Tularemia

Organism: *Francisella tularensis* is the causative agent for tularemia. The signs and symptoms of tularemia vary depending on how the bacteria enters the body. Illness ranges from mild to life-threatening. All forms are accompanied by fever, which can be as high as 104 °F.

Incubation period: ~3 to 5 days, but can vary from 1-14 depending on route of transmission.

Infectious period: Direct transmission from another person has not been reported.

Transmission route: May vary and will inform the clinical picture. See below for a description of the distinct forms.

- **Wound/skin-break** usually causes a localized lesion with regional lymphadenopathy; this is the most commonly reported type in Alaska.
- **Concern for aerosols in a bioterrorist attack.** Note that “naturally-occurring” aerosol exposures have also been described among landscapers in situations such as a lawnmower macerating an infected animal carcass.

Treatment:

- Streptomycin is the drug of choice based on experience, efficacy and FDA approval. Gentamicin is considered an acceptable alternative, but some series have reported a lower primary success rate. Treatment with aminoglycosides should be continued for 10 days.
- Tetracyclines may be a suitable alternative to aminoglycosides for patients who are less severely ill. Tetracyclines are static agents and should be given for at least 14 days to avoid relapse.
- Ciprofloxacin and other fluoroquinolones are not FDA-approved for treatment of tularemia but have shown good efficacy in vitro, in animals, and in humans.

Information Needed for the Investigation

Verify the Diagnosis

An illness characterized by several distinct forms, including the following:

- Ulceroglandular: cutaneous ulcer with regional lymphadenopathy
- Glandular: regional lymphadenopathy with no ulcer
- Oculoglandular: conjunctivitis with preauricular lymphadenopathy
- Oropharyngeal: stomatitis or pharyngitis or tonsillitis and cervical lymphadenopathy
- Intestinal: intestinal pain, vomiting, and diarrhea
- Pneumonic: primary pleuropulmonary disease
- Typhoidal: febrile illness without early localizing signs and symptoms
Epidemiologic criteria:
Most of the Alaska cases have involved some contact with animals, whether skinning a trapped muskrat, snowshoe hare; or contact with a dog that had recently killed a hare. There have also been cases among veterinarians and other persons who were bitten by a clinically affected cat. Most cases have been exposed in Interior Alaska; although other locations have been reported. Cases of tularemia are not unexpected in these circumstances; if however, there was a cluster of cases that did not seem consistent with the historic epi/findings and could be related to an intentional release, we will need to consult with CDC and local law enforcement.

Laboratory criteria for diagnosis:

*Presumptive*
- Elevated serum antibody titer(s) to *Francisella tularensis* antigen (without documented fourfold or greater change) in a patient with no history of tularemia vaccination, OR
- Detection of *F. tularensis* in a clinical specimen by fluorescent assay

*Confirmatory*
- Isolation of *F. tularensis* in a clinical specimen, OR
- Fourfold or greater change in serum antibody titer to *F. tularensis* antigen

**Determine the Extent of Illness**
- Determine if cluster exists depending on suspected exposure source. Consider the potential for an intentional inhalational release based on the number of cases reported, the location, and the lack of reported animal exposure.
- If a specific animal exposure was reported, interview others who may have been in contact with the animal. For example, if an animal carcass was shared with others, or an animal subsequently died and was taken to a veterinary clinic, etc., interview/notify those persons of the potential exposure. There is no routine antimicrobial prophylaxis, but consult with CDC SME for unusual situations.

