Brucellosis

College of Veterinary Medicine

BASICS

Brucellosis is an infectious disease of mammals caused by Gram-negative, intracellular bacteria in the *Brucella* genus.

Brucellosis occurs in a **WIDE VARIETY** of mammals, including domestic animals, wildlife, and humans. Wildlife species affected include elk, bison, caribou, feral pigs, wild boar, rodents, rabbits, opossums, foxes, bears, raccoons, seals, sea lions, dolphins, porpoises, whales, and sea otters.

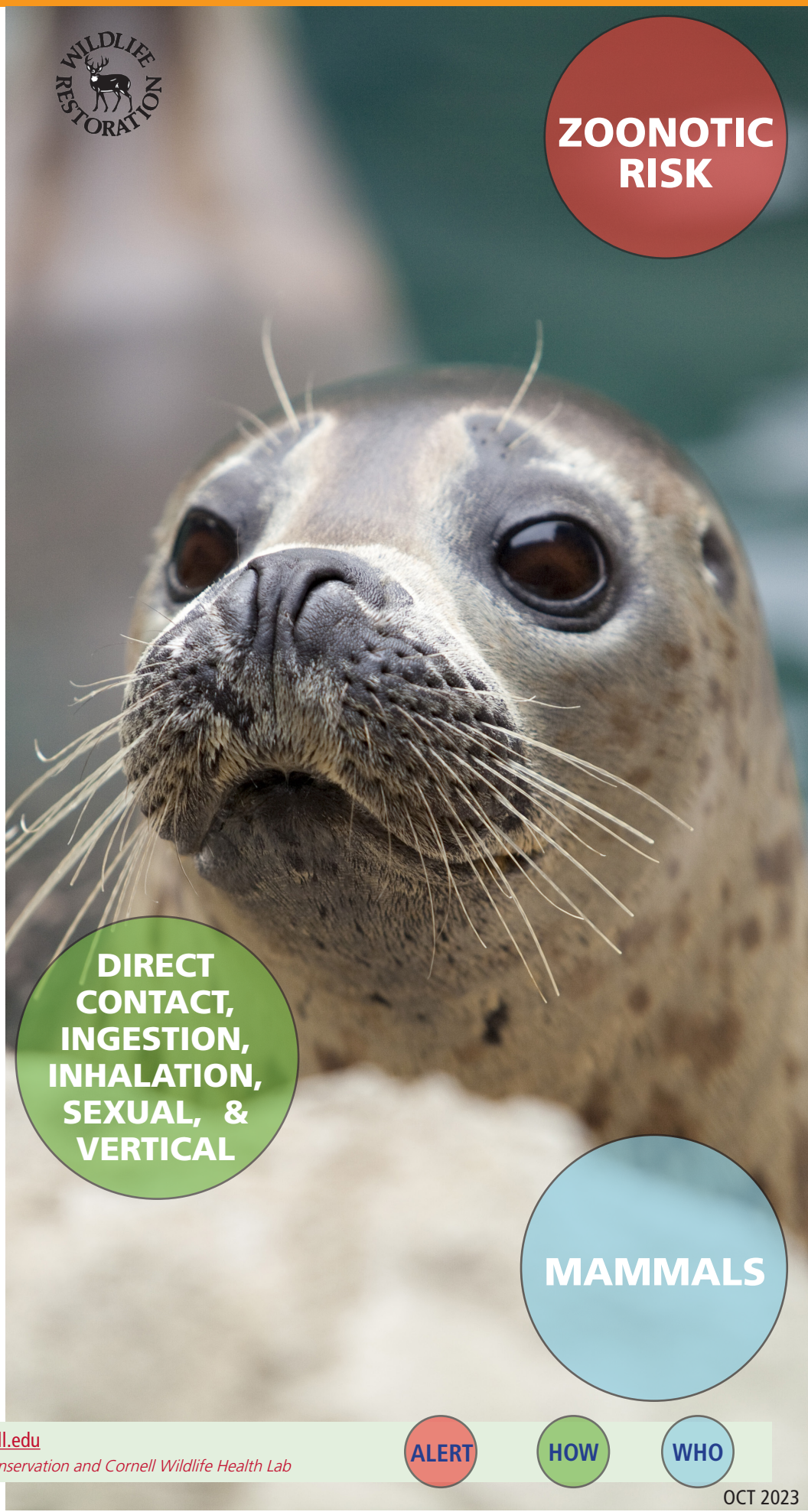
TRANSMISSION of *Brucella* bacteria occurs via ingestion of contaminated animal tissues or products, contact with infected animals or tissues, and inhalation. Infected males may transmit the infection to females via semen during mating.

