



***B.canis* in Europe: Gaps and
challenges in controlling the
spread**

Summary

COHESIVE/IDEMBRU



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Purpose	Minutes
Group	COHESIVE/IDEMBRU

Participation

List of attendees

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Section 1: disease overview and country introductions

Presentation by Fabrizio de Massis

Presentation highlights

- Brucella is a coccobacilli short rod gram-negative bacterium, found on all continents other than Antarctica and Australasia, with a range of susceptible hosts including dogs, wolves, racoons, rabbits, cats, rodents and humans.
- It is transmitted through contact with foetuses/fetal membranes/placenta/abortion material including from milk, fomites and urine
- Symptoms include late abortion, prolonged vaginal discharge, infertility, epidymitis, sperm anomalies and painful urination. It can cause Lymphdenitis, resulting in fever, loss of appetite, stiffness, and lameness; but could also be asymptomatic.
- In humans it is often asymptomatic, with effective antibiotic treatment and low mortality

- Treatment includes antibiotics (eg: tetracyclines like doxyxyclyne)

Discussion highlights

- Experience in Canada has been that bacteremia does not seem persistent in clinically normal carriers, resulting in few positives from PCR or blood culture. It is common to find it during active reproductive disease, sporadic with active discospondylitis and rare otherwise.
- A similar trend is seen in Germany, where most positive cases in dogs are based on follow-up from clinical signs.
- In France, however, a seropositive (sub-clinical) dog was detected with bacteria in their semen.
- Doxycycline is a drug commonly used against the disease in growing animals and humans.

Presentation by Claire Ponsart

Presentation highlights

- A survey was conducted with 15 questions sent to different laboratories, including EU national reference labs, OIE labs and private laboratories – 27 responses were received.
- Most answered that they believed *B.canis* was not endemic in their country.
- The modal number of samples tested for the disease was >50 and the modal confirmed cases was 0.
- A range of other findings were made. Key gaps included the lack of legal basis, standardisation, surveillance, import control, and training.

Discussion highlights

- A comment was made that the perceived prevalence from the map of Europe was the proportion of submitted tests being positive and therefore may be biased.

Section 2: Testing

Presentation by John McGiven & Alessandro Gerada

Presentation highlights (John McGiven – animal testing)

- Culture is the gold standard for testing specificity to *B.canis*. But there can be issues obtaining test analyte in the sample (same for PCR) hence these are not reliable to rule out the disease.
- Serology is more sensitive than cultures or PCR, but there are many methods/platforms/antigen types which makes interpretation of serology challenging.
- Some validation work has been to compare Tube agglutination, Immuno-fluorescence assay, rapid slide agglutination tests, i-ELISA, and lateral flow immunoassays with ranging sensitivity for each
- Work still to be done on improving standardisation, assay technology, test interpretation and testing algorithms (with the integration of PCR and culture)

Presentation highlights (Alessandro Gerada – human testing)

- Discussed the challenges of human testing, due to lack of standardisation and validation
- Described the results of human post-exposure testing over the past year in the UK
- Overall view of serological response suggesting exposure/subclinical infection, but no patients reported to be unwell/treated.

Discussion highlights

- Reference was made to the relative virulence of *B.canis* compared to other Brucella species. This is uncertain, but the disease undoubtedly causes serious harm to dogs.
- The low evidence of spread in high-risk populations and the absence of concerns raised by physicians point to low human virulence.
- However, the lack of awareness, low levels of human testing, and the potential response to empirical treatments such as doxycycline make any conclusions highly uncertain.
- The core differentiator of *B.canis* with regards to human contact was examined to be the extended contact dogs have with humans.
- There was one case reported in Brazil of a child infected with *B.canis* from their dog presenting clinical signs.
- However, there is also evidence that even people working in infected kennels (ie: with high exposure) had no human positives.
- The risk to humans has been explored in the HAIRS report:
<https://www.gov.uk/government/publications/hairs-risk-statement-brucella-canis>
- Reference was also made to the issues identifying *B.canis* using the MALDITOF, where it will identify *B.canis* as *B.abortus* unless you have the *B.canis*-specific spectra.
- For humans, testing is also limited to vet tests and antigen tests. If the GP has prescribed antibiotics this could inhibit the efficacy of tests.
- However, the MALDITOF (VITEC and Brooker systems) have, or soon will have the ability to identify brucella to the genus level without the need for a special database. MALDITOF can provide the genus, and a follow-up PCR will confirm the species.
- Suspicion and subsequent testing in some labs is based on a combination of clinical signs and countries of origin. In suspicious cases, these labs will run microbiology and antigen tests.

Section 3: Spread

Presentation by Claire Ponsart

Presentation highlights

- At the large scale, spread between kennels and countries is dependent on country-level prevalence, transmissibility, probability of investigation, and level of trade.
- In Europe, Hungaria, Slovakia, and Spain (68%) were the main countries of origin, with 71% of exported dogs going to France, Germany and the UK.
- SNP-typing and WGS can be used to trace back cases of *B.canis* to their original point of incursion.

