

Outbreak of Cryptosporidiosis among Responders to a Rollover Accident of a Truck Carrying Holstein Calves — Thomas County, April 2013



Background

On April 3, 2013 at 3:00 pm, the Thomas County Health Department (TCHD) notified the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) of two lab-confirmed cases of cryptosporidiosis among individuals who responded to a truck rollover accident during a snowstorm near Colby, Kansas on March 10, 2013. The truck was carrying approximately 350 Holstein steer calves that were younger than ten days old. An outbreak investigation was initiated by KDHE at 3:15 pm on April 3 in order to determine the cause and scope of illness and to understand risk factors for infection.

Methods

KDHE conducted a retrospective cohort study. Persons who responded to the incident were identified and questionnaires were administered by phone. During interviews, demographic and clinical information was collected, and accident response and exposure activities were identified. Potential exposures assessed for association with illness included carrying calves during the response, reporting coming into contact with fecal matter from calves, having anything to eat or drink at the accident scene, or returning to a location that did not have electricity following the response. A case was defined as an accident responder who experienced diarrhea (3 or more loose stools in a 24-hour period) and one or more of the following in the ten days following the accident: abdominal cramping, vomiting, or anorexia.

Analysis was conducted using SAS® 9.2. Relative risks (RR) and 95% confident intervals were calculated to assess the association between exposures and subsequent illness.

Results

Fifteen people participated in the response to this accident; all were interviewed. Six (40%) respondents were ill and all met the case definition. All ill individuals were male and ranged in age from 17 to 34 years (median: 29 years). The most common symptoms were diarrhea (100%), abdominal cramping (83%), anorexia (83%), and weight loss (83%) [Table 1]. Five (83%) individuals sought medical care; of these, two people submitted stool specimens which tested positive for *Cryptosporidium*. The incubation period ranged from six to eight days (median: seven days) [Figure 1]. Among the four individuals whose illness had resolved by the time of interview, duration ranged from seven to thirteen days (median: nine days).

Table 1: Symptoms Reported Among Cases (n=6)

Symptom	# of Cases	% of Cases
Diarrhea	6	100%
Abdominal Cramping	5	83%
Anorexia	5	83%
Weight Loss	5	83%
Nausea	4	67%
Fever	4	67%
Chills	4	67%
Myalgia	3	50%
Bloody Stool	1	17%
Vomiting	1	17%

On March 10, 2013 at 5:20 a.m., a truck overturned in a snowstorm carrying approximately 350 Holstein steer calves fewer than ten days of age. Many calves died as a result of the accident; many others became scattered around the area outside of the truck. City police officers and county Sheriff's deputies responded to the accident; they conducted traffic control and scene security, then contacted towing company employees and civilian volunteers with horses and cattle trailers to assist with righting the truck and securing the cattle. From about 6:00 a.m. until 2:00 p.m., volunteers and towing company employees worked to find, herd, and carry live calves onto cattle trailers at the scene of the accident. Most of the calves were reportedly experiencing scours, or diarrheal symptoms, at the time. Due to the very young age of the calves and the injuries and stress resulting from the accident, most calves were unable to walk onto the trailers and had to be carried by the responders. Deceased calves were loaded into the wrecked truck, which was righted and towed to the local sale barn. The next day, towing company employees loaded those calves onto another truck to be sent to a plant for rendering. A timeline of events can be seen in Figure 2.

