



## **Zoonotic Diseases of Concern for WGFD Personnel**

The impact of infectious disease can play an important role in managing free-ranging wild populations. Examining wildlife mortalities and collecting/submitting samples for diagnosis becomes an integral part of overall population management and disease surveillance. It is important that every field staff member is aware of what a zoonotic disease is (an infection/disease that can be transmitted from animals to people or vice-versa), and that certain wildlife infectious diseases are zoonotic. This briefing document highlights a small number of important zoonotic diseases that occur in Wyoming that employees could come across in their day to day activities.

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## Plague (*Yersinia pestis*)

**Background:** A flea (arthropod) transmitted bacterial disease of rodents that occurs in the western U.S. Most carnivores are resistant; however, mortality has been seen in some mountain lions and other felids, wild and domestic, after consumption of an infected rodent or lagomorph. Plague is a serious disease, and extreme caution is advised when handling plague suspects. Field necropsies are not recommended, and care should be exercised to prevent bites from their ectoparasites (i.e. fleas).

**Transmission:** Plague is primarily transmitted by bites from infected fleas and handling infected animals/tissues or by inhalation of respiratory droplets.

**Clinical signs in animals:** Infected animals may be depressed, but will frequently be found dead. Swollen, draining lymph nodes may be observed, especially around the head. Abscesses may be present on the face, gluteal muscles, forelimbs or hindlimbs. This bacterium can also infect the conjunctiva around the eyes. Gross findings on necropsy may include granulomas on the spleen and liver and enlarged lymph nodes.

**Symptoms in humans:** Chills, acute onset of fever, swollen and painful lymph nodes as well as malaise. This disease can become septicemic (bacteria in blood stream), pneumonic (affecting the lungs), or bubonic (causing painful, swollen lymph nodes, or “buboes”). If you experience fever, chills, prostration, coughing, and respiratory difficulties - seek medical attention immediately.



*Image on left shows a mule deer with *Yersinia pestis* infected eye. The middle image shows the characteristic white spots on spleen (can also occur on liver; white circle). Image on right shows greatly enlarged mandibular lymph nodes of an infected mountain lion (white circle).*

## Tularemia (*Franciscella tularensis*)

**Background:** Also known as “rabbit fever,” this bacterial disease is found throughout the world and is primarily a disease of rabbits and rodents but can also occur in beavers and muskrats. Tularemia is very infectious and extreme caution is advised when handling disease suspects. Field necropsies are not recommended, and care should be exercised to prevent bites from blood feeding arthropods (i.e. ticks).

**Transmission:** Tularemia can be transmitted via blood feeding arthropods such as ticks, direct contact with infected tissue/fluid, or ingestion of contaminated water.

**Clinical signs in animals:** Most infected animals are found dead. Affected animals may appear lethargic, ataxic (“drunk”) or tame, run slowly, and not carry their head or forefeet well. Gross findings on necropsy include enlarged lymph nodes, pinpoint granulomas in the liver, spleen, and lymph nodes, and an enlarged and/or discolored spleen and/or liver.

**Symptoms in humans:** Symptoms can range from mild illness to pneumonia, meningitis, and death. Typical symptoms include; Sudden fever, chills, headaches, diarrhea, muscle aches, joint pain, progressive weakness, swollen lymph nodes (known as glandular tularemia), and an ulcer can develop at the site of infection (bite from infected arthropod). Important to seek medical attention immediately upon development of symptoms.



*The image on the upper left shows glandular tularemia in a man infected with *F. tularensis*. Upper middle image shows a large ulcer formation at site of infection (bite from infected arthropod). Upper right image demonstrates white spots on liver from an animal with tularemia. Lower left image is a beaver mortality due to tularemia.*

## Rabies (Rabies virus)

**Background:** Rabies occurs worldwide, and is one of the oldest recognized wildlife diseases where only mammals are thought to be important in the epidemiology of the disease. Any mammal can be infected with rabies virus; however, the most commonly affected species in the United States include bats\*, skunks\*, raccoons, and foxes. Infection with rabies virus almost always results in fatality.

\*primary variants found in Wyoming

**Transmission:** Occurs primarily due to exposure to infected animals' saliva through bites and scratches. Transmission can also occur if neural tissue (brain or spinal cord) of an infected animal comes in contact with an open wound or mucous membrane.

**Clinical signs in animals:** Any behavioral abnormality in carnivores or bats should be suspect. Animals may lose wariness of humans, become agitated, or extremely aggressive (furious form). Additionally, animals may head press, stargaze, head tilt, drool, tongue loll, and mouth gape. Animals can also display the dumb or paralytic form by being lethargic, incoordination, hind limb weakness, and paralysis. Bats can go a long time without demonstrating clinical signs, any contact with a bat should be deemed suspect. There are no "typical" gross findings on the necropsy of a rabies-positive animal; however, there may be evidence of animal interaction such as bite or scratch wounds.

