Introduction

Cryptosporidium parvum (Crypto), Cyclospora, and Giardia lamblia (Giardia) are three parasites most commonly associated with water. However, they have been known to contaminate foods and cause illness if those foods are eaten raw. Of the three parasites, the least is known about Cyclospora. When consumed, all three parasites establish themselves in the intestinal tract of the people or animals that consume them, resulting in illness. Transmission of these parasites occurs when food or water has been contaminated with the fecal matter of an animal or human that is infected with the parasite. Avoiding water from unknown sources and safe handling of food will prevent infection from all three of these organisms.

What is a parasite?

A parasite is an organism that needs another living organism or host in order to stay alive. Crypto, Cyclospora, and Giardia need a human or animal host to stay alive and to reproduce. However, all three parasites are able to live outside of a host for a period of 2–6 months at a time depending on the environmental conditions.

Public health consequences

Parasitic diseases are not common in the United States. Of the 304,057 reported disease cases in the United States for 2009, parasitic diseases made up less than 10%. Bacterial infections such as Salmonella caused up to 16% of all reported disease. Giardiasis is the most commonly reported parasitic illness in the United States. Children under the age of 5 who are in daycare environments are most affected. The table below indicates that parasitic diseases occur most frequently in the warmer months. This is the time when people are outside taking part in recreational activities such as swimming, hiking, and camping, and therefore, most at-risk for being exposed to contaminated water sources.

Susceptible groups

Everybody is susceptible to illness caused by parasites. Children are at the greatest risk, but those individuals who are immune-compromised as a result of a chronic illness or transplants and/or pregnancy face considerable risk as well.

<table>
<thead>
<tr>
<th>Parasite: Disease</th>
<th>Number of cases in the United States</th>
<th>Number of cases in Ohio</th>
<th>Population most at risk</th>
<th>Months of highest reported cases</th>
<th>Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptosporidium: Cryptosporidiosis</td>
<td>7,654</td>
<td>2.5%</td>
<td>384</td>
<td>3.3%</td>
<td>Children under the age of 9</td>
</tr>
<tr>
<td>Cyclospora: Cyclosporiasis</td>
<td>141</td>
<td>&lt; 1%</td>
<td>0</td>
<td>0.0%</td>
<td>Adults 40 and above</td>
</tr>
<tr>
<td>Giardia: Giardiasis</td>
<td>19,399</td>
<td>6.3%</td>
<td>806</td>
<td>7.0%</td>
<td>Children under the age of 5 and in daycare centers</td>
</tr>
</tbody>
</table>

CDC's MMWR: Summary of notifiable diseases—United States 2009
Symptoms of illness

All three parasites produce similar symptoms with diarrhea being the most common symptom. The diarrhea can be fatty and loose, such as the case with *Giardia*, or very watery, which is typical of a Crypto or *Cyclospora* infection. The diarrhea is often accompanied with abdominal cramps that can become severe, gas, and nausea. Fever may accompany a *Cyclospora* infection. In severe cases of an infection, dehydration and weight loss will occur. Symptoms will present 1 to 2 weeks after ingestion and may persist for a week in the instance of Crypto and *Cyclospora*, or 2–6 weeks if infected with *Giardia*. Individuals who are immune-compromised are not only at greater risk for infections by parasites, but they are at greater risk for experiencing extreme symptoms that can result in hospitalization or death.

There are a number of organisms that can make people sick. It is not possible to determine which pathogen is causing the problem based on symptoms alone. Individuals suffering from serious illness should seek appropriate medical advice.

Treatment

People with healthy immune systems are usually able to clear an infection without medical help. However, there are medications that will treat both Crypto and *Giardia* effectively. If you think you have symptoms of a parasitic infection, be sure to tell your physician about your outdoor water-related activities over the previous month and about recently consumed raw fruits and vegetables.

Pathogen control

These parasites are not effectively controlled by chlorination or other disinfectants. Chlorine used to kill bacteria in municipal water is not added at a sufficient concentration or for a sufficient length of time to kill chlorine-resistant *Giardia*, Crypto, and *Cyclospora*. Water filtration is the current practice for controlling these parasites; therefore, municipal programs for clean water are essential for protection. When municipal water is not available, boiling for at least 1 minute is an effective method of controlling these parasites in the water supply.

Tips to avoid parasitic infections

Some steps to take to protect you from these parasites:
- Wash your hands with soap and warm water.
- Drink water from safe sources such as municipal water.
- Wash all raw fruits and vegetables under running water from a safe source.
- If possible, use a vegetable brush to scrub the outside of fruits and vegetables.
- If camping/hiking and safe water is not available, boil water for 1 minute before drinking.
- When swimming try not to swallow the water.
- When drinking milk and juice, use only pasteurized products.
- Be aware of public boil alerts and follow the recommendations.

References


Written by Janet Buffer, Michele Williams, Lydia Medeiros, and Jeffery LeJeune.