

Brucellosis

- TRANSMISSION
- RISK OF EXPOSURE
- PREVENTION
- SIGNS AND SYMPTOMS
- TREATMENT
- RESOURCES

Transmission

Eating undercooked meat or consuming unpasteurized/raw dairy products

The most common way to be infected is by eating or drinking unpasteurized/raw dairy products. When sheep, goats, cows, or camels are infected, their milk becomes contaminated with the bacteria.

If the milk from infected animals is not pasteurized, the infection will be transmitted to people who consume the milk and/or cheese products.

Breathing in the bacteria that cause brucellosis (inhalation)

Breathing in the bacteria that causes brucellosis may also lead to infection. This risk is generally greater for people in laboratories that work with the bacteria. In addition, slaughterhouse and meat-packing employees have also been known to be exposed to the bacteria and ultimately become infected.

Bacteria entering the body through skin wounds or mucous membranes

Bacteria can also enter wounds in the skin/mucous membranes through contact with infected animals.

This poses a problem for workers who have close contact with animals or animal excretions (newborn animals, fetuses, and excretions that may result from birth). Such workers may include:

- slaughterhouse workers
- meat-packing plant employees

- veterinarians

People who hunt animals may also be at risk. When they are in contact with infected animals, exposure to the bacteria may occur through:

- skin wounds
- accidentally ingesting undercooked meat
- inhaling the bacteria while dressing their game. Commonly infected animals include: bison, elk, caribou, moose and wild hogs (feral swine).

CDC Feature – Hunters: Protect Yourself from Brucellosis

Person-to-person spread of brucellosis is extremely rare. Infected mothers who are breast-feeding may transmit the infection to their infants. Sexual transmission has been rarely reported. While uncommon, transmission may also occur via tissue transplantation or blood transfusions.

Risk of Exposure:

Areas at Risk

Although brucellosis can be found worldwide, it is more common in countries that do not have 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)
- Mexico, South and Central America
- Eastern Europe
- Asia
- Africa
- The Caribbean
- The Middle East

Occupational Risks

People in certain occupations or settings may face increased exposure to the bacteria that cause brucellosis.

These can include:

- slaughterhouse workers
- meat-packing employees
- veterinarians
- laboratory workers

Risks from Unpasteurized Dairy Products

Raw milk and milk products are those that have not undergone a process called pasteurization that kills disease-causing germs. These types of products are common outside the United States and are increasingly being sold in mainstream supermarkets in the United States as well.

Consumption of raw milk containing *Brucella* can cause brucellosis. Most cases of brucellosis associated with raw milk are caused by a strain called *Brucella melitensis* or *Brucella abortus* in people who traveled to countries where these strains are common and drank contaminated cow, sheep or goat milk. In rare cases, brucellosis cases associated with other strains, including RB51 and *Brucella suis*, are reported.

RB51 is resistant to certain antibiotics that would normally be used to prevent or treat *Brucella* infections. CDC recommends that anyone exposed to RB51 receive antibiotics to prevent an infection.

Risks for Expecting Mothers

Women who are pregnant and have been exposed to brucellosis should consult with their obstetricians/healthcare provider for evaluation. Laboratory tests and a short course of antibiotics also known as post-exposure prophylaxis (PEP) may be recommended.

Prompt diagnosis and treatment of brucellosis during pregnancy can be lifesaving for the fetus.

While rare, human-to-human transmission from lactating mothers to their breastfed infants has been reported.

If you have been diagnosed with brucellosis, please consult with your obstetrician/healthcare provider for healthy nursing options.

Hunters Risks

Photo courtesy of United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services. sed risk of exposure.

Some game animals that can transmit brucellosis include:

- wild hogs (feral swine)
- elk
- bison
- caribou
- moose

Prevention

The best way to prevent brucellosis infection is to be sure you do not consume:

- undercooked meat
- unpasteurized dairy products, including:
 - milk
 - cheese
 - ice cream

Pasteurization is when raw milk is heated to a high temperature for a short period of time. This heating process destroys harmful bacteria that may make the milk unsafe to consume.

If you are not sure that the dairy product is pasteurized, do not eat it.

People who handle animal tissues (such as hunters and animal herdsman) should protect themselves by using:

- rubber gloves

- goggles
- gowns or aprons

This will help ensure that bacteria from potentially infected animals do not get into eyes or inside a cut or abrasion on the skin.

Signs and Symptoms

Brucellosis can cause a range of signs and symptoms, some of which may present for prolonged periods of time.

Initial symptoms can include:

- fever
- sweats
- malaise
- anorexia
- headache
- pain in muscles, joint, and/or back
- fatigue

Some signs and symptoms may persist for longer periods of time. Others may never go away or reoccur.

These can include:

- recurrent fevers
- arthritis
- swelling of the testicle and scrotum area
- swelling of the heart (endocarditis)
- neurologic symptoms (in up to 5% of all cases)
- chronic fatigue
- depression
- swelling of the liver and/or spleen

Treatment

Before treatment begins, a diagnosis of brucellosis infection must be made by a doctor.

Tests will be performed to look for bacteria in samples of blood, bone marrow, or other body fluids.

In addition, a blood test can be performed to detect antibodies against the bacteria.

Once a diagnosis is made, a doctor can prescribe antibiotics.

Depending on the timing of treatment and severity of illness, recovery may take a few weeks to several months. Death from brucellosis is rare, occurring in no more than 2% of all cases.