

Ontario Public Health Standards:  
Requirements for Programs, Services and Accountability

Infectious Disease Protocol

# **Appendix 1:**

## **Case Definitions and Disease-Specific Information**

### **Disease: Brucellosis**

Effective: May 2023

# Brucellosis

Communicable

Virulent

[Health Protection and Promotion Act \(HPPA\)](#)<sup>1</sup>

[Ontario Regulation \(O. Reg.\) 135/18 \(Designation of Diseases\)](#)<sup>2</sup>

## Provincial Reporting Requirements

Confirmed case

Probable case

As per Requirement #3 of the "Reporting of Infectious Diseases" section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- [O. Reg. 569](#) (Reports) under the HPPA;
- The iPHIS User Guides published by Public Health Ontario (PHO); and Bulletins and directives issued by PHO.<sup>3,4</sup>

## Type of Surveillance

Case-by-case

## Case Definition

### Confirmed Case

Laboratory confirmation of infection with clinically compatible signs and symptoms:

- Isolation of *Brucella* spp. from an appropriate clinical specimen (e.g., blood, tissue)

**OR**

- A significant (i.e., fourfold or greater) rise in *Brucella* agglutination titre

between acute and convalescent serum specimens obtained 2 or more weeks apart

**OR**

- Detection of *Brucella* spp. deoxyribonucleic acid (DNA) from an appropriate clinical specimen

## **Probable Case**

- Clinically compatible signs and symptoms with supportive serology (i.e., *Brucella* agglutination test titre of 1:160 or higher in one or more serum specimens obtained after onset of symptoms)

**OR**

- Clinically compatible signs and symptoms in a person with an epidemiologic link to a confirmed case or suspected source

## **Outbreak Case Definition**

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.<sup>3</sup>

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified, if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

Outbreak cases may be classified by levels of probability (i.e., confirmed and/or probable).

# Clinical Information

## Clinical Evidence

Clinically compatible signs and symptoms are characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache, and arthralgia.

## Clinical Presentation

Acute or insidious onset of symptoms, such as intermittent fever, headache, weakness, profuse sweating, chills, arthralgia, depression, weight loss, and generalized aching. Localized infections of organs, including the liver and spleen, may be present. Physical findings include lymphadenopathy, hepatosplenomegaly and occasionally arthritis. Serious complications include meningitis, endocarditis and osteomyelitis. Disease may last days, months, or occasionally a year or more if not adequately treated,<sup>5,6</sup>

# Laboratory Evidence

## Laboratory Confirmation

Any of the following will constitute a confirmed case of brucellosis:

- Positive *Brucella* sp. culture with confirmation (See Section 4.2)
- A significant (i.e., fourfold or greater) rise in *Brucella* sp. antibody titre
- Detection of *Brucella* spp. DNA

## Approved/Validated Tests

- Standard culture for *Brucella* sp. with confirmation
- Brucella serology
- Confirmatory methods include traditional phenotypic and biochemical testing and/or nucleic acid amplification test (NAAT)

## Indications and Limitations

- Additional tests may include NAAT for *Brucella* sp. based on availability.

For further information about human diagnostic testing, contact the [Public Health Ontario Laboratories](#).

## Case Management

In addition to the requirements set out in Requirement #2 of the “Management of Infectious Diseases – Sporadic Cases” and “Investigation and Management of Infectious Diseases Outbreaks” sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection.<sup>3</sup> Refer to Provincial Reporting Requirements above for relevant data to be collected during case investigation.

The following disease-specific information should also be obtained:

- History of exposure to possible sources based on specific species identified on culture (in past 60 days)
- History of occupational risks
- History of recent travel
- Food history
- Date of symptom onset
- History of past infection, as relapses of prior infection can occur

Notify Canadian Food Inspection Agency (CFIA) if disease is traced to imported or domestic animals/sources. Consider testing suspect food samples or other products. Consult the Public Health Ontario Laboratories advice on testing availability, sampling, and transport considerations. Collaborate with CFIA to ensure proper removal/disposal of implicated product or animal.

Treatment is under the direction of the attending physician and depends on clinical symptoms and age of the case; antibiotics are usually prescribed for six weeks to prevent recurring infection.<sup>5</sup>

*Brucella* sp. may also be used as a bioterrorism agent. If bioterrorism is suspected, the Provincial Emergency Operations Centre (PEOC) will be activated to coordinate and direct the province's response under the [Emergency Management and Civil Protection Act](#).<sup>7</sup>

