735095
5. Tessier JL, Davies GAL. Giardiasis. *Prim Care Update Ob Gyns*. 1999;6(1):8–11.
6. Cordingley FT, Crawford GP. Giardia infection causes vitamin B12 deficiency. *Aust N Z J Med* [Internet]. 1986 Feb [cited 2016 Oct 3];16(1):78–9. Available from: www.ncbi.nlm.nih.gov/pubmed/3458451
7. Berger SA, Marr JS. *Giardia lamblia*. In: *Human parasitic diseases sourcebook*. Jones & Bartlett Pub.; 2006. p. 241–4.
8. Dizdar V, Gilja OH, Hausken T. Increased visceral sensitivity in Giardia-induced postinfectious irritable bowel syndrome and functional dyspepsia. Effect of the 5HT3-antagonist ondansetron. *Neurogastroenterol Motil* [Internet]. 2007 Dec [cited 2016 Oct 3];19(12):977–82. Available from: www.ncbi.nlm.nih.gov/pubmed/17973637
9. Penrose AS, Wells E V, Aiello AE. Infectious causation of chronic disease: examining the relationship between Giardia lamblia infection and irritable bowel syndrome. *World J Gastroenterol* [Internet]. 2007 Sep 14 [cited 2016 Oct 3];13(34):4574–8. Available from: www.ncbi.nlm.nih.gov/pubmed/17729408
10. Pettoello Mantovani M, Guandalini S, Ecuba P, Corvino C, di Martino L. Lactose malabsorption in children with symptomatic Giardia lamblia infection: feasibility of yogurt supplementation. *J Pediatr Gastroenterol Nutr* [Internet]. 1989 Oct [cited 2016 Oct 3];9(3):295–300. Available from: www.ncbi.nlm.nih.gov/pubmed/2614615
11. Wolfe MS. Giardiasis. *JAMA* [Internet]. 1975 Sep 29 [cited 2016 Oct 3];233(13):1362–5. Available from: www.ncbi.nlm.nih.gov/pubmed/1174208
12. Vega-Franco L, Meza C, Romero JL, Alanis SE, Meijerink J. Breath hydrogen test in children with giardiasis. *J Pediatr Gastroenterol Nutr* [Internet]. [cited 2016 Oct 3];6(3):365–8. Available from: www.ncbi.nlm.nih.gov/pubmed/3430245
13. Hanevik K, Wensaas K-A, Rortveit G, Eide GE, Mørch K, Langeland N. Irritable bowel syndrome and chronic fatigue 6 years after giardia infection: a controlled prospective cohort study. *Clin Infect Dis* [Internet]. 2014 Nov 15 [cited 2016 Oct 3];59(10):1394–400. Available from: www.ncbi.nlm.nih.gov/pubmed/25115874
14. Hanevik K, Dizdar V, Langeland N, Hausken T. Development of functional gastrointestinal disorders after Giardia lamblia infection. *BMC Gastroenterol* [Internet]. 2009 [cited 2016 Oct 3];9:27. Available from: www.ncbi.nlm.nih.gov/pubmed/19383162
15. Halliez MCM, Buret AG. Extra-intestinal and long term consequences of Giardia duodenalis infections. *World J Gastroenterol* [Internet]. Baishideng Publishing Group Inc; 2013 Dec 21 [cited 2016 Oct 6];19(47):8974–85. Available from: www.ncbi.nlm.nih.gov/pubmed/24379622
16. Kiser JD, Paulson CP, Brown C. Clinical inquiries. What's the most effective treatment for giardiasis? *J Fam Pract* [Internet]. 2008 Apr [cited 2016 Oct 3];57(4):270–2. Available from: www.ncbi.nlm.nih.gov/pubmed/18394362
17. American Academy of Pediatrics. *Giardia intestinalis Infections*. In: Kimberlin D, Brady M, Jackson M, Long S, editors. *Red Book: 2015 Report of the Committee on Infectious Diseases*. 30th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2015. p. 353–5.
18. Olson ME, O'Handley RM, Ralston BJ, McAllister TA, Thompson RCA. Update on Cryptosporidium and Giardia infections in cattle. *Trends Parasitol* [Internet]. 2004 Apr [cited 2016 Oct 3];20(4):185–91. Available from:

www.ncbi.nlm.nih.gov/pubmed/15099558

19. Rendtorff RC. The experimental transmission of human intestinal protozoan parasites. II. Giardia lamblia cysts given in capsules. Am J Hyg [Internet]. 1954 Mar [cited 2016 Oct 3];59(2):209–20. Available from: www.ncbi.nlm.nih.gov/pubmed/13138586
20. Danciger M, Lopez M. Numbers of Giardia in the feces of infected children. Am J Trop Med Hyg [Internet]. 1975 Mar [cited 2016 Oct 6];24(2):237–42. Available from: www.ncbi.nlm.nih.gov/pubmed/1119665
21. Huang DB, White AC. An updated review on Cryptosporidium and Giardia. Gastroenterol Clin North Am [Internet]. 2006 Jun [cited 2016 Oct 3];35(2):291–314, viii. Available from: www.ncbi.nlm.nih.gov/pubmed/16880067
22. Auerbach PS. Wilderness medicine. Elsevier/Mosby; 2012.
23. Esfandiari A, Jordan WC, Brown CP. Prevalence of enteric parasitic infection among HIV-infected attendees of an inner city AIDS clinic. Cell Mol Biol (Noisy-le-grand) [Internet]. 1995 [cited 2016 Oct 3];41 Suppl 1:S19-23. Available from: www.ncbi.nlm.nih.gov/pubmed/8574144
24. Overturf GD. Endemic giardiasis in the United States--role of the daycare center. Clin Infect Dis [Internet]. 1994 May [cited 2016 Oct 3];18(5):764–5. Available from: www.ncbi.nlm.nih.gov/pubmed/8075267
25. Alberta Health. Communicable Disease Reporting System (CDRS). Edmonton, AB; 2017.