

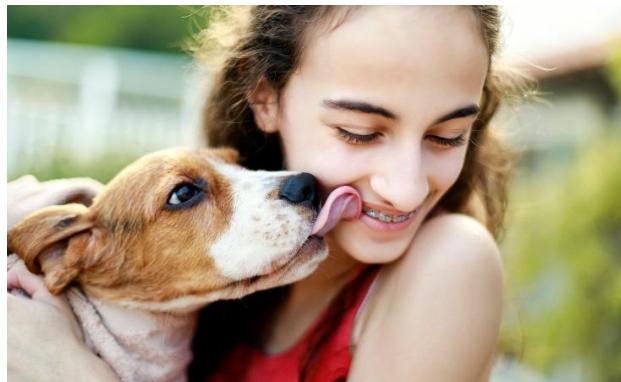
Emergence of canine brucellosis in different European countries and UK

PONSART C, 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

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

Outline

Canine brucellosis, a dog disease with public health impacts



Is canine brucellosis emerging in Europe ?



Collective work in progress



***B.canis* in Europe**

COHESIVE/IDEMBRU

Grant Agreement number 773830



<https://onehealthjep.eu/jrp-idembru/>




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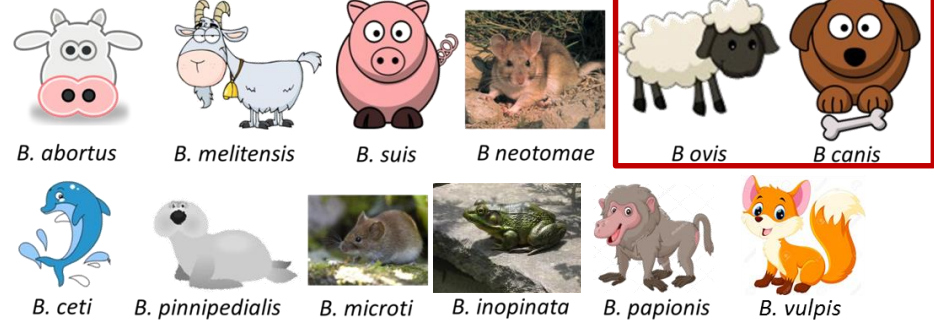
Canine brucellosis, a dog disease with public health impacts

What is canine brucellosis ? (1/4)

Brucellosis is a **worldwide zoonosis**

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

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



- **4 species of Brucella** cause brucellosis in dogs
- adapted to primary host but can cross the species barrier
- *B. abortus* (large ruminants), *B. melitensis* (small ruminants), *B. suis* (swine), and *B. canis* (most frequent infection in dogs)

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

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

What is canine brucellosis ? (2/4)

Clinical Manifestations in Dogs : cause of reproductive failure, but dogs may be **subclinically** affected

Signs of disease : shortly after infection or silent infection can last for a prolonged period (months, years)

→ **Female dogs:** mid- to late-term abortion (during days 45–59), embryonic death with resorption = conception failure after an apparently successful mating

Male dogs: epididymitis, prostatitis, and orchitis, pain, scrotal asymmetry ; chronicity → testicular atrophy, infertility

→ **Discospondylitis, lameness, spinal pain, neurologic dysfunction, muscle weakness,** or any combination of these signs, caused by vertebral osteomyelitis and intervertebral disc infection

Bacteria can remain within the blood for many years and easily shed with body fluids → isolated from seminal fluids, vaginal secretions, post-abortion and post-parturition vaginal fluids, saliva, nasal secretions and urine



Fig. 1 Puppies from a late-term abortion (56 days' gestation).



. 2. Scrotal asymmetry. Note the stud dog's left testicle is smaller than the right testicle.

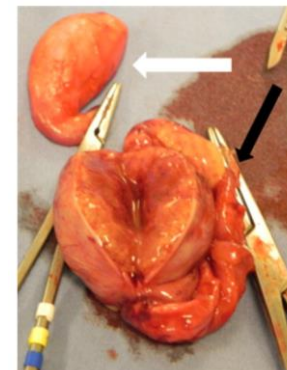


Fig. 3 Testicles that were removed due to illness, pain, and scrotal asymmetry.

