



Canine Brucellosis: an emerging threat in Europe

PONSART C, FONTBONNE A


**FRANCE - EU/WOAH & NATIONAL REFERENCE LABORATORY FOR BRUCELLOSIS,
ANIMAL HEALTH LABORATORY, PARIS-EST UNIVERSITY/ANSES**

ENVA – UNITE DE MEDECINE, DE L'ELEVAGE ET DU SPORT (UMES)



Welcome to our webinar !

→ **Main goal: Raising awareness of vets on canine brucellosis to limit dissemination of the disease in Europe**



European Food Safety Authority

Knowledge Innovation & Partnership Management Unit

27th EMERGING RISKS EXCHANGE NETWORK MEETING (EREN)

Vienna Austria (and online streaming)
Briefing Note on Emerging Issues¹

Emergence of canine brucellosis due to infection with *Brucella canis* in different European countries (ID0xxx)² EFSA's Area³:

AUTHOR: PONSART C¹, DE MASSIS F², FERREIRA AC³, KOETS A⁴, LAHTI E⁵, MC GIVEN J⁶, SACCINI F⁷, WHATMORE AM⁸, GIRAULT G¹, FREDDI L¹, FERREIRA VICENTE A¹ AND DJOKIC V¹

In the framework of the **IDEMBRU** project = **TOOLKIT** for emerging *Brucella*

Adapted from the **Webinar** prepared for French vets, presented in July & September 2022 by C. Ponsart / A. Fontbonne

Replay : <https://vimeo.com/733219390>

1. Introduction: why is it important to investigate canine brucellosis ?



2. Epidemiology in Europe



3. Clinical signs, transmission routes




4. Diagnostic

5. Treatment / Prevention

6. Feedback on confirmed cases

7. Conclusions

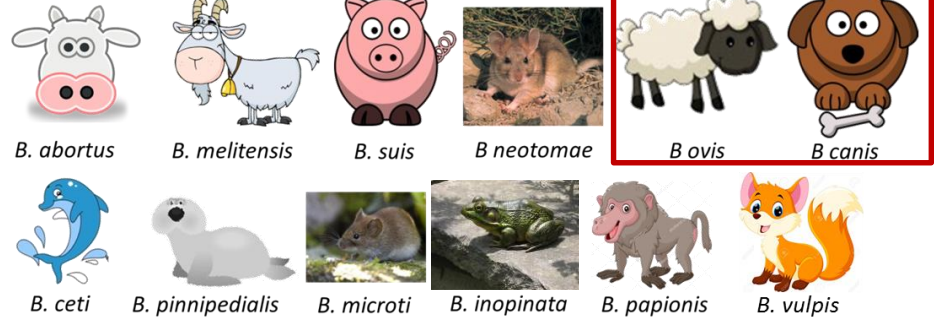


1. Introduction: why is it important to consider canine brucellosis ?

Brucellosis is a **worldwide zoonosis**

- **In animal:** reproductive troubles (abortions), arthritis...
- **In human:** undulant fever, chronic affections

Rough phenotype



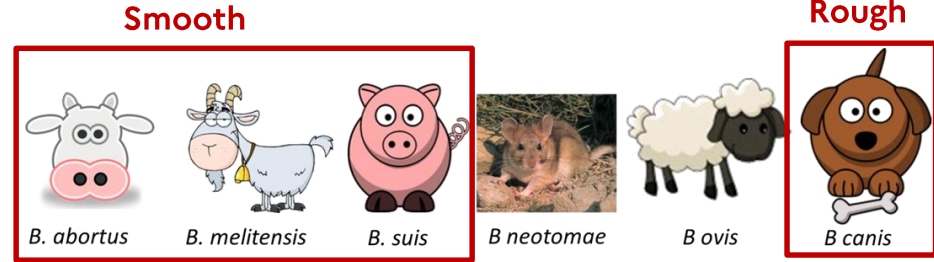
6 classical species with host preferences

- 2 types of polysaccharide (O-PS)
 → Smooth (*abortus*, *melitensis*, *suis*) vs
Rough phenotype (*ovis*, *canis*, *vaccine strain RB51*)

→ ***Brucella canis*: first identified in 1966 (USA, beagles)**

- **Smooth vs Rough species:** different serological tests, Rough considered less virulent
- ***B. canis* :** rare detected human cases (no validated serological tests for human brucellosis)

- *B. abortus* (Bovinae), *B. melitensis* (small ruminants), *B. suis* (Suidae)
- *B. canis* (the most frequent infection in dogs)



Short Communication

Isolation of *Brucella abortus* from a Dog and a Cat Confirms their Biological Role in Re-emergence and Dissemination of Bovine Brucellosis on Dairy Farms

G. Wareth, F. Melzer, M. El-Diasty, G. Schmoock, E. Elbaoumy, N. Abdel-Hamid, A. Sayour, H. Neubauer

First published: 15 June 2016 | <https://doi.org/10.1111/tbed.12535> | Citations: 35



Emergence of *Brucella suis* in dogs in New South Wales, Australia: clinical findings and implications for zoonotic transmission.

Mor SM¹, Wiethoelter AK¹, Lee A², Moloney B³, James DR⁴, Malik R¹

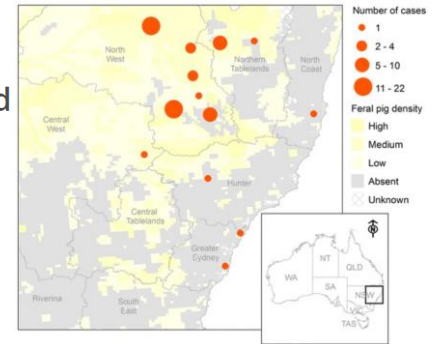


[Emerg Infect Dis.](https://doi.org/10.3201/eid2406.171887) 2018 Jun; 24(6): 1127–1129.

doi: [10.3201/eid2406.171887](https://doi.org/10.3201/eid2406.171887)

