Pod 1-3 BSL-3 Emergency Response Packet

TAKE THIS PACKET WITH YOU!

- Emergency Contact Information
- Workers’ Compensation Information
- Directions to Authorized Treating Physicians
- Directions to Fort Collins Emergency Room
- Biosafety Incident Report Form
- Infectious Agent Fact Sheets:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Bacillus anthracis</strong></td>
<td>Human Immunodeficiency Virus (Pod 2, Rooms A100, 165)</td>
</tr>
<tr>
<td><strong>Botulinum toxin (Neurotoxin A)</strong></td>
<td>Japanese Encephalitis Virus</td>
</tr>
<tr>
<td><strong>Brucella Species (abortus, suis, melitensis)</strong></td>
<td>Lassa Virus Vaccine Clone (ML-29, no virulence determinants)</td>
</tr>
<tr>
<td><strong>Burkholderia mallei</strong></td>
<td>MERS-CoV</td>
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<tr>
<td><strong>Burkholderia pseudomallei</strong></td>
<td><em>Mycobacterium tuberculosis</em></td>
</tr>
<tr>
<td><strong>Clostridium botulinum (Pod 2, Room 165)</strong></td>
<td><em>Rickettsia prowazekii</em> (to be acquired)</td>
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<tr>
<td><strong>Coccidioides immitis</strong></td>
<td><em>Rickettsia prowazekii</em> (to be acquired)</td>
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<tr>
<td><strong>Coxiella burnetti</strong></td>
<td>Rift Valley Fever Virus</td>
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<tr>
<td>Eastern Equine Encephalitis Virus</td>
<td>Severe Fever with Thrombocytopenia Virus</td>
</tr>
<tr>
<td><strong>E. coli (BSL2)</strong></td>
<td><em>Staphylococcus aureus (BSL2)</em></td>
</tr>
<tr>
<td><strong>Francisella tularensis</strong></td>
<td>Venezuelan Equine Encephalitis Virus</td>
</tr>
<tr>
<td><strong>Francisella tularensis LVS (BSL2)</strong></td>
<td><em>Yersinia pestis</em></td>
</tr>
</tbody>
</table>

Updated 12/2014

The most up to date version of this document can be found in the Biosafety or Occupational Health Websites under the “Illness Procedure and “Emergency Response Packet” Bar: [http://www. ehs.colostate.edu/WOHS P/Bsl3Packets.aspx](http://www.ehs.colostate.edu/WOHSP/Bsl3Packets.aspx)
# Emergency Phone Numbers

<table>
<thead>
<tr>
<th>BIOSAFETY EMERGENCY NUMBER</th>
<th>491-0270</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDRC On-Call</td>
<td>491-IDRC (491-4372)</td>
</tr>
<tr>
<td>Fort Collins Emergency Room</td>
<td>495-7000</td>
</tr>
<tr>
<td>Occupational Health Coordinator</td>
<td>491-3102, 420-8172</td>
</tr>
</tbody>
</table>
Workers’ Compensation Procedure

Updated 12/2014

NOTE: Workers Compensation Statutes change frequently, and every effort has been made to update this document accordingly. However, Risk Management is the source for the most current Workers’ Compensation procedures: [http://www.ehs.colostate.edu/WWorkComp/Home.aspx](http://www.ehs.colostate.edu/WWorkComp/Home.aspx)

- First Report of Injury must be INITIATED as soon as possible

- Medical attention must be sought by a CSU Authorized Treating Physician
  - For a complete list of CSU Authorized Treating Physicians: [http://www.ehs.colostate.edu/WWorkComp/HealthContPrint.aspx](http://www.ehs.colostate.edu/WWorkComp/HealthContPrint.aspx)

- All claims are subject to review and may not be covered under Workers Compensation unless found compensable under current Worker’s Compensation Statutes.
  - **GO TO A CSU AUTHORIZED TREATING PHYSICIAN WHENEVER POSSIBLE** as initial visit costs will be covered through Workers Compensation even if it is determined that your illness is not work related. If you must go to the ER or an Urgent Care provider for the specific reasons listed above, you and/or your insurance carrier will be responsible for all health care costs for illnesses/injuries that are NOT related to your employment.
  - **However,** in order to assure that medical attention is sought appropriately for potentially work related illnesses, CSU may cover certain out of pocket costs for ER or Urgent Care services that are NOT covered under Colorado Workers’ Compensation Statutes (provided that the requirements of this procedure have been properly followed). In general, such coverage will not exceed $2,000.

- CSU Workers’ Compensation Website: [http://www.ehs.colostate.edu/WWorkComp/Home.aspx](http://www.ehs.colostate.edu/WWorkComp/Home.aspx)
When to go to a CSU Authorized Treating Physician

- During regular business hours
  - When you **have a fever**, and you have been in the **BSL-3 barrier in the last 5 days**
  - When you have a **KNOWN exposure** to or an injury **INVOLVING TUBERCULOSIS**
  - When you have a minor injury

- When told by the ER, Urgent Care, or Workers’ Compensation to follow up after an Emergency Room or Urgent Care visit

- Due to limitations in Workers’ Compensation coverage for ER or Urgent Care visits, see a CSU Designated Care Provider whenever possible.
  - For details see Workers’ Compensation Procedure in this packet, or “BSL3 Illness Procedures” online at [http://www.ehs.colostate.edu/WBiosafety/Home.aspx](http://www.ehs.colostate.edu/WBiosafety/Home.aspx) under the bar labeled “BSL3 Illness Procedures, Info, and Emergency Response Packets”.


CSU AUTHORIZED TREATING PHYSICIANS

For NON-EMERGENCY incidents

If you go to the Emergency Room, follow-up with one of these providers

A complete list of designated providers can be found at:
http://www.ehs.colostate.edu/WWorkComp/HealthContPrint.aspx
University of Colorado Health Occupational Health Services
4674 Snow Mesa Drive, Suite 200
Fort Collins, CO
(970) 495-8450
Mon-Fri, 7:00am - 6:00pm

FROM FOOTHILLS CAMPUS:
• Right on Overland trail
• Left on W. Prospect Rd
• Left on S. College Ave.
• Left on Harmony Rd.
• Right on Snow Mesa Dr
• Occ Health is on 2nd floor, Suite 200
Approximate drive time is 20 minutes.

FROM MAIN AND SOUTH CAMPUS:
• South on College Ave.
• Left on Harmony Rd.
• Right on Snow Mesa Dr
• Occupational Health Services is on 2nd floor, Suite 200
Approximate drive time is 15 minutes.
**Workwell Fort Collins**  
1600 Specht Point Road, Suite 115  
Fort Collins, CO  
(970) 672-5100  
Mon- Fri, 8:00am - 5:00pm

**Workwell Loveland**  
1608 Topaz Drive  
Loveland, CO  
(970) 593-0125  
Mon-Fri, 8:00am - 5:00pm

FROM FOOTHILLS CAMPUS to Workwell, Fort Collins
- Turn Right on Overland Trail.  
- Turn Left on W. Prospect Road.  
- Turn Right at Specht Point Drive.  
- Workwell is located on the first floor.  
Approximate drive time is 15 minutes.

FROM MAIN AND SOUTH CAMPUSES to Workwell, Fort Collins
- Head East on Prospect Road.  
- Turn Right at Specht Point Drive.  
- Workwell is located on the first floor.  
Approximate drive time is 15 minutes.
When to go to the Emergency Room

• When you have a KNOWN EXPOSURE to a BSL-3 infectious agent (other than Tuberculosis)

• When you have a major injury

• **WHEN A CSU AUTHORIZED TREATING PROVIDER IS CLOSED** and you have a fever within 5 days of being in the BSL-3 barrier and/or have symptoms associated with disease due to pathogens worked with.
  - IF YOU GO TO THE EMERGENCY ROOM OR URGENT CARE AND ARE DIRECTED TO DO SO, YOU MUST FOLLOW UP WITH ONE OF THE CSU AUTHORIZED TREATING PHYSICIAN THE NEXT BUSINESS DAY.

• Complete list: [http://www.ehs.colostate.edu/WWorkComp/Home.aspx](http://www.ehs.colostate.edu/WWorkComp/Home.aspx)

• If you go to the Emergency Room or Urgent Care, it is your responsibility to follow up by providing them with your Workers’ Compensation claim number and billing information:
  
  P.O. Box 4998  
  Greenwood Village, CO 80155  
  Phone: (303) 804-2000  
  Fax: (303) 804-2005  
  Toll-Free: (888) 428-4671
Emergency Room Directions

Please do not drive yourself. Have someone take you. Contact Biosafety if you need a ride. 491-0270
**Poudre Valley Hospital**

Emergency Dept (Colorado Health Medical Group)

1024 South Lemay Ave
Fort Collins, CO

(970) 495-7000

24 hours, 7 days per week
Poudre Valley Hospital Harmony

URGENT CARE

Go to an Urgent Care closest to you

FROM FOOTHILLS CAMPUS

- Turn Left on Overland Trail
- Turn Right on Mulberry Ave
- Turn Right on Riverside Ave
- Turn Left on E. Prospect Rd
- Turn Right on Timberline Rd
- Turn Left on E. Harmony Rd
- Facility is on the South side of Harmony Road
- Follow signs to Urgent Care

Approximate drive time is 21 minutes

FROM MAIN AND SOUTH CAMPUSES

- Head East on Prospect Rd
- Turn Right on Timberline Rd
- Turn Left on E. Harmony Rd
- Facility is on the South side of Harmony Road
- Follow signs to Urgent Care

Approximate drive time is 20 minutes

PVHs Harmony Urgent Care
2127 E. Harmony Road
Daily, 8 a.m. to 8 p.m.
(970) 297-6250
# Biosafety Incident Report Form

**THIS IS NOT A WORKERS’ COMPENSATION INCIDENT REPORT FORM**

If this is an injury, have you filled out a workers’ compensation form? ☐ Yes ☐ No

## Personal Information

<table>
<thead>
<tr>
<th>Date:</th>
<th>CSU ID:</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name:</td>
<td>Last Name:</td>
</tr>
<tr>
<td>Email:</td>
<td>Phone Number:</td>
</tr>
<tr>
<td>Alt. Phone Number:</td>
<td></td>
</tr>
</tbody>
</table>

## Emergency Contact Information

<table>
<thead>
<tr>
<th>Name:</th>
<th>Phone #:</th>
<th>Alt. Phone #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Phone #:</td>
<td>Alt. Phone #:</td>
</tr>
</tbody>
</table>

## Incident Information

Pathogen working with:

Does the pathogen contain recombinant DNA or synthetic nucleic acid molecules? ☐ Yes ☐ No

Location (building, room): Time of Incident:

Incident Type (exposure, physical injury, etc.):

Incident Description (Provide as much detail as possible and list external events that may have contributed to the incident):

---


# Method and Location of Injury

**Method**
- [ ] Needlestick
- [ ] Blood or body fluids
- [ ] Spill
- [ ] Aerosol
- [ ] Animal Bite/Scratch
- [ ] Necropsy
- [ ] Broken glass
- [ ] Sharps Container
- [ ] Other (describe)

**Location**

---

**Action(s) taken to control incident (e.g. hand washing, spill clean-up, etc.):**

---

## Personal Protective Equipment (PPE) Worn at time of Injury

- [ ] Scrubs
- [ ] Surgical gown
- [ ] N-95 respirator mask
- [ ] Gloves
- [ ] Hair Cover
- [ ] Tyvek
- [ ] PAPR
- [ ] Face Shield
- [ ] Goggles
- [ ] Shoes

**Was there a PPE failure?**

If yes, explain:

---

Print or scan and send to the Biosafety Office: 6021 Campus Delivery, 141 General Services Building, Fort Collins, CO 80523; E-mail scanned copies to Heather.Blair@colostate.edu, or Joni.Triantis@colostate.edu
Bacillus anthracis

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 and ABSL-3 Level practices, containment equipment and facilities are required for work involving propagation of the organism, any activity with potential for aerosol production and infection of animals.
- BSL2 practices and containment equipment are recommended for activities using clinical materials and diagnostic cultures

Special Considerations:
- Select Agent, Tier 1

HAZARD IDENTIFICATION

Disease: Anthrax, woolsorters’ disease

Transmission: skin contact with infected animal tissue, biting flies, contaminated hair, wool, hides or other hide products, inhalation of spores, ingestion of undercooked meat.

