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10-1-1998

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Recommended Citation

Namminga, Kelly and Epperson, Bill, "Bovine Neonatal Cryptosporidiosis - Prevalence and Public Health Issues" (1998). *Extension Extra*. Paper 436.
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Extension Extra

ExEx 14053
October 1998
Food Safety

COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

Bovine Neonatal Cryptosporidiosis PREVALENCE AND PUBLIC HEALTH ISSUES

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Cryptosporidiosis (crypto), a disease affecting both animals and humans, is caused by the organism *Cryptosporidium*. This is not a bacteria or virus but a group of parasitic protozoans (single-celled organisms that live off other organisms). There are several species of *Cryptosporidium*, most of which infect only specific species of animals. One species – *Cryptosporidium parvum* (*C. parvum*) – is capable of infecting many mammals including humans. *Cryptosporidium parvum* causes most crypto infections in humans and mammalian species of livestock and is the primary source of crypto infections in humans. References in this publication are to *Cryptosporidium parvum*.

Transmission

Cryptosporidium infects many species of wild and domestic mammals. People who handle animals may acquire *Cryptosporidium* infection through fecal contamination. *Cryptosporidium* is transferred via the fecal-oral route (contaminated hands in contact with the mouth) by tiny oocysts (eggs) that are infective when excreted by infected animals or humans.

Cryptosporidium can be transmitted directly in four ways: from animals to animals, from animals to humans, from humans to humans, or from humans to animals (Figure 1). In addition, *Cryptosporidium* infections can occur when people drink water contaminated with fecal material or sewage that contains oocytes. Waterborne transmission of *Cryptosporidium* is an important route of human infection and can lead to large epidemics of diarrheal disease.

In outbreaks of *Cryptosporidium* traced to contaminated surface water sources (reservoirs, streams, and ponds), further investigations revealed that livestock waste might

have been the source of water contamination. However, adult cows rarely, if ever, shed *Cryptosporidium* oocytes and are not a significant threat. Rather, young, pre-weaned calves are more critical to the spread of the oocytes. Contamination from livestock waste is only speculation, as many other animals, including humans, shed *Cryptosporidium*.

Cryptosporidiosis in Calves

Cryptosporidium parvum (*C. parvum*) is a common cause of diarrhea in 5 to 15 day old calves. *Cryptosporidium* can be the sole cause or can act in combination with other organisms such as rotavirus, coronavirus and *E. coli* K99 to produce diarrhea. When acting in combination with other organisms, morbidity (illness) and mortality (death) rates increase. Nutrient malabsorption and fluid loss results from damage to intestinal cells. Dehydration causes severe illness and death. Therefore, treatment is aimed primarily at maintaining hydration and nutrition in affected calves.

Calves infected with *C. parvum* can shed up to 10 billion oocysts per day for 3 to 12 days. Oocyst shedding also can occur without any clinical signs of disease in the animals. Such heavy shedding results in a rapid increase in contamination of the calves' environment. Since infection is spread from calf to calf by oral ingestion of excreted oocysts, management practices to minimize contact with infected calves feces are important to help control of spread of disease.

There is no disinfectant that can be practically used in a farm setting to inactivate *Cryptosporidium*. To prevent the transmission of *C. parvum* and other organisms to themselves and others when handling and

