

Zoonotic Diseases of Cattle

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Zoonotic diseases are diseases that can be transmitted from animals to humans and from humans to animals. Zoonotic diseases may be acquired or spread in a variety of ways: through the air (aerosol), by direct contact, by contact with an inanimate object that harbors the disease (fomite transmission), by oral ingestion, and by insect transmission. There are fifteen cattle diseases with zoonotic potential in the United States, some of which are more common than others. They include anthrax, brucellosis, cryptosporidiosis, dermatophilosis, Escherichia coli, giardiasis, leptospirosis, listeriosis, pseudocowpox, Q fever, rabies, ringworm, salmonellosis, tuberculosis, and vesicular stomatitis.

Potential Human Exposure to Zoonotic Organisms in the U.S. Key

Very Common	****
Common	***
Occasional	**
Rare	*

Note: Not all exposure results in clinical disease. Additionally, symptoms may be mild and may go unnoticed.

Anthrax *

Anthrax is a bacterial disease caused by *Bacillus anthracis*, which forms spores that survive for years in the environment. Cattle, sheep, and goats are at the highest risk of developing anthrax, but other farm animals, as well as wildlife and humans, can contract the disease. Most animals are infected by oral ingestion of soil contaminated with anthrax spores. People develop anthrax when the organism enters a wound in the skin, is inhaled in contaminated dust, or is eaten in undercooked meat from infected animals. Biting flies can transmit the bacterium, which results in redness and swelling at the bite site. The most common clinical sign in animals is sudden death. Blood may be seen oozing from the mouth, nose, and anus of animals that died of anthrax. A vaccine for livestock is available in areas where anthrax is a common livestock disease. Animals suspected of dying from anthrax should be examined by a veterinarian immediately. Animals that have died of anthrax should be burned or buried deeply and covered with lime. The area should be thoroughly decontaminated with lime, as anthrax spores can survive in the soil for decades. Anthrax is prevented by avoiding contact with animals that are suspected to have anthrax and areas that may contain bodies of animals that died from anthrax.

Brucellosis *

Brucellosis is caused by the bacterium *Brucella*, which can affect a wide variety of animals including cattle, pigs, sheep, goats, horses, and dogs. *Brucella* organisms can be present in birthing tissues or fluids (aborted fetuses, fetal fluids, placentas, and vaginal discharges), and also in milk, urine, blood, and semen. Transmission among cattle is through ingestion of birthing fluids and milk and in utero. The most common clinical sign in cattle is late-term abortion, but many infected cattle do not show any clinical signs. Most infections in humans are associated with drinking or eating unpasteurized milk products. Handling infected aborted fetuses or afterbirth is another common means of human infection, as the organism can enter through cuts in the skin and the mucous membranes of the eye and mouth. Common symptoms in humans are undulating fever, weakness, headache, joint pain, and night sweats. There is a Cooperative State Federal Brucellosis program in the United States to eradicate the disease from this country. States are designated “Brucellosis Class Free” when there are no cattle or bison infected with brucellosis for 12 consecutive months. Virginia is Brucellosis Class Free, as are all states except Texas and Idaho. There is a pocket of brucellosis in the bison and elk herds of Yellowstone National Park, and sporadic outbreaks of animal brucellosis have occurred in western states. Human brucellosis is prevented by not drinking unpasteurized dairy products, and wearing gloves when handling reproductive tissues. Hands should be washed after touching or handling animals.

Cryptosporidiosis ****

Cryptosporidium is a protozoal parasite that causes diarrhea. Most animals can be infected with *Cryptosporidium*, but clinical signs are most commonly observed in calves less than 1 month old. Infected animals shed the organism in their feces, contaminating the environment. *Cryptosporidium* can then be ingested from infected food or water. Humans are infected by consuming food or water contaminated with the organism or by failing to wash their hands after exposure to infective feces or animals. Most people who are infected do not become sick. For those individuals that show clinical signs, explosive diarrhea and abdominal pain are common. Vomiting, fever, and muscle cramps may also occur. Young children, pregnant women, and immune compromised adults are most severely affected. Calves with diarrhea should be separated from healthy ones, and the infected area disinfected with bleach. Prevention efforts in humans focus on hand washing, especially after handling or being around animals and before eating or handling food.

Dermatophilosis *

Dermatophilosis is a bacterial skin disease caused by *Dermatophilus congolensis*, and is also known as rain rot, lumpy wool, and strawberry foot rot. It most commonly affects cattle, sheep, goats, and horses. The disease is spread by direct contact with infected skin or through biting insects. Wet conditions allow the bacteria to spread. It causes thick scabs, and when the hair is pulled, the tuft of skin looks like a paintbrush. Infections in humans are rare, but people can develop sores that form ulcers, often resulting in scarring. Infected animals should be isolated and treated with antibiotics. Human infections can be prevented by wearing gloves and washing hands thoroughly after working with infected animals.

