

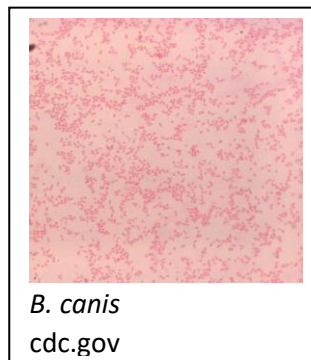
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Brucella canis Infections

Although uncommon in this country, brucellosis can result in significant morbidity. While dogs can become infected with various *Brucella* spp., they serve as the primary host for *B. canis*. Few human cases of *B. canis* have been documented, although it is unclear if this reflects lower virulence than other *Brucella* species, or the result of difficulty in diagnosis.



Background

Brucella species can infect various domestic animals with occasional spill-over infections in humans, carrying the potential for severe illness. *B. canis* is a gram-negative non-motile aerobic intracellular coccobacillus that is transmitted among dogs by mucosal contact with infected material. Vaginal discharges, semen fluids and tissues associated with birth and abortion contain the highest concentrations of the bacteria. However, urine, blood, milk, saliva, and feces also contain organisms. Typically, there is a low risk of infection for persons in contact with infected animals; there are currently no serological tests to detect antibodies to *B. canis* in humans so diagnosis is a challenge.

Risks for infection is greatest for persons handling aborted animals or reproductive tissues, or treating animals undergoing parturition. Other high-risk activities may include surgical or aerosol-generating procedures, collection of clinical specimens from infected humans or animals, or handling of specimens in laboratory settings. Routes of transmission are inhalation, oral or mucous membranes, or contamination of broken skin.

Brucellosis results in varying clinical manifestations. The initial symptoms are non-specific, including fever, sweats, loss of appetite, fatigue, headache, backache, and pain in muscles or joints. Chronic infection may result in recurrent fevers, arthritis, endocarditis, scrotal or testicular inflammation, granulomas in the brain causing various neurologic presentations, and liver or spleen abscesses. Appropriate treatment is with extended therapy, typically using dual antibiotics.



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Brucella canis Morbidity

Brucella canis is an important cause of reproductive failure in dogs, especially in kennels. Infections can result in abortions and stillbirths in female dogs and epididymitis, prostatitis, orchitis, and sperm abnormalities in males. Even after antibiotic therapy, *B. canis* may persist in a treated animal. *B. canis* has been reported globally, including in North, Central and South America, as well as parts of Asia, Africa, and Europe.

Limited data is available on seroprevalence in the United States, and prevalence likely varies geographically. However, the incidence of *B. canis* infection within the dog breeding industry appears to be on the rise. A recent serosurvey of 1,080 dogs from commercial breeding kennels in Ontario, Canada, identified 12% positivity. A similar study conducted in Michigan identified rare infections in animals from noncommercial breeders (0.4%), but at commercial facilities prevalence was higher (9%-83%). Within the United States, southern states appear to have a higher prevalence of infection compared to the rest of the country.

Once an animal has had confirmatory testing performed, recommendations for follow-up generally involve either euthanasia or castration/spaying and antibiotic treatment. Pet animals must remain isolated at home until treatment is completed; however, infection can persist even following antibiotic treatment, requiring serial monitoring of agglutination titers and ongoing hygiene precautions.

