

Brucellosis

Control Guideline for Public Health Units

Public health priority: Routine.

PHU response time: Respond to confirmed cases within 3 working days. Enter confirmed cases on NCIMS within 5 working days.

Case management: Case should receive appropriate antibiotics. Identify source and if from Australian animals or their products, report to CDB on same day.

Contact management: None

Version	Date	Revised by	Changes	Approval
1.0	01/07/2012	-	-	-
2.0	27/05/2016	Communicable Disease Branch	Minor edits and addition of Managing Special Situations	Approved 27/05/2016
2.1	01/07/2016	CDNA	Revision of national case definitions	Approved 08/07/2016
2.2	22/11/2016	Communicable Disease Branch	Updated the management of brucellosis in a dogs to align with NSW DPI recommendations, added references to the new Brucellosis & Feral Pig Hunting Factsheet and other additional resources, and other minor edits	Approved 01/12/2016
2.3	10/10/2019	Communicable Disease Branch	Minor corrections of broken DPI links	Approved 10/10/2019

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1. Reason for surveillance

- To identify any resurgence of animal disease in NSW
- To monitor the epidemiology and so inform the development of better prevention strategies.

2. Case definition

Confirmed and **probable cases** should be notified.

Confirmed case

A confirmed case requires **laboratory definitive evidence** only.

Laboratory definitive evidence

- Isolation of *Brucella* species **or**
- Detection of *Brucella* species by nucleic acid testing from a blood sample **or**

- IgG seroconversion or a significant increase in IgG antibody level (e.g. fourfold or greater rise) to *Brucella*.*

*It is important to note that serological testing for brucellosis cannot determine the species of *Brucella*.

Probable case

A probable case requires **laboratory suggestive evidence** and **clinical evidence**.

Laboratory suggestive evidence

- A single high agglutination titre to *Brucella* **or**
- Detection of *Brucella* species by nucleic acid testing from a normally sterile site other than blood.

Clinical evidence

A clinically compatible illness.

Epidemiological evidence

Not applicable.

3. Notification criteria and procedure

Brucellosis is to be notified by laboratories on microbiological confirmation (ideal reporting by routine mail).

Confirmed and probable cases should be entered onto NCIMS.

4. The disease

Infectious agents

Brucella species is an important bacterial zoonosis caused by members of the genus *Brucella*. Although found worldwide it is well controlled in most developed countries.

Different species of *Brucella* infect different preferred animal species, although infection can occur in animals other than the preferred host. There are five *Brucella* species that are known to cause human brucellosis.

- *Brucella suis* usually infects pigs (biovars 1, 2 and 3). Like the USA, Canada and many European countries, Australia has eradicated *B. suis* from domestic pigs. *B. suis* was last diagnosed in NSW domestic pigs in 1968. Despite this it is still known to be present in feral pigs in Queensland and in northern NSW. From 2012, *Brucella suis* has been diagnosed in several pig hunting dogs in NSW.
- *Brucella melitensis* usually infects goats, sheep and camels, however, is not found in Australia, New Zealand, Southeast Asia, Northern Europe or North America. It is particularly common in the Mediterranean and also occurs in Africa, India, Central Asia, Central America and the Middle East.
- *Brucella abortus* usually infects cattle; however all states of Australia including NSW have eradicated bovine brucellosis. Following a National Brucellosis and Tuberculosis Eradication Program, NSW achieved bovine brucellosis free status in 1989. *B. abortus* is found in cattle-raising regions of the world except Australia, New Zealand, Canada, Israel, some European countries and Japan.
- *Brucella canis* usually infects dogs throughout the world however it has not been reported in Australia or New Zealand.
- Marine mammal *Brucella* usually infects seals, sea lions, walruses, whales, porpoises and dolphins. Infected animals have been found along the coasts of Australia, New Zealand, Antarctica, Hawaii, North America, Peru and the Solomon Islands. There is little information on the contribution of marine mammal *Brucella* to human brucellosis.

Although *Brucella ovis* is present in many sheep flocks across NSW, it is not known to cause human disease. *Brucella neotomae* and *Brucella suis* (biovar 5) are found in rodents. They are not known to cause human disease nor have they been described in Australia.