Communicability: Person to person transmission is extremely rare, occurring with contact of exudates from cutaneous forms of anthrax.

Incubation: within 7 days

Infectious Dose: 8,000 to 50,000 organisms by inhalation

VIABILITY/INACTIVATION

Stability: Spores remain viable in soil, skins/hides, milk, dried surfaces for years; spores survive in pond water for 2 years

Inactivation:
- Incineration and autoclave sensitive
- Spores are resistant to many disinfectants. Susceptible 10-12% bleach at pH close but not exceeding 7 (Add 1 part bleach, to 8 parts water, mix, and add one part white vinegar); 25.8% Hydrogen peroxide, 24 C, 15 minutes; 2% glutaraldehyde formaldehyde and 5% formalin (overnight soak). 10% NaOH or 0.5% bleach can be used for animal stockyards, pens and related farm equipment.

MEDICAL

Signs and Symptoms:
- Cutaneous: Skin lesions becoming papular (bump with no visible fluid), then vesiculated (fluid filled), and depressed, black scab (eschar)
- Inhalation: Respiratory distress, fever and shock with death shortly after
- Intestinal: Abdominal distress followed by fever, septicemia and death (rare)
Pre-exposure Prophylaxis:
- Vaccine available, however, is only indicated when exposure risk is high: 5 shots intermuscular given at day 0, week 4, months 6, 12 and 18 months

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

Diagnosis:
- Serum will be tested for antibody at day 0 and day 7-14 (or 14-35 days after symptoms occur)
- Dependent on type of specimen, mostly direct culture and PCR.

Treatment:
- **Post-exposure prophylaxis**: 3 doses of vaccine plus 60 days of antibiotics. Vaccine dose given as 0.5 ml subcutaneously at 0, 2, and 4 weeks after exposure. Duration of antibiotic treatment should be at least 30 days after administration of third dose of vaccine: ciprofloxacin, 500 mg orally every 12 hours; or doxycycline, 100 mg orally every 12 hours.
- **Treatment of Symptomatic Cases**: Treatment of inhalational anthrax should include ciprofloxacin (400 mg IV every 12 hours), or doxycycline (200 mg IV loading dose, followed by 100 mg IV every 12 hours for adults), in addition to additional drugs

**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:
   - 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)

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
REFERENCES

- Disinfection, EPA: http://www.epa.gov/pesticides/factsheets/chemicals/bleachfactsheet.htm
- Iowa State University Technical Data Sheet: http://www.cfsph.iastate.edu/Factsheets/pdfs/anthrax.pdf

CONTENT REVIEW

This document has been reviewed by:

- CSU subject matter expert: Dr. Richard Bowen
- Licensed Physicians: Occupational Health Services (principal: Dr. Tracy Stefanon)
Botulinum toxin, Botulinum Toxin Producing Clostridium spp.

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CONTAINMENT AND SPECIAL PRECAUTIONS

Containment:
- BSL-3 Level practices, containment equipment and facilities are required for work involving large volumes of toxin producing bacterial (>10L) and/or activities with a high potential for aerosol production, and use of sharps should be limited.
- BSL2 level practices, containment equipment, and facilities are recommended for work involving infectious or potentially infectious clinical specimens, animals, or cultures <10L as well as for the purified toxin. Additional layers of PPE protection are required for handling of concentrated toxin (e.g., face shields, masks, and other additional PPE). Movement and activities in rooms should be minimized in rooms having concentrated toxin.

Special Considerations:
- Select Agent, Tier 1

HAZARD IDENTIFICATION

Disease: Botulism

Transmission: Ingestion, inhalation, contamination of wounds, needlesticks

Incubation: ingestion: 2 hrs to 8 days; inhalation: 72 hours; wound: 7 days

Infectious dose: Spores are not normally toxic for healthy adults. Botulinum toxin is the most potent toxin known. Injected toxic dose (serotype A) is 0.001 ug/kg body weight, and lethal inhalation dose of 0.07 ug/kg body weight.

VIABILITY/INACTIVATION

Stability:
- Toxin is detoxified in air within 12 hours, and following 1-3 hours exposure to sunlight. Spores are resistant to drying and heat, and can be found in soil and water.

Inactivation:
- Physical: Autoclave sensitive (minimum of 20 minutes at 121 C).
- Chemical: Vegetative state is susceptible to 70% ethanol, 10% bleach (20 minutes). Spores may be resistant to disinfectants. Toxins are inactivated by 20 minutes of exposure to 3 mg/L free available chlorine or 0.1 M sodium hydroxide. Alternatively, Sodium hypochlorite in concentrations of 0.5% or greater (equivalent to a 1:10 dilution of household bleach) may be used to bathe all surfaces exposed to botulinum toxin for a period of 20 minutes. Autoclaving at 121 C for 30 minutes or greater will also render the toxin inactive.
MEDICAL

Signs and Symptoms:
- Nausea, Vomiting
- Drooping eyelids
- Diarrhea (early)
- Constipation (late)
- Fatigue
- Weakness and dizziness
- Blurred or double vision
- Dry mouth
- Difficulty speaking and swallowing
- Descending paralysis of the arms, legs, trunk and breathing muscles (starts in the arms and moves down)

Diagnosis:
ELISA to detect botulinum toxin

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

Pre-exposure Prophylaxis:
The botulism toxoid vaccine is no longer available due to declining immunogenicity, decreased potency, and adverse reactions.

Treatment
- Post Exposure Prophylaxis:
  o Contact State Health Department IMMEDIATELY
  o 24 hour CDC Emergency Operations Center: 770-488-7100
  o Heptavalent Botulinum Antitoxin (HBAT) to be administered but must be acquired by State Health Department from CDC.
  o In 2013, the FDA approved Botulism Antitoxin Heptavalent (A, B, C, D, E, F, G)-(Equine) to treat patients showing signs of botulism following documented or suspected exposure to botulinum neurotoxin. The product is derived from horse plasma and contains a mixture of antibody fragments that neutralize all of the seven botulinum nerve toxin serotypes known to cause botulism.
- Treatment of clinical cases:
  o Supportive care: Antibiotics are recommended for wound botulism after antitoxin is administered.
    ▪ Penicillin G – 3 million units IV every 4 hours in adults
    ▪ Alternatively, 500 mg IV metrodiazole every 8 hours

WHAT TO DO IF AN EXPOSURE OCCURS
IF CLINICAL SIGNS OR SYMPTOMS ARE PRESENT, PROCEED DIRECTLY TO EMERGENCY ROOM

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:

Page 2 of 3
Colorado State University   Environmental Health Services Biosafety Office   (970) 491-0270
Updated 2013

**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.**
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

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
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REFERENCES
- CDC Treatment Outline for Physicians: http://www.bt.cdc.gov/agent/botulism/clinicians/treatment.asp
- CDC Vaccine Information: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6042a3.htm?s_cid=mm6042a3_w
- Iowa State University Technical Data Sheet: http://www.cfsph.iastate.edu/Factsheets/pdfs/botulism.pdf

CONTENT REVIEW
- CSU subject matter expert: Dr. Dennis Pierro
- Licensed Physicians: Occupational Health Services (principal: Dr. Tracy Stefanon)
Brucella spp. (B. abortus, B. melitensis, B. suis, B. canis)

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CONTAINMENT AND SPECIAL PRECAUTIONS

Containment:
- BSL-3 level practices, containment equipment, and facilities for manipulations of cultures and experimental studies using animals.
- BSL-2 level practices, containment equipment and facilities for manipulations of clinical specimens.

Special Considerations:
- Select Agent

HAZARD IDENTIFICATION

Disease: Brucellosis, Undulant fever

Transmission: ingestion, direct contact of mucous membranes and broken skin with infected material, inhalation, contact with vaccine strain for cattle RB51 (accidental injection)

Communicability: Person to person spread is extremely rare, occurring through sexual contact or ingestion of infected breastmilk.