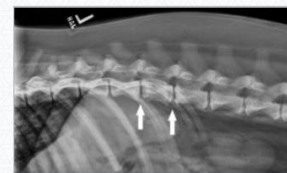
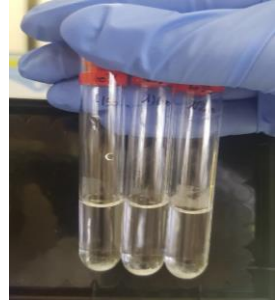


FIGURE 1. Radiograph of the lumbar spine showing vertebral body endplates that are irregular with permeative lysis centered at the disc spaces (arrows). ©The Ohio State University

Makloski et al., 2011
doi:10.1016/j.cvsm.2011.08.001

What is canine brucellosis ? (3/4)

- **Accuracy of diagnostic testing is very important**
 - False neg → disease spread & zoonotic risk
 - False pos → unnecessary euthanasia
- **Difficult diagnostic & interpretation**
 - **SEROLOGY:** Specific tests dedicated to Rough *Brucella* species (*canis*, *ovis*)
 - **Lack of standardised methods** / reference material
 - **BACTERIOLOGY:** Gold standard, but lack of sensitivity, long (10 d), expensive,
 - **Negative culture and/or PCR from blood not sufficiently reliable** to determine status as non-infected (intermittent shedding / bacteriemia / age ; various quality of samples)
 - **MOLECULAR BIOLOGY :** variable protocols (extraction method / matrix ...)
 - **MALDI-TOF-MS :** possible identification errors (*Ochrobactrum*) / libraries not specific enough for rough species of *Brucella*



What is canine brucellosis ? (4/4)



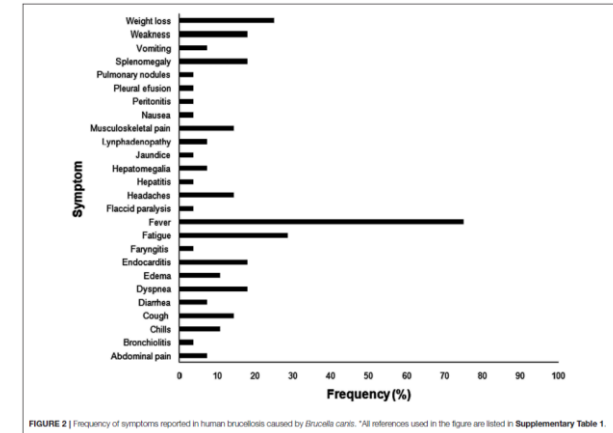
- **Management of infected dogs**

- In dogs, **treatment with antibiotics is not encouraged → euthanasia**
 - high rates of relapse, cure for the disease still uncertain after treatment,
 - Long-term (1 – 2 mo) and expensive antibiotic treatment
- **Neutering** : reduced transmission risk. But, reservoir of bacteria in the prostate with intermittent bacteremia even in castrated males ...
- **Antibiotic treatment and neutering**: lower transmission risk to the veterinary surgeon, best chance of eliminating infection from the dog itself but there are no guarantee
- **Ethical, legal and animal welfare issues**



Public Health Implications

- **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 also present a risk of human exposure to *B. canis* (HAIRS, 2021) → **less than 60 cases of human *B. canis* infections in literature, almost exclusively reported from the Americas and Asia** (3 reports of *B. canis* in HIV-infected patients ; 3 cases in children <4 years of age)
→ children and immunosuppressed persons might be at higher risk
- 2022 in Europe: **Two cases recently confirmed**
 - **in the Netherlands** (Eva Kolwijck, 2022) – 55 years old woman with a recent history of *B. canis* infection in her dog breeding facility
 - **UK** (Gray, 2022) - 61 years old, immune compromised ; high temperature, chills, shivers, bad shakes, severe headaches, severe backache, and low blood pressure



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

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

SHARE       For Hannah Mollard, Reporter & Tally Gold, Trainee reporter
19/10/2022 10:50 AM GMT+0



Is canine brucellosis emerging in Europe ?



