



Prevalence of *Cryptosporidium* and *Giardia* In Prewaned Dairy Heifer Calves NAHMS Dairy 2014 Study Calf Component

September 2022

Information Brief

INTRODUCTION

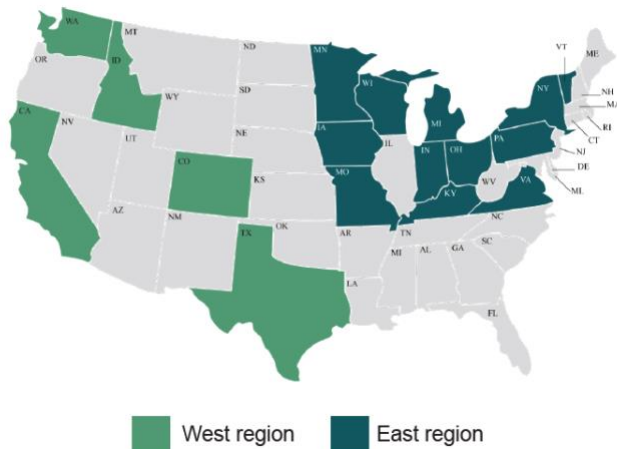
Cryptosporidium parvum and *Giardia* are parasitic protozoa that commonly cause diarrhea in dairy calves. Currently, no effective treatments exist for these protozoa infections in dairy calves. *Cryptosporidium* and *Giardia* are difficult to control because their oocysts can survive in the environment for months. These oocysts can be spread from animals to humans, causing diarrhea in people. However, cryptosporidiosis and giardiasis are usually self-limiting diseases in healthy humans, with supportive care being the recommended treatment. Therefore, in order to help manage calves and protect dairy calf workers, the Dairy 2014 study aimed to better understand the prevalence of *Cryptosporidium* and *Giardia* in preweaned dairy heifer calves.

NAHMS DAIRY 2014 STUDY CALF COMPONENT

U.S. Department of Agriculture’s National Animal Health Monitoring System (NAHMS) conducted the Dairy 2014 study, which collected data on dairy health and management practices from 17 of the Nation’s major dairy States (Figure 1). These States represented 80.5 percent of U.S. dairy operations and 81.3 percent of U.S. dairy cows in 2014. The Dairy 2014 study Calf Component included 104 operations in 13 of the Nation’s major dairy States.*

To estimate the prevalence of *Cryptosporidium* and *Giardia*, fecal samples were collected from 2,323 heifer calves: 326 from small operations (fewer than 100 cows); 622 from medium operations (100 to 499 cows); and 1,375 from large operations (500 or more cows). The age of calves at fecal-sample collection ranged from 3 to 66 days, with an average age of 22 days. Sample collection occurred throughout all four seasons, beginning on April 12, 2014, and ending on July 23, 2015. Samples were shipped overnight on ice to the USDA Agricultural Research Service’s Environmental Microbial and Food Safety Laboratory in Beltsville, MD. The samples were examined for *Cryptosporidium* and *Giardia* by immunofluorescence microscopy.

Figure 1. States/regions that participated in the NAHMS Dairy 2014 study



West region: California, Colorado, Idaho, Texas, Washington
East region: Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Vermont, Virginia, Wisconsin

*Idaho, Indiana, Kentucky, and Texas did not enroll calves in the calf component.

CRYPTOSPORIDIUM

Cryptosporidium parvum commonly causes diarrhea in dairy calves that are 1 to 3 weeks old. Clinical signs of *Cryptosporidium* in calves last approximately 1 to 2 weeks and include pale, yellow, or watery diarrhea; dehydration; weight loss; and decreased weight gain.¹ Although *Cryptosporidium* is not recognized as a major cause of death in calves, the clinical signs, including diarrhea and dehydration, make the disease a potential economic loss for the dairy industry.²

Currently, no effective treatments exist for *Cryptosporidium* infections in dairy calves. However, severely dehydrated calves should receive supportive care such as fluid and electrolyte therapy. In addition, calves should continue to receive milk during the course of the disease, as withholding milk can lead to death.³

Cryptosporidium oocysts can easily be spread from calf to calf and from calf to people via feces from infected animals and the environment. *Cryptosporidium* is difficult to control because its oocysts can survive in the environment for months. To help prevent infection or minimize clinical signs, calves should have a clean environment and be provided colostrum as soon as possible following birth. To minimize the spread to people, proper hygiene such as handwashing and removal of soiled clothes should be used by anyone handling calves.¹

GIARDIA

Giardia infects nearly all dairy calves but rarely causes clinical disease. When clinical disease does occur, it usually happens in calves older than 3 weeks and results in chronic infections. Clinical signs include pasty, watery, or mucus-like diarrhea, dehydration, weight loss, and decreased weight gain. Calves may also display a reduced rate of gain without a reduction in feed intake.