Escherichia coli ***

Escherichia coli (*E. coli*) are bacteria normally found in the intestines of people and animals. However, some strains cause a severe, often bloody, diarrhea in humans. Animals are the carriers of the bacteria, and humans become infected by ingesting contaminated food or water, especially undercooked ground beef, unpasteurized juice and milk, and vegetables. Humans may also become infected after handling or being exposed to feces of a carrier animal. Person-to-person transmission can occur by lack of good hand washing following diaper changes. *E. coli* can also be transmitted through swimming pools. *E. coli* O157:H7 is a particularly virulent strain of *E. coli* that in humans can cause abdominal cramping, bloody diarrhea, and occasionally, especially in young children and the elderly, life threatening kidney disease and a hemolytic uremic syndrome. *E. coli* O157:H7 may cause diarrhea in young calves, but most infected cattle show no clinical signs. Prevention focuses on hand washing and proper food

hygiene. Hands and all cooking equipment should be washed with soap and hot water after touching or handling raw meat. Meats should be thawed in the refrigerator, and ground beef should be cooked until it reaches an internal temperature of 165°F and the juices run clear. At restaurants, undercooked meats should be returned to the kitchen. Do not drink unpasteurized milk or milk products, juice, or cider. Make sure drinking water, especially well water, is adequately disinfected. Wash hands after handling animals or being in animal facilities and do not eat or drink around animals. Day-care facilities should wash toys frequently, and individuals with diarrhea should avoid swimming in public areas.

Giardiasis **

Giardia lamblia is an intestinal protozoal parasite that may or may not cause disease in cattle. *Giardia* is present in soil, food, and water that have been contaminated by infected feces. Humans become infected by ingestion of contaminated food or water. Infants and small children may place their hands that have been contaminated with fecal material directly into their mouth. Because a large number of wild animals harbor *Giardia*, water from lakes, streams, or ponds may be unsafe to drink. *Giardia* causes diarrhea and abdominal cramping in humans. It can be prevented by avoiding untreated drinking water and thoroughly washing all fruits and vegetables. Frequent hand washing is also recommended.

Leptospirosis **

Leptospirosis is a bacterial disease caused by *Leptospira interrogans* that can occur in a large number of animals, including cattle, sheep, goats, pigs, horses, and dogs. Leptospirosis is spread through the urine of infected animals and can survive in water and soil for months. The most common clinical signs in cattle are abortion and weak newborn calves. Cattle, and especially rodents, may show no signs of illness but carry and pass the organism in their urine. Humans acquire leptospirosis through direct contact, ingestion, or inhalation of the bacteria. Infection usually results in mild flu-like symptoms but may progress to severe liver and kidney disease. Prevention involves rodent control and elimination of standing water. Avoid water, such as ponds, where animals congregate and urinate, and wear gloves when handling reproductive fluids or when being exposed to urine.

Listeriosis *

Listeriosis is caused by the bacterium *Listeria monocytogenes*. Cattle, sheep, and goats are commonly affected. Common signs of infection in livestock are circling, incoordination, and the inability to chew and swallow. Pregnant animals may abort. The organism lives in decaying vegetation and low-lying wet areas. Consumption of spoiled or improperly ensiled feed is often associated with outbreaks in animals. Feeding good-quality corn silage will decrease the risk of listeriosis in animals. Moldy silage that has been exposed to air and leftover silage from feed bunks should be discarded. Most humans are resistant to infection, but individuals who are immunosuppressed, pregnant, or taking antacids are at increased risk of acquiring infection. Infection in humans usually occurs after eating contaminated processed meats or unpasteurized milk products. Infections in humans can result in abortions and septicemia (blood poisoning). Prevention consists of washing produce, cooking meats properly, and avoiding unpasteurized milk and milk products. Pregnant women should avoid deli meats and soft cheeses. Gloves should be worn while assisting calvings and hands washed afterward.

Pseudocowpox *

Pseudocowpox is a virus that causes small raised sores and scabs on the teats and udders of cattle. The virus is spread from cow to cow by milkers and milking equipment, and causes small raised sores that later scab. Humans acquire pseudocowpox by direct contact with infected cows, and can develop painful scabby sores on the hands and arms. Good milking hygiene and teat dipping will decrease the spread of this virus. People should wear gloves when handling infected cows, and thoroughly wash hands and arms after milking.