Figure 1: Illness Onset Dates by Number of Cases

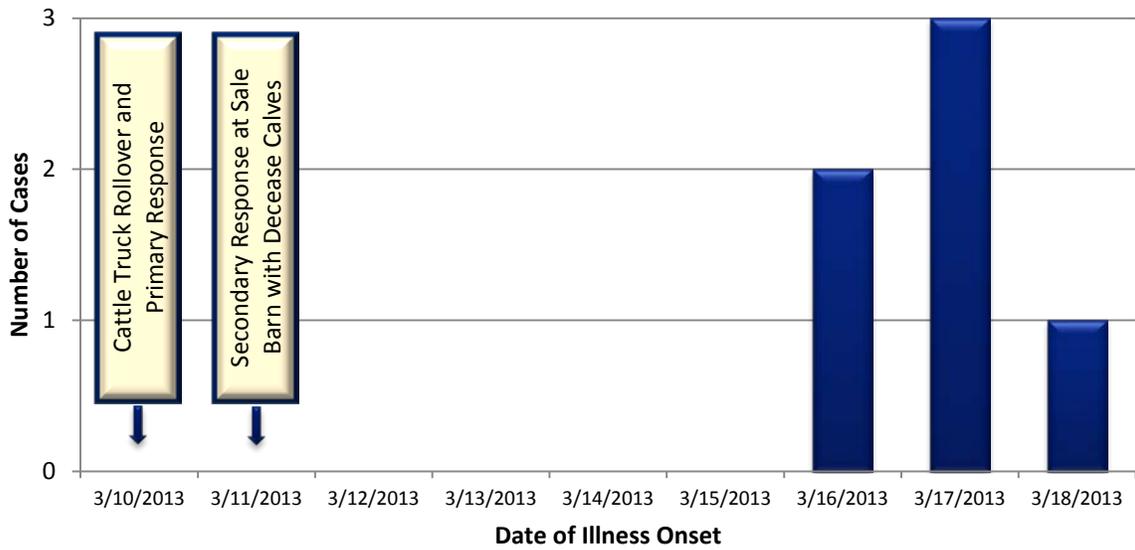
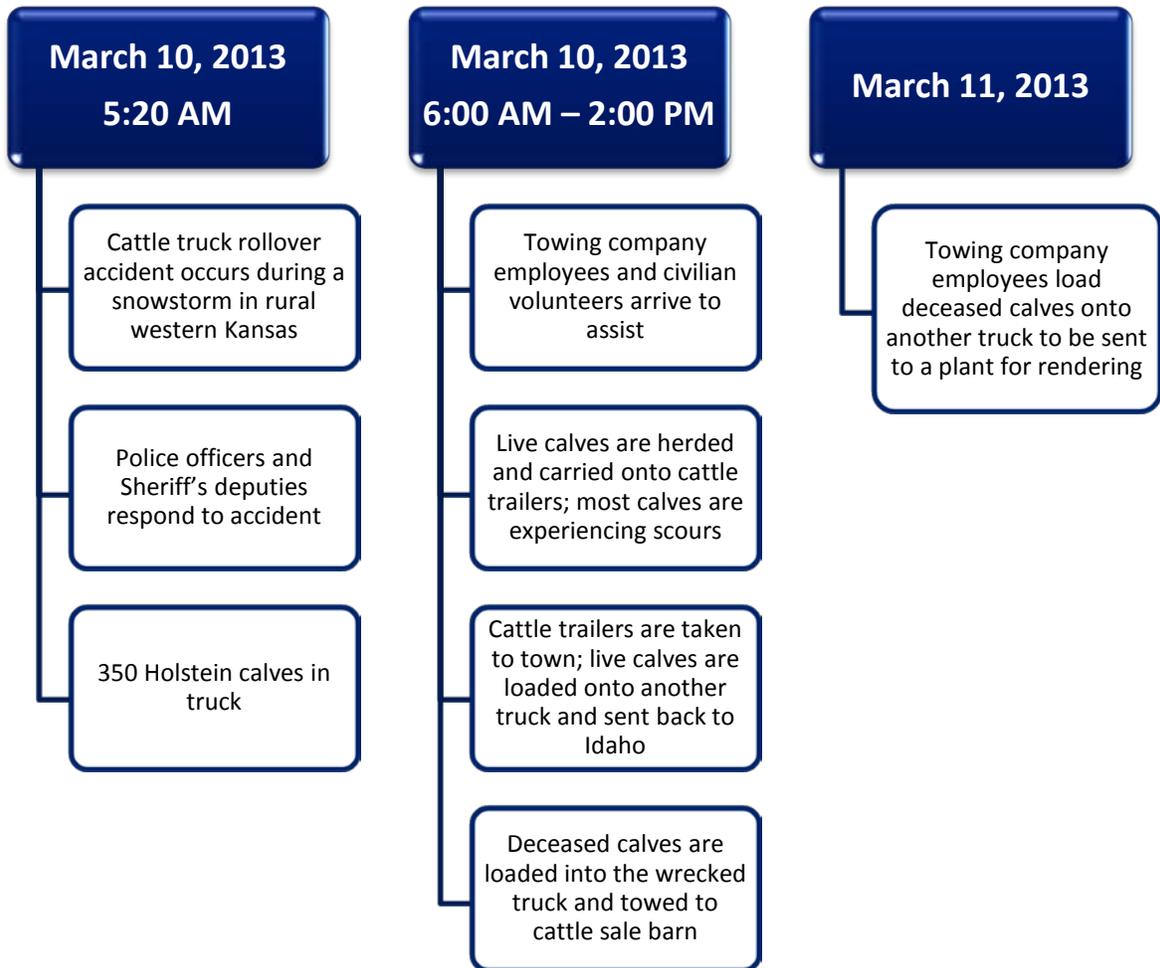