Incubation: variable, 5-60 days, stable in the environment

Infectious Dose: 10 to 100 by inhalation

VIABILITY/INACTIVATION

Stability: Survives for up to 28 days at room temperature on glass and aluminum and without UV light and 7 days on concrete. Survives in carcasses and organs for up to 135 days, and blood stored at 4 C for 180 days

Inactivation:
- Autoclave sensitive
- 1%-2.5% bleach (500 -1,250 ppm available sodium hypochlorite), 70% ethanol, susceptible to most commonly available disinfectants

MEDICAL

Signs and Symptoms:
Note that there have been very few documented human cases of infection with B. canis

Systemic disease:
- Intermittent fever
- Headache
- Weakness
- Profuse sweating
- Chills
- Arthralgia (joint pain)
- Localized suppurative (discharge or pus) infections
Diagnosis:
Serological testing microagglutination testing at day 0 and at week 2, 4, 6 and 24

Pre-exposure Prophylaxis:
None

Treatment:
• Post-exposure Prophylaxis and Treatment of Symptomatic Cases:
  o Antibiotic therapy, doxycycline (100mg) and rifampin (600mg) in combination for 21 days
  o Exposure to the RB51 (vaccine) strain does not require rifampin
  o For individuals with problems with doxycycline, trimethoprim-sulfamethoxazole can be used

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REFERENCES
• CDC Clinician Guide: http://www.cdc.gov/brucellosis/clinicians/index.html
• CDC Information on Transmission: http://www.cdc.gov/brucellosis/transmission/index.html
• CDC Summary: http://emergency.cdc.gov/coca/summaries/pdf/08_25_11_Transcript_FIN.pdf
• CDC Web Page: http://www.cdc.gov/nczved/divisions/dfbmd/diseases/brucellosis/recommendations.html
• Emedicine: http://emedicine.medscape.com/article/830118-medication
• Iowa State University Technical Data Sheet:  http://www.cfsph.iastate.edu/Factsheets/pdfs/brucellosis.pdf
• Iowa State University Technical Data Sheet, Brucella abortus:
  http://www.cfsph.iastate.edu/Factsheets/pdfs/brucellosis_abortus.pdf
• Iowa State University Technical Data Sheet, Brucella canis:
  http://www.cfsph.iastate.edu/Factsheets/pdfs/brucellosis_canis.pdf
• Iowa State University Technical Data Sheet, Brucella melitensis:
  http://www.cfsph.iastate.edu/Factsheets/pdfs/brucellosis_melitensis.pdf
• Iowa State University Technical Data Sheet, Brucella ovis:
  http://www.cfsph.iastate.edu/Factsheets/pdfs/brucellosis_ovis.pdf
• Iowa State University Technical Data Sheet, Brucella suis:
  http://www.cfsph.iastate.edu/Factsheets/pdfs/brucellosis_suis.pdf
• USAMRIID Manual for Occupational Exposures:

CONTENT REVIEW

This document has been reviewed by:

• CSU subject matter expert: Dr. Richard Bowen

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**Burkholderia mallei**

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**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: People with diabetes or renal disease are at greater risk for infection.

**HAZARD IDENTIFICATION**

**Disease:** Glanders

**Transmission:** inhalation, contact with mucous membranes, through broken skin, ingestion.

**Communicability:** Person-to-person transmission could occur

**Incubation:** 10-14 days following aerosol exposure; 1 – 5 days following percutaneous exposure.

**Infectious dose:** unknown

**VIABILITY/INACTIVATION**

**Stability:** Inactivated by heat and sunlight, but can survive in wet or humid places for at least two weeks and can survive in water at room temperature for a month.

**Inactivation methods:**
- Autoclave sensitive
- 1% bleach (500 ppm available sodium hypochlorite), 70% Ethanol, 2% glutaraldehyde, Iodines, Phenolics and Formaldehyde

**MEDICAL**

**Signs and symptoms:**

**Vary pending route of infection:**
- **Acute localized infection (Infection by inoculation of abraded or lacerated skin, percutaneous, mucosal)**
  - Nodules, abscesses and ulcers at site of inoculation
  - Fever, sweats, malaise, swelling of regional lymph nodes
- **Acute Septicemia (Infection by inhalation or localized infection)**
  - Fever
  - Chills
  - Malaise (discomfort)
  - Myalgia (muscle pain)
  - Severe headache
Disorientation
- Chest pain
- Rash
- Lymphadenopathy (swollen lymph nodes)
- Cellulitis (skin infection)
- Cyanosis (blue or purple skin color)
- Jaundice (yellowing of the skin)
- Photophobia (light sensitivity)
- Diarrhea
- Necrotizing (dead or black) lesions
- Tachycardia (fast heart beat)
- Hepatomegaly or splenomegaly (enlarged liver or spleen)
- Multi-organ failure
- Death within 24 to 48 hours of onset of symptoms

- **Acute pulmonary infection (infection by inhalation)**
  - Pulmonary abscesses
  - Pleural effusion (build-up of fluid between layers of tissue)
  - Pneumonia
  - Fever
  - Sweats
  - Coughing
  - Chest pain
  - Dyspnea (shortness of breath)

- **Chronic suppurative (pus) disease (Infection by inoculation of abraded or lacerated skin, percutaneous, mucosal)**
  - Multiple abscesses, nodules and ulcers
  - Organ involvement
  - Weight loss
  - Lymphadenopathy (swollen lymph nodes)
  - Chronic form of the disease can last up to 25 years

**Pre-exposure prophylaxis:**

**NONE**

**Medical Surveillance:**

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

**Diagnosis:**

- **Self-report febrile illness with or without cough for 21 days post exposure**

- **Culture of sputum or cutaneous lesions. Isolation from blood, sputum, urine, or skin lesions.**

- **Serum taken day of exposure, 1, 2, 4, and 6 weeks’ post exposure.**
  - 4 fold increase in titer is indicative of infection
  - Detection of antibodies in blood does not distinguish between *B. mallei* and *B. pseudomallei*,

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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.**
**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):**
  - Despite slight differences in antimicrobial drug susceptibilities, drug regimens that are effective in human melioidosis (which have been better evaluated than those for glanders) would also be expected to be effective in glanders. Recommendations for the management of exposure to *B. mallei* are the same as those for *B. pseudomallei* with one important exception. Although serum should be taken and stored, no validated serologic test for human glanders currently exists.

  - 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. Resistance may be developed to tetracyclines.

  - Trimethoprim-sulfamethoxazole (TMP-SMX) orally: 160 mg/800 mg tablets: 2 tablets every 12 h for adult \( \geq 60 \text{kg} \)
  
  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 \( \geq 60 \text{kg} \)
  
  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 Glanders:**
  - 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 \( \geq 3 \text{months and older can be} \) ≤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 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
  - 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:
   - 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)
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

REFERENCES

- CDC, Actions Required before working with B. pseudomallei: [http://wwwnc.cdc.gov/eid/article/14/7/07-1501_article.htm#actionrequiredbeforeworkingwithb.pseudomallei](http://wwwnc.cdc.gov/eid/article/14/7/07-1501_article.htm#actionrequiredbeforeworkingwithb.pseudomallei)
- Iowa State University Fact Sheet, B. mallei: [http://www.cfsph.iastate.edu/Factsheets/pdfs/glanders.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/glanders.pdf)
- Iowa State University Fact Sheet, B. pseudomallei: [http://www.cfsph.iastate.edu/Factsheets/pdfs/melioidosis.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/melioidosis.pdf)

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)

**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.
**Burkholderia pseudomallei**

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**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
• 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)**
  o Ulcers, abscessus, or cellulitis at site of inoculation
  o Fever and malaise
  o Could progress to acute septicemic form

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

• **Chronic Suppurative Infection (Infection through skin and mucous membrane exposures)**
  o Pneumonia
  o Abscessus located primarily on extremities
  o Patients may not have a fever
  o 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
  o 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.
  o 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
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
  - 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

  - 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.
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2. Employee goes to Emergency Room
3. After the Emergency Room visit, individual fills out the following forms:
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Volunteers and Visitors
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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

REFERENCES
• CDC General Information Melioidosis: http://www.cdc.gov/melioidosis/


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)
**Coccidiodes immitis**

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**CONTAINMENT AND SPECIAL PRECAUTIONS**

**Containment:** BSL-3 Level practices, containment equipment and facilities are recommended for infectious or potentially infected materials, animals, or cultures.

**HAZARD IDENTIFICATION**

**Disease:** Valley Fever

**Transmission:** inhalation of fungal spores, and secondary transmission by fomites.

**Incubation:** 1-3 weeks

**Infectious dose:** unknown

**VIABILITY/INACTIVATION**

**Stability:** Can survive on surfaces for a long period of time, can grow in soil.

**Inactivation:**
- Autoclave sensitive, 30 minutes at 120° C
- Iodine, 5% bleach, phenol, quaternary ammonia

**MEDICAL**

**Signs and symptoms:**
- 60% of cases are asymptomatic
- Symptomatic:
  - Fever
  - Cough
  - Headache
  - Rash
  - Muscle aches
  - Full recovery requires weeks to months of anti-fungal therapy
- Chronic Pulmonary infection
- Widespread disseminated infection
  - Skin lesions, central nervous system infection (meningitis), bone and joint infection

**Pre-exposure prophylaxis:**

None

**Diagnosis:**

Testing serum at day 0 and day 14 to check for antibody using complement fixation test.
Treatment:

- **Post-exposure prophylaxis:**
  - Monitor for symptoms
- **Treatment of clinical cases:**
  - Fluconazole or another antifungal

**WHAT TO DO IF AN EXPOSURE OCCURS**

**Employees, Graduate Students, Work Study**

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4. Employee follows up with CSU Authorized Treating Physician

**Student Not Paid by CSU**

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**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
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   [http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf](http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf)

**REFERENCES**

- Iowa State University Technical Data Sheet: [http://www.cfsph.iastate.edu/Factsheets/pdfs/coccidioidomycosis.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/coccidioidomycosis.pdf)

**CONTENT REVIEW**

- This document has been reviewed by CSU subject matter expert, Dr. Richard Bowen.
**Disclaimer**

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### Coxiella burnetii

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### 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
- Health care personnel PPE should include masks and eye protection when generation of aerosols or splatters of body fluids are anticipated.
- Health Risk factors: Persons with valvular heart disease, prosthetic heart valves, liver disease, altered immune systems and pregnant individuals are at increased risk for developing Q fever or complications.

### HAZARD IDENTIFICATION

**Disease:** Q fever

**Transmission:** inhalation of infective animal body fluids (urine, milk, blood, and birthing fluids); arthropods (ticks). Person to person transmission is rare. While there is not a risk of secondary contamination or reaerosolization of the organisms from patients exposed to aerosolized *C. burnetti*, contaminated clothing may be a source of infection.

**Communicability:** While rare, person to person transmission has been reported in hospital workers as well as contact families.

**Incubation:** 10-40 days; varies

**Infectious dose:** 10-50 cfu by inhalation and percutaneous

### VIABILITY/INACTIVATION

**Stability:** Spore-like form is resistant to heat, drying and sunlight and fomites contaminated by blood, urine, feces, and birth fluids can remain infectious for long periods.

**Inactivation:**
- Autoclave sensitive
- 1% Sodium hypochlorite, 5% Peroxide, , 70% Ethanol (30 minutes), 2% glutaraldehyde, formaldehyde
- Zoonotic
- Can cause abortion and premature labor
- People with recent heart surgery should avoid contact with agent
**MEDICAL**

**Signs and symptoms:**
Commonly presents as self-limited febrile illness of 2-14 days of duration. Can also cause chronic infections such as endocarditis or granulomatous hepatitis.