Worldwide situation

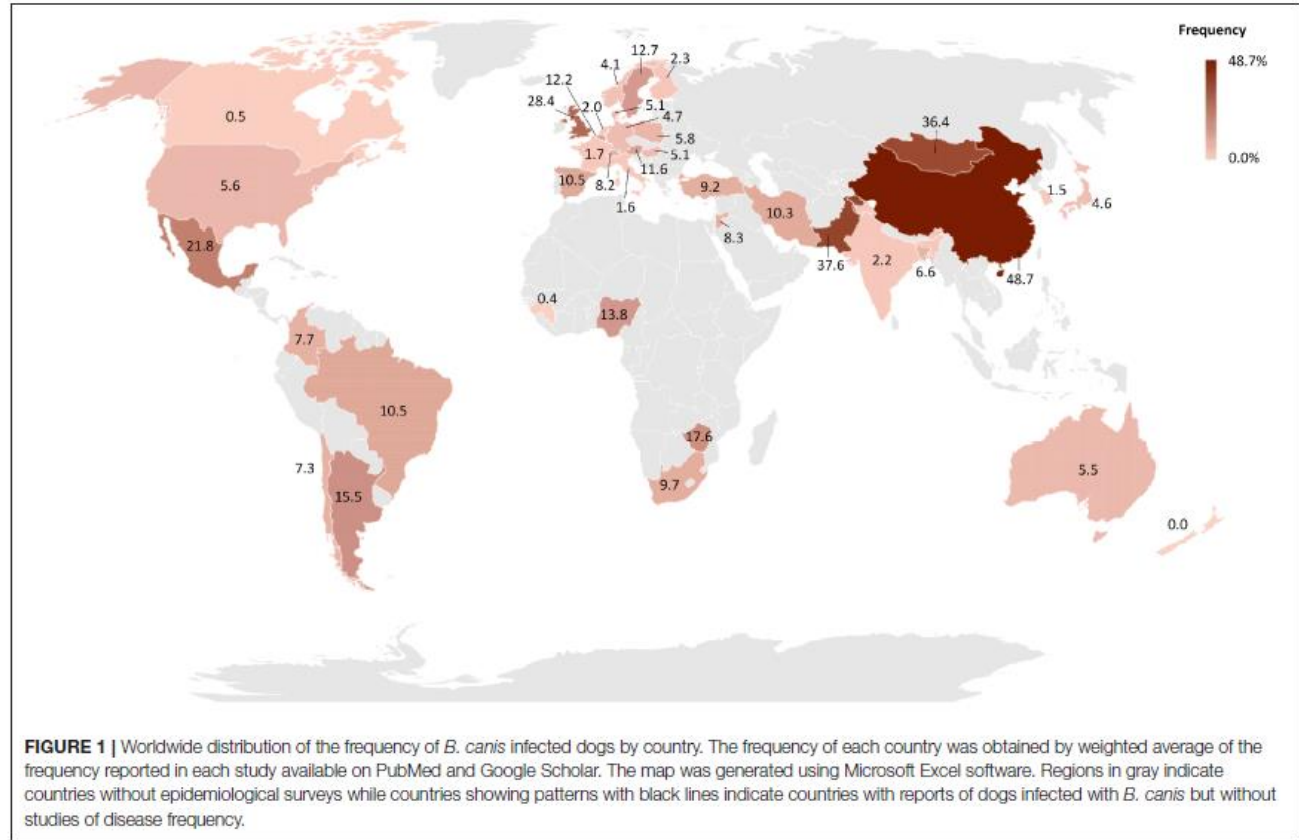
Canine Brucellosis: An Update

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!