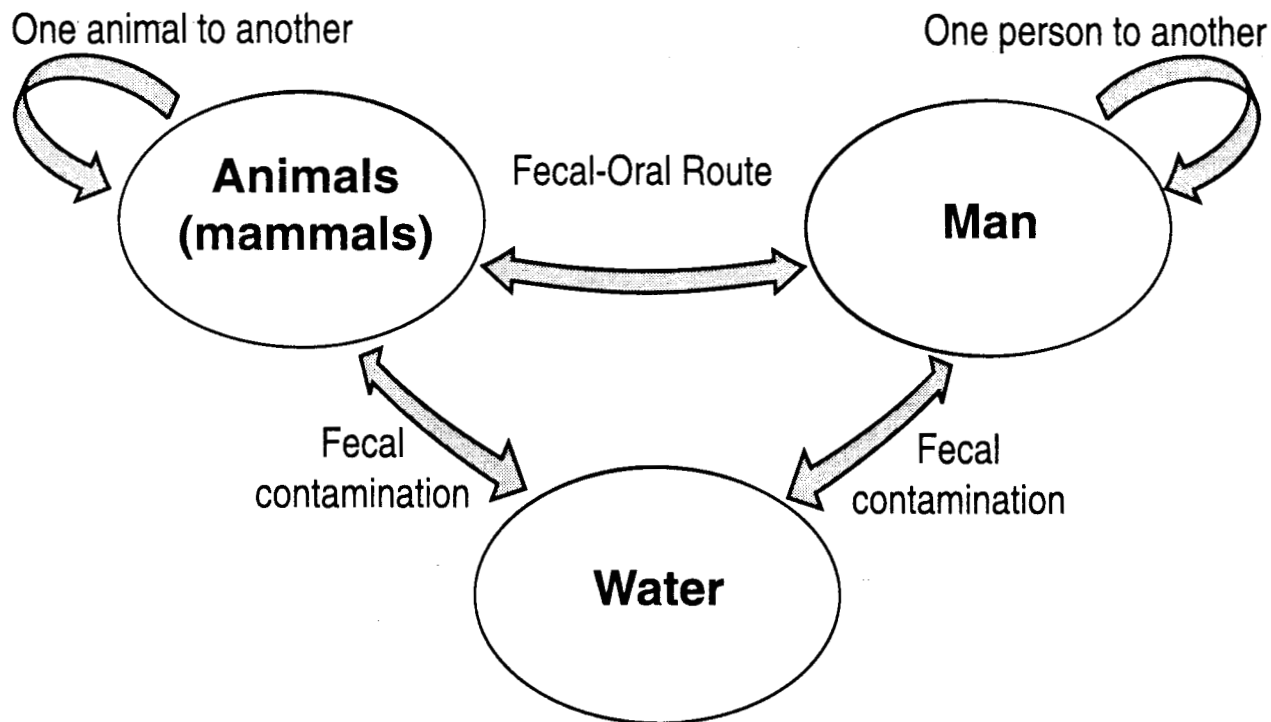


Figure 1. Modes of transmission for infection of *C. parvum*.

treating sick calves, farm families and workers need to remember to practice good personal hygiene (wash hands after contact with young animals and wash work clothing after use).

Cryptosporidium has been found to be a common organism on many dairy farms. In a study published in 1994 by the National Animal Health Monitoring System's (NAHMS) Dairy Heifer Evaluation Project, 22% of dairy calves from 0-17 weeks of age were positive for *C. parvum*. At least one positive dairy calf was found on 59% of the farms evaluated. *Cryptosporidium* prevalence was found to be higher in medium to large herds (more than 100 cows). Calves from 1-3 weeks of age were most likely to be found shedding *C. parvum*, indicating that this age of calf is most at risk of infection.

Part of another NAHMS study – the Beef Cow/Calf Health and Productivity Audit (1994) – examined beef calves. About 20% of samples from calves with diarrhea and 11% of samples from calves without diarrhea were positive for *C. parvum*. Approximately 40% of the farms submitting samples had at least one positive calf. This indicated that, similar to dairy farms, *Cryptosporidium* commonly exists on beef operations. As with dairy calves, *Cryptosporidium* shedding was higher in younger animals, and calves that shed oocysts do not always show clinical signs of disease.

***Cryptosporidium* in Feedlot and Adult Cattle**

Infections of *C. parvum* are largely confined to young calves typically about 2 weeks old. Shedding of *Cryptosporidium* has been reported in adult cattle but appears to be rare, and feed lots should not serve as a significant source of contamination. No clinical signs of diarrhea have been associated with mature cattle shedding *Cryptosporidium*. It has been hypothesized that a few cows in each herd may act as a reservoir, shedding *Cryptosporidium* at calving and infecting young calves; however, conclusive evidence of this theory is lacking.

Public Health Importance of *Cryptosporidium*

Cryptosporidium infection is of public health importance because it can infect and cause disease in humans. A common symptom of *Cryptosporidium* infection in humans is severe, watery diarrhea. Other symptoms may include nausea, abdominal cramps, and low-grade fever. Weakness and loss of appetite may occur due to associated weight loss from diarrhea. Persons most at risk for *Cryptosporidium* infections are those handling young calves and lambs, especially if the animals have diarrhea.

Since water is a possible source of *Cryptosporidium* infection, people should not drink from untreated, surface water sources. In addition, people caring for other people affected with diarrhea should use good personal hygiene (handwashing) to prevent disease transmission.

Anyone can be affected with diarrhea from *Cryptosporidium*, and typically, those affected may have diarrhea for 1-3 days. Immunocompromised individuals infected with *Cryptosporidium* experience more severe symptoms of longer duration than otherwise healthy individuals. *Cryptosporidium* can be lethal for people with AIDS.

Following infection, healthy individuals develop antibodies and become immune to *Cryptosporidium* infection. Individuals with diarrhea have a higher proportion of oocyst shedding. Estimates of shedding in the U.S. are around 0.5 to 1%, according to the Center for Disease Control (CDC).

Summary Points

- *Cryptosporidium* is common in dairy and beef calves.
- Young animals (calves and lambs) can be affected with *Cryptosporidium parvum* and shed the organism in large numbers when they have diarrhea.
- People can get *Cryptosporidium* by ingestion of oocysts (eggs). This is not uncommon in farm workers who care for sick animals.
- Water can be a source of *Cryptosporidium* infection and can lead to outbreaks in humans. People should avoid drinking untreated surface water (camping or hiking).
- Person-to-person transfer of *Cryptosporidium* occurs commonly in caregivers when they contact diarrhetic feces.

*This publication was produced with funding from the USDA-CSREES project:
The National Support and Coordination of CES Food Handler Education Programs.
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ExEx 14053: 150 copies printed by CES at a cost of 6 cents each. October 1998. pdf December 2002.