Brucella suis Infection in Dog Fed Raw Meat, the Netherlands

Marloes A.M. van Dijk, Marc Y. Engelsma, Vanessa X.N. Visser, Marcel A.H. Spijerenburg,



- 19 reported human cases with *B. canis* (bacteria isolated from blood)
 - rare infection in humans (HAIRS, 2021; HSCP, 2022)

➤ <https://www.hcsp.fr/explore.cgi/avisrapportsdomaine?clefr=1195>

- Risk review and statement on the risk Brucella canis presents to the UK human population (publishing.service.gov.uk)



Protecting and improving the nation's health

Human Animal Infection and Risk Surveillance Group

Risk review and statement on the risk *Brucella canis* presents to the UK human population

February 2021

***B. canis*: rare human cases, but no validated serological test**

- 2022: 2 recent confirmed cases in Netherlands + UK

- dog breeder, 55 years-old, with recent history of *B. canis* in the kennel

!! At-risk practices = resuscitation of puppies at birth !!

- dog breeder, 61 years-old, with recent history of abortion (following importation of pregnant female dog from Belarus)

!! Immunodepressed, chills, shivers, severe headaches, 2 weeks at hospital, lost 9 kg !!

> Clin Infect Dis. 2022 Jun 2;ciac425. doi: 10.1093/cid/ciac425. Online ahead of print.

First case of human *Brucella canis* infection in the Netherlands

Eva Kolwijck¹, Suzanne Pm Lutgens¹, Vanessa Xn Visser², Marjan J van Apeldoorn³, Heather Graham⁴, Ad P Koets⁵, Michelle Mwp Schrauwen⁶, Frans Ag Reubsaet⁷, Els M Broens⁸, Laetitia M Kortbeek⁷

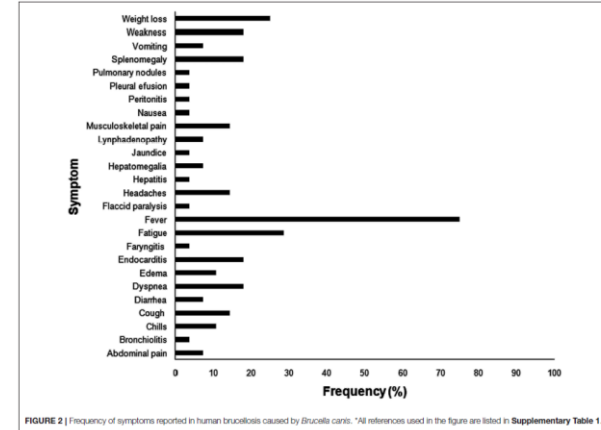
First confirmed dog-to-human case of *Brucella canis* in UK sparks vets plea

Four other dogs had to be put down after coming into contact with the infected pet from Belarus

By Sarah Hillier, Professor & Tracy Gold | 11 June 2022



- **Human brucellosis** : same clinical manifestations associated with other *Brucella* spp. Infections = **unspecific symptoms** (intermittent fever, chills, sweating, loss of appetite, weight loss, fatigue, headaches, back pain or joint pain)
- **Contact with joint, bodily fluids and tissue from infected dogs** may present a risk of human exposure to *B. canis* (HAIRS, 2021 ; HCSP, 2022)
 - **Exposure** = direct contact with body fluids, on damaged or mucous skin or by the respiratory route
 - **At-Risk situations**: birth, obstetric surgery, cleaning, birth or abortion products, semen collection, joint injury surgery, on a positive or highly suspect animal ...
 - **Prevention** → general hygiene measures (wearing gloves, hand hygiene, cleaning litter boxes) or even wearing a FFP2 mask in a risky situation
+ **Clinical surveillance to be put in place / National guidelines**



