Burkholderia pseudomallei

Principal investigators are responsible for communicating this information to staff working with or around this agent, and for mitigation of associated risks. This document is not intended to be used as a sole source for diagnosis, medical treatment, or medical advice. Consult a CSU Authorized Treating Physician for concerns about work related medical conditions.

CONTAINMENT AND SPECIAL PRECAUTIONS

**Containment:** BSL-3 level practices, containment equipment, and facilities are required for work involving infectious body fluids, tissues, animals and cultures.

**Special considerations:**
- Select Agent, Tier 1
- Health Risk Factors: Persons with diabetes, chronic kidney failure, cystic fibrosis, chronic lung disease, immunosuppression, or alcoholics are at increased risk for infection with this organism.

HAZARD IDENTIFICATION

**Disease:** Melioidosis

**Transmission:** Inhalation, ingestion, percutaneous inoculation (wounds or abrasions), not spread by casual contact.

**Communicability:** Extremely rare person-to-person spread

**Incubation:** Varies from 1 day to years; generally 1-21 days, and acute localized infection could be 1-5 days post inoculation.

**Infectious dose:** Unknown

VIABILITY/INACTIVATION

**Stability:** Can survive for years in soil and water and is very resistant to drying.

**Inactivation methods:**
- Autoclave sensitive
- 1% Sodium hypochlorite, 70% Ethanol, 2% glutaraldehyde, Iodines, Phenolics and Formaldehyde

MEDICAL

**Signs and symptoms:**
Most individuals exposed to B. pseudomallei do not develop symptoms. Those who do develop symptoms usually have predisposing medical conditions (See Special Considerations). Symptoms of melioidosis may be exhibited many years after exposure, commonly in association with an alteration in immune status or other compromising conditions such as diabetes. Manifestations of disease are extremely broad ranging and form a spectrum from rapidly life-threatening sepsis to chronic low-grade infection. A common clinical picture of acute melioidosis is that of sepsis associated with bacterial dissemination to distant sites, frequently causing concomitant pneumonia and liver and splenic abscesses. Infection may also occur in bone, joints, skin, soft tissue, or the prostate. Specific disease manifestations include:

- **Early:**
  - Enlarged lymph nodes in jaws/neck (looks like mumps)
  - Skin infections
- **Acute Pulmonary disease (most common form, from inhalation or secondary from septicemia)**
  - Fever above 102 F
  - Pneumonia

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**Disclaimer** This document is for informational purposes ONLY. This document should not be used in lieu of professional medical attention, and medical professionals should seek appropriate resources for diagnosis and treatment.**
- Coughing
- Chest pain
- Headache
- May present similar to tuberculosis with fever, weight loss, and lung lesions.

**Acute Localized (infection through skin and mucous membrane exposures)**
- Ulcers, abscessus, or cellulitis at site of inoculation
- Fever and malaise
- Could progress to acute septicemic form

**Acute Septicemia (infection through inhalation or as consequence of localized infection)**
- Fever
- Severe muscle tenderness
- Severe headache
- Diarrhea
- Disorientation

**Chronic Suppurative Infection (Infection through skin and mucous membrane exposures)**
- Pneumonia
- Abcessus located primarily on extremities
- Patients may not have a fever
- May present similar to tuberculosis with fever, weight loss, and lung lesions

**Pre-exposure prophylaxis:**

**NONE**

**Medical Surveillance:**
- Before working with or around this agent, individuals must enroll in CSU’s medical surveillance program through the Occupational Health Program.

**Diagnosis:**
- Self-report febrile illness with or without cough for 21 days post exposure — if symptoms occur, culture sputum samples on Ashdown medium or *Burkholderia cepacia* agar if Ashdown is unavailable. Gram negative, motile, bipolar staining, wrinkled colonies.
- Detection of antibodies in blood, 4 fold increase in titer is indicative of infection
  - Serum taken:
    - Day of exposure, 1, 2, 4, and 6 weeks post exposure

**Treatment**
- Note, for any prolonged use of TMP-SMX, of coadministration of folinic acid may be considered to prevent or reduce the antifolate activity of TMP-SMX without affecting its antimicrobial action.
- **Post exposure prophylaxis (duration 3 weeks):**
  Antimicrobial susceptibility of the strain of involved in the exposure event should be known, and if not tested as soon as possible. PEP should be cross referenced with this information to ensure efficacy. If patient seroconverts, but is asymptomatic, continue PEP for 12 weeks, with periodic checks.
  - Trimethoprim-sulfamethoxazole (TMP-SMX) orally: 160 mg/800 mg tablets: 2 tablets every 12 h for adult ≥60kg
  
  OR

  80 mg/400 mg tablets: 3 tablets every 12 h for adult 40-60 kg
OR
160 mg/800 mg tablets: 1 tablet every 12 h or 80 mg/400 mg tablets: 2 tablets every 12 h for adult <40 kg,
OR
- Amoxicillin-clavulanic acid (co-amoxiclav) orally: 500 mg/125 mg tablets: 3 tablets every 8 h for adult ≥ 60 kg*
  OR
500 mg/125 mg tablets: 2 tablets every 8 h for adult <60 kg*

*Weight-based dosage based on 20 mg/5 mg/kg/dose.

