

## What Are *Cryptosporidium*?

- ▶ *Cryptosporidium*, or “crypto” for short, are a group of single-celled intestinal parasites of animals and humans that cause the disease cryptosporidiosis. The most common clinical sign of this condition is diarrhea.
- ▶ Animals and humans can also be infected with *Cryptosporidium* without developing any illness, but the parasite can still be found in their stool.
- ▶ There are many species of *Cryptosporidium*. Some only seem to infect a certain species or group of animals, like birds and lizards, but not people. Others, like *C. parvum*, can infect people and many animal species. For others, it remains unclear if they can naturally infect people or animals other than the species in which they were originally found.
- ▶ The most common species of *Cryptosporidium* in people are *C. hominis*, *C. parvum*, *C. meleagridis*, *C. felis* and *C. canis*. These species are most commonly found in people, cattle, turkeys, cats and dogs, respectively.
- ▶ In North America, outbreaks of cryptosporidiosis have been associated with stool contamination of water supplies, but this only accounts for 10% of cases reported in the USA. The rest of the cases occur sporadically. The source of infection in these sporadic cases is usually unknown, but transmission from animals, particularly *C. parvum* from young cattle (calves), is sometimes suspected.
- ▶ The degree of risk of transmission of *Cryptosporidium* from pets is still unknown, but the potential exists. Taking a few simple steps can help reduce the risk that you will get *Cryptosporidium* from your pet.



## How Common Are *Cryptosporidium*?

### Humans



- ▶ In North America, 0.6% to 4.3% of the population may be shedding *Cryptosporidium* in their stool at any given time, but there is evidence that 15-32% of the population has been exposed to the parasite. It is much more common in developing countries.
  - ▶ In 2004, 571 cases of cryptosporidiosis were reported in Canada, with 298 cases in Ontario. The disease is likely under-reported because the diarrhea usually resolves without treatment.
  - ▶ People who have contact with infected animals (particularly calves) or individuals, visit farms, swallow contaminated recreational (e.g. swimming) or drinking water, and travel to developing countries where *Cryptosporidium* is more common are at higher risk for infection.
  - ▶ Cryptosporidiosis is also more common in immunocompromised individuals (e.g. HIV/AIDS, cancer and transplant patients), and children under two years old or in daycare centres.
- ▶ In general, **contact with pets is not associated with the risk of cryptosporidiosis**, even in HIV patients.

### Animals

- ▶ Depending where they live, between 1.3-14.7% of cats in the USA have been exposed to *Cryptosporidium*; this is more common in outdoor cats.
- ▶ Generally, only a small percentage (less than 4%) of cats and dogs in the USA pass *Cryptosporidium* in their stool. But depending on the group of animals tested, this proportion can range from 0-45%. **Young animals are more susceptible** than adults.
- ▶ In one study, 7.4% of dogs and 7.3% of cats in the Niagara region of Ontario had some evidence of *Cryptosporidium* in their stool, but not necessarily live parasites.



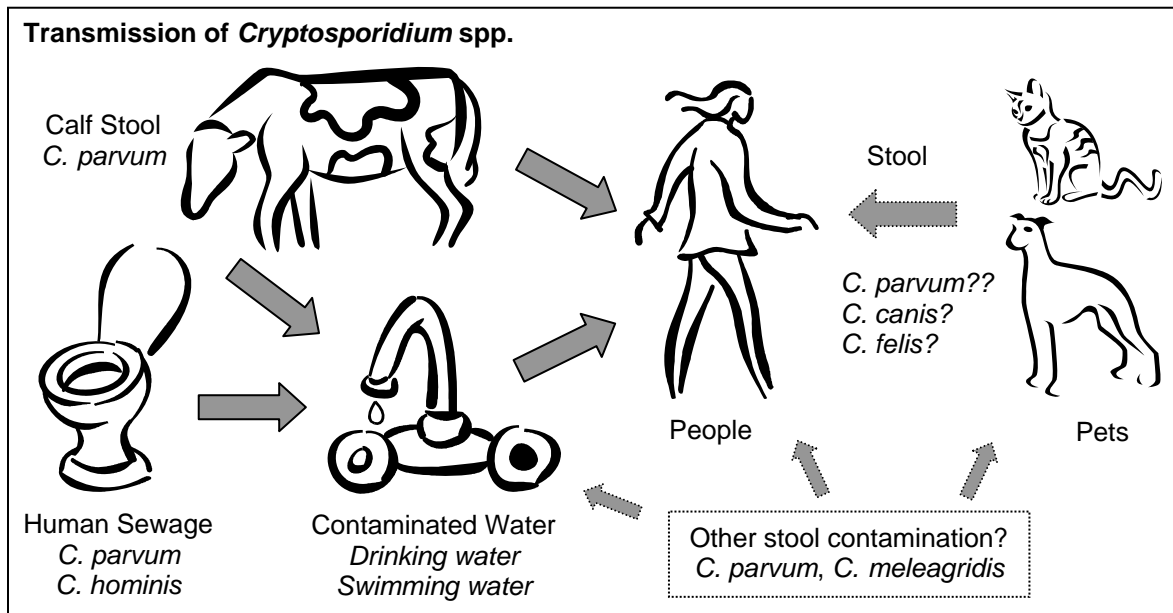
## How Do *Cryptosporidium* Spread?

