



## Canine Brucellosis and Human Health Questions and Answers for Veterinarians

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- **WHY IS CANINE BRUCELLOSIS IMPORTANT FROM A PUBLIC HEALTH PERSPECTIVE?**

Canine brucellosis, caused by *Brucella canis*, is a significant cause of reproductive failure in dogs, but it is also a zoonotic disease. Veterinarians are urged to educate their staff and their clients, particularly those who own breeding kennels, about this disease and its potential to cause illness in humans. In Wisconsin, canine brucellosis is reportable to the Office of the State Veterinarian.

- **HOW IS CANINE BRUCELLOSIS TRANSMITTED?**

1. **Dog to Dog:** In infected dogs, *B. canis* is predominately present in the placenta, the fetus and fetal fluids, vaginal discharge and secretions, semen, milk, urine, feces, saliva, and nasal and ocular secretions. Most dog-to-dog transmission occurs by oronasal contact with vaginal discharge of an infected female during estrus, breeding, abortion, or whelping. Transmission occurs through contact with oral, nasal, conjunctival, and genital mucous membranes, abrasions in the skin, and via placenta. It is also commonly transmitted through semen or urine, and can be shed by intact or castrated males for several years in cases of chronic infection.
2. **Dog to Human:** Dogs are the only natural reservoir of *B. canis*. The most common way humans become infected is through contact with birthing fluids, canine abortion products, or vaginal discharges from an infected dog. *Brucella canis* can be transmitted if these infectious materials contact a person's mucous membranes or abraded skin. The organism can also be present in canine urine, feces, and nasal secretions, although typically in lower concentrations than in reproductive fluids. Nevertheless, it is likely that humans can become infected through exposure to all these materials. *Brucella canis* is a relatively resistant bacterium and can survive for several months under conditions of high humidity and low temperatures with no exposure to sunlight. Therefore contaminated dust and dirt, water, feces, clothing, and other fomites can pose a transmission risk for a prolonged period of time.

- **WHAT ARE THE SYMPTOMS IN DOGS?**

Brucellosis is a reproductive disease of dogs commonly causing abortion between the 45th and 59th day of gestation. Other typical reproductive symptoms in dogs include failure to conceive in an otherwise healthy bitch; infertile males with abnormal semen quality; testicular atrophy and scrotal dermatitis. Non-specific symptoms for both sexes include lethargy, loss of libido, premature aging, and generalized lymph node enlargement.

- **HOW DOES A VETERINARIAN DIAGNOSE *B. CANIS* INFECTION?**

1. **Serologic tests:** Serology is most commonly used to diagnosis *Brucella* species but these tests are imprecise because the majority test for surface antigens that cross-react with antibodies of non-pathogenic bacteria. Most veterinary assays use some form of agglutination test such as the slide agglutination (SAT), tube agglutination, agar gel immunodiffusion, or microtiter agglutination. In order to reduce nonspecific reactions on agglutination assays, serum can be treated with 2-mercaptoethanol (2-ME) to eliminate the less specific IgM antibody. This is incorporated into the procedure for the rapid slide agglutination test (2ME-RSAT). Additionally, since suspensions of wild-type *B. canis* tend to aggregate even in the absence of specific antibodies, some tests use a less mucoid mutant strain (designated M-), which does not produce autoagglutination and can be used to reduce the number of false positive results. This test is called M-RSAT.
2. **Antigen detection:** Culture should always be attempted when brucellosis is suspected since it is the only definitive way to make the diagnosis. Bacteremia typically persists for months but can be intermittent, so serial blood samples should be collected if an initial culture is negative. Additionally, aborted fetuses and placental tissue (fresh, non-fixed) can be submitted for bacterial culture.



*Brucella* species in culture are highly contagious in a laboratory setting. Therefore, it is imperative that you label the specimen as a suspect for brucellosis and call the lab for further details. Additionally, laboratories should incubate culture plates for a longer period of time to allow for the relatively slow growth of *Brucella*.

- **WHAT ARE THE RISKS TO HUMANS OF AN INFECTION WITH *B. CANIS* ?**

Reports of human illness due to *B. canis* are uncommon. However, it is likely that infections in humans are significantly underdiagnosed and under-reported due to the nonspecific presentation of the disease and the lack of readily available laboratory testing. Non-specific manifestations such as fever (often periodic and nocturnal), fatigue, headache, weakness, malaise, chills, sweats, weight loss, hepatomegaly, splenomegaly, and lymphadenopathy can occur. Other more serious manifestations have been described. These include septic arthritis, aortic valve vegetations, lower extremity aneurysms, osteomyelitis, epidural abscess, and culture negative endocarditis.

- **WHAT ADVICE SHOULD I GIVE TO OWNERS OF BRUCELLOSIS POSITIVE DOGS ?**

1. **Kennel situation:** Canine brucellosis poses a health risk for kennel workers as well as being economically detrimental to a breeding kennel. There is currently no vaccine available for *B. canis*. The only proven method for eradication in kennels is to test all dogs and eliminate the confirmed positives. Treatment is expensive and relapse is common, even after continual use of antibiotics. The best preventative measures include yearly testing of all breeding stock, testing all dogs introduced for breeding, and only breeding non-infected dogs.
2. **Household Pets:** Owners should be informed of the health risk posed by keeping a dog infected with *B. canis*, and should be urged to consult with their physician, especially if there are immune compromised persons, pregnant women, or young children in the household, since such individuals may be at greater risk for infection and severe illness

Before making a decision to keep the dog, owners should know that the animal must be neutered in order to reduce the risk of transmission. However, owners should be cautioned that neutering alone does not remove the *B. canis* organism from the body. Neutering should be followed by a four to six week course of antibiotic therapy and subsequent retesting for brucellosis because treatment failures may occur. Antibiotic treatment is frequently not effective in male dogs because the prostate and epididymis can remain chronically infected.

Owners who elect to keep an infected dog should take precautions to avoid infection. Use of liquid-impervious gloves and eye protection are suggested when assisting whelping females, followed by thorough handwashing. Surfaces or areas contaminated with birthing fluids, vaginal discharge, urine, or nasal secretions should be disinfected after a careful cleaning (wear gloves, wash hands afterwards). *Brucella* species are readily killed by most commonly available disinfectants including hypochlorite solutions, 70% ethanol, isopropanol, iodophores, and phenolic disinfectants; however, organic matter and low temperatures decrease the efficacy of disinfectants.

Persons who believe they have been exposed to *B. canis* should be aware of the signs and symptoms of brucellosis (see above) and consult with their medical provider if they become ill. It is important to know that currently available human serologic tests do not have the capability to detect antibodies against *B. canis* because its surface antigens differ from other *Brucella* species. Therefore, testing should include a blood culture (collected prior to antibiotic administration), instead of routine serology.