Mode of transmission

Brucellosis is an infection primarily of animals that causes infertility and late-term abortion. Rarely, brucellosis occurs in humans as a zoonosis causing a broad spectrum of symptoms. The ultimate control of human brucellosis will depend on the elimination of the disease in animals; therefore human cases may act as a marker of animal disease.

Brucella bacteria are found in the blood, urine, semen, vaginal discharges, placentas, milk and aborted fetuses of infected animals. It may also be found in the saliva, and nasal, ocular and joint fluids of infected animals.

Humans usually become exposed by contact with bacteria contaminated fluids from infected animals through abraded skin or mucous membranes or by ingestion of infected animal products. In laboratories and during butchering of infected animals, *Brucella* may be transmitted in aerosols. It can also be transmitted on fomites as it withstands drying and can survive in contaminated dust and soil. Survival may be prolonged in conditions of low temperature, high humidity and no sunlight. *Brucella* species are also considered potential bioterrorism agents.

Person-to-person transmission of brucellosis is very rare. Congenital infection may occur through the placenta, during breast feeding or due to contact with the mother's blood, urine or faeces during delivery. There have also been rare reports of transmission after blood transfusions, bone marrow transplant and sexual contact.

Live animal vaccines for brucellosis are known to be pathogenic to humans however they are not currently in use in Australia.

Who is at risk?

- People who handle or otherwise come into contact with animals, their tissues or body fluids that are infected with *Brucella* bacteria. In Australia these are usually feral pig hunters who come into contact with feral pigs infected with *B. suis*, people who run 'chillers' (a refrigerated local storage point usually owned by a game exporting company), transport or process feral pigs carcasses and to a lesser extent AQIS inspectors who inspect feral pigs prior to export. Contacts of dogs diagnosed with Brucellosis maybe at potential risk.
- As *B. abortus* has been eradicated from NSW, farmers, abattoir workers and veterinarians are not at risk from the species.
- People who work in microbiology laboratories handling *Brucella* cultures may be at risk.
- People travelling to countries where brucellosis is common and who come into contact with infected animals or drink or eat unpasteurised dairy products. These areas include Africa and Europe (especially around the Mediterranean - Portugal, Spain, Southern France, Italy, Greece, and Turkey), the Middle East, Central and South America and Asia.
- Rarely people may become infected after eating imported foods (e.g. unpasteurised cheese) that were manufactured in an endemically infected country.

Timeline

The typical incubation period is difficult to determine, probably 5 to 60 days, but more commonly 30 to 60 days. The incubation period may be shorter if the bacteria have been aerosolised for use as a biological weapon.

Clinical presentation

Brucellosis typically begins with acute nonspecific flu like symptoms. These may include fever, headache, weakness, profuse sweating, chills, weight loss, joint pain, muscle pain, and generalised aches.

Inflammation of the liver and spleen, and gastrointestinal or respiratory signs may occur. In males, the testicles and epididymis may become inflamed. Suppurative infections of organs and

osteoarticular complications may also occur. Where endocarditis occurs, there is a high case-fatality rate.

Typically symptoms last for 2-4 weeks and are followed by a spontaneous recovery. Some infected people may develop an intermittent fever and other symptoms that wax and wane at 2-14 day intervals, known as 'undulant fever'. Occasionally symptoms last for a year or more, patients may become chronically ill and symptoms may recur even after successful treatment.

5. Managing Single Notifications

Response times

Investigation

Within 3 working days of notification begin follow-up investigation. Where transmission from Australian animals or their products is suspected, notify the Senior Animal Health Officer, NSW Department of Primary Industries (from the likely source area) and CDB on the same day. The public health unit will work closely with the NSW Department of Primary Industries to try and identify and control the likely source of infection in appropriate.

Data entry

Within 5 working days of notification enter confirmed and probable cases on NCIMS.

Response procedure

The response to a notification will normally be carried out in collaboration with the case's health carers. But regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend the tests be done
- Find out if the case or relevant care-giver has been told what the diagnosis is before beginning the interview
- Seek the doctor's permission to contact the case or relevant care-giver
- Review case management
- Identify and help control the likely source in partnership with DPI.