Canine brucellosis 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

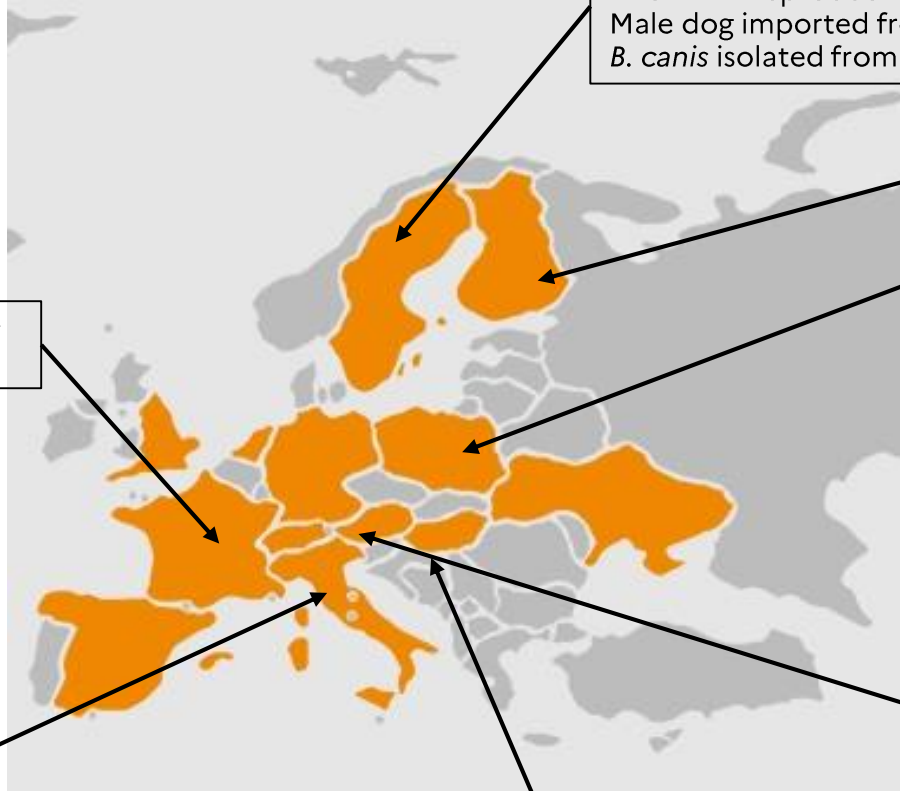
Sweden (2011-2014) – 2 cases

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



Is *B. canis* an emerging pathogen in EU ?

Blog

Government Vets

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Veterinary
Services

Search blog 

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

[kenmeiger](#), 6 July 2022 - [Disease outbreaks](#), [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



ARTICLE AHEAD OF PRINT

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

Fabrizio De Massis¹, Flavio Sacchini¹, Daniela Averaimo¹, Giuliano Garofolo¹, Pierdaveide Lecchini², Luigi Ruocco³, Roberto Lomolino², Ugo Santucci², Elisa Sgariglia¹, Silvia Crotti¹, Antonio Petrini¹, Giacomo Migliorati¹, Nicola D'Alterio¹, Stefano Gavaudan³ and Manuela Tittarelli¹

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 E-mail: d.averaimo@izs.it

Veterinaria Italiana 2021, xxx (x), xxx-xxx, doi: 10.12834/VetIt.2497.15848.1
 Accepted: 01.09.2021 | Available on line: xxx.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 ouvrage d'American Bully.

