

# PUBLIC HEALTH REFERENCE SHEET

## Tularemia



<b>Name</b>	<i>Francisella tularensis</i> (rabbit fever)
<b>Reservoir &amp; Transmission</b>	Wild animals, especially rabbits, hares, voles, muskrats, water rats, beavers, and some domestic animals; also, various hard ticks Arthropod bites, handling infected animal tissues, ingestion of contaminated food or water, inhalation of contaminated aerosols
<b>Incubation Period</b>	Usually 3–5 days (range 1–14 days)
<b>Common Symptoms</b>	Vary depending on how the bacteria enter the body. All forms of illness cause fever as high as 104°F
<b>Gold Standard Diagnostic Test</b>	Culture
<b>Risk Groups</b>	Occupational and recreational activities involving wild animals or exposure to ticks
<b>Geographic Significance</b>	Most common in North America and in parts of Europe, Russia, China, and Japan

### What is tularemia?

Tularemia is a potentially life-threatening illness caused by the bacterium *Francisella tularensis* (*F. tularensis*) (formerly called *Pasteurella tularensis*) that is found in animals, especially rodents, rabbits, and hares.

### What is the occurrence of tularemia?

Naturally occurring *F. tularensis* infections have been reported from all states except Hawaii. In the U.S., tularemia is an uncommon disease with approximately 250 cases reported annually.

### How is tularemia transmitted?

Individuals can develop tularemia by being bitten by an infected tick, deerfly, or other insect; skin contact from handling infected animal carcasses; eating or drinking contaminated food or water; inhaling contaminated aerosols or agricultural and landscaping dust; occupational exposure in the laboratory; or exposure as a result of bioterrorism. Tularemia does not spread from person-to-person contact. Ticks that transmit *F. tularensis* bacteria to humans include the dog tick (*Dermacentor variabilis*), Rocky Mountain wood tick (*D. andersoni*), and lone star tick (*Amblyomma americanum*). *F. tularensis* is not transmitted by the same ticks that transmit *Borrelia burgdorferi*, the agent of Lyme disease.

### Who is at risk for tularemia?

Hunters, trappers, sheep shearers, veterinarians, forest rangers, game wardens, hikers, and campers are at increased risk of infection.

### What are the signs and symptoms of tularemia?

Symptoms of tularemia vary depending on how the person was infected. All forms of tularemia are accompanied by fever, which can be as high as 104°F. Generalized signs and symptoms include fever, chills, headache, malaise, fatigue, anorexia, myalgia, chest discomfort, cough, sore throat, vomiting, diarrhea, abdominal pain.

- **Ulceroglandular:** The most common form of tularemia usually occurs following a tick or deer fly bite or after handling of an infected animal. A skin ulcer usually appears at the site where the bacteria entered the body and is accompanied by swelling of regional lymph glands, usually in the armpit or groin.

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

# PUBLIC HEALTH REFERENCE SHEET



## Tularemia

- **Glandular:** Similar to ulceroglandular tularemia but without an ulcer. Also generally acquired through the bite of an infected tick or deer fly or from handling sick or dead animals.
- **Oculoglandular:** Occurs when the bacteria enter through the eye, for example, when a person touches their eye after handling infectious material. Symptoms include irritation and inflammation of the eye; photophobia; excessive lacrimation; conjunctivitis; and preauricular, submandibular, and cervical lymphadenopathy.
- **Oropharyngeal:** Results from eating or drinking contaminated food or water. Symptoms may include sore throat; mouth ulcers; exudative pharyngitis or tonsillitis; and cervical, preparotid, and/or retropharyngeal lymphadenopathy.
- **Pneumonic:** The most serious form of tularemia occurs after breathing dusts or aerosols containing the bacteria or is secondary to other untreated forms of tularemia. Symptoms include cough (dry or productive), substernal tightness, difficulty breathing, hilar adenopathy, infiltrate, or pleural effusion may be present on chest imaging.
- **Intestinal:** intestinal pain, vomiting, and diarrhea
- **Typhoidal:** Characterized by any combination of the general symptoms (without the localizing symptoms of other syndromes)

### What are potential complications of tularemia?

Tularemia disease can be fatal left untreated.

### How is tularemia diagnosed?

Culture of *F. tularensis* is confirmatory from a clinical specimen, such as swabs or scapings of ulcers, lymph node aspirates or biopsies, pharyngeal swabs, or respiratory specimens (e.g., pleural fluid), depending on the form of illness. Serologic testing for *F. tularensis* can be confirmatory with the first serum collected during the acute phase of illness (within first week of onset) and the second serum sample collected 2–3 weeks later. Positive serologic tests should be interpreted in the context of a compatible clinical illness and exposure. *F. tularensis* serologic tests can cross-react with antibodies to some other bacteria, including *Brucella*, causing false positive results. Supportive laboratory tests include detection of antibodies to *F. tularensis* through a single serologic test of serum collected at least 14 days after illness onset, or detection of *F. tularensis* in a clinical specimen by direct immunofluorescence assay (DFA), immunohistochemical staining, sequence-based technologies, or polymerase chain reaction (PCR) assay.

### How is tularemia treated?

Consult an infectious disease specialist regarding individual patient treatment decisions. Most infections can be treated with antibiotics (e.g., gentamicin, doxycycline, and ciprofloxacin) for 10 to 21 days depending on medication, stage of illness, and personal factors (e.g., age, medical history, underlying health conditions, pregnancy status, or allergies). Although symptoms may last for several weeks, most patients completely recover.

Tularemia post-exposure prophylaxis is recommended in cases of laboratory exposure to infectious materials.

A live virus vaccine for tularemia used for research and laboratory personnel who are at risk of exposure to *F. tularensis* is under review by the Food and Drug Administration and is not generally available in the U.S., nor is it useful in management of ill patients. Natural infection with *F. tularensis* is thought to impart life-long immunity, but re-infections have occurred.

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

# PUBLIC HEALTH REFERENCE SHEET



## Tularemia

### How can tularemia be prevented?

Prevent insect bites by using repellent containing DEET on skin or permethrin to treat clothing. Wear gloves when handling sick or dead animals. Cook food thoroughly. Ensure water is from a safe source. Note any change in the behavior of pets (especially rodents, rabbits, and hares) or livestock, and consult a veterinarian if unusual symptoms develop.

### What are some public health considerations?

- Specify the clinical form of disease.
- Document the circumstances under which the case patient was exposed including duty exposure, occupational activities, environmental exposures, or other high-risk activities.
- Alert laboratory personnel when tularemia is suspected. All work with suspect cultures of *F. tularensis* should be performed in a biological safety cabinet. Standard diagnostic procedures with clinical materials can be performed in biosafety level 2 conditions. Manipulation of cultures and other procedures that might produce aerosols or droplets (e.g., grinding, centrifuging, or vigorous shaking) should be conducted under biosafety level 3 conditions.
- *F. tularensis* is a CDC Category A bioterrorism agent/disease. A small number (10–50) of organisms can cause disease. If *F. tularensis* were used as a potential bioweapon, the bacteria would likely be made airborne (aerosolized) for exposure by inhalation. People who inhale an infectious aerosol or contaminated dust would generally experience severe respiratory illness (pneumonic tularemia), including life-threatening pneumonia and systemic infection, if they are not treated.
- The CDC's tularemia case report form is available at: <https://www.cdc.gov/tularemia/publichealthofficials/index.html>

### References

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events: Guidelines and Case Definitions*.

<https://www.health.mil/Reference-Center/Publications/2022/11/01/Armed-Forces-Reportable-Medical-Events-Guidelines>

Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*. 21st Edition. Washington, DC: APHA Press.

"Tularemia," Centers for Disease Control and Prevention (CDC), last reviewed July 5, 2022.

<https://www.cdc.gov/tularemia/>

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.