**Note:** Given the potential for the appearance of brucellosis cases to signal a bioterrorism incident, investigation and follow-up may involve notification of law enforcement. If tampering, sabotage, or bioterrorism is suspected, the health unit shall immediately notify their local police service and the Health System Emergency Management Branch (HSEMB) Health Care Provider Hotline at 1-866-212-2272. A bioterrorism event would trigger activation of the provincial emergency operations centre, including the HSEMB of the ministry and relevant health emergency response plans, as well as those additional ministries with responsibilities for security, law enforcement, or other relevant areas of concern, as identified in the [Emergency Management and Civil Protection Act](#) and associated Order in Council. The [Ministry Emergency Response Plan \(MERP\)](#) provides information on how the ministry would respond to a health emergency.<sup>7,8</sup> Any requests for federal supplies of medical countermeasures for a brucellosis bioterrorism incident must be made through HSEMB. The Provincial Emergency Operations Centre (PEOC) can be contacted by email at [EOCOperations.MOH@ontario.ca](mailto:EOCOperations.MOH@ontario.ca).

## Contact Management

Investigate contacts, such as co-workers and family members, to identify people who may have been exposed to the same source and who could also be infected.<sup>6</sup>

## Outbreak Management

Two or more cases linked in time and space is suggestive of an outbreak. If no common source is identified, consideration may be given to a bioterrorism event where there is potential to infect humans and animals through aerosol exposure.

Please see the *Infectious Diseases Protocol, 2018* (or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.<sup>3</sup>

The likelihood of an outbreak of brucellosis is low, given Ontario's brucellosis-free

status in cattle; however, clusters of cases could possibly occur following exposure to an animal with brucellosis other than cattle, such as deer.

## Prevention and Control Measures

### Personal Prevention Measures

Preventive Measures:

- Travellers to foreign countries should be advised not to consume unpasteurized dairy products and undercooked meat products;
- If an outbreak is suspected among a particular subset of the population, then potentially affected farmers, hunters and animal handlers should be educated about the proper handling of carcasses. This includes burying the remains and using protective clothing and gloves;
- Protective clothing and gloves should be worn when handling feral swine;
- No one should consume raw unpasteurized milk; and
- Direct contact with body fluids and/or products of parturition from infected animals should be avoided. When products of parturition must be handled, appropriate care should be taken to avoid exposure, and contaminated areas should be disinfected.<sup>6</sup>

### Infection Prevention and Control Strategies

For hospitalized cases, routine practices are recommended and contact precautions are indicated when dealing with individuals with draining wounds and or lesions.<sup>5</sup>

Refer to [PHO's website](#) to search for the most up-to-date information on Infection Prevention and Control.

## Disease Characteristics

**Aetiologic Agent** - Brucellosis is caused by the bacterium *Brucella*. *Brucella* species are small, nonmotile, gram-negative coccobacilli. The species that most commonly infect humans include *B. suis*, *B. abortus*, *B. melitensis*, and *B. canis*.<sup>5</sup> While rare, *B. ceti*

(reservoirs: dolphins, porpoises, whales), *B. pinnipedialis* (sea lions, seals, walruses) and *B. inopinata* (unknown reservoir) are recently described *Brucella* species known to also cause disease in humans.<sup>6,9</sup>

*Brucella* spp. are potential bioterrorism agents.<sup>6</sup>

**Modes of Transmission** - Transmission occurs as a result of direct contact of breaks in the skin and mucous membrane with infected animal tissue, body fluids (blood, urine, vaginal discharges), aborted fetuses and especially placentas, as well as through ingestion of undercooked meat, raw milk and unpasteurized dairy products from infected animals. Airborne inhalation in laboratories and abattoirs has also been reported.<sup>6</sup>

**Incubation Period** – The incubation period is variable and difficult to ascertain; commonly 1-2 months, with a range of 5 days to 5 months.<sup>6</sup>

**Period of Communicability** - Person-to-person transmission is rare, but sexual transmission and in utero transmission have been reported. Breastfeeding women may transmit infections to their infants.<sup>5,6</sup>

**Reservoir** - Domestic animals such as cattle, swine, goats and sheep as well as wild animals such as caribou, bison, elk and some species of deer.<sup>6</sup>

Canadian cattle were certified brucellosis-free in 1985.<sup>10</sup>

*B. canis* is occasionally found in dogs, most often in laboratory dog colonies or kennels, and coyotes have also been found to be infected.<sup>6</sup>

**Host Susceptibility and Resistance** - The severity and duration of the illness varies widely and the duration of acquired immunity following infection is uncertain.<sup>6</sup>

Please refer to [PHO's Reportable Disease Trends in Ontario reporting tool](#) for the most up-to-date information on infectious disease trends in Ontario.

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.



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# Document History

<b>Revision Date</b>	<b>Document Section</b>	<b>Description of Revisions</b>
April 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
April 2022	Epidemiology: Occurrence section	Removed.
April 2022	ICD Codes	Removed.
March 2023	Bioterrorism	Addition of bioterrorism guidelines.
May 2023	Case Management	Addition of contact information.