- ▶ In most animal species and people, *Cryptosporidium* lives in the small intestine. Infected individuals pass a form of the parasite called an oocyst in their stool. The oocysts can immediately infect the next susceptible person or animal that swallows them. This usually happens when there is stool contamination of the hands, face, food or water. **Just ten *Cryptosporidium* oocysts can make a person sick.** An infected person may shed up to a billion oocysts per day, so very little stool contamination can result in transmission.
- ▶ ***Cryptosporidium* oocysts are very resistant to almost all disinfectants**, and they are very small so they are even difficult to filter out of water. Even steam, freezing and thawing, and drying may not be entirely effective at killing oocysts. Prolonged contact with high concentrations of ammonia or chlorine, or boiling water vigorously for at least one minute will kill oocysts. Because oocysts are so hard to kill, **the best thing to do is prevent stool contamination** of hands, food, water and the environment in the first place.



## Can I Get “Crypto” From My Pet?

- ▶ **Maybe.** The most common species of *Cryptosporidium* in humans is *C. hominis*, which appears to almost exclusively infect people only. The next most common species is *C. parvum*. **Cattle are the primary source of *C. parvum*, and this species is clearly a zoonotic risk.** But because humans can carry both *C. hominis* and *C. parvum*, the source of *C. parvum* in human cases could be infected cattle or other infected people. Dogs, cats, sheep, goats, horses and rodents can also carry *C. parvum*, but it is unknown how common this is. However, if infected, these animals could potentially transmit *C. parvum* to people.
- ▶ The question is what is the risk of getting sick from other species of *Cryptosporidium* carried by dogs, cats and other pets? The dog-adapted species, *C. canis*, has been reported in a few healthy individuals but it did not cause diarrhea. The cat-adapted species, *C. felis*, has been reported to cause diarrhea in a small number of both healthy and immunocompromised individuals. Transmission from cats and dogs is therefore possible, but very uncommon. Human infections with *Cryptosporidium* species from other kinds of pets are extremely rare.



## How Do I Know If My Pet Or I Have *Cryptosporidium*?



- ▶ It is possible for humans and pets to have *Cryptosporidium* without being sick at all.
  - This is very common in cats and dogs. In fact it is debated whether or not the parasite can cause diarrhea in a cat or dog that is not sick for another reason.
- ▶ If a person or an animal gets sick, they usually get diarrhea, which may be very watery. In people this tends to occur 5-7 days after being infected, and may last 2-26 days.
- ▶ Illness is more likely and usually worse if the person or animal has a weakened immune system due to another infection or medical treatment. In some cases, such as HIV/AIDS patients, the infection can even be fatal, but such severe disease is much less common now due to modern HIV therapies.

*C. parvum* is an important cause of diarrhea in dairy calves, but calves can also be infected without being sick.