Q Fever **

Q fever is caused by the bacterium *Coxiella burnetii* and causes abortions in cattle, sheep, and goats. Animals acquire Q fever through contact with reproductive fluids and milk from infected animals. Humans are usually infected when they are assisting the birthing process and are exposed to reproductive fluids. They may also be infected by drinking infected unpasteurized milk. Humans develop a fever, night sweats, and pneumonia and hepatitis in severe cases. Miscarriages, premature delivery, and infections of the placenta are possible in pregnant women. To prevent the spread of Q fever, aborted fetuses and reproductive tissues should be buried or burned. Wearing gloves and protective eyewear when assisting in birthings and washing hands thoroughly afterward are recommended. Pregnant women should not assist in birthings. Unpasteurized milk products should be avoided.

Rabies *

Rabies is a deadly viral infection affecting all mammals, including humans. Rabies is spread in the saliva of a rabid animal, typically through bite wounds. Cattle may show changes in behavior, excessive vocalization, have difficulty swallowing, drool, and/or become paralyzed. People contract rabies through exposure to infected saliva in open wounds or mucous membranes (eyes, nose, and mouth). This could occur during examination or treatment of infected cattle. Rabies is almost always fatal once clinical signs are evident. People should not handle or feed wildlife. Contact your veterinarian immediately if cattle behave abnormally or have symptoms of rabies. Always wear gloves and take safety precautions when treating sick animals. A veterinarian should be consulted if an animal dies of unknown causes. If there is human exposure to an animal with rabies, a physician should be contacted immediately so post-exposure prophylactic injections can be initiated.

Ringworm ***

Ringworm is a skin infection caused by fungi of the *Trichophyton* or *Microspora* species. Animals get ringworm by direct contact with an infected animal or by being in an infected environment, such as a barn. Ringworm is characterized by hairless, crusty circular areas on the skin. People are infected with ringworm through direct contact with infected animals. In humans, ringworm forms itchy areas on the skin that are round and irritated. Good hygiene and thorough hand and forearm washing after handling infected cattle will help decrease the risk of ringworm.

Salmonellosis ***

Salmonella are bacteria that are shed in the feces of infected animals. Many animals are susceptible to *Salmonella*, including cattle. Infection occurs as a result of the ingestion of contaminated feed, water, or grass. The bacterium can live for months to years in the environment, especially in wet and warm conditions. Young, stressed or pregnant animals are the most susceptible to *Salmonella* infection. Infection may result in fever, foul smelling diarrhea, and severe dehydration. People acquire *Salmonella* from undercooked contaminated meat, infected eggs, or unpasteurized milk products. If hands are not washed after direct contact with infected feces, then accidental ingestion of bacteria can occur. Humans may develop diarrhea, abdominal cramping, and fever, which can be very severe. Animals with diarrhea should be isolated and the area disinfected. Meat and eggs should be adequately cooked and proper food handling hygiene should be used. Always wash hands after touching or working with animals.

Tuberculosis *

Bovine tuberculosis is caused by the bacterium *Mycobacterium bovis* which is shed in respiratory secretions, feces, and milk of infected animals. Cattle are infected by inhaling or ingesting the bacterium. Weight loss, weakness, low-grade fever, and coughing are common clinical signs of infection in cattle. Humans may acquire tuberculosis from unpasteurized dairy products and can develop symptoms involving the lungs, kidneys, spine, or brain. Infected individuals have a persistent cough and often cough up blood. Currently there is little tuberculosis in cattle as a result of a federal eradication program. All states, including Virginia, are currently accredited Tuberculosis Free except Michigan, Minnesota, and New Mexico. Prevention is by avoiding unpasteurized dairy products.

Vesicular Stomatitis *

Vesicular stomatitis is a viral disease, producing blister-like sores on the mouth and feet of infected animals. The disease is transmitted by flies or direct contact. People acquire the virus by direct contact with infected animals. People develop flu-like symptoms and occasionally develop blisters in their mouth and on their hands. Prevention is by wearing gloves while handling animals suspected of having vesicular stomatitis. Hands should be thoroughly washed after handling any animals.

Summary

There are numerous zoonotic diseases that can be transferred from cattle to humans. These diseases cause mild to severe symptoms and are a definite concern for farmers and their families. While some of the diseases are rare, their potential for devastating outcomes makes it necessary to take precautions for these diseases seriously. Luckily, many of the precautions taken to prevent these diseases are the same.

- Washing hands with soap after handling animals is the most important precaution. Soap should be readily available in the barn/lavatory areas.
- Unpasteurized milk and milk products should be avoided. This is especially true for children, the elderly, and pregnant women.
- All meat should be cooked to appropriate internal temperatures. Ground beef should be cooked until reaching an internal temperature of 165°F and the juices run clear.
- Raw meat and eggs should be handled as if they contain infectious organisms.
- All surfaces and utensils used to prepare raw foods should be thoroughly washed with hot water and soap. Utensils used on raw foods should not be used later in the cooking or serving process.

If you suspect any of these diseases on your farm, or you have questions about them, contact your veterinarian. If you suspect that you, one of your farm employees, or anyone in your family has any of these diseases, contact your physician immediately.