Brucellosis can affect multiple organ systems, although infection most commonly affects the reproductive system. **CLINICAL SIGNS** include abortion, stillbirth, inflammation of the placenta, uterus, or testes, and infertility. Infection of the central nervous system can cause meningoencephalitis. Other signs of infection include bone and joint inflammation, lameness, and abscesses.

Infection in some animals may be **ASYMPTOMATIC**; however, shedding of bacteria in feces and urine may still occur.

DIAGNOSIS of brucellosis can be made by isolating bacteria from tissues, PCR, and immunohistochemistry analyses.

TREATMENT of brucellosis requires long-term antibiotics.



DETAILS

Brucellosis occurs worldwide and affects both terrestrial and marine mammals. *Brucella* species are generally associated with specific animal hosts, although they can also infect other species. *B. abortus* circulates in domestic cattle as well as bison and elk. *B. suis* infects domestic and feral pigs, wild boars, and caribou. *B. melitensis* and *B. ovis* are found mainly in goats and sheep. *B. ceti* and *B. pinnipedialis* infect cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals, sea lions, and walruses), respectively. *B. neotomae* and *B. microti* are found in wild rodents. *B. canis* is found mainly in domestic dogs. *Brucella* organisms have also been isolated from frogs.

In Yellowstone National Park, *B. abortus* is enzootic in elk and bison. The infection most likely spilled over from domestic cattle, but it is now repeatedly transmitted from elk to cattle.

In the southeast US, *B. suis* circulates in feral pigs and wild boars which occasionally transmit the infection to domestic pigs.

Brucella infections in marine mammals were first identified in the 1990s. Infection of cetaceans by *B. ceti* causes typical *Brucella*-associated reproductive symptoms as well as pneumonia, bone infections, blubber abscesses, and meningitis. Infections of pinnipeds by *B. pinnipedialis* are more commonly asymptomatic. A sea otter was reported with a traumatic non-healing wound caused by *B. ceti*.

B. melitensis is the most common cause of brucellosis in humans, although other species, including *B. abortus, B. suis, B. canis*, and *B. pinnipedialis*, have infected humans.

TRANSMISSION *Brucella* bacteria are shed in birth products, such as the placenta, fetus, and fluids, vaginal discharge, semen, urine, and milk. Transmission occurs through ingestion of or contact of mucous membranes or open wounds with contaminated animal tissues or fluids. Young animals may become infected in utero or through nursing from an infected mother. Infection through inhalation of contaminated aerosols is also possible.

The mode of transmission of *B. ceti* and *B. pinnipedialis* among marine mammals has not been definitively determined. Close contact during mating, ingestion of fish, and lung worms are suspected to play roles.

Serological tests for antibodies to *Brucella* bacteria can be used for population surveys in wildlife to determine exposure but are not reliable for definitive diagnosis.

PRECAUTIONS AND PREVENTION Brucellosis is a nationally notifiable disease with zoonotic potential. The USDA Brucellosis Eradication Program works to control the infection in cattle and swine in the US with vaccination and herd management plans.

In humans, brucellosis is known as undulant fever and results in flu-like symptoms. The disease is an occupational and recreational hazard; veterinarians, hunters, cattle and pig farmers, slaughterhouse workers, wildlife biologists, and consumers of raw milk are at highest risk of exposure. Personal protective equipment to prevent skin and mucous membrane contact with contaminated tissues/fluids and inhalation of aerosols during field dressing, butchering, and necropsies can limit exposure. Cooking meat to an internal temperature of 160 °F and pasteurization of milk kill the bacteria, but freezing, smoking, and pickling do not. Dogs should not be fed offal from game. The bacteria are readily killed by common disinfectants.

Below: Feral pigs infected with *B. suis* can spread infection to domestic pigs.