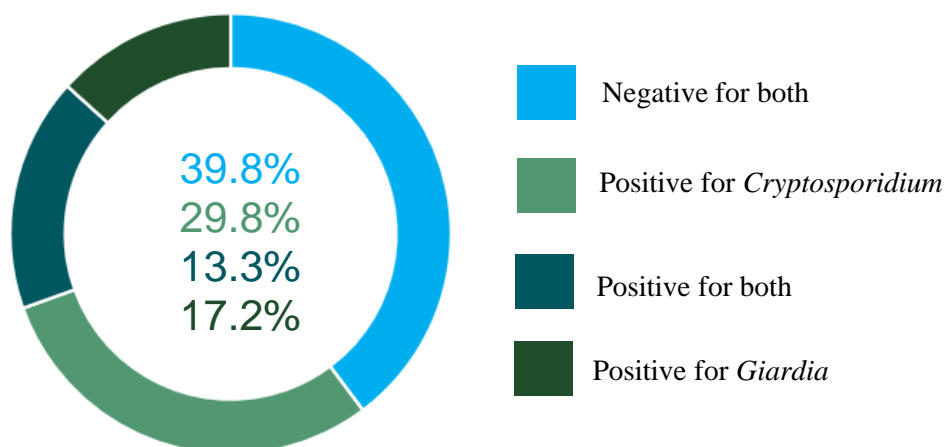
As is the case with *Cryptosporidium*, no effective treatments exist for *Giardia* infections. Infected animals, however, should receive supportive care. Fluid and electrolyte therapy should be used in severely dehydrated calves and calves should continue to receive milk.

Giardia is difficult to control for the same reasons listed for *Cryptosporidium* above. *Giardia* cysts can be spread from calf to calf and from calf to people via feces from infected animals and cysts can survive in the environment for months. . Calves should have a clean environment and be provided colostrum. To minimize the spread to people, proper hygiene such as handwashing and removal of soiled clothes should be used by anyone handling calves.¹

PREVELANCE RESULTS

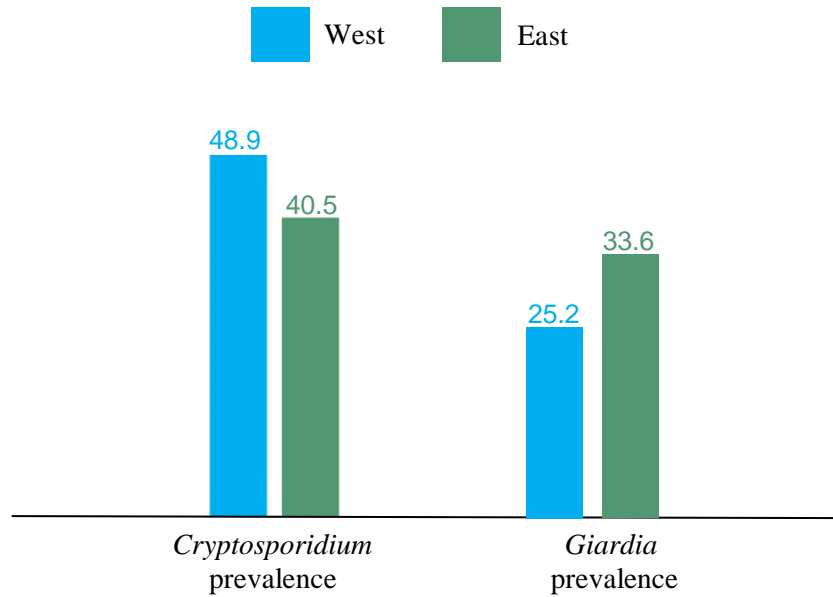
Overall, 43.1 percent of fecal samples from preweaned heifers were positive for *Cryptosporidium* and 30.5 percent were positive for *Giardia*. Of fecal-positive samples, 13.3 percent had a positive result for both *Cryptosporidium* and *Giardia* while 39.8 percent of fecal samples tested were negative for both parasites (figure 2). Almost all operations, however, had at least one sample test positive for *Cryptosporidium* and/or *Giardia* (94.2 and 99.0 percent, respectively).