Discussion highlights

- Whole genome sequencing can be used for trace-back, commonly with multi-locus variable number tandem repeats analysis.
- Multi-locus sequence typing schemes are also available. However, with the abundance of new strains, whole genome sequencing is done manually.

Presentation by Vitaliy Bolotin

Presentation highlights

- *B.canis* is circulating among stray and breeding dogs in Ukraine

- More detailed studies to provide strategies for controlling of canine brucellosis and disease outbreaks in kennels in Ukraine are needed.
- It is important to control canine brucellosis in our country by testing serologically of dogs before mating and to provide quarantine requirements for all animals entering from abroad.

Discussion highlights

- The EU does not have a common legislative framework to handle this threat, and each country is left in large part to devise their own strategies.
- Many countries including Romania have a stray cat or stray dog management problem, and there is no streamlined legislation for managing stray animals.
- In Ukraine, any legislation on canine brucellosis is not well regarded and few pay attention to disinfection.
- Stray dogs in Ukraine may, as in Romania, be a significant source of infection but surveillance is low so it's difficult to tell this for sure.
- Strays also provide an additional layer of complexity to an already complex spread mechanism.
- Spread through environmental contamination was also raised, and understanding the timeframe after which dogs will no longer be infected from the environment after an outbreak is an important data-gap in understanding disease spread in kennels.
- Spread through the human population is undocumented.
- In looking at the overall prevalence in humans, it can be difficult to know what this actually is without looking specifically for *B.canis* at the population level.
- Sampling the human population runs in to ethical issues when we are uncertain of what an asymptomatic positive means for a patient in the long term.
- The disease may have high impact, for example, on fertility in humans.

Section 4: Control

Presentation Vanessa Visser

Presentation highlights

- *B.canis* is notifiable by Dutch Animal Law.
- 72 cases of infected dogs from a single kennel came about from import from a third country.
- In this case administration was not complete, and it was difficult to estimate what puppies had been sold and to whom. There was no eradication program or possibilities for human testing.
- Most recent cases have been found from imported dogs. If these dogs were neutered in the country of origin, the risk was significantly reduced.

Discussion highlights

- Infection during and before pregnancy is identified as a significant concern for those working in infected kennels with potential high exposures.
- One issue is that many countries do not have a legal framework to restrict movement of dogs following the detection of a case.
- Improved public awareness is essential to controlling the disease, to help humans understand the risks to themselves and their pets.

- One method of improving public awareness is the publication of pamphlets and information sheets to the public. These must contain up-to-date information as more becomes known about the disease.
- At present in the Netherlands, public information exists as advice for pet owners, which is very general. No advice exists for the general public.
- In controlling the disease, many countries have had an ad-hoc response which was unplanned and based primarily on the opinions of experts at the time. These responses should be reinforced with coordinated formalised action plans.
- In Romania, spread through shepherding communities is common and connected to the sale of unpasteurised milk or contact with stray dogs. The rescue community relies on community awareness and with public support, the pre-export testing of dogs has recently started.
- Tracing is an important aspect of control but may not be mandatory and is in any case linked to willingness of the public to participate.
- Euthanasia is regarded as the only way to guarantee no onward transmission from an infected dog. But if other options were more effective these would be preferred.
- Around 50% of owners will choose euthanasia.
- If, without euthanasia, a dog will be confined to a single house or garden for the rest of its life, it is estimated that more would consider euthanasia. But the issue is complex and depending on the background of the dog, owners may be more/less inclined to take severe measures.
- Prophylactic antibiotics is a possible control measure for humans but cases are usually not raised fast enough because vets do not identify the disease soon enough, strengthening the need for better awareness.
- The UK only provide doxycycline as treatment.
- Mandatory or incentivised testing would also be an effective mechanism for control. Lateral flow tests would be a useful tool.
- Lateral flow tests should be accompanied by strong instruction and training to maximise their effectiveness.
- In testing many big drug companies are pulling out of human brucella diagnostics, including BioRad and BioMerriar. There is no market for these, and home-made tests may become the only option. This could, however, provide a lower legal bar for new testing protocols produced in collaboration between institutes.

Wrap up and next steps:

During the meeting menti-com questions were answered by the participants. Many opinions and suggestions were given, many thanks for that. All responses will be analysed for future activities. The most important gaps and challenges of the menti.com and the discussions in the workshop are mentioned below.

Major gaps and challenges:

- The situation is unclear in many countries. Is it already endemic?
- Legislation is scattered throughout Europe, everyone is inventing the wheel themselves and coming out with their own strategies working to a greater or lesser degree depending on the location.

- Import testing is considered an effective measure, but it is only in limited use. There are several Legal issues around this
- Another thing identified as important is that although everyone feels there are only a few cases but that everyone still feels it is important to address issues surrounding public health.
- Having good material to raise awareness with GPs, vets and others.
- Having (standardised) screening and diagnostic tests available, both for animals and humans

Next steps:

- Seed cooperation between countries and institutes
- This can be around raising awareness universally, combining efforts around development/validation/standardisation of tests and discussing raised gaps and challenges in more detail