Brucella Exposure Medical Response Guidance
for the University of Wisconsin

Instructions: Information in this guidance is meant to inform both laboratory staff and health professionals about the risks and treatment of infectious agent exposures. In developing this guidance, please consider that multiple routes of exposure may occur in a lab and that organism strains will sometimes be genetically modified to incorporate traits such as antimicrobial resistance. Research protocols and other available guidance such as Health Canada material safety data sheets will be provided as supporting information when available. It should be assumed that when exposures do occur, that the healthcare provider will be provided information about the specific strain involved, route of exposure, inoculum concentration, and victim vaccination and serological status, when available. If there are any questions about this document, please contact Jim Morrison, UW Occupational Health Officer at 263-2177 or jmorrison@fpm.wisc.edu.

Signs and Symptoms of Infection- Describe signs and symptoms associated with the agent.

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<tr>
<th>Infection with Brucella spp. (B. abortus, B. canis, B. melitensis, B. suis) can result in a range of symptoms involving multiple organ systems.</th>
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<tr>
<td>Acute</td>
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<tr>
<td>• Non-specific, flu-like illness</td>
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<td>• Intermittent or “undulant” fever, headache, weakness, profuse sweating, painful joints, and/or diarrhea</td>
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<tr>
<td>Subacute</td>
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<td>• Persistent, intermittent fever</td>
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<td>• Malaise, muscle aches, headache, neck pain, or sweats</td>
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<tr>
<td>Chronic</td>
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<td>• Loss of appetite, weight loss, abdominal pain, joint pain, back pain, weakness, irritability, insomnia, depression, constipation</td>
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Local supplicative infection can occur with subacute or chronic infection, resulting in endocarditis, hepatitis, diffuse lymphadenopathy, uveitis, breast abscess, epididymitis, arthritis, diskitis, pneumonia, deep vein thrombosis, and meningitis.

Infecivity- Describe infective dose, relevant exposure routes (considering laboratory use), incubation period and potential severity of infection.

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<th>The infecting dose of Brucella in humans unknown; however, in animal models, disease has been transmitted with as few as 10-100 organisms by the aerosol route and subcutaneous routes. Infection may be acquired in the lab through inhalation, mucous membrane exposure, ingestion, or inoculation of abraded skin. (Person-to-person transmission does not occur.) Previous laboratory exposures have occurred through sniffing bacteriological cultures, direct skin contact, mouth pipetting, inoculations, and</th>
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sprays into eyes, nose, and mouth. Manipulation of *Brucella* organisms on an open bench without use of the recommended practices has led to infections. Anyone who practiced a specifically implicated procedure (above), anyone who was within five feet of any manipulation of *Brucella* on an open bench, or anyone present in a laboratory during a *Brucella* aerosol-generating event is at risk for acquiring brucellosis. Previous laboratory outbreaks have shown attack rates of 30-100% depending on the route of exposure (aerosolization highest) and the concentration of the organism in the infectious material.

Accidental human exposure to *B. abortus* RB51, strain for vaccination of cattle, has also rarely been a cause of human disease. The most common route of infection is via a needlestick during animal vaccination.

The incubation period is variable and difficult to ascertain. Reported incubation periods range from 5-60 days, with 1-2 months being most common. Deaths are rare (<5%) even among untreated patients with brucellosis.

**Description of First Aid** - Provide an overview of first aid treatment of exposures considering that multiple routes of exposure could occur (needlestick, aerosol, eye, skin and ingestion).

1. If needle puncture, laceration, scratch or broken skin occurs
   - Squeeze the puncture or open area to induce bleeding
   - Cleanse the wound thoroughly with soap and water
2. If a mucous membrane or eye exposure occurs
   - Irrigate the affected area immediately with copious amounts of water or normal saline for at least 3 minutes
3. If suspected inhalational exposure, vacate the laboratory immediately and contact Occupational Health.

**Urgency of Medical Care** - Describe how soon medical attention should be sought, i.e. is an ER visit necessary, visit to University Health, or simply schedule a visit with a personal physician.

Contact a medical provider within 24-48 hours for consideration of post-exposure prophylaxis, unless the specific injury requires more urgent attention, such as sutures or additional cleansing.

**Description of Medical Response** - Provide an overview for clinical treatment of exposures to the agent considering that multiple routes of exposure could occur (needlestick, aerosol, eye, skin and ingestion) and that strains of agents will vary and sometimes include antimicrobial resistance.

1. Define the exposure risk.
   - High-risk exposure
     - Individuals who performed a specifically implicated practice (see above)
     - Individuals who were near (within 5 feet) work with *Brucella* on an open bench
Individuals present in the laboratory during a *Brucella* aerosol-generating event

- Low-risk exposure
  - Individuals in the lab at the time of *Brucella* manipulation on an open bench, but who do not have high-risk exposures as defined above

2. Post-exposure prophylaxis (PEP) should be given to high-risk exposures and discussed with low-risk exposures.

3. PEP should be administered for at least 21 days.
   - Doxycycline 100 mg orally twice a day
     AND
   - Rifampin 600 mg orally daily

NOTE: Trimethoprim-sulfamethoxazole may be considered for patients with contraindications to doxycycline. For women who are pregnant, PEP should be considered in consultation with obstetricians.

4. PEP recommendations for *B. abortus* RB51 (attenuated vaccine strain) differ from those for fully pathogenic *Brucella* spp. due to rifampin resistance in RB51. PEP for those at high risk of exposure should include doxycycline 100 mg orally twice daily for at least 21 days. For those with contraindication to doxycycline, trimethoprim-sulfamethoxazole may be used.

**Description of Medical Surveillance** - Describe the advisability of medical surveillance strategies (in particular baseline and annual serology) for those working with the agent. If doing so would likely improve the identification, diagnosis or treatment of exposures, please indicate so.

Serial serum specimens should be monitored for all exposed workers. These tests will monitor for the development of infection and can be performed at the state public health laboratory or CDC. Note: RB51 does not induce a measurable antibody response. Monitoring serum specimens in individuals exposed to RB51 will not provide a useful indicator of infection.

1. Obtain **baseline serum samples** from all workers as soon as possible after a potential *Brucella* exposure is recognized. If available, obtain pre-exposure stored specimens.

2. Arrange for sequential serologic testing on all workers exposed to *Brucella* (e.g. 2, 4, 6, and 24 weeks post exposure) using agglutination test at state public health laboratory or CDC.

3. Arrange for regular (e.g. weekly) **active surveillance** for development of febrile illness or other signs and symptoms of brucellosis among all workers exposed to *Brucella* isolates for 6 months following last exposure.
References:

**Completed By:**

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**Phone:**

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**Date:** August 14, 2010