- High Fever
- Flu-like symptoms
- Abdominal pain
- Severe sweats
- Weakness
- Severe headache
- Pneumonitis (no cough or chest pain)
- Hepatitis
- Osteomyelitis
- Arthritis
- Endocarditis
- Neurological signs - confusion

**Pre-exposure prophylaxis:**
Vaccine (Q-Vax) may be available but requires sensitivity testing and travel to Australia.

**Diagnosis:**
- Serological tests include: immunofluorescence, microagglutination, complement fixation and ELISA
- PCR can detect organism in blood, cerebrospinal fluid, tissues and milk.
- Serum taken: Day of exposure, and 14 - 21 days post infection to detect 4-fold rise in titer

**Treatment**
- **Post exposure prophylaxis:**
  - Doxycycline, 100 mg, orally, every 12 hours, or tetracycline, 500 mg, orally every 6 hours following moderate to high risk exposure.
- **Symptomatic Treatment: Should be started within first 3 days:**
  - 100 mg Doxycycline, orally, twice daily for 15-21 days
  - Chronic stage – Doxycycline and quinolones for 4 years, or Doxycycline and hydroxychloroquine for 1 ½ to 3 years.

**WHAT TO DO IF AN EXPOSURE OCCURS**

**Employees, Graduate Students, Work Study**
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   - The Principal Investigator/Supervisor must also be notified
2. Employee goes to Emergency Room
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Volunteers and Visitors
1. Contact supervisor/PI
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   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

REFERENCES
- CDC Prophylaxis after Exposure: http://wwwnc.cdc.gov/eid/article/14/10/08-0576_article.htm
- Iowa State University Technical Data Sheet: http://www.cfsph.iastate.edu/Factsheets/pdfs/q_fever.pdf
- Moodie CE, Thompson HA, Meltzer MI, Swerdlow DL. Prophylaxis after exposure to Coxiella burnetii. Emerg Infect Dis [serial
  on the Internet]. 2008 Oct [date cited]. (http://www.cdc.gov/EID/content/14/10/1558.htm)
  Biosafety, 11(1), 32-41.

CONTENT REVIEW
This document has been reviewed by:
- CSU subject matter expert: Dr. Richard Bowen
Encephalitis Viruses

Japanese Encephalitis Virus (JE)
Western Equine Encephalitis (WEE)
Venezuelan Equine Encephalitis (VEE)
Eastern Equine Encephalitis (EEE)

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CONTAINMENT AND SPECIAL PRECAUTIONS

Containment

- BSL-3 Level practices, containment equipment and facilities are required for work involving potentially infected materials, animals, cultures, or mosquitos.

Special considerations:

- North American strains of EEE virus and some epizootic subtypes (IAB and IC) of VEE virus are Select Agents
- Arthropod-borne disease
- Can cross placenta

HAZARD IDENTIFICATION

Disease: Encephalomyelitis

Transmission: infected mosquitoes, aerosol transmission of VEE and WEE viruses, natural person to person spread not reported, no human to mosquito transmission for WEE and EEE virus, but can happen in VEE virus up to 72 hours post-infection, VEE virus known to cross the placenta and this may also occur with the other viruses.

Incubation: 1-6 days (VEE) 5-15 days (JE, WEE and EEE)

Infectious dose: VEE – 1 pfu, JE, WEE and EEE – unknown

VIABILITY/INACTIVATION

Stability: Stable in blood, exudates, and freeze dried materials (VEE), can survive over winter in mosquito eggs (JEE)

Chemical Inactivation: Like most enveloped viruses, susceptible to 1% bleach (500 ppm available sodium hypochlorite), 2% glutaraldehyde, 3-8% Formaldehyde, quaternary compounds and phenolics. JEE and VEE are susceptible to 70% ethanol. EEE is inactivated after 60 minutes exposure to 50% ethanol.

Physical Inactivation: Sensitive to autoclave and drying
**MEDICAL**

**Signs and symptoms:**

**EASTERN EQUINE ENCEPHALITIS**

- Fever
- Chills
- Myalgia (muscle pain)
- Arthralgia (joint pain)
- Headache
- Irritability
- Neck stiffness
- Confusion
- Stupor
- Disorientation
- Tremors
- Seizures
- Paralysis
- Coma
- Abdominal pain
- Vomiting and diarrhea
- Symptoms subside in 1-2 weeks

**JAPANESE ENCEPHALITIS**

- Fever
- Headache
- Stupor
- Disorientation
- Coma
- Tremors/Seizures
- Paralysis
- Diarrhea
- Myalgia (muscle pain)

**WESTERN EQUINE ENCEPHALITIS (similar signs as EASTERN EQUINE ENCEPHALITIS)**

- Fever
- Chills
- Myalgia (muscle pain); back pain
- Malaise (discomfort)
- Headache
- Nausea, vomiting
- Diarrhea, abdominal pain
- Respiratory symptoms
- Symptoms subside in 1-2 weeks

**VENEZUELAN EQUINE ENCEPHALITIS**

- Fever
- Chills
- Malaise (discomfort)
- Myalgia (muscle pain)
- Severe headache
- Encephalitis
- Coughing
- Sore throat
- Nausea, vomiting
- Diarrhea
- Symptoms subside in 4-6 days

**Pre-exposure prophylaxis:**

- JE: Vaccine readily available, although there are no data demonstrating vaccine efficacy post needle stick or aerosol exposure.
- EEV, VEE, and WEE- May be available under certain circumstances through USAMRIID

**Diagnosis:**

- In all cases, Serum is taken on day of exposure, and 10-14 days post infection to detect 4-fold rise in titer.
- EEE: Isolated in A549 and MRC-5 cell cultures. Antigens detected by immunofluorescence and ELISA. Nucleic acid detected by RT-PCR.
- WEE: Throat swabs can be cultured. Viral isolation in embryonated eggs (Vero cell plaque assay). Also, detection methods similar to EEE.
• VEE: Viral isolation from blood, CSF and throat swabs. During febrile stage, antigen capture ELISA can detect VEE in the blood. Also, detection methods similar to EEE and WEE.

• JE: Similar to EEE, WEE and VEE

Treatment (Post-Exposure Prophylaxis/Treatment):
• Treatment is supportive and symptomatic

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
   • Workers’ Compensation (within 4 days or as soon as possible): 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)

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

REFERENCES
• CDC General Information: http://www.cdc.gov/ncidod/dvbid/jencephalitis/qa.htm
• Iowa State University Technical Fact Sheet, Eastern, Western, Venezuelan: http://www.cfsph.iastate.edu/Factsheets/pdfs/easter_wester_venezuelan_equine_encephalomyelitis.pdf
• Iowa State University Technical Fact Sheet, Japanese: http://www.cfsph.iastate.edu/Factsheets/pdfs/japanese_encephalitis.pdf

CONTENT REVIEW
This document has been reviewed by:
• CSU subject matter experts: Dr. Richard Bowen
Francisella tularensis

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 viable cultures, infected experimental animals and for activities with a high potential for aerosol production.
- BSL2 practices and containment equipment are recommended for activities using inactivated clinical materials.

Special Considerations:
- Select Agent, Tier 1

HAZARD IDENTIFICATION

Disease: Tularemia

Transmission: arthropods (ticks, deer fly, mosquito), infected rabbits, hamsters and other rodents, inhalation, contact with infected animal tissue, blood and urine; contaminated food and water

Communicability: Person to person transmission has NOT been documented

Incubation: 1-14 days, clinical symptoms 3-5 days post infection

Infectious dose: VERY LOW 10-50 cfu by inhalation or percutaneous inoculation

VIABILITY/INACTIVATION

Stability: Can survive in carcasses and organs for up to 133 days, and in straw and animal bedding for 192 days. Survives in water for 90 days.

Inactivation:
- Autoclave sensitive
- 1% Sodium hypochlorite, 70% Ethanol, 2% glutaraldehyde, Formaldehyde
- Can withstand freezing for months to years

MEDICAL

Signs and symptoms:
There are six forms of tularemia in humans, depending on the inoculation site (lastate.edu):
- Tularemia can be fatal if not treated with the appropriate antibiotics.
- Ulceroglandular (when infection occurs through the skin or mucous membranes)
  - Initial flu-like symptoms: fever, chills, headache, body aches, malaise
  - Inflamed and ulcerated lesion at site of entry
  - Enlarged and painful regional lymph nodes
- Glandular (When infection occurs through the skin or mucous membranes)
- Identical to Ulceroglandular, but without the lesion

- **Oculoglandular** (when infection occurs through the eyes)
  - Fever
  - Painful and purulent conjunctivitis
  - Swelling of lymph nodes in front of the ear
  - Sometimes nodules or ulcerations on the conjunctiva

- **Oropharyngeal** (infection through eating or drinking)
  - Fever, malaise
  - Exudative stomatitis (oozing inflammation of the mouth)
  - Sore throat with pustules and ulcers
  - Inflamed tonsils
  - Swelling of lymph nodes in the neck
  - Vomiting
  - Diarrhea

- **Pneumonic** (infection through inhalation)
  - Acute form of tularemia
  - Non-specific symptoms: fever, chills, malaise
  - Coughing, chest pain, dyspnea (difficulty breathing)
  - Sometimes nausea and vomiting
  - May follow other forms of tularemia that are left untreated, when the bacteria spread through the bloodstream to the lungs
  - Occasionally no overt signs of pneumonia

- **Typhoidal** (infection route may not be apparent)
  - Acute form of tularemia
  - Septicemia
  - Fever, chills, malaise
  - Usually lymph nodes NOT enlarged
  - Usually NO ulcers
  - Delirium, shock
  - Mortality rate: 30-60%

**Pre-exposure prophylaxis:**

NONE – no vaccine currently approved for use in the US (Currently under review by FDA, but not available)

**Medical Surveillance:**

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

**Diagnosis:**

Serological tests include: tube agglutination, microagglutination, and ELISA

Serum taken: Day of exposure, and 14 days post infection to detect 4-fold rise in titer (cross reaction with *Brucella*, *Proteus* and *Yersinia* species.)
Isolation of baceteria from blood, sputum, pharyngeal or conjunctival exudates, ulcers, lymph nodes and gastric washings grown on blood-enriched media, including cysteine glucose blood agar, cysteine heart agar supplemented with 9% heated sheep red blood cells (CHAB), buffered charcoal yeast extract agar, modified Thayer Martin media. Sheep blood agar, chocolate agar, and Thayer-Martin may be used for initial isolation of bacteria, but CDC recommends CHAB media once presence of \textit{F. tularensis} is confirmed.

