

**Report Immediately  
by phone**  
If bioterrorism suspected

# BRUCELLOSIS

**Potential Bioterrorism Agent: Category B**

**Also known as: Undulant Fever, Malta Fever, Mediterranean Fever**

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## **Responsibilities:**

**Hospital: Report immediately** by phone if bioterrorism suspected, otherwise within 3 days

**Lab: Report immediately** by phone if bioterrorism suspected, otherwise within 3 days

**Physician: Report immediately** by phone if bioterrorism suspected, otherwise within 3 days

**Local Public Health Agency (LPHA): Follow-up required. Iowa Department of Public Health will lead the follow-up investigation.**

**Iowa Department of Public Health**

**Disease Reporting Hotline: (800) 362-2736**

**Secure Fax: (515) 281-5698**

## **1) THE DISEASE AND ITS EPIDEMIOLOGY**

### **A. Agent**

Brucellosis is caused by *Brucella* bacteria. The species of *Brucella* which infect humans are *B. abortus*, *B. melitensis*, *B. suis*, and rarely, *B. canis*.

### **B. Clinical Description**

Symptoms: May be non-specific, including sustained or irregular fever of variable duration, headache, weakness, sweats, chills, arthralgias, malaise, weight loss, depression and generalized aching.

Onset: May be acute or insidious. Localized infections of organs (including the liver and spleen) and chronic localized infections can occur. The disease may last for days, months, or occasionally longer if inadequately treated. Relapse is not uncommon.

Complications: Most commonly include osteomyelitis, splenic abscess, genitourinary tract infection, pulmonary disease, and endocarditis. The case-fatality rate of untreated brucellosis is 2% or less with death often resulting from endocarditis caused by *Brucella melitensis*.

### **C. Reservoirs**

Common reservoirs: Cattle (*B. abortus*), swine (*B. suis*), goats (*B. melitensis*) and sheep.

Less common reservoirs: Bison, elk, coyotes, caribou, and some species of deer may also harbor *Brucella* species. *B. canis* is an occasional problem in laboratory dog colonies and kennels; a small percentage of pet dogs and a higher proportion of stray dogs have *B. canis* antibody titers.

### **D. Modes of Transmission**

Spread through direct contact (of mucosal surfaces and non-intact skin) with secretions of living or dead infected animals, including their tissues, blood, urine, vaginal discharges, aborted fetuses, and especially placentas. It may also be spread through ingestion of raw milk and dairy products (*e.g.*, unpasteurized cheese) from infected animals.

Airborne transmission may occur through inhalation of contaminated aerosols (*e.g.*, in laboratory settings).

Transmission from strain 19 *Brucella* animal vaccine or Rev-1 animal vaccine may occur in veterinary practices and associated personnel and farmers.

Person-to-person spread is extremely rare, although it has been reported to occur through bone-marrow transplantation.

### **E. Incubation period**

The incubation period for brucellosis is highly variable, ranging from 5 - 60 days; illness most commonly occurs about 1-2 months after exposure.

### **F. Period of Communicability or Infectious Period**

Person-to-person transmission of brucellosis is extremely rare.

### **G. Epidemiology**

- Humans are accidental hosts, although there is worldwide distribution of brucellosis.
- Commonly seen in farmers, ranchers, veterinarians, and other people who work directly with animals. It may also be found in laboratory and slaughterhouse employees, or meat inspectors.
- Sporadic cases and outbreaks, especially among overseas travelers may occur among consumers of raw (unpasteurized) milk and milk products, especially soft cheeses. Less than 10% of reported cases occur in children under 19 years old. Fewer than 120 cases per year are reported in the United States; incidence worldwide may be largely unrecognized and under reported.

### **H. Bioterrorism Potential**

**Category B:** *Brucella* species are considered potential bioterrorism agent. If acquired and properly disseminated, *Brucella* could cause a serious public health challenge in ability to limit the numbers of casualties and control other repercussions from such an attack.

## **2) DISEASE REPORTING AND CASE INVESTIGATION**

### **A. Purpose of Surveillance and Reporting**

- To identify the source of infection and prevent further transmission from this source (*e.g.*, an infected animal, a contaminated unpasteurized dairy product, etc.).
- To identify cases and clusters of human illness that may be associated with a bioterrorist event.

### **B. Laboratory and Healthcare Provider Reporting Requirements**

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider must report. The preferred reporting method is through the Iowa Disease Surveillance System, unless Bioterrorism is involved. The reporting phone number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736; fax number (515) 281-5698, mailing address:

IDPH, CADE  
Lucas State Office Building, 5<sup>th</sup> Floor  
321 E. 12<sup>th</sup> St.  
Des Moines, IA 50319-0075

*Note:* Due to the infrequent occurrence and potential severity of brucellosis, IDPH requests that information about any suspect or known case be reported within 24 hours, however any suspected exposure to *Brucella* that may be bioterrorist in nature should be **immediately reported** to the

local public health agency where diagnosed. If this is not possible, call IDPH Center for Acute Disease Epidemiology at (800) 362-2736.

