

Brucellosis

Revision Dates

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| Case Definition | July 2012 |
| Reporting Requirements | July 2012 |
| Remainder of the Guideline (i.e., Etiology to References sections inclusive) | December 2005 |

Case Definition

Confirmed Case

Clinical illness^[1] with laboratory confirmation of infection:

- Isolation of *Brucella* species from an appropriate clinical specimen (e.g., blood, bone marrow)^[2]

OR

- Detection of *Brucella* nucleic acid (e.g., PCR) from an appropriate clinical specimen (e.g., blood, CSF, biopsy tissue)^[3]

OR

- Seroconversion or significant (i.e., fourfold or greater) rise in *Brucella* agglutination titre between acute and convalescent phase serum specimens obtained 2 or more weeks apart.

Probable Case

Clinical illness^[1] and one of the following:

- Epidemiologically linked to a confirmed animal case

OR

- Supportive serology (*Brucella* agglutination titre of 1:160 or higher in one or more serum specimens obtained after onset of symptoms).

^[1] Clinical illness is characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache and arthralgia.

^[2] Refer to the [Provincial Laboratory for Public Health \(ProvLab\) Guide to Services](#) for current specimen collection and submission information.

^[3] Refer to the [National Microbiology Laboratory \(NML\) Guide to Services](#) for current specimen collection and submission information.

Reporting Requirements

1. Physicians, Health Practitioners and others

Physicians, health practitioners and others listed in Sections 22(1) or 22(2) of the *Public Health Act* shall notify the Medical Officer of Health (MOH) (or designate) of all confirmed and probable cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two days).

2. Laboratories

Section 23(a)(ii) of the *Public Health Act* requires that all laboratories, including regional laboratories and the ProvLab, shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two days) to the:

- Chief Medical Officer of Health (CMOH) (or designate),
- MOH (or designate) and
- Attending/ordering physician.

3. Alberta Health Services and First Nations Inuit Health Branch

- The MOH (or designate) of the zone where the case currently resides shall forward the preliminary Notifiable Disease Report (NDR) of all confirmed and probable cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
- For out-of-zone reports, the MOH (or designate) first notified shall notify the MOH (or designate) of the zone where the client currently resides by mail, fax or electronic transfer and fax a copy of the positive laboratory report within 48 hours (two days).
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two days) including:
 - name,
 - date of birth,
 - out-of-province health care number,
 - out-of-province address and phone number,
 - attending physician (locally and out-of-province) and
 - positive laboratory report (faxed).

4. Additional Reporting Requirements

- Canadian Food Inspection Agency (CFIA): Under federal legislation: *Health of Animals Act – Reportable Diseases Regulation*, available at: laws-lois.justice.gc.ca/PDF/SOR-91-2.pdf, all suspect animal cases of brucellosis must be reported. Animal health issues associated with the source of human brucellosis disease should be reported to the District Veterinarian of the CFIA by the MOH (or designate) and to Alberta Agriculture and Rural Development by the CMOH (or designate). Contact information for CFIA is available at: www.inspection.gc.ca/english/animal/heasan/offbure.shtml
- Additional information is available on current surveillance programs in Alberta at: [Canadian Food Inspection Agency - Animal Diseases - Brucellosis - Fact Sheet](#).

Etiology

Brucellosis is caused by the bacterium (gram negative cocci or small rods, aerobic, non-motile, urease positive) *Brucella*. The bacteria live naturally in animals as *Brucella abortus* in cattle, as *Brucella melitensis* in sheep and goats, as *Brucella suis* in pigs, and as *Brucella canis* in dogs.

Clinical Presentation

Subclinical disease has been reported. Onset of brucellosis may be acute or insidious. Symptoms include fever (continuous or intermittent), headache, weakness, sweating, chills, arthralgia, depression, weight loss or generalized aching. Localized infections of organs, including the liver and spleen, may be present.

Infection may last for several days, months or occasionally for more than one year if not adequately treated. Most cases recover, however, relapses may occur in untreated persons. The case-fatality rate of untreated brucellosis is less than 2% and usually results from endocarditis.

Osteoarticular complications are seen in up to 60% of cases. Genitourinary involvement occurs in up to 20% of cases, with orchitis and epididymitis being reported most commonly.

Diagnosis (1)

Diagnosis is made by isolation of the infectious agent from an appropriate clinical specimen. Diagnosis may also be made by serology when paired sera show a rise in antibody titre (see case definition). Interpretation of serologic tests in "chronic" and recurrent cases is especially difficult since titres are usually low. Speciation is made by taking a positive culture specimen and running specific biochemical tests. The time from initial inoculation of a clinical specimen to identification at the species level may take at least 10 to 12 days. Often, public health measures need to be implemented prior to confirmation of the diagnosis. (R Rennie, personal communication, July 2003)

With recovery, antibody titres decline slowly but are usually not detected after 2 to 3 years. Persistent elevation of immunoglobulin G antibodies is prognostic of chronic infection or relapse (Mandell)

Epidemiology

Reservoir

Animal reservoirs include cattle, swine, goats, sheep, elk, bison, caribou, some species of deer, coyotes, and occasionally dogs. New species have been found in marine mammals. Animal tissues, blood, urine, vaginal discharges, aborted fetuses, placentas, and milk may be other sources of infection.