Treatment:

- **Post Exposure Prophylaxis:**
  - Should be started within 24 hours and continued for at least 14 days
  - Streptomycin 1mg IM 2x/day
  - Gentamycin 5 mg/kg IM or IV 1x/day for 10 days
  - Doxycycline 100 mg 2x/day for 14 days
  - Ciprofloxacin 500 mg 2x/day for 10-14 days

- **Symptomatic Treatments:**
  - Streptomycin (7.5 to 10 mg/kg every 12 hours for 10 to 14 days, not to exceed 1 g IM twice daily)
  - Doxycycline (100 mg IV twice daily for 14 to 21 days)
  - Ciprofloxacin (400 mg IV twice daily for 14 to 21 days, switching to oral 750 mg every 12 hours after clinical improvement),

**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 (491-0270) or Occupational Health (420-8172) to report, 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 report, 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)

**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.**
**REFERENCES**

- Iowa State University Technical Data Sheet: [http://www.cfsph.iastate.edu/Factsheets/pdfs/tularemia.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/tularemia.pdf)

**CONTENT REVIEW**

This document has been reviewed by:

- CSU subject matter experts: Drs. Richard Slayden and Claudia Gentry-Weeks
- Licensed Physicians: Occupational Health Services (principal: Dr. Tracy Stefanon)
**Human Immunodeficiency Virus (HIV)**

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:**

- BSL2 level practices, containment equipment, and facilities are recommended work involving clinical specimens and non – culture protocols.
- BSL3 level practices, containment equipment and facilities are recommended for work involving culture or infected or inoculated animals.

**Special considerations:**

- Transplacental transfer can occur

**Training:**

- Bloodborne pathogen training required annually, taken online

**HAZARD IDENTIFICATION**

**Disease:** HIV/AIDS

**Transmission:** person to person by direct exposure to body fluids

**Incubation:** 6 months to 7 years or longer

**Infectious dose:** unknown

**VIABILITY/INACTIVATION**

**Stability**

- Relatively stable in blood at room temperature. Potentially infectious in blood remaining in syringes for up to 4 weeks, dried blood at room temperature for up to 6 days

**Inactivation methods:**

- Autoclave sensitive, Sensitive to drying
- 1% bleach (500 ppm available sodium hypochlorite), 70% Ethanol, 2% glutaraldehyde, and formaldehyde

**MEDICAL**

** Signs and symptoms:**

- Early: non-specific symptoms, fever, flu-like symptoms
- Rapid weight loss
- Dry cough
- Recurring fever or profuse night sweats
- Swollen lymph nodes

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• Diarrhea that lasts for more than a week
• White spots or unusual blemishes on the tongue, mouth or throat
• Pneumonia
• Red, brown, pink, purplish blotches on or under the skin, mouth, nose, eyelids
• Memory loss, depression, other neurological disorders

Pre-exposure prophylaxis: NONE

Testing:
• Baseline HIV test available upon hire at CSU designated Occupational Health Care provider
• Routine HIV tests available every 2 years

Post-exposure prophylaxis: (See tables below)
• Treatment varies with resistance to reverse transcriptase and protease inhibitors.
• Recommendations from CDC for a FOUR week regimen:

Basic Regimen:
Zidovudine (Retrovir, ZDV, AZT) + Lamivudine (Epivir, 3TC) available as Combivir
  ZDV: 300mg twice daily or 200 mg three times daily, with food; total 600 mg daily
  3TC: 300mg once daily or 150mg twice daily
  Combivir: One tablet twice daily
Zidovudine (Retrovir, ZDV, AZT) + Emtricitabine (Emtriva, FTC)
  ZDV: 300mg twice daily or 200 mg three times daily, with food; total 600 mg daily
  FTC: 200mg once daily
Tenoforv DF (Viread, TDF) + Lamivudine (Epivir, 3TC)
  TDF: 300mg once daily
  3TC: 300mg once daily or 150mg twice daily
Tenoforv DF (Viread, TDF) + Emtricitabine (Emtriva, FTC); available as Truvada
  TDF: 300mg once daily
  FTC: 200mg once daily
  Truvada: one tablet daily

Alternate Basic Regimens:
Lamivudine (Epivir; 3TC) + Stavudine (Zerit; D4T)
  3TC: 300mg once daily or 150mg twice daily
  D4T: 40mg twice daily
Emtricitabine (Emtriva, FTC) + Stavudine (Zerit; D4T)
  FTC: 200mg once daily
  D4T: 40mg twice daily
Lamivudine (Epivir; 3TC) + Didanosine (Videx; DDI)
  3TC: 300mg once daily or 150mg twice daily
  DDI: chewable tablet, on empty stomach as either 200mg twice daily or 400 mg twice daily.
Emtricitabine (Emtriva, FTC) + Didanosine (Videx; DDI)
  FTC: 200mg once daily
  DDI: chewable tablet, on empty stomach as either 200mg twice daily or 400 mg twice daily.
From CDC’s Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Postexposure Prophylaxis

### TABLE 1. Recommended HIV postexposure prophylaxis (PEP) for percutaneous injuries

<table>
<thead>
<tr>
<th>Exposure type</th>
<th>HIV-positive, class 1*</th>
<th>HIV-positive, class 2*</th>
<th>Source of unknown HIV status†</th>
<th>Unknown source§</th>
<th>HIV-negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less severe†</td>
<td>Recommend basic 2-drug PEP</td>
<td>Recommend expanded ≥3-drug PEP</td>
<td>Generally, no PEP warranted; however, consider basic 2-drug PEP** for source with HIV risk factors††</td>
<td>Generally, no PEP warranted; however, consider basic 2-drug PEP** in settings in which exposure to HIV-infected persons is likely</td>
<td>No PEP warranted</td>
</tr>
<tr>
<td>More severe§</td>
<td>Recommend expanded ≥3-drug PEP</td>
<td>Recommend expanded ≥3-drug PEP</td>
<td>Generally, no PEP warranted; however, consider basic 2-drug PEP** for source with HIV risk factors††</td>
<td>Generally, no PEP warranted; however, consider basic 2-drug PEP** in settings in which exposure to HIV-infected persons is likely</td>
<td>No PEP warranted</td>
</tr>
</tbody>
</table>

* HIV-positive, class 1 — asymptomatic HIV infection or known low viral load (e.g., <1,500 ribonucleic acid copies/mL). HIV-positive, class 2 — symptomatic HIV infection, acquired immunodeficiency syndrome, acute seroconversion, or known high viral load. If drug resistance is a concern, obtain expert consultation. Initiation of PEP should not be delayed pending expert consultation, and, because expert consultation alone cannot substitute for face-to-face counseling, resources should be available to provide immediate evaluation and follow-up care for all exposures.
† For example, deceased source person with no samples available for HIV testing.
§ For example, a needle from a sharps disposal container.
** The recommendation “consider PEP” indicates that PEP is optional; a decision to initiate PEP should be based on a discussion between the exposed person and the treating clinician regarding the risks versus benefits of PEP.
†† If PEP is offered and administered and the source is later determined to be HIV-negative, PEP should be discontinued.
§§ For example, large-bore hollow needle, deep puncture, visible blood on device, or needle used in patient’s artery or vein.

### TABLE 2. Recommended HIV postexposure prophylaxis (PEP) for mucous membrane exposures and nonintact skin* exposures

<table>
<thead>
<tr>
<th>Exposure type</th>
<th>HIV-positive, class 2†</th>
<th>Source of unknown HIV status†</th>
<th>Unknown source§</th>
<th>HIV-negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small volume**</td>
<td>Consider basic 2-drug PEP††</td>
<td>Generally, no PEP warranted</td>
<td>Generally, no PEP warranted</td>
<td>No PEP warranted</td>
</tr>
<tr>
<td>Large volume§§</td>
<td>Recommend basic 2-drug PEP</td>
<td>Recommend expanded ≥3-drug PEP</td>
<td>Generally, no PEP warranted; however, consider basic 2-drug PEP** for source with HIV risk factors§§</td>
<td>Generally, no PEP warranted; however, consider basic 2-drug PEP** in settings in which exposure to HIV-infected persons is likely</td>
</tr>
</tbody>
</table>

* For skin exposures, follow-up is indicated only if evidence exists of compromised skin integrity (e.g., dermatitis, abrasion, or open wound).
† For example, deceased source person with no samples available for HIV testing.
‡ For example, splashes from an appropriately disposed blood.
§ For example, a few drops.
†† The recommendation “consider PEP” indicates that PEP is optional; a decision to initiate PEP should be based on a discussion between the exposed person and the treating clinician regarding the risks versus benefits of PEP.
§§ If PEP is offered and administered and the source is later determined to be HIV-negative, PEP should be discontinued.

professionals should seek appropriate resources for diagnosis and treatment.**
### 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:
   - 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)

#### Volunteers and Visitors

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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

REFERENCES
- CDC Information for Health Care Workers: http://www.cdc.gov/hantavirus/health-care-workers/
- MMWR Revised Recommendations for HIV Testing: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5514a1.htm

CONTENT REVIEW
This document has been reviewed by:
- CSU subject matter expert: Dr. Ramesh Akkina
- Licensed Physicians: Occupational Health Services (principal: Dr. Tracy Stefanon)
Middle East Respiratory Syndrome Virus (MERS-CoV, Formerly Human Coronavirus Erasmus)

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CONTAINMENT AND SPECIAL PRECAUTIONS

Containment
- BSL-3 and ABSL-3 Level practices, containment equipment and facilities are required for work involving virus culture and isolation, laboratory manipulation of virus stocks, and all work involving animals. All work with exposed animals or manipulation of virus in vitro will require use of a PAPR for respiratory protection.

Special considerations:
- **Healthcare:** There is very limited information on transmission, severity and clinical impact of this newly emerged coronavirus. Until transmission is better understood, it is recommended that patients under investigation and probable and confirmed cases should be managed according to CDC’s infection control recommendations for the coronavirus that caused SARS per Appendix A of the 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (http://www.cdc.gov/hicpac/2007ip/2007isolationprecautions.html) and CDC’s Appendix 1, Supplement I of Public Health Guidance for Community-Level Preparedness and Response to SARS (http://www.cdc.gov/sars/guidance/I-infection/app1.html) which include:
  - Prioritized placement into a single patient room, with preference for Airborne Infection Isolation Room
  - Droplet Precautions are recommended in addition to Standard Precautions, and Airborne Precautions should be used for aerosol generating procedures.
  - Appropriate use of PPE:
    - Laboratory coat or gown and gloves are recommended during procedures and patient-care that might result in contact of clothing/exposed skin with blood/body fluids, secretions.
    - In addition, eye protection, particulate N95 masks or equivalent during procedures and patient-care likely to generate splashes or sprays of blood, body fluids, or secretions.
  - Vigilant environmental disinfection is recommended per http://www.cdc.gov/hicpac/Disinfection_Sterilization/3_2contaminatedDevices.html

VIABILITY/INACTIVATION

Inactivation:
- Autoclave sensitive
- Studies with SARS indicates effective disinfection after 1-minute contact time with 10% household bleach (5,000 ppm available sodium hypochlorite), 70% ethyl alcohol, and povidone-iodine (1% iodine)

Stability:
- Not specifically known, however, the closely related SARS-CoV is infectious in solution for up to 9 days, and 24 hours to 6 days in the dried state, and is heat labile.

HAZARD IDENTIFICATION

Transmission: At least one strain has the potential for a broad host range, indicating potential for zoonotic and human-to-human transmission.
**Communicability:** Unclear. May have originated from bats, and zoonotic infection and human-to-human transmission is a possibility.