Figure 2: Timeline of Events



Individuals who reported carrying calves were 3.0 times more likely to have become ill than those who did not handle calves. Those who reported having come into contact with calf feces were 4.5 times more likely to have become ill than those who did not report contact with fecal matter [Table 2]. No respondent reported eating any foods during the response; all beverages consumed were contained in sealable plastic bottles and having anything to drink during the response was not significantly associated with illness. Due to weather conditions, some of the area near the accident site did not have electricity; whether an individual returned to a location without power was not significantly associated with illness.

Table 2: Exposure Information

Exposure	Relative Risk	95% CI	Fisher's p-value
Carried calves	3.0	1.2 – 7.6	0.028*
Contact with fecal matter	4.5	1.3 – 15.3	0.007*
Location without power	4.5	0.6 – 33.7	0.235
Drink during response	2.5	0.9 – 6.7	0.119

Discussion

This cryptosporidiosis outbreak was associated with handling young Holstein calves during the response to a tractor-trailer rollover. Cryptosporidiosis is a gastrointestinal disease caused by the parasitic protozoan *Cryptosporidium* which is spread through fecal-oral transmission. The disease is characterized by watery diarrhea and also commonly causes stomach pain, loss of appetite, nausea, fever, vomiting, and weight loss. The incubation period is generally between two and ten days (average: 7 days) and illness usually lasts about two weeks but can persist longer than four weeks, especially in immunocompromised individuals¹.

Cryptosporidiosis in humans is most commonly associated with recreational or drinking water, but zoonotic transmission, or transmission through contact with infected animals, has also been documented². Young calves can be a reservoir for *Cryptosporidium*, and transmission to humans has occurred particularly in veterinary schools and agricultural settings³.

In the United States, Holstein cows (females) are typically used for milk production; therefore, Holstein steers (males) born on dairy farms may be transported to another location to be raised

¹ Centers for Disease Control and Prevention. *Cryptosporidium*. January 2011. Retrieved April 2013 from <http://www.cdc.gov/parasites/crypto>.

² Ibid.

³ Xiao L, Feng Y. Zoonotic cryptosporidiosis. *FEMS Immunology & Medical Microbiology* 2008; 52:309-323.

for beef. Scours, or diarrheal disease, is a common illness in young calves. Scours can be caused by *Escherichia coli*, *Salmonella*, coccidia, *Cryptosporidium*, rotavirus, and other etiologic agents. Diarrheal symptoms will be exacerbated by stress.

No illness prevention or hygiene education was provided to emergency responders, and no veterinarian was consulted regarding appropriate care and handling of calves during the response. Additionally, the accident occurred during a snowstorm and much of the area did not have electricity at the time. While not having electricity was not significantly associated with illness, it could have contributed to individuals being unable to appropriately clean and sanitize equipment and clothing following the response.

Cryptosporidium is a common cause of diarrhea in young calves and transmission to humans has been documented. All of the calves involved in this outbreak were fewer than ten days old and many had to be carried by emergency responders. Symptoms of cryptosporidiosis in calves are more severe when calves are experiencing stress. In this instance, very young calves were being transported long distances across multiple states in severe weather, with no apparent allowances for feeding and watering during transport. Due to the young age of the calves and the extreme conditions, high potential existed for contamination and subsequent transmission of *Cryptosporidium*. This unique outbreak highlights the need for prevention and control guidelines to prevent possible zoonotic disease transmission from animals to emergency responders.

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On: 24 April 2013*

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