Cryptosporidium parvum outbreak associated with Raccoons at a Wildlife Facility—Virginia, May–June 2019

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INTRODUCTION

Cryptosporidium parvum is a parasitic zoonotic pathogen responsible for diarrheal illness in humans and animals worldwide. While several species of *Cryptosporidium* exist, human infections are most commonly caused by *C. hominis*, which mainly infects people, and *C. parvum*, which infects both people and animals. Infection occurs after ingestion of infectious oocysts, which can be transmitted person-to-person, animal-to-person, or via ingestion of contaminated food or water. Illness begins after an incubation period of 7-10 days. Domestic ruminants are the animals most commonly associated with *C. parvum* infections in people. We report an investigation of a cryptosporidiosis outbreak in raccoons and wildlife rehabilitation workers at a Virginia facility.

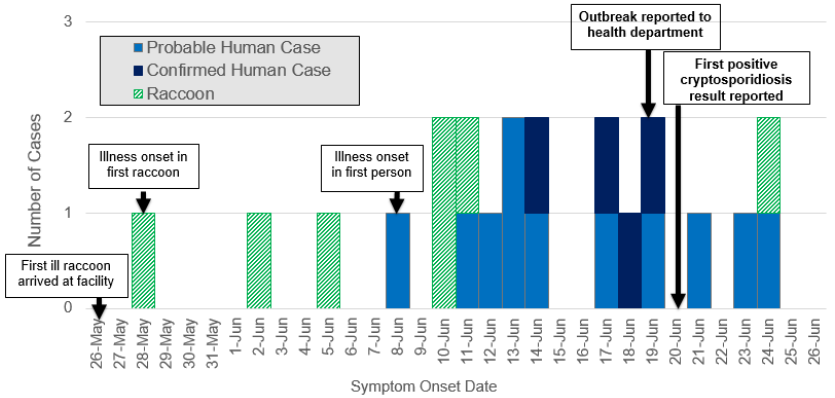
METHODS

On June 19, 2019, a wildlife facility contacted their local health department (LHD) to report an outbreak of gastrointestinal illness (vomiting and diarrhea) affecting 10/24 (42%) full-time staff and interns. The LHD recommended norovirus testing and provided basic infection control recommendations. On June 20, the LHD was notified that one person tested positive for *Cryptosporidium* antigen at a commercial laboratory. A retrospective cohort study was designed to better understand clinical illness and possible exposures. Probable cases were defined as people who worked or volunteered at the facility and experienced gastrointestinal illness (diarrhea and abdominal cramping, vomiting, or anorexia) occurring after June 6, 2019; confirmed cases had additional laboratory evidence of *Cryptosporidium* infection. Stool specimens from sick humans and raccoons were collected and tested for gastrointestinal pathogens. Water samples from pretreatment taps inside and outside the building were tested for bacterial indicators of fecal contamination.

RESULTS

Fifteen (31%) of 49 facility personnel experienced symptoms meeting the case definition, including four laboratory-confirmed cases. Seven juvenile raccoons were reported to have diarrhea and other animals were reported to be healthy. The first case of raccoon illness began two days after intake. The first human illness meeting the outbreak case definition was in an intern who cared for raccoons. Of all the potential human, animal, and environmental exposures surveyed, contact with raccoons (risk ratio [RR] = 4.4; 95% confidence interval [CI] = 1.7-11.3, *P*=<.01), foxes (RR = 4.0; 95% CI = 1.5–10.2, *P*=<.01), cottontails (RR = 2.8; 95% CI = 0.9–8.3, *P*=<.05) and drinking facility tap water (RR = 3.8; 95% CI = 1.5–10.0, *P*=<.01) were significantly associated with illness. Because fox and raccoon contact were not independent (only those vaccinated against rabies could care for these species) and foxes were not demonstrating clinically significant illness, fox contact was not included in the multivariable logistic regression model. In the multivariable model, contact with raccoons ($p < .01$) and drinking tap water ($p < .05$) remained significantly associated with illness. Well water samples had detectable total coliforms (3.0, 10.9, and 13.5 MPN/100 m) and one detected *E. coli* at 1 MPN/100 mL. Norovirus testing was negative. Three additional human stool specimens tested positive for *Cryptosporidium* via polymerase chain reaction. Six raccoon fecal specimens and one intestinal tissue sample also tested positive for *Cryptosporidium*. Molecular typing at CDC's CryptoNet Laboratory revealed *C. parvum* subtype (IIaA16G3R2) in six raccoon fecal specimens, one raccoon intestinal tissue specimen, and two human stool specimens.

Figure 1. Outbreak Epidemic Curve



DISCUSSION AND CONCLUSIONS

Cryptosporidium parvum of the same molecular subtype was identified in people and raccoons, with raccoon illness preceding human illness by 11 days, suggesting zoonotic transmission. Two limitations of this investigation are that the foxes, while healthy, were not tested for *Cryptosporidium,* and neither was the facility water supply, though coliform levels were low. While *C. parvum* infection has been reported in raccoons, this appears to be the first report of human illness after exposure to infected raccoons. Raccoons might be an under-recognized reservoir for human *C. parvum* infections. Further study is needed to explore the prevalence of cryptosporidial species in raccoons and their role as a wildlife reservoir.

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