

## Brucellosis



### Case Definition

Clinically compatible illness (see below) with one of the following:

- a positive culture for a species of *Brucella*;
- detection of a four-fold or greater change in the serologic titre against *Brucella* to more than 1/80 by Standard Tube Agglutination (STA), or equivalent, between acute and convalescent serum specimens obtained two or more weeks apart and studied in the same laboratory; or
- a single significantly high titre against *Brucella* (>1/160).

### Reporting Requirements

- All positive laboratory tests are reportable by laboratory.
- All clinical cases are reportable by attending health care professional.
- Cases of *B. bovis* and *B. melitensis* should be reported to an inspector of the Canadian Food Inspection Agency.

### Clinical Presentation/Natural History

Acute or insidious onset with fever (continuous or intermittent), headache, weakness, sweating, chills, arthralgia, depression, weight loss, or generalized aching. Relapses are frequent in untreated persons. Localized suppurative infections of organs, including the liver and spleen, may occur; subclinical disease has been reported and chronic localized infections can occur. Osteoarticular complications are seen in up to 60% of cases; sacroiliitis is the most frequent joint manifestation. Genitourinary involvement is reported in up to 20% of cases, with orchitis and epididymitis most common. Infection may last for several days, months, or occasionally for more than one year if not adequately treated. Recovery is usual but disability is often pronounced. The case-fatality rate of untreated brucellosis is less than 2% and usually results from endocarditis.

### Etiology

*Brucella abortus*, biovars 1-6 and 9; *B. melitensis*, biovars 1-3; *B. suis*, biovars 1-5; and *B. canis*.

### Epidemiology

**Reservoir:** Animal reservoirs, including 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 sources of infection.

**Transmission:** Transmission is most commonly through direct contact with infected animals/tissues, through breaks in the skin. Ingestion of unpasteurized milk and milk products (especially cheese) from infected cows, goats and sheep can also result in transmission. A small number of cases result from accidental self-inoculation of strain 19 *Brucella* vaccine; the same risk is present when Rev-1 vaccine is handled. Airborne infection of animals occurs in pens and stables, and of humans in laboratories and abattoirs.

### Occurrence:

**General:** Worldwide. Primarily an occupational disease among farmers, veterinarians and abattoir workers. The sources of infection and the responsible organism vary according to geographic area. Sporadic cases and outbreaks occur among consumers of raw milk and milk products (especially unpasteurized soft cheese) from cows, sheep and goats. Isolated cases of infection with *B. canis* occur in animal handlers from contact with dogs. The current reported incidence in the United States is less than 120 cases annually; worldwide, the disease is often unrecognized and unreported.

**Manitoba:** Since 1986, Canada's domesticated animals have been considered *Brucella*-free, but *B. bovis* remains endemic in bison in Northern Alberta. *Brucella suis* biovar 4 has been reported from caribou and is the only *Brucella spp* endemic in Manitoba. Since 1994, there have been five cases of human brucellosis reported in Manitoba.

**Incubation Period:** Variable, usually five to 60 days but may be longer.

**Susceptibility and Resistance:** Severity and duration of clinical illness are subject to wide variation. Duration of acquired immunity is uncertain.

**Period of Communicability:** No evidence of communicability from person-to-person.

## Diagnosis

Diagnosis is made by appropriate isolation of the infectious agent from blood, bone marrow or other tissues. Diagnosis may be made by serology when paired sera show a rise in antibody titre (see above). Interpretation of serologic tests in “chronic” and recurrent cases is especially difficult since titres are usually low. Specific serologic techniques are needed for *B. canis* antibodies, which do not cross-react with the other species; relevant history is very helpful.

## Key Investigations

Depends on *Brucella* species.

- *B. melitenis*. History of travel or immigration (especially involving Mediterranean area). History of contact with goats/sheep, ingestion of imported cheese, imported non-pasteurized milk, imported sausage, etc.
- *B. abortus*. History of travel or immigration. Contact (e.g., hunting/wild meat preparation) with wild or farmed bison, elk, deer, etc. in Alberta or Yukon. Accidental exposure to Strain 19 cattle vaccine.
- *B. canis*. History of travel or immigration (especially Southeast Asia, South America). Exposure to coyotes in the United States. Exposure to whelping dogs, kennels, laboratories.
- *B. suis* biovar 4. History of hunting/preparation/ingestion of wild caribou.

## Control

### Management of Cases:

- Drainage/secretion precautions should be used if there are draining lesions.
- Place dressings from lesions and discharges in disposable bags and dispose of them in a safe manner.

### Treatment:

- Adults: rifampin (RIF) (600-900 mg daily), or streptomycin and doxycycline (200 mg daily) for at least six weeks.
- Children older than eight years of age: tetracycline and rifampin, or tetracycline and gentamicin, or trimethoprim and gentamicin.
- Children younger than eight years of age: trimethoprim/sulfamethoxazole and gentamicin.

Relapses occur in about 5% of patients treated with doxycycline and rifampin and are due to sequestered rather than resistant organisms; they should be retreated with the original regimen. Arthritis may occur in recurrent cases. While evidence for its efficacy has not been proven in clinical trials, it is recommended that persons inadvertently inoculated with strain 19 or Rev-1 vaccines should be given doxycycline 100 mg twice daily, combined with rifampin 600-900 mg once daily for 21 days; for conjunctival inoculations, prophylaxis should be maintained for four to six weeks.

### Management of Contacts:

- Human contacts require no investigation unless a common exposure is suspected.

### Management of Environment:

- If contact with local animals is implicated, veterinarians should investigate and test animals. Infected animals are usually destroyed.

## Management of Outbreaks:

- If common exposure to food is suspected, investigate immediately and institute control measures to recall the suspected products.
- Provincial public health staff coordinate recalls if the food originated in Manitoba. The Canadian Food Inspection Agency should also be contacted.

## Preventive Measures:

- Control of domestic animals and animal products in international trade and transport. Elimination of infected cows, swine, goats, sheep and game-farmed ungulates.
- Pasteurization of milk.
- Education of hunters to use barrier precautions (gloves, clothing) and bury the remains.
- Education of farmers and workers in slaughterhouses, meat processing plants and butchers' shops as to the nature of the disease and the risk in handling carcasses and products of potentially infected animals. Exercise care in handling and disposal of placenta, discharges and fetus from an aborted animal. Disinfect contaminated areas.
- Education of the public (especially tourists to foreign countries) not to drink untreated milk, or eat products made from unpasteurized or otherwise untreated milk.