Santos et al, 2021
doi:10.1016/j.cvsm.2011.08.001





Epidemiology in Europe

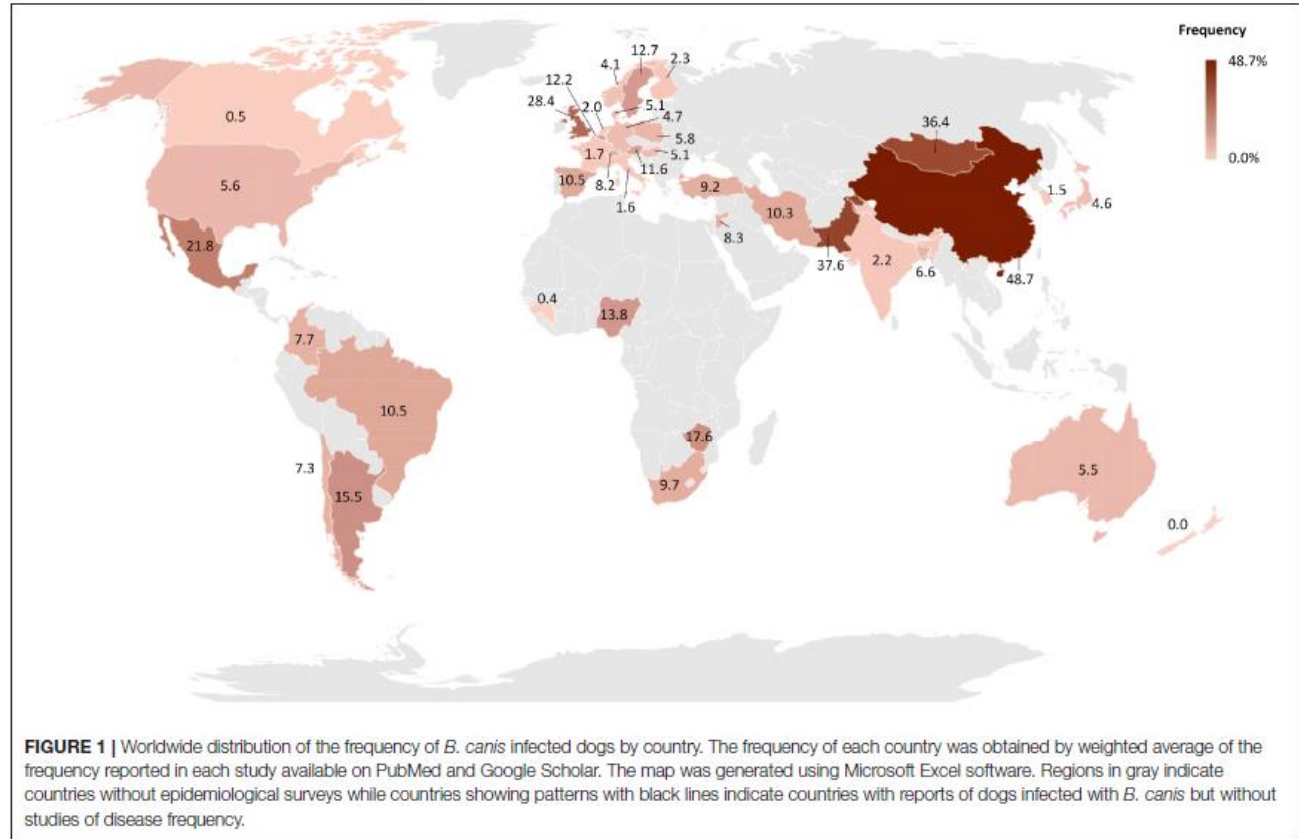
Canine Brucellosis: An Update

Renato L. Santos^{1*}, Tayse D. Souza¹, Juliana P. S. Mol¹, Camila Eckstein¹ and Tatiane A. Paixão²

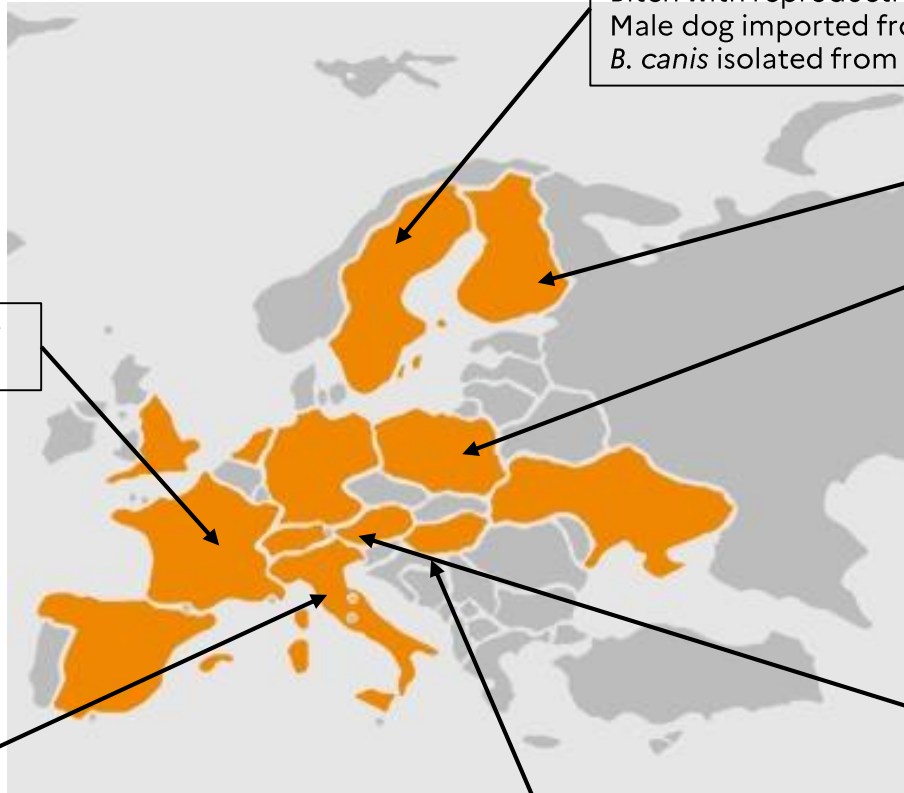
¹ Departamento de Clínica e Cirurgia Veterinárias, Escola de Veterinária, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil; ² Departamento de Patologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil



Many grey zones!



In Europe, rare cases before 2018



France ; 2 infected kennels (1998 ; 2016 in Réunion Island)

Italy (2008) 6-y old male with chronic prostatitis & discospondylitis

Hungary (2011) abortion case in a kennel consisting of 31 dogs (necrotic placentitis) → 3 strains / 31 dogs

Sweden (2011-2014) – 2 cases

Bitch with reproductive disorders (links with Poland)
Male dog imported from Spain
B. canis isolated from aborted material

Finland (2017) – reported case from NRL

Poland (2017) – reported case from NRL

Austria (2012) Female dog with iritis / fetal death ; *B. canis* isolated from fetal placenta, fetal lungs

Blog

Government Vets



Government
Veterinary
Services

Organisations: [Civil Service](#)

Search blog

World Zoonoses Day – How you can help protect our dogs from Brucella canis

[kenneiger](#), 6 July 2022 - [Disease outbreak](#), [Government Veterinary Services](#)

Government Veterinary Services

Government Veterinary Services (GVS) supports public-sector veterinary professionals and promotes veterinary policy to other vets and the public.

[Read more](#)



Transboundary Spread of *Brucella canis* through Import of Infected Dogs, the Netherlands, November 2016–December 2018

Marloes A.M. van Dijk, Marc Y. Engelsma, Vanessa X.N. Visser, Ingrid Keur, Marjolijn E. Holtslag, Nicole Willems, Björn P. Meij, Peter T.J. Willemsen, Jaap A. Wagenaar, Hendrik I.J. Roest,¹ Els M. Broens¹



ARTICOLO A HEADLINE PRIN

First Isolation of *Brucella canis* from a breeding kennel in Italy

Fabrizio De Massis¹, Flavio Sacchini¹, Daniela Averaimo¹, Giuliano Garofolo¹, Pierdave Lecchini², Luigi Ruocco², Roberto Lomolino², Ugo Santucci², Elisa Sgariglia², Silvia Crotti³, Antonio Petri³, Giacomo Migliorati¹, Nicola D'Alterio¹, Stefano Gavaudan³ and Manuela Tittarelli¹

¹National and OIE Reference Laboratory for Brucellosis, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale", Teramo, Italy.
²Direzione generale della sanità animale e dei farmaci veterinari, Ministero della Salute, Roma, Italy.
³Istituto Zooprofilattico Sperimentale dell'Umbria e delle Marche "Togo Rosati", Perugia, Italy.