**Incubation:** Unknown. The incubation period for SARS is usually 2-7 days with approximately 95% of patients developing symptoms within 10 days.

**Infectious dose:** Unknown

**MEDICAL**

**Signs and symptoms:**
- Symptoms have not yet been comprehensively defined, and may be similar to SARS, including prodromal symptoms of fever, myalgias and headache for the first 3–7 days followed by respiratory symptoms including non-productive cough. Dyspnea may follow and may progress to respiratory failure.
- CDC requests that state and local health departments report patients under investigation for infection to CDC. Severity of symptoms may vary, ranging from flu-like to symptoms to those for severe acute respiratory syndrome (SARS):
  - Criteria for investigation of infection can be found at [http://www.cdc.gov/coronavirus/ncv/case-def.html](http://www.cdc.gov/coronavirus/ncv/case-def.html) and include:
    - Acute respiratory infection, which may include fever and cough, AND
    - Suspicion of pulmonary parenchymal disease (e.g. pneumonia or acute respiratory distress), AND
    - Symptoms not already explained by any other infection or etiology, including all clinically indicated tests for community acquired pneumonia

**Pre-exposure prophylaxis:**
None

**Medical Surveillance and Occupational Health:**
- Before the initiation of work involving HuCov EMC, personnel shall be enrolled in the CSU Occupational Health Medical Surveillance Program; and be appropriately trained and proficient in specific laboratory and safety practices for the work being performed.
- Personnel working with HuCov EMC should immediately contact their supervisor in the event of exposure or development of respiratory symptoms
  - Exposures: The procedure outlined below should be followed for exposures
  - Symptoms: If symptoms consistent with the above description occur, then personnel should seek medical attention from a CSU Authorized Treating Physician, per the CSU Illness Procedure:

**Diagnosis:**
- To increase likelihood of detection, it is recommended that multiple specimens are collected from different sites.
- Lower respiratory tract and stool specimens should be considered as priority for collection and testing.
Treatment:

Post-exposure prophylaxis:
- Evaluation and active monitoring for respiratory symptoms as discussed above (in addition to sore throat, rhinorrhea, chills, myalgia, headache) within 10 days of exposure
- Activity restrictions should be discussed with the health department

Treatment of clinical cases:
- No specific treatment is recommended except for meticulous supportive care.

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
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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

REFERENCES
- CDC disinfection guide (SARS): http://www.cdc.gov/hicpac/Disinfection_Sterilization/3_2contaminatedDevices.html
- CDC infection control guidelines: http://www.cdc.gov/sars/guidance/I-infection/app1.html

**CONTENT REVIEW**

This document has been reviewed by:

- CSU subject matter expert: Dr. Richard Bowen
- CSU Institutional Biosafety Committee Physician: Dr. Joseph Lopez
- Colorado Health Medical Group, Occupational Health (Dr. Tracey Stefanon)
**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.

**Rickettsia prowazekii**

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 infectious or potentially infected materials, animals, or cultures

**Special Considerations**
- Select Agent

**HAZARD IDENTIFICATION**

**Disease:** Typhus Fever, Epidemic Typhus, louse-borne typhus fever

**Transmission:** Through ectoparasite bites during feeding or by contamination of bites or wounds with ectoparasite feces; the primary ectoparasite of concern is the human body louse. Can also be transmitted via aerosol transmission of contaminated feces, dried ectoparasite tissues, or cultures and tissue homogenates.

**Communicability:** Person-to-person spread is not documented. Humans can spread the disease to ectoparasites, therefore, infection could occur through exposure to ectoparasites of infected individuals.

**Incubation:** 10-14 days

**Infectious dose:** Less than 10 infectious particles

**VIABILITY/INACTIVATION**

**Inactivation:**
- Autoclave sensitive
- 1% bleach (500 ppm available sodium hypochlorite), 70% ethanol, 2% glutaraldehyde

**Stability**
- Can survive in infected ectoparasite feces for 100 days or more.

**MEDICAL**

**Signs and symptoms:**
- One to three days of malaise, then abrupt onset of acute symptoms, including:
  - Severe headache and fever
  - Muscle and joint pain
  - Rash
  - Black indented scab at site of bite
  - Abdominal pain, diarrhea
  - Chills
  - Cough
  - CNS symptoms include delirium, seizures, coma, hearing loss
Pre-exposure prophylaxis:
None

Diagnosis:
- PCR test on skin biopsy of rash or bite scab, or EDTA whole blood
- Immunoassays of skin biopsy of rash or bite scab

Treatment
Post-exposure prophylaxis:
- Antimicrobial therapy indicated, early treatment is critical

Treatment of clinical cases:
- Antimicrobial therapy:
  - 200 mg doxycycline daily 3-14 days, or 2.2 mg/kg body weight per dose twice daily

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: [Link](http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf)
   - Workers’ Compensation (within 4 days or as soon as possible): [Link](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 [Link](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 [Link](http://www.ehs.colostate.edu/WBiosafety/PDF/IncidentReportForm.pdf)
REFERENCES

- CBW website: http://www.cbwinfo.com/Biological/Pathogens/RP.html

CONTENT REVIEW

This document has been reviewed by:

- CSU subject matter expert: Dr. Richard Bowen
RICKETTSIA RICKETTSII

PATHOGEN SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: Rickettsia rickettsii

SYNONYM OR CROSS REFERENCE: Rocky Mountain Spotted Fever (RMSF), Brazilian Spotted Fever, Tobia Fever, fiebre maculosa, fiebre manchada, New World Spotted Fever, Tick-borne typhus fever, Sao Paulo Fever

CHARACTERISTICS: Rickettsia rickettsii is an obligate intracellular alpha proteobacteria that belongs to the Rickettsiaceae family\(^1,2,3\). It is a small (0.2-0.5 \(\mu\)m by 0.2-0.3 \(\mu\)m) pleomorphic, gram-negative coccobacillus which multiplies by binary fission and has both DNA and RNA\(^1,2,3\).

SECTION II – HAZARD IDENTIFICATION

PATHOGENICITY/TOXICITY: RMSF is a potentially fatal tick-borne disease normally causing moderate to severe illness\(^1\). It can appear as an abrupt onset of fever (typically higher than 38.9 \(^{\circ}\)C), malaise, headache, anorexia, nausea, vomiting, abdominal pain, photophobia, diarrhoea and neck stiffness\(^1,3\). The characteristic maculopapular rash usually appears 2-5 days after the other symptoms, starting on wrists and ankles before progressing to the rest of the body\(^1\). 95% of children and 80% of adults have the rash; however, absence of the rash is more common in fatal cases and cases involving the elderly or African-Americans\(^1\). The rash is due to the infection of host vascular endothelial cells and is a multisystem vasculitis that can lead to necrotic or gangrenous lesions in severe cases\(^1,3\). Mucosal ulcers, postinflammatory hyperpigmentation, jaundice, cough, pneumonia, acute renal failure, lymphadenopathy, hepatomegaly, splenomegaly, conjunctivitis, peripheral, perioral and optic disk oedema, arterial occlusion, retinal vein engorgement, retinal haemorrhage and retinal sheathing are some of the complications that can be caused by RMSF\(^1,3\). After the skin, the CNS is the most affected system and people over 15 are at higher risk of developing CNS complications\(^2\). 40% of all patients reported neurological abnormalities such as meningismus, seizures, altered mental states, temporary deafness, lethargy and amnesia\(^1,3\). The symptoms can last 2 weeks although some patients have neurological sequelae lasting up to one year after disease onset. 20% of untreated cases are fatal compared to 5% of treated cases\(^1\). Mortality rates are higher for patients over the age of 60\(^1\). The symptoms of RMSF can be confused with meningococcemia, various viral infections and other tick-borne diseases\(^1,2,3\).

EPIDEMIOLOGY: The disease is restricted to the Americas where it is common in the United States of America, Western Canada, Mexico, Panama, Costa Rica, Argentina, Brazil, Colombia and Bolivia\(^1,2,3\). It is the most common tick-borne disease in the USA where 250-1200 cases are reported each year\(^1\). 90-93% of the cases reported in the USA occurred between April and October with most of them occurring in rural and suburban areas\(^1,3\). The highest infection rates were among children between 5-9, Caucasians and men\(^3\). Infections are more common in tick-infested areas\(^1\).

HOST RANGE: Humans, dogs, rodents, small mammals and ticks\(^1,4\).

INFECTION DOSE: The precise infectious dose for R. rickettsii is unknown; however rickettsiales generally have a very low infectious dose. The bite of a single tick is sufficient to cause RMSF in humans\(^1,3\). Dogs that were inoculated with approximately 3000 vero cells infected with RMSF or...
infected with 10 ticks all developed clinical symptoms of the disease(5).

**MODE OF TRANSMISSION:** RMSF is usually spread by the bite of an infectious tick where the bacterium changes from a dormant avirulent state to a pathogenic state(1). The tick normally needs to be attached for a 4-6 hour period in order to transmit the disease to humans(1). *Rickettsia rickettsii* can also be spread through contact with the tick’s infected saliva, blood, bodily fluids or feces(1,2,8). Human-to-human transmission has not been confirmed but aerosols are a potential source of infection(4,2).

**INCUBATION PERIOD:** The incubation period is from 2-14 days after the bite of an infected tick(1,3).

**COMMUNICABILITY:** Human-to-human transmission through infectious droplets is suspected but still remains to be proven(7). Ticks are infective for life(2).

**SECTION III - DISSEMINATION**

**RESERVOIR:** The disease is maintained by transovarial and transstadial passages in ticks where it is then spread to humans, dogs, rodents and other mammals(1,2). Small mammals can serve as amplifying hosts by maintaining the bacteria in their blood (they are infective for a maximum of 8 days) and then passing it to a tick during a blood meal(6).

**ZOOANOSIS:** The disease is spread from ticks to humans through the bite, or contact with tick feces or internal contents(1,1,2). Mammals (such as dogs) can also spread the ticks to humans, thus spreading the RMSF infection(2,4).

**VECTORS:** Several tick species are responsible for the spread of this disease(1). *Dermacentor variabilis* is most prevalent in the United States of America, *Demacentor andersoni* in the Rocky Mountains and in Canada, *Rhipicephalus sanguineus* in Mexico, *Amblyomma cajennense* in Central and South America and *Amblyomma aureolatum* in Brazil(1).

**SECTION IV – STABILITY AND VIABILITY**

**DRUG SUSCEPTIBILITY:** Tetracyclines and chloramphenicol are the only drugs that are confirmed as being effective against an infection by *Rickettsia rickettsii*(1). The most effective and recognized antibiotic used to treat RMSF is doxycycline(1,3).

