## Agent Characteristics

<table>
<thead>
<tr>
<th>Risk Group (RG)</th>
<th>Agent Viability</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ RG-2</td>
<td>associated with human disease, rarely serious; preventive or therapeutic interventions often available</td>
</tr>
<tr>
<td>☐ RG-3</td>
<td>associated with serious or lethal human disease; preventive or therapeutic interventions may be available</td>
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<th>Agent Type</th>
<th>Description</th>
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<td>Bacteria</td>
<td>Francisella tularensis, a gram-negative, non-spore forming bacterium, is the causal agent of tularemia (rabbit fever, deerfly fever). F. tularensis is endemic throughout North America and Eurasia and is one of the most infectious pathogenic bacteria known. Due to the low infective dose, ease of dissemination and high capacity for illness/death, wild type F. tularensis is considered a potential biological weapon and is classified as a select agent by the CDC. Though attenuated, F. tularensis subspecies holarctica causes Type B tularemia.</td>
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</table>

| Host Range | Rabbits, humans, arthropod vectors. |
| Host Shedding | Blood, saliva, urine, feces, other: arthropod vector body fluids |
| Routes of Exposure to Humans | Aerosol/inhalation, animal bites, arthropod vectors, contaminated items, direct contact, ingestion, mucous membranes, percutaneous, vertical transmission, broken skin |
| Infectious Dose | Approximately 10 CFU (inhalation) |
| Incubation Period | Symptoms may appear between 1 to 14 days, usually within 3-5 days. |

Based on NIH definitions. Final Risk Group (RG) designation will be assigned upon a case-by-case review by the Cornell University Institutional Biosafety Committee (IBC).

### Laboratory Hazards

- ☒ High energy-creating activities (centrifugation, sonication, high pressure systems, vortexing, tube cap popping)
- ☐ Handling of sharps (needles, scalpels, microtome blades, broken glass, etc.)
- ☒ Splash/droplet-creating activities (shaking incubators, liquid culturing, mechanical pipetting)
- ☒ Equipment contamination
- ☒ Exposed skin/uncovered wounds

### Laboratory Acquired Infection History

Third most commonly reported (wildtype strain); almost all cases involved tularemia research; few cases related to work with infected animals and their ectoparasites; 225 cases up to 1976 with 2 deaths.

### Laboratory Handling Guidelines

<table>
<thead>
<tr>
<th>Laboratory Biosafety Level (BSL)</th>
<th>Attenuated Strain Alternatives</th>
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<tr>
<td>☒ BSL-2</td>
<td>Francisella tularensis sp. Holarctica; non-tularensis Francisella or other species.</td>
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#### Training

- ☒ EHS Laboratory Safety Training (CULearn #2355)
- ☒ EHS Bloodborne Pathogens Training (CULearn #1079)
- ☒ Lab-specific protocol training
- ☒ BARS CULearn #2277.20

#### Lab Engineering Controls

- ☒ Benchtop
- ☒ Biosafety Cabinet (for aerosol containment)
- ☐ Chemical Fume Hood
- ☒ Centrifuge lids or safety cups; samples are loaded/unloaded inside the BSC
- ☒ Use of safety-engineered sharps
- ☒ Eye protection
- ☒ Single gloves
- ☒ Additional gloves
- ☒ Snap-front lab coat with cinch cuffs
- ☒ Disposable solid front gown
- ☒ Additional mucous membrane protection
- ☒ Disposable outer sleeves
- ☒ Other: Respiratory protection

#### Waste Management

- ☒ Regulated Medical Waste (RMW)

#### Shipping Guidance

- ☒ Refer to EHS Biological Materials Shipping

#### Animal Vivarium Guidance

<table>
<thead>
<tr>
<th>Animal Housing Biosafety Level (ABSL)</th>
<th>☒ ABSL-1 ☒ ABSL-2 ☐ ABSL-3</th>
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<tr>
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#### Perform Inoculations

- ☒ Benchtop
- ☒ Biosafety Cabinet

#### Change Cages

- ☒ Benchtop
- ☒ Biosafety Cabinet

### Health Hazards

#### Signs and Symptoms

- ☒ Flu-like symptoms (i.e. fever, headache, dehydration, weight loss, lethargy)
- ☐ Cutaneous symptoms (i.e. skin lesions, rash)
- ☐ Gastrointestinal symptoms (i.e. loss of appetite, nausea, vomiting, diarrhea)
- ☒ Respiratory symptoms (i.e. coughing, sneezing)
- ☒ Neurological symptoms (i.e. loss of sensation, ataxia)
- ☐ Musculoskeletal symptoms (i.e. joint and muscle pain)
- ☒ Lymphoreticular symptoms (i.e. enlarged internal organs or lymph nodes)
- ☐ Reproductive Health concerns (i.e. abortion, fetal abnormalities) – request a Reproductive Health Consultation

#### Immunization

- ☐ Available
- ☒ Not Available

#### Prophylaxis

- ☒ Available
- ☐ Not Available

#### Agent Viability

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<td>☒ 1:10 Bleach Dilution</td>
<td>Carcasses and organs: up to 133 days; grain dust, bedbugs: 136 days; rabbit meat: 31 days; straw: 192 days; water: up to 90 days; infected rabbit meat stored frozen at -15°C has remained infective longer than 3 years.</td>
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**Biosafety Level 2 Containment Requirements Summary**

**Personal Hygiene**
- Remove PPE before leaving the lab – avoid wearing PPE in public spaces.
- Wash hands frequently with soap and water after removing gloves, handling samples, leaving lab, etc.
- Change gloves frequently while working, and before removing samples from the biosafety cabinet to minimize potential contamination of equipment and surfaces within the lab.

**Standard Microbiological Practices**
-In addition to standard BSL1 practices:
- Biohazard signs and labels on equipment.
- Use a biological safety cabinet (BSC), such as a Class II Type A2, for manipulations that can generate infectious aerosols.
- Use aerosol containing devices for high energy activities which may generate infectious aerosols. For example, centrifugation of agents which may generate infectious aerosols will use gasketed rotors or buckets. Rotors or buckets will be removed and opened inside a BSC. Centrifuge tubes will be filled and opened in a BSC.
- Vacuum lines are protected with liquid disinfectant-filled traps and 0.45 micron filters.
- Sharps handling and safety practices are implemented.
- Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant.
- Chemically disinfect all surfaces and equipment.
- Potentially infectious materials are placed in durable, leak proof, labeled primary containers during collection, handling, processing, and secondary containers during storage, or transport within a facility.
- Windows in BSL-2 labs remain closed.

**Special Practices**
- All persons entering the laboratory are advised of the potential hazards and meet specific entry/exit requirements.
- The laboratory supervisor ensures that lab personnel demonstrate proficiency in standard and special microbiological practices before working with such agents.
- Laboratory equipment are routinely decontaminated, as well as, after spills, splashes or other potential contamination.
- Spills involving infectious materials are contained, decontaminated, and cleaned up by staff properly trained and equipped to work with infectious material.
- Equipment is decontaminated before repair, maintenance, or removal from the laboratory.

**Regulated Medical Waste (RMW)**

- **Soft waste:**
  - All materials that come into contact with this agent must be placed in a biohazard waste bag.
  - If working in a BSC, have a biohazard waste bag inside the BSC for waste collection.
  - All equipment, tubes, and waste bags that are brought out of the biosafety cabinet are wiped with appropriate disinfectant.
  - Place smaller red bag waste from BSC into larger red bag outside the BSC for transport.

- **Sharps waste:**
  - Place in leak proof sharps container labeled with the biohazard symbol. If working in a BSC, place a sharps container in the BSC.

- **Liquid waste:**
  - Add EHS-approved disinfectant to appropriate concentration, hold for contact time specified per manufacturer’s guidelines, and then gently pour down the drain.

**References**
1. University of Iowa EHS Organism Fact Sheet: [http://ehs.research.uiowa.edu/francisella-tularensis](http://ehs.research.uiowa.edu/francisella-tularensis)