^{*}Corresponding author at: National and OIE Reference Laboratory for Brucellosis, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale", Campo Boario, 64100 Teramo, Italy. E-mail: daveraimo@izs.it

Veterinaria Italiana 2021, xx(x), xxx-xxx, doi: 10.12834/VetIt.2497.15848.1
Accepted: 01.09.2021 | Available on line: xx.xx.2021

L'identification récente d'un cas de brucellose canine en élevage canin impose de ne pas l'oublier

Mardi 23 Septembre 2020 Animaux de compagnie



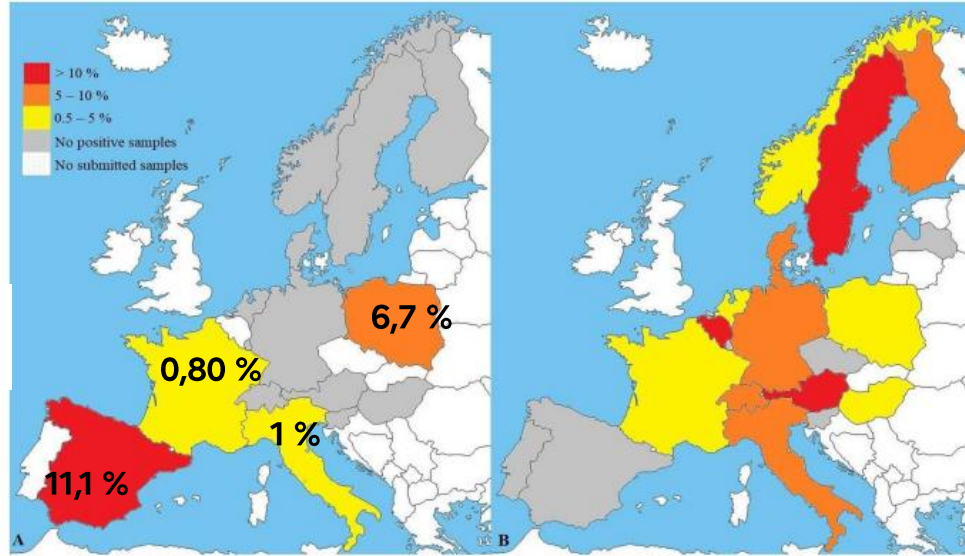
Le cas est illustré dans un petit élevage d'américain bully.

ALAIN FONTBONNE

« VUITTON » = American bully male, imported from USA to France / EU for breeding → *B. canis* isolated from semen (2020)



(A) Positive PCR for **3,7 %** of samples (61/1657)



(B) Samples with *Brucella canis* antibodies from 13 European countries (Sweden, Belgium, Austria, Switzerland, Italy, Finland, Germany, Denmark, Hungary, Norway, Poland, France, Netherlands).

- *Brucella canis* antibodies identified in **5.4%** of samples (150/2,764).

FIGURE 1 | (A) Results of *Brucella* spp. PCR ($n = 1,657$) and **(B)** *B. canis* antibody testing ($n = 2,764$) in a veterinary diagnostic laboratory. Maps reflect preference to use PCR **(A)** or antibody tests **(B)** in respective countries. *B. suis* may not be recognized. Sample sizes and confidence intervals ($CI_{95\%}$) for each country are described in **Tables 2, 3**.

Ongoing situation

UK (2017) – 2 cases

Imports from Romania
Lumbosacral diskospondylitis,
B. canis isolated from blood

2020-21 : 87 cases

2022-First human case

The NL (2016-2018) – investigations in imported dogs (Romania, Eastern Europe)

10 notified seropositive cases and 8 littermates → 14 (78%)
had musculoskeletal disease (lameness and neck or back pain;
discospondylitis diagnosed in 11).

2022 - First human case

France (ANSES, pers. com)

– **Since 2020:** 20 dogs infected and confirmed positive (11 females, 8 males, 1 aborted puppy – from 5 month to 4 years – With and without symptoms)

- **8 kennels** : see table

Portugal (INIAV, pers. com)

2018-2019: 2 kennels with seropositive results (9/16, 56%) + PCR positive puppies

Spain (Buhmann et al., 2019)

11.1% of submitted samples presented positive PCR results

Switzerland

(2019) 21-mo old male with epididymitis and orchitis – imported from Germany

(2018) 1 kennel

Italy (2020-2022) 1 kennel : 269 (46,1 %) seropositive tests. 2nd round (4-5 weeks apart), 241/683 seropositive (35,3 %), 68 strains (10,0 %).

Sweden (E. Lahti, pers. com)

Cluster in 2020 ; male imported from the NL, with links to Mexico

Poland (Buhmann et al., 2019)

6.7 % of submitted samples presented positive PCR results

Ukraine

(2020) 3-y old male Labrador retriever, orchitis and epididymitis

Germany (Buhmann et al., 2019)

4 young (7 to 30-mo old) female dogs with discospondylitis
Imports from Macedonia, Moldavia, Romania

Dissemination through COVID, trade, imports...

