

ANIMAL AND HUMAN HEALTH PREVENTION OPPORTUNITIES

Enteric Bacteria

Enteric *Campylobacter* spp, *Salmonella*, and *E.coli* O157:H7 are three of the top five pathogens causing foodborne illness resulting in hospitalization in the United States, including in Montana (**figure 1**).

Campylobacter

Campylobacter spp are ubiquitous in the environment and occur in a wide variety of domestic and wild animals including birds, wild rodents, and some insects. Animals can become infected by ingesting contaminated food or water, or through direct contact with infected feces, tissues, and environmental surfaces.

Clinical signs of *Campylobacter* infection in animals can include abdominal pain, fever, diarrhea (sometimes bloody) and signs may be more severe in young animals. *Campylobacter* infections can also cause abortions or infertility in some species. However, animals can also be asymptomatic shedders of the bacteria. Most cases of campylobacteriosis are self-limiting and resolve with supportive therapy. *Campylobacter* infections can be diagnosed by isolating the organism in fecal cultures or specific assays of placental, fetal, or other reproductive tissues.

Campylobacter jejuni is the most common cause of human *Campylobacter* infections. Humans become infected by consuming raw or undercooked meat and poultry, contaminated water, unpasteurized milk and dairy products, and through direct contact with animals. Symptoms can range from mild gastrointestinal distress to nausea, vomiting, and bloody diarrhea. Most individuals recover without specific treatment within ten days. Complications are rare but can include the development of reactive arthritis, focal extraintestinal infections, and Guillain-Barré syndrome.

Salmonella

Salmonella typhimurium and *enteritidis* are the most common serotypes in the United States; however, 2500 *Salmonella* serotypes exist, and *Salmonella* spp have been isolated from all animal species investigated. Ill animals and humans shed the bacteria in their feces. Asymptomatic carriers (commonly poultry, swine, reptiles, and amphibians) can continuously or intermittently shed the organism. Animals can become

	2016 (rate per 100,000)	5 Yr Average (rate per 100,000)
<i>Campylobacter</i> Count	300	223
<i>Campylobacter</i> Rate	29.0	21.9
<i>Salmonella</i> Count	158	130
<i>Salmonella</i> Rate	15.4	12.2
<i>E.coli</i> O157:H7 Count	109	49
<i>E.coli</i> O157:H7 Rate	10.5	4.8

Figure 1. Confirmed Montana Cases of *Campylobacter*, *Salmonella*, and *E. coli* O157:H7, 2016

infected by ingesting contaminated feed or water, or coming into close contact with an infected animal, including humans. Wild birds and rodents can also transmit *Salmonella* spp to livestock.

Salmonella spp primarily cause enteritis and septicemia in animals and occasionally abortion in pregnant animals. Diagnosis depends on clinical signs and isolation of the bacteria from feces, blood, or tissues.

People become infected by consuming contaminated water or food (including undercooked meat and eggs, contaminated produce, and unpasteurized milk), or through direct contact with infected feces and contaminated surfaces. Many human cases have been associated with handling pet reptiles, amphibians, and poultry, like baby chicks and ducklings. Symptoms of a human infection include nausea and cramping, abdominal pain followed by diarrhea, fever, and sometimes vomiting. The illness usually lasts one to four days, and most people recover without treatment. However, a small number of people develop reactive arthritis.

The last large salmonellosis outbreak in Montana occurred in 2015; 39 individuals, from Montana and Wyoming, fell ill after eating dinner at a restaurant on Valentine’s Day.

Escherichia coli

Escherichia coli (*E. coli*) bacteria naturally reside in the digestive tracts of humans and animals. While most strains are innocuous, some strains are pathogenic due to virulence factors such as exotoxins (toxins released by the bacteria). *E.coli* O157:H7 is the most common serotype causing human *E. coli* infections in N. America.

Many species of animals asymptotically shed the bacteria. Ruminants are the most common reservoir for *E.coli* O157:H7. Animals can become infected through direct contact with other animals, contaminated pastures and environmental surfaces, or through shared water and feed. Wild birds and some flies are also potential vectors. Carrier animals can be diagnosed through fecal samples.

People can become infected by consuming contaminated water or food, or through direct contact with infected animals or contaminated environments. *E.coli* O157:H7 infection typically begins with severe abdominal pain and watery diarrhea. Some people recover without treatment, but the infection can progress to hemorrhagic colitis, and a small number of people develop a potentially life-threatening complication called hemolytic-uremic syndrome (HUS). Children less than five years of age, adults over 60 years of age, and the immunocompromised, are at high risk for HUS. Many people fully recover without permanent damage, but HUS can lead to long-term complications, kidney failure, and death.

The last large *E.coli* O157:H7 outbreak in Montana occurred in 2016. At least 38 individuals, from six counties in Montana and nine other states, fell ill after eating dinner at a community event.

Prevention

Because these bacteria are all transmitted by the fecal-oral route, prevention centers on proper hand hygiene and food handling. People should wash their hands before eating and handling food and after handling raw animal products. All food should be properly cleaned, refrigerated, and cooked. People should avoid consuming untreated surface water, raw or undercooked animal products, and unpasteurized juice, milk, or other dairy products. People with diarrhea should wash their hands frequently to reduce the risk of spreading bacteria.

Numerous enteric disease outbreaks have been associated with direct contact with animals. People should perform proper hand hygiene after direct contact with animals, their feces, and objects in their environment. Equipment and environmental surfaces should be disinfected to help decrease the risk of infection. Individuals working with sick or dead animals should use appropriate personal protective equipment, such as gloves, facial protection, and protective outerwear and footwear. These individual's work clothes and shoes should be kept away from main living areas and laundered separately to protect other household members, especially children. Additionally, people should not consume food or beverages in animal environments.

Campylobacter, salmonellosis, and E.coli O157:H7 are all human reportable communicable diseases (ARM 37.114.203). All suspected or confirmed cases must be reported immediately to your local public health jurisdiction. If your local public health jurisdiction is unavailable call 406-444-0273.

References available on web version. Visit <http://www.dphhs.mt.gov/publichealth/publications.shtml>.

2,836 copies of this public document were published at an estimated cost of \$0.59 per copy, for a total cost of \$1660.54, which includes \$711.04 for printing and \$949.50 for distribution.

1400 Broadway
Helena, MT 59620-2951

Sheila Hogan, Director, DPHHS
Mike Honeycutt, Executive Officer, DOL
Todd Harwell, MPH, Administrator, PHSD
Martin Zaluski, DVM, State Veterinarian