**Laboratory Specimens**

*Notify Lab prior to submission; specimens require Select Agent biosafety precautions.*
- ASPHL can work with: isolate, swab of affected area, aspirates (e.g., lymph node), tissue biopsy, bronchial/tracheal wash, pleural fluid, sputum, blood, serum, autopsy specimens; animal samples from necropsy (e.g., abscess, sections of lymph nodes, liver, spleen, bone marrow); vector samples e.g., (e.g., mosquitoes, ticks, flies); environmental samples (e.g., water, soil, air, grass, food, other); and evidentiary materials (e.g., dried desiccated organics - hair, wood liquids; nonorganics - powders, paper, containers).
- ASPHL will perform LRN testing on all specimens, and titer quantification on sera. PCR positive results would be presumptive not confirmatory.
- Laboratory personnel should be alerted when tularemia is suspected. Diagnostic procedures with clinical materials can be performed in biosafety level 3 conditions. All
work with suspect cultures of *F. tularensis* must be done in a biological safety cabinet. Manipulation of cultures and other procedures that might produce aerosols or droplets (e.g., catalase assay, Gram stain smear, transfers for subculture, etc.) should be conducted under a biosafety cabinet with biosafety level 3 precautions.

- NOTE that testing at commercial labs may not be a quantitative assay (as for a true titer). Interpret results in light of the clinical picture and consider recommending additional confirmatory testing, i.e., culture or demonstration of 4-fold increase in titer.
- In limited circumstances, ASPHL will test animal specimens. Consult with ASPHL on a case-by-case basis.

**Contact and Control Measures**

- Ensure that if isolate/culture was processed at a hospital lab, there is appropriate follow-up to ensure that correct PPE was used. More information on post-exposure monitoring and prophylaxis for laboratory personnel/settings is available at: [http://www.cdc.gov/tularemia/laboratoryexposure/](http://www.cdc.gov/tularemia/laboratoryexposure/)
- Bodies of patients who die of tularemia should be handled using standard precautions. Autopsy procedures likely to produce aerosols or droplets should be avoided.
- Consider working with Alaska Department of Fish and Game (ADFG) and Department of Environmental Conservation’s Office of the State Veterinarian (OSV) to put out a press release to alert the public and veterinarians about increased activity among wildlife and potential infection of domestic pets. ADFG contact is Dr. Kimberlee Beckmen: dfg.dwc.vet@alaska.gov or 907-328-8354. OSV phone contacts are: Bob Gerlach 375-8214; Jay Fuller 375-8213 (main 907-375-8200).
- CDC SME for tularemia are located in Fort Collins: Bacterial Diseases Branch, CDC 3150 Rampart Road Ft Collins, Colorado 970-221-6400
- Consider the potential of a bioterrorist attack; involve appropriate personnel accordingly. CDC’S EOC phone # is 770-488-7100.

**Hospital Considerations**

- Isolation is not recommended for tularemia patients, given the lack of person-to-person transmission. In hospitals, standard precautions are recommended.
- Clothing or linens contaminated with body fluids of patients with tularemia should be disinfected per standard hospital procedure.
- Direct transmission from another person has not been reported.

**Reporting Requirements**

- FTR: write up cluster investigations
- AK STARS: enter all *confirmed* and *probable* cases.
- CDC Case Definition is used to define *confirmed* and *probable* cases; see above.
Fax a tularemia case report form to CDC:
http://www.cdc.gov/tularemia/resources/TularemiaCaseReportForm.pdf

Alaska Wildlife Disease Resource
ADFG Division of Wildlife Conservation information on tularemia in animals:

Hospital Resources:
• Centers for Disease Control and Prevention (CDC) tularemia website:
  http://www.cdc.gov/Tularemia/
• Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control
  Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing
  Transmission of Infectious Agents in Healthcare Settings. Available at

Other References:
• CDC. Tularemia FAQs; available at: http://www.cdc.gov/tularemia/faq/index.html
• Section of Epidemiology Bulletin. Two Cases of Tularemia – Interior Alaska, June 2009.
Tularemia (Francisella tularensis)

1999 Case Definition

Clinical Description
An illness characterized by several distinct forms, including the following:
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Exposure
Clinical diagnosis is supported by evidence or history of a tick or deerfly bite, exposure to tissues of a mammalian host of F. tularensis, or exposure to potentially contaminated water.

Case Classification

Probable
A clinically compatible case with laboratory results indicative of presumptive infection

Confirmed
A clinically compatible case with confirmatory laboratory results