Cryptosporidiosis

Case Definition

**Confirmed Case**
Laboratory confirmation of infection with or without clinical illness\(^{(A)}\) from an appropriate clinical specimen (e.g., stool, intestinal fluid or small bowel biopsy):
- Demonstration of *Cryptosporidium* oocysts
- Detection of *Cryptosporidium* nucleic acid (e.g., PCR) in an appropriate clinical specimen
- Detection of *Cryptosporidium* antigen by an approved method (e.g., EIA).

*This probable case definition is provided as a guideline to assist with case finding and public health management, and should not be reported to Alberta Health.*

**Probable Case**\(^{*}\)
Clinical illness\(^{(A)}\) in a person who is epidemiologically linked to a confirmed case.

\(^{(A)}\) Clinical illness is characterized by diarrhea (often profuse and watery) and abdominal cramps with or without loss of appetite, low grade fever, nausea, general malaise and vomiting. The illness may be prolonged in severely immunocompromised persons.
Reporting Requirements

1. **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 cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).

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

3. **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 cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
   - For out-of-province and out-of-country cases, 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.
Etiology
Cryptosporidium parvum is an intracellular protozoan parasite. A ubiquitous pathogen, it is one of both medical and veterinary importance. Cryptosporidium parvum is the most prevalent species causing disease in humans (1). Additional species names have been given when isolated from different hosts. It is known to infect and reproduce in the epithelial cell lining of the digestive or respiratory tracts of most vertebrates. C. parvum is a spore forming parasite. The lifecycle is completed within a single host.

Clinical Presentation
Asymptomatic infections with C. parvum are common and represent a source of infection for others. The major symptom is diarrhea, often profuse and Watery, associated with abdominal cramping. Fever, malaise, anorexia, nausea, and vomiting occur but less often. The symptoms may come and go but, in general, abate within 30 days. In children, diarrhea may be preceded by anorexia and vomiting. Immunocompromised individuals (e.g., persons with AIDS) may not be able to clear the parasite. The disease can have a prolonged and fulminant course that may lead to death.

Diagnosis
Diagnosis is made through examination of stools, intestinal fluid or small bowel biopsy for oocysts or parasitic antigens. Detection of this organism is difficult unless it is looked for specifically. It may require more than one specimen as shedding of oocysts is intermittent.

Epidemiology
Reservoir
Humans, cattle, and sheep are the principal reservoirs for Cryptosporidium. Other domestic animals including birds and reptiles, and occasionally wild animals are also reservoirs for this parasite. Fertilizing salad vegetables with manure is known to be a source of human infection.

Transmission
Transmission of Cryptosporidium is via the fecal-oral route including person to person, animal to person or environmental, especially waterborne and foodborne. Transmission between sexual partners has been reported.

The parasite infects the intestinal epithelial cells. The end result is oocysts in feces that are able to survive under adverse environmental conditions for a long period of time. The oocysts are highly resistant to chemical disinfectants used to purify drinking water. The mode of transmission of Cryptosporidium increases the risk of infection for those living in group settings, travellers to endemic areas, and immunocompromised persons. Fewer than 10 organisms can cause disease.(2)

Incubation Period
The incubation period is not precisely known. It has been suggested that one to 12 days is the likely range with an average of seven days.

Period of Communicability
Oocysts, the infectious stage of the parasite, appear at the onset of the symptoms and are infectious immediately upon excretion. The oocysts may be excreted in stool for weeks beyond the symptoms of the disease however, in most cases the shedding of C. parvum stops within two weeks. These oocysts may remain infective outside the body for two to six months in a moist environment.
Host Susceptibility
Universal susceptibility. Persons with intact immune functions usually have asymptomatic or self-limited infections. It has been estimated that 10 to 20% of AIDS patients develop *C. parvum* infection at some time during their illness and the *C. parvum* infection persists throughout.

Occurrence
General
*Cryptosporidium* is considered one of the most common enteric pathogens in humans and domestic animals worldwide. It affects all age groups. Children under six years of age, animal handlers, travellers, MSM, and close personal contacts of infected individuals (families, healthcare and daycare workers) are most likely to become infected. In developing countries the prevalence ranges from 3 to 20%. The incidence is greatest in the summer and early fall (outdoor swimming season). Outbreaks in North America and Europe have been associated with contaminated drinking water, bathing in contaminated swimming pools, waterparks and lakes, and drinking unpasteurized apple cider that had been contaminated with cow manure (1, 2). The most notable outbreak occurred in 1993 in Wisconsin. More than 400,000 people were infected. The source was a contaminated water supply (1).