Figure 2. Percentage of fecal samples from preweaned heifer calves by *Cryptosporidium* and/or *Giardia* status



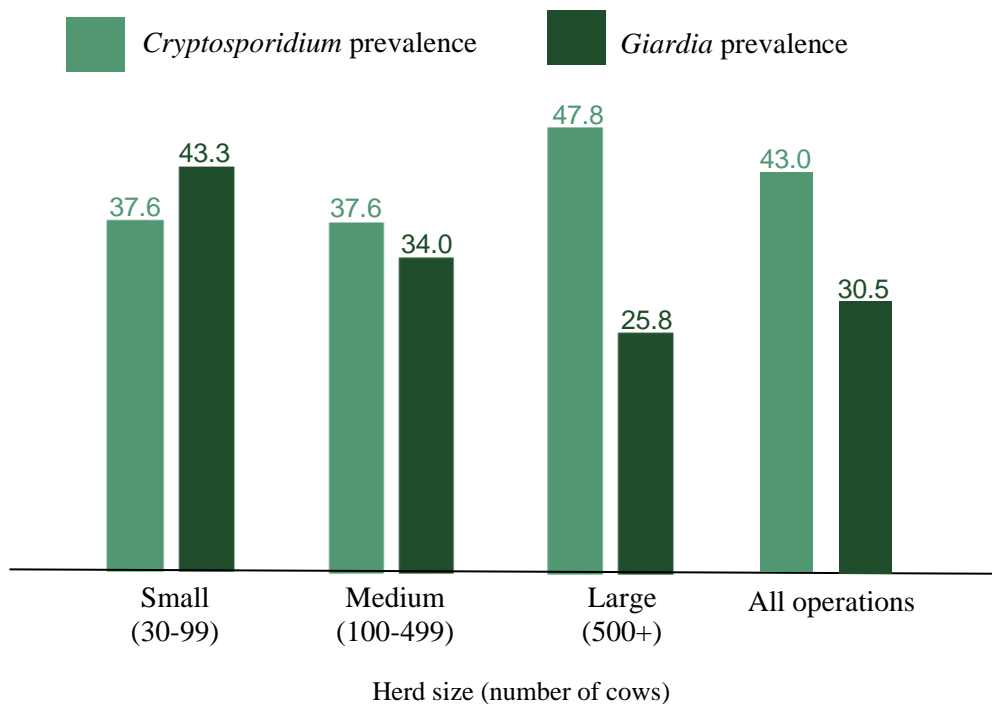
The percentage of fecal samples that tested positive for *Cryptosporidium* was slightly higher in the West region than in the East region (48.9 and 40.5 percent, respectively). Conversely, the percentage of fecal samples that tested positive for *Giardia* was higher in the East region (33.6 percent) than in the West region (25.2 percent) (figure 3).

Figure 3. Percentage of fecal samples that tested positive for *Cryptosporidium* or *Giardia* by region



A higher percentage of fecal samples from large operations (47.8 percent) tested positive for *Cryptosporidium* compared with samples from medium and small operations (37.6 and 37.6 percent, respectively). A higher percentage of fecal samples from small operations (43.3 percent) tested positive for *Giardia* compared with fecal samples from medium and large operations (34.0 and 25.8 percent, respectively) (figure 4).

Figure 4. Percentage of fecal samples that tested positive for *Cryptosporidium* or *Giardia*, by herd size (number of cows)



FACTORS ASSOCIATED WITH *CRYPTOSPORIDIUM* PREVALENCE

The following factors were associated with positive *Cryptosporidium* samples:



Herd size: Large operations had a higher *Cryptosporidium* prevalence than medium or small operations.



Calf age at fecal collection: Fecal samples from calves younger than 2 weeks old were more likely to test positive for *Cryptosporidium* than samples from older calves.



Warm weather: As the temperature and humidity index (THI) increased so did the likelihood that fecal samples would test positive for *Cryptosporidium*.

FACTORS ASSOCIATED WITH *GIARDIA* PREVALENCE

The following factors were associated with positive *Giardia* samples:



Herd size: Small operations had a higher *Giardia* prevalence than medium or small operations.



Calf age at fecal collection: Fecal samples from calves more than 2 weeks old were more likely to test positive for *Giardia* than samples from younger calves.



Warm weather: As the temperature and humidity index (THI) increased so did the likelihood that fecal samples would test positive for *Giardia*.



Serum IgG status: Fecal samples from calves with a serum IgG less than 10 g/L (failure of passive immunity) were more likely to test positive for *Giardia* than calves with serum IgG levels equal to or greater than 10 g/L.



Average daily gain: Fecal samples from calves with low average daily gain during the preweaning period were more likely to test positive for *Giardia* than calves with high average daily gain.

CONCLUSION

Cryptosporidium and *Giardia* are zoonotic protozoans commonly found in preweaned dairy heifer calves across the United States. Both protozoans cause diarrhea in calves, and supportive care is the only available treatment. Operation size, temperature and humidity index of the calves' environment during the preweaning period, serum IgG status, and average daily gain are factors related to *Cryptosporidium* and *Giardia* infections. Educating calf caretakers on personal hygiene practices and which calves are most likely to be infected can help prevent zoonotic transmission.

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