Animal & Plant Health Agency

Canine Brucellosis: Summary Information Sheet

1. Introduction

This document has been adapted from a Canine Brucellosis Q&A published by the Wisconsin Department of Health Services, Division of Public Health and revised for the UK context. The following text represents disease specific advice for responsible dog owners rather than an official statement of government policy. This document may be revised in future as more information about *B. canis* in the UK becomes available, so please check the APHA website regularly to ensure you have the most up to date version.

Canine brucellosis is an infectious disease caused by the *Brucella canis (B. canis)* bacterium. *B. canis* is the most common *Brucella* species found in dogs although other *Brucella* species can also cause infection. In countries from which most imported dogs into the UK originate, any *Brucella* infection is predominantly due to *B. canis*. As there are no other species of *Brucella* present in UK terrestrial animals, *B. canis* is the most likely cause of a dog in the UK having brucellosis, whether imported or born in the UK. *B. canis* can also infect humans and cause disease.

2. Frequency of occurrence in the UK

Fortunately, this disease is currently uncommon in the UK. However, cases appear to be rising due to increasing numbers of untested imported dogs, some of which are infected. Because of mixing and breeding, the first identified cases of within-UK transmission of this disease have now occurred.

3. Clinical signs of canine brucellosis in dogs

In female dogs, brucellosis usually causes abortion between the 45th and 59th day of the first pregnancy following infection. Subsequent pregnancies are more likely to reach full term, although pups may be weak and more likely to die shortly after birth. Other puppies in the same litter may appear healthy but develop brucellosis later in life. Other common reproductive issues include failure to conceive in an otherwise healthy dog, infertile males with abnormal semen quality, and enlarged and painful testicles and epididymis that may subsequently decrease in size in chronic infection. Non-specific symptoms for both sexes include: lethargy (decrease in activity, appearing depressed), loss of libido, premature aging, lameness (particularly back pain), and generalized lymph node enlargement. However, in many cases the disease may show no clinical signs. Dogs with no clinical signs can still be infectious and therefore a vehicle of disease transmission. Outwardly healthy infected dogs are also at high risk of going on to suffer clinical disease later in their life.

4. Transmission of infection between dogs

Canine brucellosis is primarily a reproductive disease although non-reproductive routes of transmission are also possible. The most common routes of transmission of infection between dogs are:

- Through mating.
- Contact with products of conception from an infected dog e.g. abortion material and birth products.
- Vertical transmission (from mother to pup) within the uterus and/or from ingestion of infectious milk

from the mother (all puppies will have been exposed and are at high risk of infection).

- Contact with vaginal discharges, both oestrus fluids ("menstrual" blood) when a bitch is in heat/ season and those shed for several weeks (following an abortion or apparently normal birth).
- Contact with infectious seminal fluid; then, to a lesser extent, contact with infectious urine (as infected dogs may excrete *B. canis* in the urine).
- Contact with non-"menstrual" blood, which may also be infectious.
- To a lower extent faeces, saliva, or nasal secretions which may be infectious although this is unusual.

In general, mature sexually intact animals are more at risk of infection and are also more infectious. Dogs that are neutered present a lower, but not negligible, risk of transmitting disease. Dogs with clinical signs of disease may also be more infectious. Dogs in transient contact with infected dogs, for non-breeding purposes, are unlikely to become infected on a single given occasion. However, multiple contacts or sustained contact increases the risk accordingly. Time spent in the environment where any of the above infectious material exists is also a risk, even without direct physical contact with an infected dog.