Canada (3)
In 2000, 613 cases (rate 2.62/100,000) were reported. The highest incidence was in children one to four years of age followed by children aged five to nine years. Recent outbreaks and cases in Canada have been associated with swimming in and drinking contaminated pool water.

Alberta (4)
From 1997 to 2000, a total of 289 cases were reported. In 2001, 443 cases were reported in the province. This was a significant increase when compared to previous years. The increased incidence in 2001 was associated with common source outbreaks occurring in a neighbouring province (141 cases) as well as contaminated local swimming pools (5). Young children between one and 14 years of age had the highest incidence of disease (1997 to 2001). In 2002, 136 cases were reported. The number of cases continued to fall in 2003 and 2004 with 111 and 104 cases reported respectively.

Key Investigation
Single Case/Household Cluster
- Determine possible source of infection taking into consideration the incubation period, reservoir, and mode of transmission. Assessment may include:
  - determining contact with cattle, sheep, or other domestic animals,
  - determining recent visits to farms or petting zoos,
  - determining consumption of contaminated food or water, or other drink including unpasteurized milk,
  - obtaining a food history,
  - identifying recent exposure to recreational water (treated or untreated),
  - determining history of high risk sexual practices, especially contact with feces, and
  - identifying history of recent travel.
- Assess for history of residing in areas with poor sanitation including improper water treatment and sewage disposal and include recent immigration.
- Assess for history of daycare or institutional exposure.
- Assess for history of similar symptoms in other members of the household.
- Suspected contaminated food may be held to prevent of consumption.
Suspected contaminated food may be destroyed.

Identify contacts. Contacts include:
  o persons living in the household,
  o children and childcare workers in a daycare/dayhome, and
  o individuals exposed to the same source (if it is identified).

Control

Management of a Case

- All cases should be instructed about disease transmission, appropriate personal hygiene, routine practices, and contact precautions.
- Exclusion should be considered for symptomatic persons who are:
  o food handlers whose work involves
    ▪ touching unwrapped food to be consumed raw or without further cooking and/or
    ▪ handling equipment or utensils that touch unwrapped food to be consumed raw or without further cooking,
  o healthcare, daycare or other staff who have contact through serving food, with highly susceptible patients or persons, in whom an intestinal infection would have particularly serious consequences,
  o involved in patient care or care of young children, elderly or dependent persons,
  o children attending daycares or similar facilities who are diapered or unable to implement good standards of personal hygiene, and
  o older children or adults who are unable to implement good standards of personal hygiene (e.g., mentally or physically challenged).
- Exclusion applies until at least 48 hours after normal stools have resumed.
- Asymptomatic individuals who are included in the above categories are generally not excluded from work or daycare. However, the decision to exclude will be made by the MOH.
- Reassignment to a low risk area may be used as an alternative to exclusion.
- When possible, people taking immunosuppressive therapy are advised to reduce or stop under the guidance of an infectious diseases physician.
- Contact precautions should be used in healthcare settings where children or adults have poor hygiene or incontinence that cannot be contained. Otherwise, routine practices are adequate.

Treatment of a Case

- In most cases, cryptosporidiosis is a self-limited disease.
- There is no treatment of known value. For chronic cases, consultation with an infectious diseases physician who may consider experimental or unproven therapies is recommended.
- Rehydration and electrolyte replacement if indicated.

Management of Contacts

- Contacts should be instructed in disease transmission, appropriate personal hygiene, routine practices, and contact precautions.
- Symptomatic contacts should be assessed by a physician.
- Contacts who are symptomatic may be excluded from daycare or similar facilities or occupations involving food handling, patient care or care of young, elderly or dependent persons as per MOH assessment.
- Asymptomatic contacts, in general, are not excluded from work or daycare.
Preventive Measures (6)

- Educate members of the public about personal hygiene, especially the sanitary disposal of feces and careful hand washing after defecation and sexual contact, and before preparing or eating food.
- Provide education to food handlers about proper food and equipment handling and hygiene, especially in avoiding cross-contamination from raw meat products, and thorough hand washing.
- Advise infected individuals to avoid food preparation.
- Educate about the risk of sexual practices that permit fecal-oral contact.
  - Educate about condom use for safer sex.
- Test private water supplies for presence of parasitic contamination, if suspected.
- Encourage hand washing after any animal contact including pets, especially those in contact with calves and other animals with diarrhea.
- Advise infected individuals to not use public recreational water (e.g., pools, lakes, ponds) for two weeks after the symptoms resolve.
References