☐ Online purchase + COVID19 = introduction risk ↗

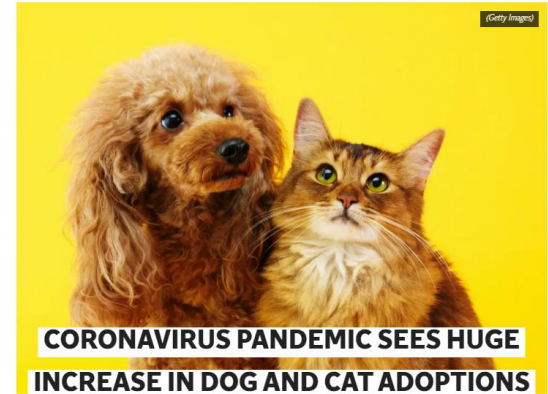
Countries (ordered by 2020 total dog import numbers)	2020* total consignments	2020* total dogs	% change in dog import numbers 2019 to 2020
Romania	21,776	29,348	+51%
Spain	4,547	5,723	+17%
Ireland	2,681	5,566	-24%
Hungary	3,325	4,583	+114%
Cyprus	3,857	3,914	+13%
Poland	2,861	3,452	+198%
United States	772	1,458	-44%
Bosnia & Herzegovina	122	1,323	+660%
Russian Federation	377	615	+779%
Greece	332	550	+87%

* Data as of November 2020

☐ Facebook and WhatsApp group, poor transport conditions...

Public Health England
Protecting and improving the nation's health

Human Animal Infection and Risk Surveillance Group
Risk review and statement on the risk *Brucella canis* presents to the UK human population
February 2021



*People are now having some more time to settle pets into their home, says Battersea Dogs and Cats Home

Sabrina Barr • Thursday 26 March 2020 10:48 • [Comments](#)

Dogs imported into Finland may bring along new infectious diseases

June 19/2019

The number of dogs imported into Finland has increased in the recent years. The import of dogs from countries with a different disease situation than Finland can contribute to the spread of diseases also in Finland as well as their formation as a permanent problem. Some

Vets and dog owners are aware of the situation and communication is ongoing in several countries

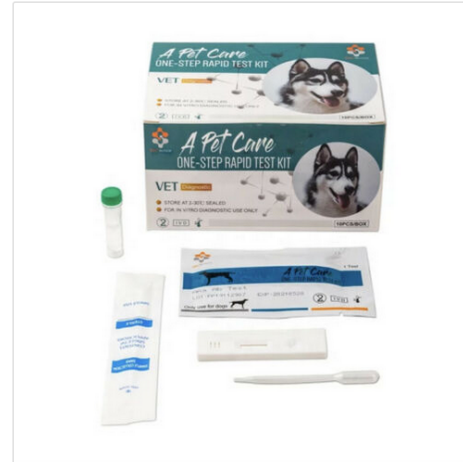
The Healthy Pet Club

Has your dog been imported from Eastern Europe, or spent time in Eastern Europe in the last 12 months?

If so, your dog may be at risk of carrying a disease called Brucellosis, which can potentially affect you or your family.

Please ask your vet for advice on how to keep you and your pets safe

SAVE UP TO 15% WHEN YOU BUY MORE



Have one to sell? [Sell now](#)

Canine BRUCELLOSIS Antibody Rapid TEST Kit (2, 5 or 10)

Condition: New
Model: - Select -

Bulk savings: Buy 1 \$19.95/ea Buy 2 \$18.95/ea Buy 3 \$17.96/ea

Quantity: 1 4 or more for \$16.96/ea
More than 10 available / 205 sold

Price: US \$19.95/ea [Buy It Now](#)

[Add to cart](#)

[Add to Watchlist](#)

205 sold 12 watchers

Shipping: US \$18.91 International Priority Shipping to France via eBay's Global Shipping Program [See details](#)
Located in: Flushing, New York, United States

Import charges: Est. \$814 Amount confirmed at checkout [See details](#)
Delivery: Estimated between Tue, Sep 20 and Sat, Sep 24 to 94220 [See details](#)
Includes international tracking

Returns: Seller does not accept returns [See details](#)

Payments: [PayPal](#) [G Pay](#) [VISA](#) [MasterCard](#) [Apple Pay](#) [Discover](#)



3. Clinical signs, transmission routes

Transmission routes:

Carmichael 1976

- Through mucous membranes: **conjunctival, oro-nasal contamination**
- Venereal transmission appears to be secondary



Infectious dose:

- Oral route: minimum 2×10^6 organisms/mL
- Conjunctival route: 10^4 to 10^5 organisms/mL

Greene and Carmichael 2006

Aerosol transmission is possible (common?)

Carmichael and Greene 2012

→ Important dissemination within kennels

Aborted fetuses and vulvar discharge

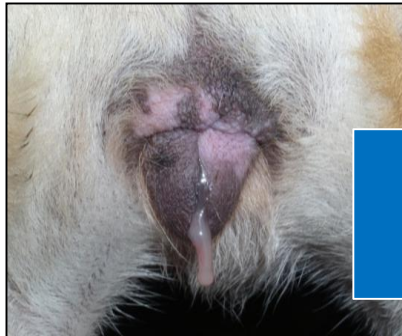
- Up to 10^{10} bacteria/mL
- 500 infectious doses/mL

Carmichael 1976



- Following an abortion, vulvar discharge can remain contaminating for 4 to 6 weeks

Carmichael and Greene 2012



« Vulvar discharge is probably the **main route of transmission** of the disease »

Carmichael and Kenney 1970

Aborted fetuses and vulvar discharge

- Up to 10^{10} bacteria/mL
- 500 infectious doses/mL

Carmichael 1976



- Following an abortion, vulvar discharge can remain contaminating for 4 to 6 weeks

Carmichael and Greene 2012



*Possible contamination
by blood flow during heat and after birth
Hollett 2006*

- High bacterial load in the **first 8 weeks** post-infection
 - ✓ Semen can be contaminated intermittently for several years



Wanke 2004 – Hollett 2006



- 6 males experimentally infected and 2 males naturally infected
- Weekly collection: urine and blood
- Excretion of *B. canis* in urine: starting **4 to 8 weeks** after inoculation
- Duration of *B. canis* excretion in urine: **1 to 1.5 years**
- Period of **high contamination** with *B. canis* in the urine in all dogs:
✓ **6 to 14 weeks** post infection

Serikawa et al. 1981

*The excretion of *B. canis* in the urine can be very long*

- Possible but secondary source of contamination?
- Experimental infection of males and females

Serikawa et Muraguchi 1979

✓ *B. canis* isolated :

- In the urine of 1/6 females and 5/10 males
- Low bacterial load in urine but up to a dose of 10^6 /mL



Increased risk of contamination
through the urine of male dogs?