Treatment of melioidosis:
- Initial parenteral therapy
  - Ceftazidime 50 mg/kg/dose (up to 2 g) intravenous every 8 h or 6 g per day by continuous infusion after a 2 g bolus
  OR
  - Meropenem 25 mg/kg/dose (up to 1 g) intravenous every 8 h (for intensive care unit, neuro-melioidosis or persistent bacteremia)
  - Duration of therapy a minimum of 10–14 d, however, four or more weeks of parenteral therapy may be necessary in cases of more severe disease such as septic shock, deep seated or organ abscesses, extensive lung disease, osteomyelitis or septic arthritis or neurological melioidosis.
  - Consider the addition of trimethoprim-sulfamethoxazole (TMP-SMX) for patients with severe infection involving the brain, prostate, or other privileged site (same dosing as described in Eradication Therapy, below). Can be administered by IV infusion over 30-60 min every 12 h, or nasogastric, or oral, as appropriate. If TMP-SMX is included, it should be used for the entire duration of the intensive phase.
  - A switch to meropenem is indicated if patient condition worsens on ceftazidime, e.g., organ failure, development of a new focus of infection during treatment, or if repeat blood cultures remain positive. Depending on the severity of infection, the dose for patients ≥3 months and older can be ≤40 mg/kg/dose; not to exceed 2 g/dose.

- Oral eradication therapy
  - Trimethoprim-sulfamethoxazole (TMP-SMX) orally: 160 mg/800 mg tablets: 2 tablets every 12 h for adult ≥60 kg
    OR
80/400 tablets: 3 tablets every 12 h for adult 40–60 kg
    OR
160 mg/800 mg tablets: 1 tablet every 12 h or 80 mg/400 mg tablets: 2 tablets every 12 h for adult <40 kg
    OR
- Amoxicillin-clavulanic acid (co-amoxiclav) orally: 500 mg/125 mg tablets: 3 tablets every 8 h for adult ≥60 kg*
    OR
500 mg/125 mg tablets: 2 tablets every 8 h for adult <60 kg*

*Weight-based dosage based on 20 mg/5 mg/kg/dose.
- Duration at is a minimum of 3 months
- If the organism is susceptible and the patient does not have a documented allergy to it, oral TMP-SMX is the agent of first choice. If the organism is resistant to TMP-SMX or the patient is intolerant, the second-line choice is co-amoxiclav.

**WHAT TO DO IF AN EXPOSURE OCCURS**

**Employees, Graduate Students, Work Study**

1. Employee notifies Biosafety (970-491-0270) and/or Occupational Health Program Coordinator (970-420-8172) to inform where medical attention will be sought and if transportation is needed.
   - The Principal Investigator/Supervisor must also be notified
2. Employee goes to Emergency Room
3. After the Emergency Room visit, individual fills out the following forms:
   - Biosafety Incident report form:  
     [http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf](http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf)
   - Workers’ Compensation (within 4 days or as soon as possible):  
     [http://www.ehs.colostate.edu/WWorkComp/Home.aspx](http://www.ehs.colostate.edu/WWorkComp/Home.aspx)
4. Employee follows up with CSU Authorized Treating Physician

**Student Not Paid by CSU**

1. Contact supervisor/PI
2. Student or supervisor contact Biosafety (491-0270) or Occupational Health (420-8172) to inform where attention is being sought, and to arrange transportation if needed.
3. Student goes to CSU Health Network (Formerly Hartshorn Health Services)
4. After the visit to CSU Health Network, student fills out Biosafety Incident Report form  
   [http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf](http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf)

**Volunteers and Visitors**

1. Contact supervisor/PI
2. Contact Biosafety (491-0270) or Occupational Health (420-8172) to inform where attention is being sought, and to arrange transportation if needed.
3. Individual goes to their personal physician, or as otherwise directed by their physician
4. Individual fills out Biosafety Incident Report form  
   [http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf](http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf)

**REFERENCES**

- CDC General Information Melioidosis:  
  [http://cmr.asm.org/content/18/2/383.long](http://cmr.asm.org/content/18/2/383.long)
  [http://wwwnc.cdc.gov/eid/article/18/12/12-0638_article.htm](http://wwwnc.cdc.gov/eid/article/18/12/12-0638_article.htm)
- Public Health Agency of Canada Pathogen Data Sheet, Burkholderia mallei:  


**CONTENT REVIEW**

This document has been reviewed by:

• CSU subject matter expert: Dr. Herbert Schweizer

• Licensed Physicians: Colorado Health Medical Group, Occupational Health (principal: Dr. Tracy Stefanon)