

More (than you want to know) About Waterborne Diseases

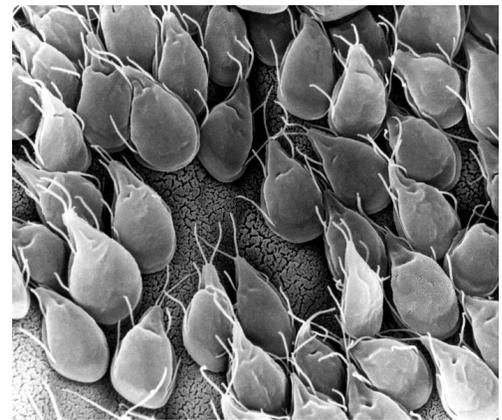
Parasites

- Very common in BC surface waters, sometimes in high concentrations, especially with spring runoff.
- Size: 5 – 14 microns (0.005 – 0.014 millimeter)
- Form tough spores (cysts) that can survive for a long time in harsh conditions.
- Less than 10 cysts can cause infection.
- Create a new generation each 5 to 14 hours: a 16 to 500 times increase in 48 hours.
- How long until I get sick? 2 to 25 days
- How long does illness last? 2 weeks to months; chronic infections can last months to years.
- How long am I contagious?
 - For about a month or as long as you are carrying the parasite in your system.
 - In cool climates 2-10% of adults and 25% of children may be carriers without symptoms.
 - Some patients (e.g., children) suffer recurring bouts of the disease, which may continue for months or years.

“Giardia” *Giardia lamblia*

i. Life cycle:

- When cysts are swallowed, each one releases four free-swimming parasites.
- These attach to the walls of the small intestine using a suction disc (cystostome), where they feed on membrane secretions.
- The parasites multiply quickly, causing severe inflammation of the gut.
- When fully mature, each parasite can either form a cyst ready to create 4 new individuals in the next host or split into two free-swimming individuals.



Giardia attached to walls of intestine

<https://sites.google.com/site/russiabioli/diseases-to-be-aware-of/giardia>

ii. Symptoms:

- In otherwise healthy individuals:
 - Only about 40% of people who are infected show symptoms; the rest become silent carriers.
 - Abdominal pain, nausea, chills, low grade fever, and watery diarrhea.
 - Diarrhea is often explosive with a foul smell.
- Can be treated with antibiotics (usually Metronidazole).
- Symptoms can last months to years after infection is gone.

“Crypto” *Cryptosporidium parvum*

i. *Life cycle:*

- When cysts are swallowed, they release the free-swimming stage (sporozoite) which then attacks the walls of the stomach and intestines.
- Once it has invaded a cell, the parasite develops into its mature feeding form (trophozoite).
- The parasite then goes through two reproductive stages:
 - First it creates clones of itself that burst from the cell as free-swimming creatures.
 - These either infect new cells or interact sexually to create two types of cysts:
 - i. Thin-walled ones that re-invade the tissues
 - ii. Thick-walled ones that are excreted by the millions to wait until they are swallowed by a new host.



Free-swimming Cryptosporidia sporozites being released from cyst

ii. *Symptoms:*

- In otherwise healthy individuals:
 - Abdominal pain and watery diarrhea for about two weeks
 - Some immunity can remain after infection clears (32-58% of adults have antibodies)
- In at-risk populations (*see introduction, page 1*):
 - Cryptosporidiosis is often incurable.
 - Symptoms may get worse or recur if the immune system gets weaker.
 - Diarrhea can be severe.
 - Patients often need IV support because of dehydration and inability to absorb nutrients.
 - Often the disease is irreversible, leading to the death of the patient.
- **There is no treatment that can remove this parasite from the body; the immune system must remove it on its own**

Coming soon:

Drinking Water Safety Part 3: Waterborne Diseases: Bacteria in our water