5. Management of infected dogs

- **Euthanasia:** it is very difficult to cure an infected dog, and if it is suffering from disease caused by *Brucella canis* then euthanasia may be the only way to stop it suffering. Once infected the only way to eliminate the risk of disease transmission is euthanasia, whether or not the dog is showing clinical signs.
- **Treatment:** treatment is not recommended. If owners choose to pursue treatment it is important to note that this can be expensive as it involves several weeks of therapy with antibiotics. Antibiotics in combination (often referred to as dual antibiotic therapy) provide the best option but even this is often unsuccessful at eliminating the infection. There is also no way of determining that treatment has been successful. Recurrence of disease is common, even after continual use of antibiotics as the bacteria can hide in parts of the body that are hard for antibiotics to reach. Therefore the dog may remain infected, be susceptible to recurrence of illness and be an ongoing source of infection for other dogs and humans even if outwardly healthy.
- **Neutering:** neutering of the dog (male or female) can reduce transmission risk, but this procedure alone has not been proven to eliminate the risk of transmitting infection to others because it does not remove the bacteria from the body.
- **Antibiotic treatment and neutering:** antibiotic treatment before neutering reduces the transmission risk to the veterinary surgeon undertaking the surgery, and minimises a potential infection flare up in the immediate post-surgery period. This combined approach also offers the best chance of eliminating infection from the dog itself but there remains no guarantee.

6. What to do before importing a dog, or breeding from an imported dog

If importing a dog from abroad, especially a rescue dog or a dog that has or may have bred before, then it is advisable that the dog is tested for brucellosis in addition to testing for other diseases prior to import. This will help to avoid bringing infected animals into the country (see 'Testing dogs for canine brucellosis' section for more detail). Infected dogs will be an infection risk to other dogs in the UK, their owner's family, veterinarians and veterinary staff, and anyone else coming into contact with the dog.

Any newly acquired dog suspected of being infected should be quarantined (kept away from other dogs and people other than their owners) until testing is complete. Before breeding any dog, owners should be sure that neither the male or female dog are infected. If there is doubt (for example they may have been imported from a country where canine brucellosis occurs or have previously mated with a dog from such a country or are a contact of a confirmed case) they should be tested for the disease. This involves a blood (serology) test. Dogs should not be bred if they test positive for brucellosis. If the dog has only recently been imported or bred with an imported dog then testing on more than one occasion may be necessary to determine if it is infected. A negative test result from testing at least 3 months after potentially becoming infected should mean the negative test result can be relied on for an adult dog, but a young dog may not test positive after being infected until it is an adult (if at all). If there remains any suspicion that a dog may be infected, the dog should not be bred from.

7. Testing dogs for canine brucellosis

No test can determine infection status with 100% accuracy. Test results must be considered alongside additional evidence, such as clinical signs, movement history and infection status of contact and related dogs (e.g. siblings, parents and dogs the individual has mated with or been in close contact with when giving birth or aborting) in order to determine the infection status of the dog in question.

Some tests aim to detect *B. canis* directly (bacterial culture) or detect specific DNA from *B. canis* (PCR). However, blood samples from infected dogs may not always contain *B. canis* or its DNA, so a negative result from these tests is not a sufficient guarantee of absence of infection. Successful culture of *B. canis* is definitive evidence of infection. Indirect tests aim to detect antibodies in the blood that are specific to *B. canis*, these are known as serological tests. Positive serology results provide evidence of a current or previous *B. canis* infection that the dog's immune system has responded to, even if *B. canis* is not directly detected. However, detectable antibodies against *B. canis* are not produced by all dogs. This may be more common in puppies because their immune system may not have been sufficiently developed when they were first exposed to *B. canis*. The GB National Brucella Reference Laboratory at Animal & Plant Health Agency, Weybridge recommends serological testing in most cases in order to obtain results with the most reliable sensitivity. This would also apply for any pre-import testing. Antibodies are typically produced within 2 weeks of infection, however it may take up to 3 months. Therefore, if there is suspicion of infection, a blood sample should be taken for serological testing 3 months after the dog in question was last in contact with an infected dog or infectious material. This provides the highest confidence that a negative result is a true indication of a dog's infection status. Bacterial culture or PCR from suitable clinical material is diagnostically effective (e.g. materials from abortion or birth or a vaginal swab from an animal shortly after giving birth).

8. How brucellosis spreads from dogs to people

B. canis can infect humans, although it is not commonly reported even in areas of the world where the level of *B. canis* in dogs is relatively high. Most contact with infected dogs carries a low risk of infection but people who come into contact with large numbers of *B. canis* bacteria are at higher risk, such people include dog breeders and others who assist dogs when their puppies are being born, if the dog is infected. People who have a compromised immune system, young children and pregnant women may be at higher risk of severe disease if they acquire the infection. Although *B. canis* is less infectious to people than it is to dogs it can still cause disease. The symptoms of human infection are different from those experienced by dogs. Human to human transmission of infection is very rare.