**SUSCEPTIBILITY TO DISINFECTANTS:** Gram-negative bacteria are susceptible to 1% sodium hypochlorite, 4% formaldehyde, 2% glutaraldehyde, 70% ethanol, 2% peracetic acid, 3-6% hydrogen peroxide and 0.16% iodine(4).

**PHYSICAL INACTIVATION:** *Rickettsia rickettsii* is susceptible to moist heat (121 °C for at least 15 minutes) and dry heat (170 °C for at least 1 hour)(2).

**SURVIVAL OUTSIDE HOST:** The organism is stable in tick tissues, feces and blood or hemolymph; however, it does not survive long outside its host(1,6,10).

**SECTION V – FIRST AID / MEDICAL**

**SURVEILLANCE:** Monitor for symptoms. The presence of the pathogen can be confirmed using a variety of laboratory techniques(11). Immunofluorescent assays (IFAs) and ELISAs can be used to identify antibodies to the bacteria; however, sera must be tested at least 7 days after the appearance of symptoms in order to detect seroconversion because IgG antibodies do not appear until a minimum of 7 days after the onset of the disease(3). A four-fold increase in titres of paired samples or a convalescent titre greater 1/64 is considered diagnostic(1). The bacteria can be visualized using Giemsa and Gimenez staining methods. Immunohistochemical staining of skin biopsies can be useful in patients presenting with rash(1,2,3). Immunohistochemical staining is the most useful method to diagnose RMSF in severe cases(12). PCR of blood, biopsy tissues and ticks is possible although this technique is not sensitive enough to be commonly used to diagnose RMSF and most diagnoses of the disease are retrospective(1,3).
**Note:** All diagnostic methods are not necessarily available in all countries.

**FIRST AID/TREATMENT:** Appropriate antibiotic therapy (i.e., doxycycline) should be initiated at the onset of RMSF-like symptoms without waiting for laboratory confirmation of the diagnosis\(^{(11,13)}\). 100 mg of doxycycline should be taken twice a day for 5-7 days and until the patient is afebrile for at least 2-3 days\(^{(1,2)}\). For children weighing less than 45 kg, a 2.2 mg/kg twice daily dose of doxycycline is recommended for 5 to 7 days\(^{(1,2)}\).

**IMMUNIZATION:** None\(^{(11)}\)

**PROPHYLAXIS:** The administration of the appropriate antibiotic treatment before any signs of clinical illness is not recommended\(^{(2)}\).

**SECTION VI - LABORATORY HAZARDS**

**LABORATORY-ACQUIRED INFECTIONS:** 63 laboratory-acquired infections have been reported as of date with 11 deaths\(^{(11)}\). The 11 fatal cases were associated with manipulating infected eggs, tissue cultures or ticks, and the respiratory route, mucous membrane contact, needle puncture wounds or cuts were involved\(^{(13)}\). 9 cases were reported in the same lab over a 6 year period, all caused by infectious aerosols\(^{(2)}\).

**SOURCES/SPECIMENS:** Tissues and blood from ticks or infected animals\(^{(1)}\).

**PRIMARY HAZARDS:** Accidental parenteral inoculation and exposure to infectious aerosols are the primary hazards when working with RMSF\(^{(11)}\). Infected mammals and arthropods are also a risk\(^{(11)}\).

**SPECIAL HAZARDS:** None

**SECTION VII – EXPOSURE CONTROLS / PERSONAL PROTECTION**

**RISK GROUP CLASSIFICATION:** Risk group 3\(^{(14)}\).

**CONTAINMENT REQUIREMENTS:** Containment Level 3 facilities, equipment, and operational practices for work involving infected or potentially infected material, including necropsy of infected animals, arthropods, inoculation, incubation and harvesting of embryonated eggs or tissue cultures.

**PROTECTIVE CLOTHING:** Personnel entering the laboratory should remove street clothing and jewellery, and change into dedicated laboratory clothing and shoes, or don full coverage protective clothing (i.e., completely covering all street clothing). Additional protection may be worn over laboratory clothing when infectious materials are directly handled, such as solid-front gowns with tight fitting wrists, gloves, and respiratory protection. Eye protection must be used where there is a known or potential risk of exposure to splashes\(^{(15)}\).

**OTHER PRECAUTIONS:** All activities with infectious material should be conducted in a biological safety cabinet (BSC) or other appropriate primary containment device in combination with personal protective equipment. Centrifugation of infected materials must be carried out in closed containers placed in sealed safety cups, or in rotors that are loaded or unloaded in a biological safety cabinet. The use of needles, syringes, and other sharp objects should be strictly limited. Open wounds, cuts, scratches, and grazes should be covered with waterproof dressings. Additional precautions should be considered with work involving animals or large scale activities\(^{(15)}\).

**SECTION VIII - HANDLING AND STORAGE**

**SPILLS:** Allow aerosols to settle and, wearing protective clothing, gently cover spill with paper towels and apply appropriate disinfectant, starting at the perimeter and working towards the centre. Allow sufficient contact time before clean up (30 min)\(^{(15)}\).

**DISPOSAL:** Decontaminate all wastes before disposal by incineration or steam sterilization\(^{(15)}\).
STORAGE: The infectious agent should be stored in a sealed and identified container in a level 3 containment laboratory.

SECTION IX – REGULATORY AND OTHER INFORMATION

REGULATORY INFORMATION: The import, transport, and use of pathogens in Canada is regulated under many regulatory bodies, including the Public Health Agency of Canada, Health Canada, Canadian Food Inspection Agency, Environment Canada, and Transport Canada. Users are responsible for ensuring they are compliant with all relevant acts, regulations, guidelines, and standards.

UPDATED: July 2010

PREPARED BY: Pathogen Regulation Directorate, Public Health Agency of Canada.

Although the information, opinions and recommendations contained in this Pathogen Safety Data Sheet are compiled from sources believed to be reliable, we accept no responsibility for the accuracy, sufficiency, or reliability or for any loss or injury resulting from the use of the information. Newly discovered hazards are frequent and this information may not be completely up to date.

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REFERENCES:


Date Modified: 2011-02-18
Rift Valley Fever Virus

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CONTAINMENT AND SPECIAL PRECAUTIONS

Containment

• BSL-3 Level practices, containment equipment and facilities are required for work involving potentially infected materials. ABSL-3 Level practices are required for studies involving rodents.

Special considerations:

• Select Agent
• Mosquito borne disease

HAZARD IDENTIFICATION

Disease: Rift Valley Fever

Transmission: Mosquito, direct contact through open wound with blood or organs of infected animal, aerosols

Incubation: 3-12 days, typically 2-6 days

Infectious dose: unknown

VIABILITY/INACTIVATION

Stability: Virus remains viable in aerosols for more than 1 hour at 25 C. Quickly destroyed by pH changes in decomposing carcasses, virus can survive for as long as 4 months at 4 C in neutral or alkaline pH, mixed with serum or other proteins.

Inactivation:

• Autoclave sensitive
• Resistant to neutral and alkaline pH, can survive 8 years below freezing
• Susceptible to low pH, lipid solvents, detergents and sodium or calcium hydroxide

MEDICAL

Signs and symptoms:

• Fever
• Weakness
• Back pain
• Dizziness
• Weight loss
• Recover 2-7 days post infection
• More severe disease –
  • Hemorrhagic fever
  • Encephalitis
  • Ocular disease
Pre-exposure prophylaxis:

Investigational vaccine through USAMRIID

Diagnosis:
Serology – Neutralization tests, ELISA or EIA to check for IgM
RT-PCR
Serum taken:
  Day of exposure, and 10-14 days post infection to detect 4-fold rise in titer

Treatment:
  • Post-exposure prophylaxis:
    o Supportive care and possibly ribavirin and interferon
  • Treatment of clinical cases:
    o Treatment is supportive and symptomatic

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Employees, Graduate Students, Work Study
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3. Individual goes to their personal physician, or as otherwise directed by their physician
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- Iowa State University Fact Sheet: http://www.cfsph.iastate.edu/Factsheets/pdfs/rift_valley_fever.pdf
- WHO Fact Sheet: http://www.who.int/mediacentre/factsheets/fs207/en/

CONTENT REVIEW

This document has been reviewed by:
- CSU subject matter expert: Dr. Richard Bowen
Severe fever with thrombocytopenia syndrome virus expands its borders

Ying Wu1 and George F Gao1,2

Emerging Microbes and Infections (2013) 2, e36; doi:10.1038/emi.2013.36; published online 19 June 2013

The war on emerging pathogens is intensifying in 2013.

The outbreak of avian-origin influenza A (H7N9) virus in eastern China1–2 has reminded the world of the imminent threat of unexpected pathogens, including an “old” virus, influenza. Recent conversation has centered on H5N1, H9N2, H7N3, and H7N7, but never before had we considered H7N9 to be the cause of outbreaks of human infection or the next possible pandemic. Maybe we have to take a closer look at the possibility of reassortment among any of the 16 hemagglutinins and 9 neuraminidases subtypes, and even within the newly identified bat-derived, influenza-like virus H17N10.3,4

A new coronavirus, called human coronavirus Erasmus Medical Center (hCoV-EMC) (with a recent proposed new name as Middle East respiratory syndrome coronavirus, or MERS-CoV in abbreviation), has caused alarm in the Middle East, as human infection was first reported in March 2012.5 In one year, as of May 12, 2013, there have been 34 cases, with 18 fatalities in total (www.who.org). More importantly, human-to-human transmission has been reported, with second-generation infections in France and the UK in those individuals who have had close contact with patients with a history of travel to the Middle East.

Less publicized but equally significant, the recently emerged severe fever with thrombocytopenia syndrome virus (SFTSV) expanded its geographic spectrum in 2012–2013, from China to the USA, and now to Japan.

SFTSV-induced disease was first suspected in China in 2009, and the virus was isolated and confirmed in 2011.6 SFTSV is a new member of the genus Phlebovirus, with over 70 known members in the genus, which is in the family Bunyaviridae. Although the phlebovirus has been found in Africa and Europe for many years, SFTSV is the first-ever virus of this type isolated in China.6–10 The virus is known as the Heartland virus after the name of the place (Heartland, Missouri) where the virus was first isolated in the USA. The Heartland virus is phylogenetically distinct from SFTSV isolated in China, although similar clinical manifestations have been observed.9

Early this year, SFTSV was confirmed in western regions of Japan. Officials referred to the etiological agent of this outbreak as the same that caused disease in China, or SFTSV. However, these two agents are similar but not identical. As Dr. William L. Nicholson from the USA Centers for Disease Control and Prevention (CDC) suggested, these viruses could be considered as “cousins.”

The viruses from three countries are too different to be linked in their transmission. The viruses are most likely of the same type but with local origins. In fact, both USA Heartland virus- and Japanese SFTSV-infected patients were retrospectively confirmed, and travel by certain patients can be traced back to 2009 for the USA and the summer of 2012 for Japan. Scientists from both countries are now working on several earlier suspected cases. There is no evidence that the patients in the USA or Japan had travelled to China. Therefore, it seems the virus has been in the USA and Japan for some time. The three viruses may not have a common origin but certainly cause similar or even the same symptoms and clinical outcomes.