(Serikawa et al. 1978)

- Possible but secondary source of contamination?
- Experimental infection of males and females

Serikawa et Muraguchi 1979

✓ *B. canis* isolated :

- In the urine of 1/6 females and 5/10 males
- Low bacterial load in urine but up to a dose of 10^6 /mL
- High bacterial load: uterus, epididymis, prostate
- Housing of 5 puppies with infected adults



→ Only 1 infected puppy



Serikawa et Muraguchi 1979

- Outdoor space, boxes, bowls:
 - ✓ Likely role in disease spread within a kennel

Moore et al. 1968



- *B. canis* can survive up to **2 months** in the environment with cool temperatures and in the presence of organic waste
 - ✓ Up to 4 months in moist soil

Graham and Taylor 2012

Carmichael and
Greene 2012

- Sensitive to conventional disinfectants:
 - ✓ Quaternary ammoniums, bleach, glutaraldehyde

Davidson and Sykes 2014

Santos et al. 2021

- Eye or nasal secretions / Saliva:
✓ Rare but possible contamination

Carmichael and Joubert 1987

- Milk: high bacterial load

Wanke 2004

- Feces

Weber and Christoph 1982

- Insects/Ticks



- Transfusions

- Other sources: syringes, speculums, insemination equipment, endoscopes...

- Knowledge about neonatal canine brucellosis is limited
- One case in New-York
 - ✓ Contamination of a 3-year-old child by a Yorkshire male puppy

de Souza et al 2018

Dentinger et al 2012

Human *Brucella canis* Infection and Subsequent Laboratory Exposures Associated with a Puppy, New York City, 2012

C. M. Dentinger^{1,2}, K. Jacob³, L. V. Lee¹, H. A. Mendez³, K. Chotikanatis³, P. L. McDonough⁴, D. M. Chico⁵, B. K. De⁶, R. V. Tiller⁶, R. M. Traxler⁶, E. R. Campagnolo^{2,7}, D. Schmitt⁸, M. A. Guerra⁶ and S. A. Slavinski¹



➔ In newborn puppies, *B. canis* infects the epithelial cells of the renal tubules

de Souza et al 2018

What about sterilized dogs?

-*B.canis* isolated from 4/13 (31%) sterilized dogs

van Dijk et al. 2021

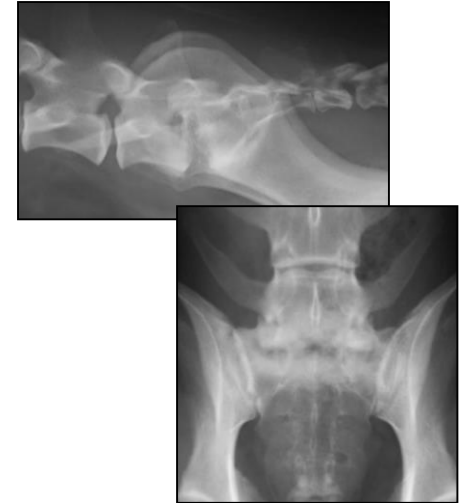


Clinical signs

- General symptoms:
 - ✓ Fever rarely present
 - ✓ Fatigability
 - ✓ Poor general condition

- Unspecific symptoms:
 - ✓ Lymphadenitis
 - ✓ Follicular hyperplasia of the spleen / Hepatitis
 - ✓ Discospondylitis / Vertebral osteomyelitis / Lameness
 - ✓ Polygranulomatous dermatitis
 - ✓ Meningitis / Meningoencephalomyelitis
 - ✓ Endocarditis
 - ✓ Uveitis

Wanke 2004, Hollett 2006,
Kauffman et Petersen 2019



Courtesy Dr Jeremy Mortier
ENVA

IDEMBRU, 08/12/2022

- In female dogs:

- Interruption of gestation:

- ✓ In particular, embryonic resorption

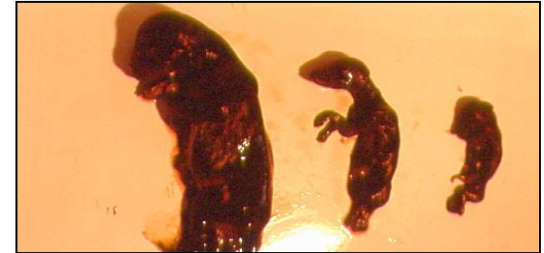


- Abortion

- ✓ Especially between D45 and D55

Carmichael 1968

- ✓ Aborted fetuses look often autolyzed



- Neonatal mortality

- ✓ Survival is possible



Box 1

Puppies

Keep in mind that your clinic may be presented with

- Pups born to infected female dogs
- Pups born in infected facilities
 - Pups may die shortly after birth due to disease
 - Pups may seem healthy but they are infected
- Infected dogs shed *B canis* bacteria for several months
 - Infected dogs can infect other dogs and humans
 - Infected pups become clinically affected after puberty
 - Pups should be tested for *B canis*; discuss culling any pups that test positive



Kauffman et Petersen 2012

•Male dogs:

–Epididymitis:

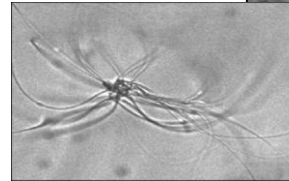
Kauffman et Petersen 2012

- Leukocytospermia/teratospermia
- Spermatozoid agglutination

–Prostatitis

–Rarely:

- Orchitis
- Testicular necrosis and ulcerative scrotal dermatitis



**Rapid alteration
of the
spermogram**



Schoeb et Morton 1978

•Male dogs:

–Epididymitis:

Kauffman et Petersen 2012

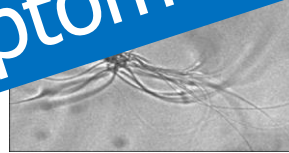
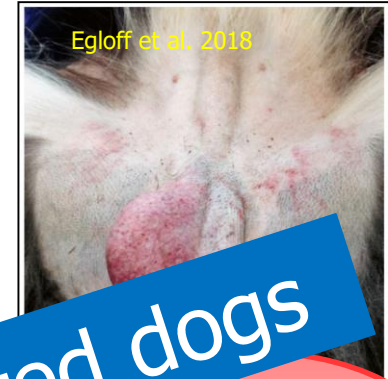
- Leukocytospermia/teratospermia
- Spermatozoid agglutination

–Prostatitis

–Rarely:

- Orchitis
- Testicular necrosis and ulcerative scrotal dermatitis

Schoeb et Morton 1978



Many asymptomatic infected dogs

Rapid alteration of the spermogram



4. Diagnosis: screening, confirmation, management options



Screening and confirmation of canine brucellosis: main tools available

- **1-SEROLOGY = indirect diagnostic:** detection of antibodies to *Brucella canis* (or *B. ovis*), false positive/or infected seronegative dogs
- **DRY TUBE:** centrifugation after sampling to obtain the serum; serum can be sent at room temperature or frozen if delayed shipment
- **Rapid kit** (immunochromatographic test ; <https://www.kitvia.com/tests-rapides>)
 - useful for screening (vets or laboratories offering *B. canis* serology)



Brucella canine Ac

Test immunochromatographique pour la détection des anticorps anti-*Brucella canis*

Echantillon	Résultat	Condit.	Référence
Sang total, Plasma, Sérum	20 min	1x10	B7TRRB2103

Serology:

+ useful for screening and monitoring animals, repeated samples every 4 to 6 weeks, less expensive tests, evolution of antibody titers

- : false positives, infected seronegative animals

Screening and confirmation of canine brucellosis: main tools available

- **2-Direct diagnostic: isolation of *Brucella canis* or DNA detection**
- **BACTERIOLOGY:** Reference method, allows genotyping of strains (surveillance), but not very sensitive, long (> 10 days)
- **MOLECULAR BIOLOGY:** Detection of *Brucella* spp. specific DNA
(no species identification; protocols not standardized)
- **MALDI-TOF-MS :** Identification by mass spectrometry of the genus *Brucella* (or *Ochrobactrum*) /
libraries not specific enough for rough species of *Brucella*

Direct diagnosis: + useful for confirmation of infection (animals with symptoms, or animals without seropositive symptoms), genotyping and strain surveillance

- : not very sensitive = a negative result does not mean that the animal is free of disease; detection limit for PCR; identification errors by MALDI-TOF

Screening and confirmation of canine brucellosis: main tools available

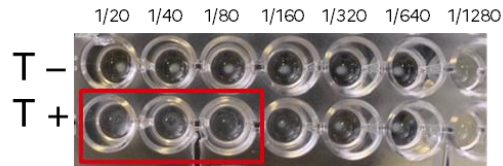
- **2-Direct diagnostic: isolation of *Brucella canis* or DNA detection**
- Samples to be frozen as soon as possible if no immediate shipment
- **Regulatory triple packaging = UN3373**
- Vaginal swab (**E-Swab 480C, COPAN**) : following abortion or stillbirth or at the time of heat
- Whole blood (citrate tube), **!! Do not use EDTA or heparin = problems of inhibition !!**
- Abortion tissues or stillborn puppies, genital tissue if castration
+ as appropriate = urine, semen, milk ... **Multiple samples = ↗ sensitivity**



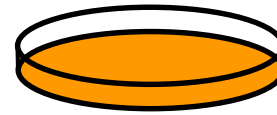
Situation	Serological screening	Samples for direct diagnostic	Further investigations
Dog with symptoms suggestive of brucellosis	Yes (B. canis tests) + EAT/ELISA if risk of infection with smooth <i>Brucella</i>)	Yes (depending on lesions / symptoms)	If necessary, repeat samples to isolate the bacteria
Asymptomatic dog	Yes (Rapid test)	No	If seropositive, add samples for direct diagnosis (whole blood, swabs, urine, semen)



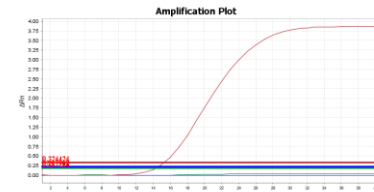
LFIA



Micro Agglutination Test



Bacteriology



Molecular biology

How to manage infected kennels?

In a kennel, seropositive dogs should be isolated

If one or more seropositive results, all dogs must be screened

Stop breeding & trade during the control period (>6 mo)



	Avantages	Limits
Euthanasia of infected dogs	No risk of transmission. No use of ineffective AB. Protection of other dogs.	Ethical/emotional issues
Neutering and AB treatment	Decrease in symptoms. Reduction of excretion (at least temporary).	Risk of relapse and transmission: AB do not cure all animals. Use of AB for several weeks (toxicity to be followed) + lifetime follow-up (serology, 1-2 times/year) The animal must be isolated from other dogs and must be followed for life (placement, informed consent)