## How Is Cryptosporidiosis Diagnosed And Treated?

- ▶ Cryptosporidiosis is typically diagnosed by finding oocysts in a stool sample using a microscope and special stains. But molecular/DNA-based tests are needed to tell most *Cryptosporidium* species apart. These tests are not typically performed for sporadic cases of cryptosporidiosis.
- ▶ **Most infections resolve without specific treatment** in otherwise healthy animals and people, and individuals recover completely. But if diarrhea is severe, intravenous fluids may be needed to prevent dehydration.
- ▶ Antibiotics are sometimes prescribed for very severe cases or immunocompromised patients, but there is currently *no known drug that is consistently effective for specific treatment of cryptosporidiosis*.
- ▶ There is no vaccine available for *Cryptosporidium* in people or in animals.

Testing drinking water for *Cryptosporidium* can be difficult, time-consuming and expensive. It typically involves passing large volumes of water through special filters in order to capture any oocysts.



## Infection Control

Basic infection control measures such as good hand hygiene, avoiding contact with stool and preventing stool contamination of the environment are the primary means of preventing cryptosporidiosis. These measures are especially important for immunocompromised individuals.

**Wash your hands** with soap and water, as alcohol-based hand sanitizers are not effective against *Cryptosporidium*:

- After handling any animal and especially after handling animal stool.
- After changing a child's diaper or using the bathroom.
- Before handling any food.



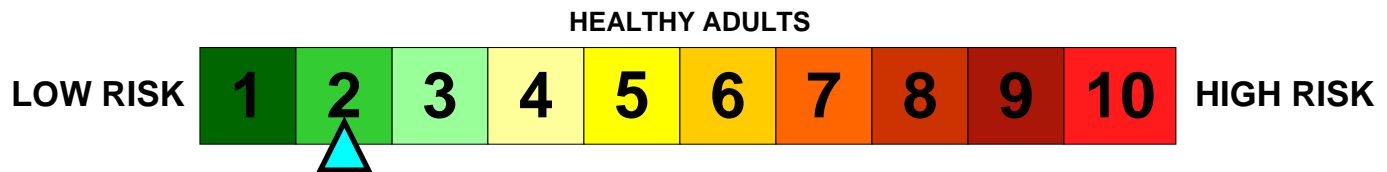
### At Home & In Public:

- Do not go swimming if you have, or have very recently had, diarrhea.
- Take children for frequent bathroom breaks/diaper checks when at public swimming venues. Change diapers in the bathroom, not poolside.
- Avoid drinking untreated water from open water sources (e.g. lakes, ponds, streams, shallow wells), or swallowing water from recreational water sources (e.g. pools)
- All fruit and vegetables should be washed with potable drinking water.



**The animals most commonly infected with a zoonotic species of *Cryptosporidium* are young calves.** Therefore hand hygiene following contact with these animals, and keeping food and drink away from areas where these animals are kept, are particularly important. Immunocompromised individuals should avoid contact with calves, whether the animals are diarrheic or not.

The zoonotic risk to the general population posed by *Cryptosporidium* in dogs and cats is:



### Individuals with Compromised Immune Systems:

- Immunocompromised individuals (e.g. HIV/AIDS, transplant or cancer patients) are more susceptible to many kinds of infections, including those which may be transmitted by pets. It can be safe and even beneficial for such a person to have a pet, if extra precautions are taken to prevent disease transmission.
- It is important for an immunocompromised person and the people around him/her to be extra diligent about avoiding direct or indirect contact with stool of any kind, especially that of young animals. In addition to the recommendations above:
  - ▶ Try to have another person clean up stool/litter boxes if possible.
  - ▶ Individuals should wear disposable gloves AND wash their hands immediately after performing one of these tasks if they must do so themselves.
  - ▶ Wash hands after working in the garden or any outdoor area where animals may have defecated.
  - ▶ Peeling and cooking vegetables in addition to washing them properly will help to further reduce the risk of contamination of food with fecal pathogens such as *Cryptosporidium*.

### Infants and Young Children:

- Young children are more likely than adults to extensively handle animals if given the opportunity. Children are also more likely to touch their faces or mouths, and are less likely to wash their hands after handling any kind of animal. Many children tend to "snuggle" with animals, which can increase the risk of disease transmission.
- Young children should be supervised when playing with animals, and an adult should ensure that they wash their hands afterwards, and especially prior to handling food. Older children should be taught to do the same.

For these groups, the zoonotic risk posed by *Cryptosporidium* in dogs and cats is likely:

