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ANIMAL AND HUMAN HEALTH PREVENTION OPPORTUNITIES

Bovine Tuberculosis

Bovine tuberculosis (TB) is a chronic bacterial disease of cattle caused by *Mycobacterium bovis (M. bovis)*, but can cross species and infect bison, elk, deer, and people. Bovine TB is a significant zoonosis that can also cause impact to livestock producers from livestock deaths, chronic disease, and trade restrictions. In this issue of Montana One Health, we will discuss the human and animal health implications of *M. bovis* and methods to reduce the risk of infection between animals, humans, and wildlife.

Animal Health

Bovine Tuberculosis was once found worldwide, but eradication and control programs have eliminated or nearly eliminated the disease from domesticated animals. Wildlife reservoirs, such as in white tail deer in areas of Michigan, have made complete eradication difficult. Cattle are the primary reservoir for *M. bovis;* however, the disease has been reported in numerous domesticated and non-domesticated species. In the United States, bovine TB is uncommon, but when detected results in large scale epidemiological investigations that result in significant time, labor, and testing expense. For producers with herds confirmed to be infected with bovine tuberculosis, herds are subject to long-term quarantine, which is often economically unfeasible, or depopulation through slaughter channels.

Cattle shed *M. bovis* in respiratory secretions, feces, milk and sometimes in urine, vaginal secretions or semen. Most transmission of *M. bovis* occurs through aerosols during close contact. Another route of infection can occur with ingestion of the organism, which can be of concern for calves nursing infected cows. The two most common ways bovine TB is introduced into a herd is from the purchase of or exposure to infected cattle and exposure to infected, free ranging wildlife. Rarely, the disease can be introduced from an infected person.

Once an animal is infected with *M. bovis,* clinical signs and symptoms can take months to years to develop. Clinical disease in cattle is rarely observed as most animals will be culled for production reasons before signs develop or are severe enough to be associated with tuberculosis. During this latent or asymptomatic phase, an animal is capable of spreading the disease to surrounding herd mates and people. In the late stages of the disease, clinical signs include weakness, weight loss, loss of appetite, fluctuating fever, dyspnea, and enlarged lymph nodes. Bovine TB is characterized by the formation of granulomatous lesions in the lymph nodes, lungs, liver, and spleen of affected animals.

Clinical signs alone are not enough to diagnose bovine TB. In live animals, the standard method for tuberculosis detection is the caudal fold test (CFT) where a small amount of TB antigen is injected intradermally and re-assessed after 72 hours. If positive, this test is often followed up with a comparative cervical test (CCT) or a Bovigram/Gamma Interferon. Animals that continue to test positive on live-animal tests or animals from high risk herds may be euthanized and examined post-mortem for evidence of disease. Post mortem testing includes gross exam, histopathology, PCR, and culture. However, most cases are diagnosed during slaughter. The Food Safety Inspection Service conducts nationwide surveillance within slaughter plants that consists of post mortem meat inspection.

Reduce the risk of your herd acquiring TB:

- Try to keep a closed herd and raise your own replacement stock
- Buy animals from accredited TB-free herds, test the new animals prior to purchase, and isolate them for 60 days and retest before introducing them with your herd
- Reduce or eliminate all contact between your herd and other herds
- Keep on-farm visitors away from your herd whenever possible, especially people who may have contact with other herds
- Make sure your fences are in good condition to separate your herd from wildlife

Human Health

The majority of human tuberculosis cases are caused by *M. tuberculosis* and a small proportion of TB cases in humans (<2%) are caused by *M. bovis*. Human cases of M. *bovis* have been greatly reduced by decades of disease control in cattle and by pasteurization of cow's milk.

People most commonly become infected by consuming contaminated, unpasteurized dairy products. Other routes of infection include inhalation of the bacteria from infected animals and by direct contact with a wound during slaughter or hunting.

Clinical signs and symptoms in people can vary greatly. Human *M. bovis* infections typically have non-specific flu like symptoms including fever, night sweats, chronic cough, chest pain, GI pain, or diarrhea. Other symptoms can occur depending on the part of the body affected by the disease. However, not everyone infected with *M. bovis* becomes ill, in which case they develop a latent TB infection. Latent TB infections have the potential to progress into the diseased state. Diagnosis requires either a tuberculin skin test or an interferon-gamma release assay. Treatment of M. *bovis* infections is similar to M. tuberculosis, which requires antibiotic therapy.

Persons at-risk for acquiring *M. bovis* include individuals working with cattle, bison, or cervids or handling the products of these animals such as hides, milk, or meat. Activities associated with an increased risk of infection include ranching, dairy farming, slaughterhouse work, butchering, and hunting. Additionally, drinking unpasteurized milk can put an individual at higher risk for acquiring *M. bovis*. Pasteurization eradicates M. *bovis* from milk products. People at a higher risk for a M. *bovis* infection should talk with their healthcare provider about screening for the disease.

Tuberculosis Key Points

Animal Health

- Minimize risk to your herd by maintaining a closed herd, test new arrivals, and eliminate contact with neighboring herds.
- If you suspect TB, work with your veterinarian to test your animals and quarantine any positive animals immediately.
- Veterinarians should be aware of the clinical signs of tuberculosis and utilize proper personal protective equipment and biosecurity measures.
- Veterinarians should immediately report any suspected cases of *M. bovis* to the Montana Department of Livestock at (406) 444-2043.

Human Health

- Consume only pasteurized dairy products.
- Hunters and other individuals who handle carcasses of wild game should be aware of the risks of *M. bovis* and take the necessary precautions including good hand hygiene and personal protective equipment in areas where *M. bovis* is known to infect the wild game population.
- Health care providers should consider *M. bovis* as a diagnosis in patients with clinical signs and a history of working with cattle or livestock.
- Health care providers should report any suspected cases of *M. bovis* immediately to their local health department.

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

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