In China, SFTSV has caused an approximately 12% case fatality rate (CFR), which is an alarming number for this country.6,11 Retrospective cases in Japan have an even higher CFR, with four deaths out of eight confirmed cases (additional suspected cases still need to be confirmed). The infected areas in China are concentrated in central China, covering six provinces. The major clinical symptoms and signs in the patients from the three countries are the same: high fever, thrombocytopenia, leucopenia, and elevated levels of serum hepatic enzymes. Although this group of viruses is transmitted by ticks, there is evidence in China that person-to-person transmission was highly probable through direct blood contact when the index patients had high viremia.12–14 Therefore, SFTSV is indeed a dangerous pathogen, and precautionary measures should be implemented in epidemic areas. Although no virus has yet been isolated from ticks, reverse transcription polymerase chain reaction (RT-PCR) tests on tick samples revealed evidence of virus.

To prevent infection and a possible epidemic, a call for vaccine development has been made in China. Scientists from the China CDC are working on this task in collaboration with large pharmaceutical companies. As high-level viremia is observed in acutely infected patients, therapeutic human-origin monoclonal antibodies or even antisera will serve as lifesaving agents that should be developed in the near future. Studies on pathogenesis, tick transmission, and useful animal models should also be pursued. A comparative study of the viruses from China, the USA, and Japan will
answer many questions about the origins and diversity of these viruses.

Indeed, our war on emerging pathogens may never end.


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**Disclaimer**

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**Mycobacterium tuberculosis Complex (MTC)**
*(M. tuberculosis, M. bovis, M. microti, M. africanum, M. pinnipedii, M. caprae, and M. canetti)*

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### Containment and Special Precautions

**Containment**
- BSL-3 Level practices, containment equipment and facilities are required for work involving infectious materials, animals, cultures and for activities with a high potential for aerosol production.
- BSL2 practices and containment equipment can be utilized for handling some clinical specimens. Consult with CSU Biosafety Office related to such work.

**Special Considerations**
- Many of the strains worked with at CSU are drug resistant and researchers should be aware of strains being worked with and antibiotic resistance profiles.
- Immuno-compromised individuals and those with pre-existing lung damage (e.g. cystic fibrosis, emphysema, smokers) are more susceptible.

### Hazard Identification

**Disease:** Tuberculosis (TB). There is more than one form of TB. For most people who breathe in TB bacteria and become infected, the body is able to fight the bacteria to stop them from growing. The bacteria are thought to remain alive in the body but can become active later. When there is infection but there are no signs or symptoms of TB, this is called latent TB infection and is manifest by evidence of a positive skin test or blood test (see below) but with no symptoms of disease. However, some people can go on to develop active TB from the latent infection. People with a compromised immune system such as certain immune problems, malignancies, medications, diabetes, other diseases and especially HIV are at particular risk of tuberculosis.

**Transmission:** Direct contact with mucous membranes or broken skin, injection, injection, aerosols, fomites; M. bovis can be transmitted by eating or drinking contaminated, unpasteurized milk products, and by inhalation of bacteria in the exhalation of infected animals.

**Communicability:** Person to person by the aerosol route.

**Incubation:** 2-12 weeks from infection to the development of a positive TB skin test or blood test for TB.

**Infectious dose:** as low as 1-10 bacilli, organisms can be stable in the environment.

### Viability/Inactivation

**Stability:** Can survive on surfaces and in soil for months.

**Inactivation:**
- Mycobacteria are very resistant to inactivation, and inactivation methods should species and strain being worked with.
- Mycobacteria are autoclave sensitive, but longer cycles may be required.
• The following disinfectants may be effective for inactivation, depending on species, strain, and conditions:
  o Sensitive to 5% phenol or 5% formaldehyde, 2% glutaraldehyde.
  o Minimum of 20% bleach (10,000 ppm available sodium hypochlorite) (*Note that bleach should not be used when waste will be subsequently processed by autoclaving*).
  o For a list of EPA Registered tuberculocidal products: [http://www.epa.gov/oppad001/list_b_tuberculocide.pdf](http://www.epa.gov/oppad001/list_b_tuberculocide.pdf)

**MEDICAL**

**Signs and symptoms:**
• A cough that lasts 3 weeks or longer
• Pain in the chest
• Coughing up sputum and/or blood
• Weakness or fatigue
• Weight loss
• No appetite
• Chills
• Fever
• Night sweats

**Pre-exposure prophylaxis:**
BCG vaccine is available but not used routinely in the United States.

**CSU TB Surveillance:** All personnel with the potential for occupational exposure to the MTB complex must be enrolled in the TB Surveillance Program. This consists of routine tuberculin skin testing every 6 or 12 months, depending on risk.

**Diagnosis:**
• TB Tuberculin Skin Test: Consists of injecting a small amount of tuberculin fluid (purified protein derivative of TB) under the skin to check for an inflammatory reaction (induration). Test must be read 48 to 72 hours by a trained health care professional.
• Blood test: Interferon-Gamma Release Assay (IGRA) may be used and is often done on individuals that are TB skin test positive or BCG vaccinated to determine if the skin reaction could be specific to tuberculosis.
• Chest X-Ray
• Culture of sputum
• Direct smear microscopy for acid fast bacilli
• Genetic methods (PCR, DNA probes, DNA fingerprinting)

**Treatment:**
• Post-Exposure Prophylaxis
  o Prophylactic antibiotic regimen may be initiated, depending on the strain involved and the nature of the exposure.
  o Skin testing is performed the day of the incident, then 10 weeks later and patient is monitored for symptoms.
• Treatment of clinical cases:
  o Persons who develop latent infection are offered treatment (usually isoniazid for 9 months). Treatment for active disease due to tuberculosis is dependent on the antibiotic susceptibility of the strain of *M. tuberculosis*.
Treatment could be a combination of isoniazid (INH), rifampin (RIF), ethambutol (EMB) and pyrazinamide (PZA) if the strain is fully susceptible.

**Disclaimer**

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.
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2. Employee goes to an Authorized Treating Physician.
3. After the visit, individual fills out the following forms:
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  http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm
- Sanger Institute: http://www.sanger.ac.uk/resources/downloads/bacteria/mycobacterium.html
CONTENT REVIEW
This document has been reviewed by:

- CSU subject matter experts: Drs. Karen Dobos and Mary Jackson
Yersinia pestis

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
- Zoonotic

HAZARD IDENTIFICATION

Disease: Bubonic, pneumonic and septicemic plague

Transmission: Bite of infected flea, inhalation, animal-to-human or person-to-person transmission by human fleas or directly in pneumonic plague, handling infected tissues, touching or skinning infected animals

Communicability: Person to person spread possible through aerosol transmission

Incubation: Generally 1-8, depending on form: Percutaneous: 2-8 days; pneumonic 1-6 days; Septicemic 1-4 days

Infectious dose: Unknown

VIABILITY/INACTIVATION

Stability: Viable in soil, water, carcasses, hides, and grains for several weeks, and longer at near freezing temperatures. Killed within several hours of exposure to sunlight and disinfectants, or within 15 minutes of exposure to 55°C. Aerosolized bacteria will survive up to one hour, depending on conditions.

Inactivation:

- Autoclave sensitive
- 1% Sodium hypochlorite, 70% Ethanol, 2% glutaraldehyde, iodines, phenolics and formaldehyde

MEDICAL

Signs and symptoms:

- Bubonic (Flu-like, with enlarged lymph nodes)
  - Sudden onset:
    - Headache
    - Fever
    - Malaise (discomfort)
    - Swollen and painful lymphnodes
  - Myalgia (joint pain)
  - Vomiting, nausea
  - Abdominal pain
• **Pneumonic (Lung Infection)**
  - Sudden onset:
    - High fever
    - Headache
    - Malaise (discomfort)
    - Myalgia (joint pain)
    - Cough (could have bloody sputum)
  - Chills
  - Nausea, vomiting
  - Diarrhea, abdominal pain
  - Respiratory failure

• **Septicemic (Blood Infection)**
  - Sudden onset:
    - Fever
    - Headache
    - Chills
    - Malaise (discomfort)
    - Myalgia (joint pain)
  - Nausea, vomiting
  - Abdominal pain
  - Hypotension
  - Meningitis -- rare

Pre-exposure prophylaxis:
NONE – Vaccine currently unavailable in the United States

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

Diagnosis:
• CDC Resource for diagnosis: [http://www.cdc.gov/plague/healthcare/clinicians.html](http://www.cdc.gov/plague/healthcare/clinicians.html)
• Organism cultured from sputum, blood or aspirates of lymph node on blood agar, MacConkey or infusion broth.
• PCR and immunoassays done at CDC-Fort Collins.
• Latex agglutination tests, passive hemagglutination and complement fixation tests available.
• Serum taken:
  - Day of exposure (or as early as possible) and 4-6 weeks after disease onset and >14 days post infection to detect 4-fold rise in titer

Treatment:
• CDC Resource for clinicians: [http://www.cdc.gov/plague/healthcare/clinicians.html](http://www.cdc.gov/plague/healthcare/clinicians.html)
• **Post Exposure Prophylaxis:**
  - Doxycycline (100 mg, orally every 12 hours); Ciprofloxacin (500 mg, orally every 12 hours).
  - *Chemoprophylaxis should be started within 24 hours and continue for 7 days after last known or suspected exposure*
• **Treatment of clinical cases:**
  - Streptomycin (streptomycin 30 mg/kg/day administered IM in 2 divided doses) for 10 days
- Gentamicin can be used due to toxicity or immediate nonavailability of streptomycin (5 mg/kg IV once daily or 2 mg/kg loading dose followed by 1.7 mg/kg IV every 8 hours)
- Tetracycline: loading dose 2g then 2g daily in 4 divided doses for 7 to 10 days
- Chloramphenicol 25 mg/kg every 6 hours IV

**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
   - Workers’ Compensation (within 4 days or as soon as possible):
     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

**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

**REFERENCES**

- USAMRIID Occupational Health Manual for Laboratory Exposures:
- CDC Website: http://www.cdc.gov/plague/
- CDC Plague Fact Sheet: http://www.cdc.gov/plague/resources/235098_Plaguefactsheet_508.pdf
- CDC Information for Clinicians: http://www.cdc.gov/plague/healthcare/clinicians.html
- Iowa State University Fact Sheet: http://www.cfsph.iastate.edu/Factsheets/pdfs/plague.pdf
CONTENT REVIEW

This document has been reviewed by:

- CSU subject matter expert: Dr. Richard Bowen
- Licensed Physicians: Occupational Health Services (principal: Dr. Tracy Stefanon)