The most common way humans become infected is through contact with birthing fluids, abortion products, afterbirths or vaginal discharges from an infected dog that has recently given birth or aborted, as this material contains very high quantities of *B. canis*. *B. canis* can be transmitted if these infectious materials come into contact with a person's mucous membranes (e.g. eyes, mouth) or an area of broken/damaged skin. It can also be transmitted if infectious aerosols (airborne droplets containing *B. canis*) are generated and are inhaled, which can occur during specific veterinary and laboratory procedures involving an infected dog.

B. canis can also be present in canine urine and milk, although typically in lower concentrations than in reproductive fluids. *B. canis* is present in even lower concentrations in non-"menstrual" blood, faeces, nasal secretions and saliva. The risk of transmission via these materials is therefore much lower. However, prolonged or repeated contact or exposure to potentially infectious material will increase the risk of infection compared to a one-off event. *B. canis* bacteria can survive in areas with high humidity and low temperatures with no sunlight for long periods of time. Therefore, dust, dirt, water, clothing, and other inanimate objects which have been contaminated with high risk infectious fluids can pose a transmission risk for a prolonged period of time, possibly several months.

To clean infectious, or potentially infectious material or environments it is important to take precautions to minimise the risk of acquiring infection during cleaning and to promote effective disinfection as a result of the cleaning. The following advice will help to achieve this.

- Avoid direct contact with materials freshly soiled with an infected dog's urine or reproductive fluids (e.g. "menstrual" blood, fluids following birth or abortion) though use of personal protective equipment (PPE) such as: disposable gloves (such as nitrile or rubber gloves) to avoid direct contact, eye protection to avoid splashes of material into the eyes and a mask to restrict inhalation of infectious aerosols. Ideally, disposable water-resistant aprons and overshoes should also be worn.
- Clean the environment regularly while using personal protective equipment (PPE) such as listed in bullet point above.
- Hard surfaces should be cleaned using warm soapy water followed by a hypochlorite solution containing 1,000 ppm (parts per million) of chlorine which is to remain in contact with the surface for a minimum of 10 minutes. Rinse with clean water and dry. Household bleach is typically a hypochlorite solution which has a concentration of between 30,000 to 80,000 ppm of chloride (3-8%). Therefore, to prepare a 1,000 ppm chloride solution dilute the bleach 1 in 30 or 1 in 80 in water respectively.
- Soft furnishings and carpet to be cleaned using steam cleaner.
- Full deep clean twice a week advised for area(s) where dogs are kept, to maintain cleanliness and reduce bacterial load, particularly in enclosed spaces and for positive dogs.
- Any contaminated clothing should be safely disposed of or washed at high temperatures (60°c or more). Any fabrics contaminated with high risk materials should be safely disposed of.
- Care should be taken to minimise splashes or generation of aerosols (small airborne liquid droplets), to minimise the potential for infection via inhalation or via the mucus membrane of the eye as there is a risk these may contain *B. canis.*

9. Symptoms of brucellosis in people

Symptoms are often mild and non-specific. The most common signs and symptoms of human infection include a continued, intermittent, or irregular fever sometimes accompanied by loss of appetite, weight loss, sweating, headaches, fatigue, back and/or joint pain. If not treated the disease may become chronic and more serious symptoms can arise.

10. Actions to take if you suspect you've been at risk of infection

People who believe they may have been exposed to *B. canis* should be made aware of the signs and symptoms of brucellosis and if concerned consult their GP and alert them of their possible exposure to a dog with *Brucella canis* **specifically** (as serological tests for infection with other *Brucella* species will not detect antibodies for *B. canis)*. Signs of illness can occur within one week but up to six months after exposure. On average, signs and symptoms will begin within three to four weeks following infection.