Case management

Investigation and treatment

Effective treatment usually involves a combination of antibiotics for at least six weeks. Occasionally, antibiotics may need to be continued for months. Despite effective treatment brucellosis can recur, therefore it is important to encourage the case to seek medical assistance if symptoms persist or recur. See the latest edition of the [Therapeutic Guidelines: Antibiotic](#).

Education

The case or relevant care-giver should be informed about the nature of the infection and the mode of transmission. In particular, emphasis should be placed on careful handling of feral pig carcasses if *B. suis* infection is suspected.

When in direct contact with animals:

- Cover all cuts or abrasions with waterproof dressings.
- Wear gloves, overalls and face masks when slaughtering animals or handling carcasses, and wear gloves when handling birth products, such as placentas, vaginal discharges and aborted fetuses.
- Wash hands and arms in soapy water after handling animals or carcasses. Wash off all urine, faeces, blood and other body fluids, and thoroughly clean all working areas with soapy water.
- Avoid opening the swollen joints and testicles of feral pig carcasses as these may be infected with brucellosis.

- Slaughter and butcher feral pig carcasses away from areas that are used for handling meat for human consumption.
- Avoid feeding domestic animals raw feral pig meat.
- Ensure that feral pig meat (or other game) is thoroughly cooked if it is to be consumed by humans.

For further information about brucellosis in humans, see the:

- [Brucellosis Factsheet](#)
- [Brucellosis & Feral Pig Hunting Factsheet](#).

In the event a dog has been diagnosed with brucellosis, please refer to recommendations in the NSW Department of Primary Industries [Brucellosis in dogs](#) information sheet (see also Section 6: Managing special situations).

People travelling overseas should avoid eating or drinking unpasteurised dairy products like milk or cheese. Raw milk can be boiled before consumption if pasteurisation is not available.

Exposure investigation

Determine the likely mode of transmission by asking about the following in the two months prior to the onset of illness:

- Overseas and/or Australian travel history;
- Occupation;
- Amateur and/or professional hunting activities (particularly feral pig hunting) including:
 - Type of animal hunted
 - Method of hunting (shooting or "chasing" with dogs)
 - Location of hunting
 - Method of carcass disposal
 - Use of personal protective equipment
- Involvement in feral pig carcass processing, transporting or inspection for export;
- Illness consistent with brucellosis in companion or hunting dogs;
- Consumption of unpasteurised dairy products (from cattle, sheep, goats and potentially other species), overseas or in Australia. If in Australia obtain the country of origin of the product and product details; and
- Consumption of undercooked feral pig meat or other game meat overseas.

Isolation and restriction

None.

Environmental evaluation

If brucellosis is acquired in NSW the NSW Department of Primary Industries should always be consulted and an environmental evaluation may be conducted if deemed necessary.

Contact management

Contacts are those who may have been exposed to the same source as the case. Identify possible cases among co-exposed persons, provide them with information about the disease, and advise to seek medical attention should symptoms develop.

6. Managing special situations

Brucellosis in a dog

Brucellosis is a notifiable condition in animals under the *Animal Diseases and Animal Pests Act 1991*. The NSW Department of Primary Industries will contact the Communicable Disease Branch concerning a positive finding of brucellosis in a dog. The public health unit will be notified by the Department of Primary Industries or Communicable Disease Branch.

NSW Department of Primary Industries will liaise with the treating veterinarian and if necessary the dog owner and provide a copy of the NSW Department of Primary Industries [Brucellosis in dogs](#) information sheet. This includes guidance and recommendations on the prevention, diagnosis and management of the infection in dogs, including that:

- Infected dogs should be euthanased, or treated with antibiotics AND desexed
- All other dogs in contact with the infected dog should be tested and considered infectious until negative.

This information sheet also includes information on the risk to human health. The veterinarian and dog owner will be provided with the local public health unit contact number and instructed to call if they have any questions concerning risk to human health.

7. Additional resources

For factsheets on brucellosis in humans, see the:

- [Brucellosis Factsheet](#)
- [Brucellosis & Feral Pig Hunting Factsheet](#).

For further information about brucellosis in animals, see the NSW Department of Primary Industries webpages on:

- [Being a responsible pig dogger: Hunt safe, hunt legal](#)
- [Brucellosis in dogs](#)
- [Brucellosis in pigs](#).