ALAIN PONTBONNE

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

Emergence of canine brucellosis in Europe

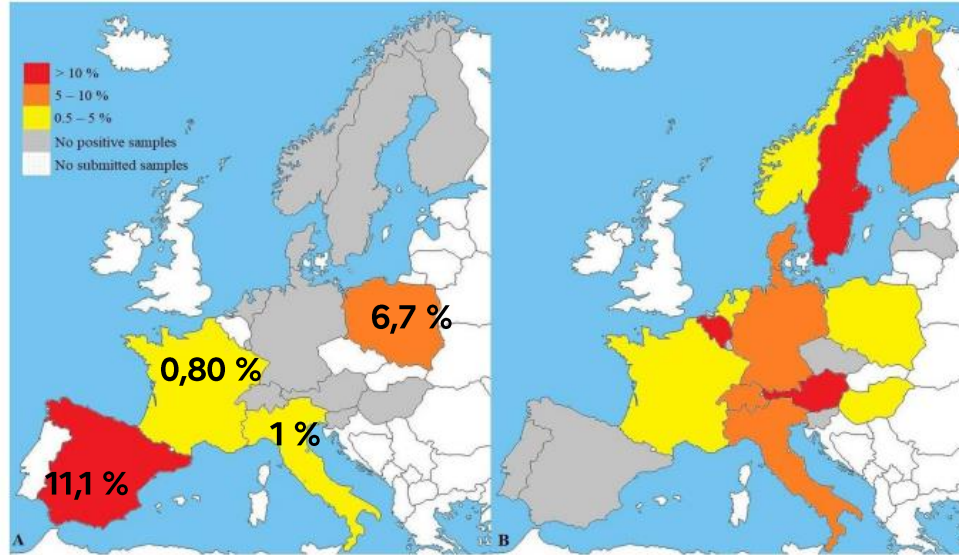
13TH OF OCTOBER 2022

Canine brucellosis in Europe



Buhmann G et al (2019) Canine Brucellosis: Insights Into the Epidemiologic Situation in Europe. Front. Vet. Sci. 6:151. doi: 10.3389/fvets.2019.00151

(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

Since July 2020, > 40 cases

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).

First human case confirmed recently

France (ANSES, pers. com)

– **Since 2019:** 12 dogs infected and confirmed positive (6 females, 6 males – from 5 month to 4 years – With and without symptoms)

- 5 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

Situation in French kennels

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

Dissemination through 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...



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

Dissemination through trade, imports

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

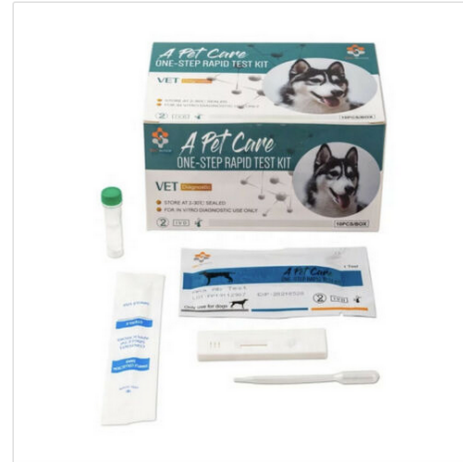


Has your dog been imported from Eastern Europe, or spent time in Eastern Europe in the last 12 months?

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



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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

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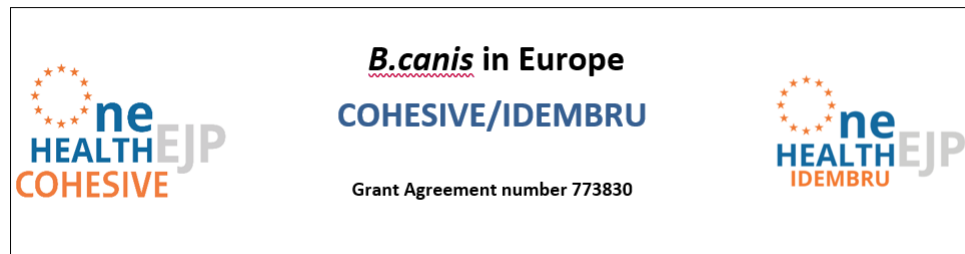
Collective work in progress



Collective work to produce a white paper : under 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**

Conclusions

- **High soundness: emerging cases in all Europe**
 - More than 1000 dogs exposed since 2020
- **Increased risk in dogs => increased exposure of pets owners**
 - Two first human cases in the NL & UK in 2022
- **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)**





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Bundesforschungsinstitut für Tierge
Federal Research Institute for Anim



Reference Laboratory
for Brucellosis



Instituto **Nacional de Saúde**
Doutor Ricardo Jorge



WAGENINGEN
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Thank you for your attention !

For any question, contact us,
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***B.canis* in Europe: Gaps and
challenges in controlling the
spread**

COHESIVE/IDEMBRU

Grant Agreement number 773830



13TH OF OCTOBER 2022