Blood sampling may be carried out if risk of infection is assessed to be more than low. This is likely to be tested using serological methods and possibly also PCR, with either a single test or a series of tests, depending on initial results and risk assessment. Bacterial culture might be considered in some circumstances, depending on clinical symptoms assessed by a doctor. Precautionary (prophylactic) antibiotic treatment is only recommended if there has been a high-risk exposure within the preceding 72 hours. If brucellosis is diagnosed the treatment is dual antibiotic therapy for a period of several weeks. This is effective if completed as per medical advice.

11. Preventing transmission of disease to people when dogs are infected

Currently there is no vaccine available for canine brucellosis to protect either dogs or people. For infected dogs, there are measures that owners can take to reduce the risk of humans or other dogs acquiring the infection. However, it should be noted that only euthanising the infected animal can be considered absolutely effective in terms of stopping potential future transmission of infection by that animal.

No breeding should be undertaken with infected dogs as breeding will result in events presenting high risk of exposure, i.e. abortion or birth. If a pregnant dog is suspected of being infected, obtain veterinary advice as soon as possible. As a minimum, PPE as described above in the top bullet point of section 8 should be worn. Gloves should be worn when handling puppies up until they have weaned, to avoid contact with any infectious material from the mother's milk or vaginal secretions.

Even in the absence of breeding, direct contact with infected reproductive secretions, blood and urine should be avoided. When disinfecting kennel areas and runs used by infected dogs, personal protective equipment including gloves, facemasks and eye protection should be worn, as described in the paragraph above, to prevent any material from entering the mouth or eyes.

If infected dogs are not euthanased then they should be neutered (if not already castrated/ spayed) whilst being treated with antibiotics. Infected dogs should ideally be tested for *B. canis* regularly for the rest of their life as stress or other disease may affect their likelihood of transmitting *B. canis* or developing clinical disease caused by *B. canis*. If the dog's serological result (titre) increases on subsequent testing, or it develops illness with clinical signs consistent with infection due to *Brucella canis,* its management should be re-considered.

Life-long control measures are advised for all dogs with *B. canis,* even if subsequent test results are negative. The control measures include:

- Avoid contact with other dogs and environments shared by other dogs.
- Practice good hygiene. Wear gloves when cleaning up areas contaminated by dog faeces or urine and wash hands thoroughly when done. Properly dispose of dog waste, and launder potentially contaminated clothing or dog blankets regularly at high temperatures. Contaminated wet areas can be dried and disinfected with a 1% bleach solution (see bullet in paragraph 8 regarding use of bleach and how to dilute it).
- Limit the dog's contacts to as few people as possible. Do not allow the dog to lick people or other dogs.
- If:
  - you change vets
  - your dog is referred to a specialist veterinary practice for investigation or treatment
  - you put your dog in kennels or doggy day care or place it with a fosterer or ask a relative or friend or neighbour to look after your dog
  - you attend a facility with your dog where other dogs are present at the same time, or will be immediately before or after

  then you must ensure the person in charge is aware of your dog's infection status in advance so they can take appropriate steps to protect their own health and the health of other people and dogs that may be present.

12. Who to contact if you suspect your dog is infected with *Brucella canis*

You should contact your private veterinary surgeon. As this disease has only recently been introduced into the UK your vet may not initially be very familiar with it. Please take along this leaflet to any consultation. Your vet can contact the Animal and Plant Health Agency to obtain further information and advice. Your vet can also arrange for any testing to be done. If a laboratory test is positive for *B. canis* infection or your vet considers *B. canis* infection is the most likely diagnosis, you should also contact and inform your local Health Protection Team who will provide public health advice. In England, Scotland and Wales a positive laboratory diagnosis of *B. canis* must by law be reported to the Animal & Plant Health Agency.

13. Other animals at risk of infection with *Brucella canis*

B. canis seems well adapted to causing disease in canines (i.e. dogs and other similar species such as foxes and wolves) and is not very effective at causing disease in other species. Apart from in people, disease in other animals is exceptionally rare. Cats have been reported to produce antibodies to *B. canis* but no disease in cats due to *B. canis* has been reported. Other UK-living species, for example horses, pigs, cows, sheep, goats and birds appear resistant to infection. Testing of non-canine animals is not recommended. The exception to this might be testing of other mammalian carnivores if there has been significant high exposure, for example contact with birth or abortion products.