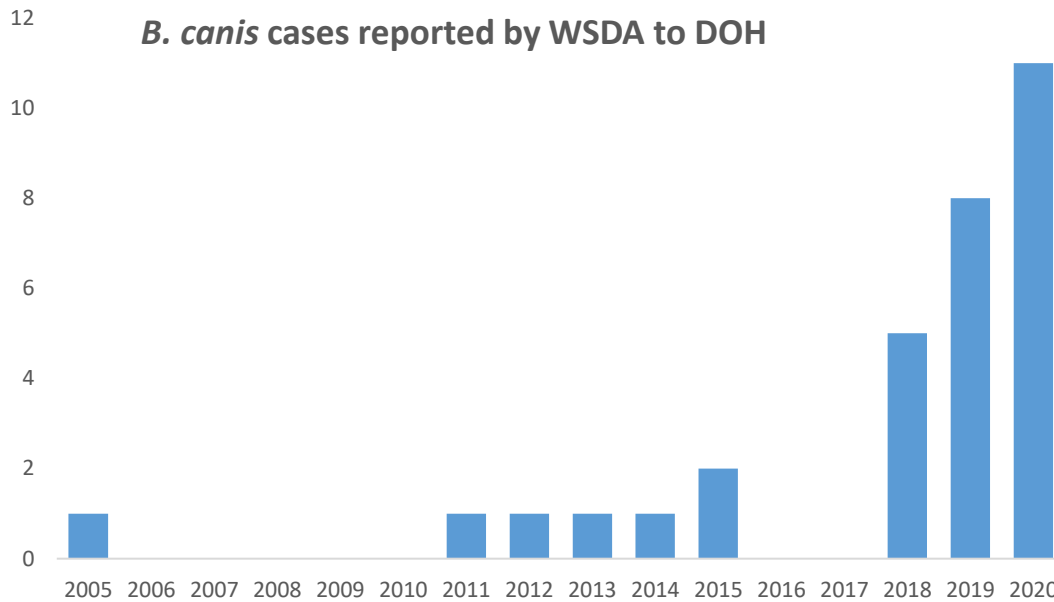
A particular concern with *Brucella* is the risk of exposure through aerosolization. Laboratory workers potentially exposed to aerosolization from an open petri dish with a *Brucella* culture generally need health monitoring, serologic monitoring, and prophylactic antibiotics; however, serologic monitoring is currently unavailable for *B. canis*. This lack of diagnostic testing, combined with non-specific symptoms and an incubation period up to five months, pose challenges to diagnosis and reporting of human cases. Isolation of the organism, particularly from the blood, is diagnostic. Due to the risk of laboratory transmission, suspected *Brucella* cultures should be handled under special precautions and require special shipment. The organism is slow-growing, forming small colonies. PCR detection can be done on clinical specimens.

B. canis Infections in Washington State

B. canis infections in animals are reportable to the Washington State Department of Agriculture (WSDA). WSDA routinely reports infected animals to Department of Health (DOH). The number of cases of canine brucellosis have increased in recent years in Washington. It is currently unclear whether this increase is due to improved awareness among veterinarians leading to more diagnostic testing, improved reporting to WSDA, or a true increase in prevalence. There is some concern that increased importations of dogs originating from the southern United States or countries with higher prevalence of *B. canis* are contributing to this increase. Of canine cases reported in Washington from 2005 through 2020, 54% originated from other US states (TX, OK, GA, CA, AZ, NM, MT, HI), 23% originated internationally (Mexico, China, South Korea), 12% originated from breeders in Washington, and 12% had an unknown origin.

The poster features a photograph of several dogs of various breeds. Below the photo is a map of the United States with a red dot indicating the location of a kennel. The text on the poster includes the USDA logo, the title 'Brucellosis and Dog Kennels: What Breeders Need To Know', and a list of key points: 'Remember: it's up to you to protect your dogs from brucellosis.', 'Know the facts about the disease.', 'Watch for signs—but know that many dogs never show signs.', 'Work with your veterinarian to test your dogs.', and 'Maintain good biosecurity and use safe cleaning techniques.' The poster also includes the USDA Animal and Plant Health Inspection Service logo and the program aid number 2005.

https://www.aphis.usda.gov/animal_welfare/downloads/CanineBrucellosisBro-finalfp.pdf



Upon report, WSDA works with the diagnosing veterinarian to collect information on the affected animal and to assist with testing and treatment recommendations. DOH works with local health jurisdictions (LHJs) to identify potentially exposed humans and implement recommendations for prophylactic treatment and symptom watch, as appropriate. Determination of appropriate follow-up measures is complicated by limited surveillance data on human infections of *B. canis*, largely resulting from unavailability of serologic testing.

Additional sero-prevalence studies are needed to better understand the changing distribution of this zoonotic pathogen in the US. The limited information available in Washington indicates that prevalence may be increasing, possibly increasing risk of brucellosis in pet owners, breeders, veterinarians, laboratorians, and other persons handling domestic animals and their clinical specimens. Both human and animal healthcare practitioners should be aware of this possible increase in risk and remain vigilant for clinically and epidemiologically consistent cases.

Resources

<https://www.cdc.gov/brucellosis/pdf/brucellosi-reference-guide.pdf>

https://wwwnc.cdc.gov/eid/article/24/8/17-1171_article

https://www.cfsph.iastate.edu/Factsheets/pdfs/brucellosis_canis.pdf

https://www.aphis.usda.gov/animal_welfare/downloads/brucella_canis_prevention.pdf

<http://www.nasphv.org/Documents/BrucellaCanisInHumans.pdf>

Serosurvey data: https://wwwnc.cdc.gov/eid/article/26/12/20-1144_article#:~:text=In%20Canada%2C%20Brucella%20canis%20has,broader%20commercial%20dog%20breeding%20population and

<https://avmajournals.avma.org/doi/full/10.2460/javma.253.3.322>