5. Treatment / Prevention

Recommended Drugs in Combination Therapy for Canine Brucellosis^a

Drug ^b	Dose ^c (mg/kg)	Route	Interval (hours)	Duration (weeks)
TETRACYCLINES				
Minocycline or Doxycycline^{d,40}				
No ocular infection	25	PO	24	4
	12.5	PO	12	4
Ocular infection	15	PO	12	8
Tetracycline³⁰	30	PO	12	4
AMINOGLYCOSIDES				
Streptomycin^{a,30}				
No ocular signs	20	IM	24	2 (treatment weeks 1 and 4)
Ocular infection	20	IM	24	4 (treatment weeks 1, 3, 5, 7)
Dihydrostreptomycin^{a,40}				
	10	IM, SC	12	2 (treatment weeks 1 and 4)
	20	IM, SC	24	2 (treatment weeks 1 and 4)
Gentamicin				
	2.5	IM, SC	12	2 (treatment weeks 1 and 4)
	5.0	IM, SC	24	2 (treatment weeks 1 and 4)
QUINOLONES				
Enrofloxacin^f				
No ocular infection	5	PO	12–24	4
Ocular infection	10	PO	24	8
ADDITIONAL DRUGS USED ONLY WITH OCULAR INFECTION				
Rifampin³	7.5	PO	24	pm
Prednisone Acetate (1%)	1 drop	Topical in eye	6–8	pm
Atropine Ointment	pm	Topical in eye	12	pm

Sykes, Jane E., and Craig E. Greene. *Infectious diseases of the dog and cat*. Elsevier Health Sciences, 2013

Recommended Drugs in Combination Therapy for Canine Brucellosis ^a				
Drug ^b	Dose ^c (mg/kg)	Route	Interval (hours)	Duration (weeks)
TETRACYCLINES				
Minocycline or Doxycycline^{d,40}				
No ocular infection	25	PO	24	4
	12.5	PO	12	4
Ocular infection	15	PO	12	8
Tetracycline³⁰	30	PO	12	
AMINOGLYCOSIDES				
Streptomycin^{30,30}				
No ocular signs	20	IM		
Ocular infection	20	IM		
Dihydrostreptomycin^{30,40}				
	10			2 (treatment weeks 1 and 4)
	20			2 (treatment weeks 1 and 4)
Gentamicin				
	2.5			2 (treatment weeks 1 and 4)
	2.5			2 (treatment weeks 1 and 4)
QUINOLONES				
Enrofloxacin³⁰				
No ocular infection	5	PO	12–24	4
Ocular infection	5	PO	24	8
ADDITIONAL THERAPY FOR OCULAR INFECTION				
Rifampin³	7.5	PO	24	pm
Prednisone Acetate³⁰	1 drop	Topical in eye	6–8	pm
Atropine Ointment	pm	Topical in eye	12	pm

Many treated dogs remain contaminated for life

Prevention ?



Prevention

- No vaccine
- Protection of non-infected kennels:
 - Introduction of dogs:
 - ✓ quarantine of at least 6 to 8 weeks
 - ✓ serological test at introduction and at 6 weeks post-introduction
- Breeding dogs:
 - Test regularly, especially males (2 times/year?)
 - Test any dog (male / female) with a reproductive disorder



veterinaire-vanhoeck.be



6. Feedback on confirmed cases in France

A wide variety of cases and situations

Since 2020:

20 infected dogs confirmed

11 females, 8 males, 1 aborted puppy

from 5 months to 4 years

With or without symptoms

Several imports from Bulgaria, Romania, Russia, Belarus, United States

8 infected kennels → 3 in 2021, 5 in 2022 + 1 under investigation

~1000 serological samples tested : rapid tests or plate agglutination test (MAT, follow-up)

199 positive results with LFIA (16 %) ; 290 positive results with MAT (27 %)



Kennel	Nb of dogs tested	Nb of tests performed	Nb of seropositive dogs (LFIA or MAT)	Related information
1	23	23 (2 series)	4 (17,4 %, LFIA)	Imported from Russia, abortion, 1 infected dog
2	15	33 (3 series)	3 (20 %, LFIA)	Imported from Russia, abortion, 2 infected dogs
3	26	46 (5 series)	5 (19,2 %, LFIA)	Imported from Russia, abortion, asymptomatic male, more than 3 infected dogs
4	70	70 (4 series)	9 (12,9 %, MAT)	Links with a German kennel, abortion
5	32	52 (2 series)	13 (40,6 %, MAT)	Abortion

Pregnant dog imported from Russia (or Belarus) as breeding female imported in November 2021 from Russia, isolated upon arrival to comply with quarantine

Abortion 15 days after arrival → abortion sent for analysis, *B. canis* strain isolated → euthanasia

→ 1st series of tests on all dogs in the kennel → 3 weakly positive dogs, isolated.

→ Treatment according to Cosford (2018): gentamicin (5 mg/kg; for 3 days) and doxycycline (2 months at 10 mg/kg).

→ 2 dogs out of the 3 developed acute renal failure (one died in anuria, the other recovered) → **Pharmacovigilance triggered.**

Regular serological follow-up (negative results)



7. Collective work in progress

- **Projects - One Health EJP**

- 15 MS + UK



- **Two workshops organised in 2021-2022**

- State of the art + Gap analysis
- Focus on epidemiology, transmission, diagnostic, treatment, regulation
- Scenarios under progress → measures in the form of White Paper + **TOOLKIT**

- **High soundness: emerging cases in all Europe**
 - More than 3000 dogs exposed since 2020
- **Increased risk in dogs => increased exposure of pets owners**
 - Two first human cases in Europe (NL, UK)
- **Severe clinical signs in infected dogs, pain, repeated AB treatments**
- **High risk of dissemination within and between kennels**



- **Lack of data / surveillance → further investigations, research needed**
- **Management: no efficient treatment → ethical, legal and animal welfare issues**
- **Measures needed to prevent introduction of the disease (kennels)**

Thank you for your attention !

For any question, contact us,
claire.ponsart@anses.fr

 **ne HEALTHEJP**
COHESIVE

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

COHESIVE/IDEMBRU

 **ne HEALTHEJP**
IDEMBRU

Grant Agreement number 773830



COHESIVE / IDEMBRU Partners

DE MASSIS F, FERREIRA AC, KOETS A, LAHTI E, MC GIVEN J,
SACCHINI F, WHATMORE AM, GIRAULT G, FREDDI L,
FERREIRA VICENTE A AND DJOKIC V

ENVA PR A FONTBONNE