**Symptoms in humans:** Disease is 100% fatal once clinical signs develop. Agency personnel who routinely work with species of concern should have pre-exposure vaccination (work with your supervisor on authorization to get vaccinated). If exposed, wash the area with soap and warm water, and seek medical attention immediately. Vaccination does not eliminate the need to seek medical attention if you should become exposed. Vaccination titers should be checked every two years to ensure continued protection.



*Images of animals demonstrating signs of rabies. Aggressive skunk on left with porcupine quills, aggressive raccoon, and a bat on the right that should be handled as a rabies suspect.*

**Hantavirus** (Hantavirus Pulmonary Syndrome, Hemorrhagic fever with renal syndrome, Sin Nombre hantavirus)

**Background:** First discovered in the southwest in 1993, this rodent-borne hemorrhagic fever can be a serious disease in humans. Rodents (particularly deer mice and white-footed mice) and insectivores (such as shrews and moles) are primarily responsible for transmission, where they are generally chronically infected, asymptomatic, and shed the virus for over a long period of time.

**Transmission:** Occurs after contact with rodent droppings, urine, saliva, or nesting materials, where the virus is inhaled into the lungs.

**Clinical signs in animals:** Asymptomatic in rodents.

**Symptoms in humans:** Early symptoms include fatigue, fever, muscle aches, headaches, dizziness, chills, nausea, vomiting and diarrhea. After 4-10 days following early symptoms, coughing, shortness of breath, breathing difficulty, and possibly pneumonia. Long-term complications can include kidney disease. The mortality rate is 35%. Use caution when opening and cleaning previously unoccupied buildings (WGFD cabins), house cleaning, or entering crawl spaces that are inhabited with mice. Wear protective goggles, N95 face mask (not a dust mask), and gloves when dealing with cleaning areas with mouse nests/waste. Dampen areas to be cleaned with water/10% bleach to limit dust.



*Pictures demonstrate situations where Hantavirus should be a concern and proper protective equipment be worn when cleaning areas inhabited by mice.*

## **Brucellosis (*Brucella abortus*)**

**Background:** Bacterial disease of elk and bison of the Greater Yellowstone Area. Cows often abort their first fetus after becoming infected which is one of the reasons why this disease is of concern to cattle producers. In addition, this disease can readily infect humans and failure to seek treatment can result in lifelong debilitation.

**Transmission:** Occurs when handling infected reproductive tract/fetus, or infected joints which are usually swollen.

**Clinical signs in animals:** There are few clinical signs, but some animals will develop swollen joints (hygroma) with lameness. Reproductive signs are more commonly observed and include inflamed testes (orchitis) in males, and of course, abortion in females. Gross findings on necropsy can include granulomatous lesions throughout the reproductive tract and lymph nodes, abnormal placenta, enlarged liver, and swollen testes.

**Symptoms in humans:** Recurring (undulant) fever, joint or back aches, night sweats, and depression. Symptoms can occur up to 3 months after infection, but generally appear in a few weeks. The higher risk period for humans to contact this bacterium occurs from February through June, with a peak from March through April. Seeking immediate medical attention and treatment is important in successful clearing of the disease.



*Images show aborted bison calf, an elk aborting a fetus, and a hygroma from an infected hock on an elk. *Brucella abortus* is extremely infectious and suspects should only be handled with proper protective equipment such as safety glasses, gloves, rubber boots and coveralls.*

## **Be prepared and safe!**

Disease in wildlife can cause severe illness and death in humans. Always handle a carcass/samples in an appropriate manner and wear proper personal protective gear. This includes personal safety clothing when conducting necropsies or collecting samples in the field. This can include (but not limited to); coveralls, rubber disposable gloves, a mask (that covers the nose and mouth), rubber boots and eyewear. Samples and carcasses should be handled, stored and disposed of in a way that minimizes exposure to other people, wildlife, domestic animals (i.e. dogs, horses, etc.).

Additionally, field personnel should try to prevent arthropod bites by donning insect repellent and wearing appropriate clothing such as long pants, long sleeve shirts, tall socks, and close-toed shoes. Domestic animals that could be at risk of exposure should be up to date on vaccines and flea/tick prevention. If you suspect your pet has been exposed to an infectious disease, remember to disclose the nature of your work to your veterinarian (so they are aware of the risk).

## **Think you have been exposed to a zoonotic disease?**

**Contact your local health provider immediately.** Advise them what you do for a job and show them your WGFD Physician's Alert Card. Treatment is most successful when initiated soon after infection - don't wait thinking you will get over it, procrastination can be fatal!

## **Questions?**

Please don't hesitate to contact Veterinary Services with any questions you might have concerning wildlife disease.

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