### **C. Local Public Health Agency (LPHA) Follow-up Responsibilities**

#### **1. Case Investigation**

- a) The most important thing a LPHA can do if it learns of a suspect or confirmed case of brucellosis, or any suspected exposure to *Brucella* that may be due to a bioterrorist event, is to call IDPH immediately, any time of the day or night. The 24-hour number for the Center of Acute Disease Epidemiology is (800) 362-2736.
- b) Case investigation of brucellosis in Iowa residents will be directed by CADE. If a bioterrorist event is suspected, IDPH and other response authorities will work closely with LPHA(s) and provide instructions/information on how to proceed.
- c) Following immediate notification to IDPH, the LPHA(s) may be asked to assist in investigating cases that live within their community. They may be asked to:
  - 1) Confirm diagnosis.
  - 2) Inform CADE of the presence of the disease and request assistance if needed.
  - 3) Work with CADE staff on completion of CDC *Brucellosis Case Surveillance form*.
  - 4) Confirm that the laboratory where the culture was identified exercised the proper precautions when working with the bacteria. Infectious aerosols can occur when manipulation of the isolate is done outside of a biosafety hood. Laboratory workers exposed to these aerosols should take preventive antibiotics.
  - 5) Ask questions regarding exposure to the *Brucella* vaccine to determine other potential sources of exposure.

If it is suspected that the case became infected through milk (or other food), CADE will work with the Department of Inspections and Appeals (DIA) to address food safety concerns.

- d) Institution of disease control measures is an integral part of case investigation. The LPHA will work with CADE to institute the control guidelines listed below in Section 4), Controlling Further Spread. CADE staff will also be available to assist in development of any risk communications or other needs of its local partners regarding the investigation.

## **3) CONTROLLING FURTHER SPREAD**

### **A. Isolation and Quarantine Requirements**

Isolation: Standard Precautions.

Quarantine: None.

### **B. Protection of Contacts of a Case**

- Follow Standard and Contact Precautions if the case has draining lesions followed by disinfection of purulent discharges.
- Licensed *Brucella* vaccines are currently available only for livestock.

### **C. Managing Special Situations**

#### **Reported Incidence Is Higher than Usual/Outbreak Suspected**

If more than one case of brucellosis is reported or suspected, or an outbreak is suspected, investigate to determine the source of infection and mode of transmission. A common vehicle, such as unpasteurized milk products or infected animals, should be sought and applicable preventive or control measures should be instituted (e.g., removing an implicated food item from the environment). Consult with an epidemiologist at CADE at (800) 362-2736 as soon as possible. The center can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross county lines and be difficult to identify.

### **Exposure of a Laboratory Worker**

Laboratory workers exposed to *Brucella* (e.g., failure to use the protection of a laminar air flow/biosafety hood), should receive prophylaxis consisting of:

- Doxycycline 100 mg bid plus rifampin 600-900 mg once daily for 21 days; for conjunctiva inoculations, prophylaxis should be maintained for 4 - 6 weeks. Consult with an epidemiologist at CADE at (800) 362-2736.

### **Inadvertent inoculation with *Brucella* animal vaccine**

Veterinarian and others in veterinary practices, farmers and others exposed to *Brucella* animal vaccine should receive prophylaxis consisting of:

- Doxycycline 100 mg bid for 21 days; for conjunctiva inoculations, prophylaxis should be maintained for 4 - 6 weeks.
- Consult with an epidemiologist at CADE at (800) 362-2736.

## **D. Preventive Measures**

- Pasteurize milk and dairy products.

### **Environmental Measures**

Implicated food items must be removed from the environment. A decision about removing these can be made in consultation with the Department of Inspections and Appeals and CADE officials.

### **Preventive Measures/Education**

To prevent future exposures, advise the following:

- Do not consume raw (unpasteurized) milk or milk products (including imported cheeses, etc.).
- Workers at occupational risk (farmers, slaughterhouse workers, meat processors or butchers) should know symptoms of the disease, how it is spread, and the risks of handling infected animal carcasses and products. They should know the proper way to reduce exposure, such as ventilating slaughterhouses and handling carcasses carefully. For more information refer to the USDA, Animal and Plant Health Inspection Service (APHIS) web site, [www.aphis.usda.gov/](http://www.aphis.usda.gov/)
- Hunters should use barrier protection (gloves or clothing) when dressing wild pigs and burying the remains.
- Wear gloves and protect skin from secretions or excretions when handling and disposing of placenta, discharges, and fetus from an aborted animal. Disinfect contaminated areas.

Local officials and farmers should search for infection among livestock and eliminate infected animals. In areas of high prevalence, immunization of livestock may be appropriate. Ultimate control of human brucellosis relies on eliminating the disease in domestic animal populations.

## **4) ADDITIONAL INFORMATION**

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for brucellosis can be found at: [www.cdc.gov/osels/ph\\_surveillance/nndss/phs/infdis.htm#top](http://www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top)

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

Contact the Iowa Department of Agriculture and Land Stewardship (IDALS), (515) 281-8601 (after hours 515-242-0247) with questions about the disease in animals. For information about the risk to humans, contact CADE at (800) 362-2736. If after hours, instructions will be given to reach on-call staff.

## References

American Academy of Pediatrics. *2000 Red Book: Report of the Committee on Infectious Diseases, 25<sup>th</sup> Edition*. Illinois, Academy of Pediatrics, 2000.

CDC web site. Brucellosis. Available at [www.cdc.gov/brucellosis/](http://www.cdc.gov/brucellosis/)

Heymann, D.L., ed. *Control of Communicable Diseases Manual, 20<sup>th</sup> Edition*. Washington, DC, American Public Health Association, 2015.

## Additional Resources

USDA web site providing information regarding brucellosis in animals:

[www.aphis.usda.gov/animal\\_health/animal\\_diseases/brucellosis/](http://www.aphis.usda.gov/animal_health/animal_diseases/brucellosis/)

FDA web site providing the latest food recalls:

[www.fda.gov/opacom/7alerts.html](http://www.fda.gov/opacom/7alerts.html)