Transmission (1,2)

Transmission occurs through ingestion, direct contact via skin abrasions and mucous membranes, and inhalation. Risk factors include contact with infected tissues, blood, urine, vaginal discharge, aborted fetuses, through the ingestion of raw milk or cheese from infected animals (most common mode) via contact in abattoirs, or laboratory-acquired (generally through aerosolization). Direct transmission from person to person is extremely rare. Mothers who are breastfeeding may transmit infection to their infants. Sexual transmission has also been reported.

Incubation Period

The incubation period is highly variable ranging from five to 60 days, occasionally several months.

Period of Communicability (3)

There is no evidence of person to person transmission.

Host Susceptibility

The severity and duration of the illness is subject to wide variation. The duration of acquired immunity following infection is uncertain.

Occurrence

General (2, 4)

Brucellosis can be found worldwide. It is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk are the Mediterranean Basin (Portugal, Spain, Southern France, Italy, Greece, Turkey, North Africa), South and Central America, Eastern Europe, central Asia, India, Africa, the Caribbean, Mexico, and the Middle East.

Brucellosis is predominantly an occupational disease of those who work with infected animals or their tissues. Infection is common in those who eat raw caribou. The current reported incidence in the United States is less than 120 cases annually.

Worldwide, the disease is often unrecognized and unreported. True incidence had been estimated to be between 10 and 25 times higher than what is reported. Cases very often remain unrecognized because of inaccurate diagnosis, and are treated for other diseases or for "fever of unknown origin".

Canada (5)

The first reported case in Canada was in 1928. Brucellosis is not common in Canada. An average of 10 cases per year has been reported since 1989.

Alberta (6)

Approximately one case of brucellosis has been reported in Alberta annually since 1989 and a total of 12 cases reported since 1985. Females are affected more than males by a ratio of two to one. Sources of infection have been cited as: five cases acquired from travel, one listed as home, and six cases were listed as unknown.

Key Investigation (1)

- Determine possible source of infection. Specific species may dictate source, for example:
 - *B. melitensis* - history of travel or immigration (especially involving the Mediterranean). History of contact with goats/sheep, ingestion of imported cheese, imported non-pasteurized milk or imported sausage.
 - *B. abortus* - history of travel or immigration. Contact (e.g. hunting/wild meat preparation) with animals such as wild or farmed bison, elk, deer, etc.
 - *B. canis* - history of travel or immigration (especially Southeast Asia, South America). Exposure to infected dogs (especially blood, semen or placenta), coyotes in the US, and kennels.
 - *B. suis* biovar 4 - history of hunting, preparing, or ingesting wild caribou.
- Determine the ingestion of potentially contaminated foodstuffs.
- Identify occupational risk.
- Recent history of travel to or immigration from an endemic area.
- Determine past history of infection as this may indicate a relapse.

Control

Management of a Case (1, 2)

- Routine practices.
- Contact precautions are required if wound drainage cannot be contained by dressings. Contaminated dressing should be disposed of in a safe manner.
- Provide supportive care for specific symptoms.

Treatment of a Case (1,2,4)

- Treatment depends on clinical symptoms and the age of the case, and is usually prescribed for six weeks to prevent reoccurring infection.
- Antibiotics (i.e., doxycycline and rifampin) are effective against *Brucella*. It usually requires the administration of more than one antimicrobial for several weeks.
- Depending on the timing of the treatment and severity of illness, recovery may take a few weeks to several months.

Management of Contacts

- Symptomatic and asymptomatic contacts should be investigated if a common source is suspected.

Preventive Measures

- No human vaccine is available.
- Provide education for Aboriginal and Inuit peoples who by the nature of traditional meat eating practices may put themselves at risk of acquiring disease.
- The prevention of human brucellosis depends on the control and elimination of the disease in domestic animals.
- Educate the public, especially travellers to foreign countries, not to consume unpasteurized dairy products, e.g., milk, cheese or ice cream
- Educate individuals about the dangers of consuming the uncooked viscera of animals.
- All domestic and wild meats should be thoroughly cooked.
- Educate hunters and animal herdsman about the proper handling of carcasses.
 - Rubber gloves and protective clothing should be worn when handling viscera of animals.
 - Discarded animal remains should be buried.
- Educate farmers and workers in slaughterhouses, meat processing plants and butchers' shops as to the nature of the disease and the risks in handling carcasses and products of potentially infected animals.
 - Exercise care in handling and disposal of placenta, discharges, and fetus from an aborted animal.
 - Appropriate disinfection of contaminated areas is essential.
- Laboratory safety
 - Brucella specimens require biosafety level 3 practices.
 - Refer to the current PHAC Laboratory Safety Guidelines at: <http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/index.html>

References

- (1) Maloney GE, Jr. CBRNE – Brucellosis. E-medicine. September 2004.
<http://www.emedicine.com/emerg/topic883.htm>
- (2) CDC. Brucellosis – General information. Division of Bacterial and Myotic Disease. June 2001.
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/brucellosis_g.htm
- (3) Public Health Agency of Canada. Infectious substances: Brucella spp. Office of Laboratory Security. Material Safety Data Sheet. November 1999.
<http://www.phac-aspc.gc.ca/msds-ftss/msds23e.html>
- (4) World Health Organization. Brucellosis. Media centre. Fact Sheet No. 173. July 1997.
<http://www.who.int/inf-fs/en/fact173.html>
- (5) Public Health Agency of Canada. Notifiable Diseases On-line – Brucellosis. December 2003.
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- (6) Alberta Health and Wellness, Disease Control and Prevention. Communicable Disease Reporting System. August 2002.

Superseded