



Infectious Disease Epidemiology Section
Office of Public Health, Louisiana Dept of Health & Hospitals
(504) 219-4563 or 800-256-2748 (after-hours emergency)
www.infectiousdisease.dhh.louisiana.gov

Tularemia

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Francisella tularensis, the causative agent of tularemia, is a small, aerobic non-motile, gram-negative cocco-bacillus. Tularemia (also known as rabbit fever and deer fly fever) is a zoonotic disease that humans typically acquire after skin or mucous membrane contact with tissues or body fluids of infected animals, or from bites of infected ticks, deerflies, or mosquitoes. Less commonly, inhalation of contaminated dusts or ingestion of contaminated foods or water may produce clinical disease. Respiratory exposure by aerosol would typically cause typhoidal or pneumonic tularemia. *F. tularensis* can remain viable for weeks in water, soil, carcasses, hides, and for years in frozen rabbit meat. It is resistant for months to temperatures of freezing and below. It is easily killed by heat and disinfectants.

Epidemiology

Reservoir: *F. tularensis* is capable of infecting hundreds of different vertebrates and invertebrates, but no more than a dozen mammalian species are important to its ecology in any geographic region. These include lagomorphs, particularly *Sylvilagus* and *Lepus* spp., and rodents such as voles, squirrels, muskrat, and beaver in North America; included in the former Soviet Union are voles, hamsters, mice, and hares.

Transmission: Transmission of *F. tularensis* to humans occurs most often through the bite of an insect or contact with contaminated animal products. Other routes of transmission include aerosol droplets, contact with contaminated water or mud, and animal bites. Illness may occur in families or friends because of shared activities and exposures. Nonetheless, human-to-human spread does not occur.

Bloodfeeding arthropods and flies are the most important vectors for tularemia in the United States. Ticks predominate in the central and Rocky Mountain states, whereas biting flies predominate in California, Nevada, and Utah. In contrast, mosquitoes are the most frequent insect vector in Sweden and Finland, and they also are important in the former Soviet Union. At least 13 species of ticks have been found to be naturally infected with *F. tularensis*, and transovarial passage may occur. The dog tick (*Dermacentor variabilis*), wood tick (*D. andersoni*), and Lone Star tick (*Amblyomma americanum*) are commonly involved in North America. The organism may be present in tick saliva or feces and may be inoculated either directly or indirectly into the bite wound. Several outbreaks of tickborne tularemia have involved *F. tularensis* biogroup *palaearctica* (type B), although this organism is more often linked to water, rodents, and aquatic animals; tick transmission traditionally has been associated with biogroup *tularensis* (type A).

Tularemia in children in endemic areas of the United States is now most often associated with tick exposure in the summer.

Animal contact is another important mode of acquiring tularemia. Skinning, dressing, and eating infected animals, including rabbits, muskrats, beavers, squirrels, and birds, have transmitted tularemia, occasionally resulting in large outbreaks in hunters. For example, hamster hunting was responsible for an epidemic in Eastern Europe.

Airborne transmission has occurred during these activities, as well as from contact with water, contaminated dust, and hay. Carnivorous animals may transiently carry *F. tularensis* in the mouth or on claws after killing or feeding on infected prey, whether or not they become infected. This is thought to be the mechanism by which domestic cats occasionally transmit tularemia. *F. tularensis* may survive for prolonged periods in water, mud, and animal carcasses even if frozen; however, cooking game meats thoroughly to the proper temperatures should minimize risk from ingestion. Contaminated water continues to be an important environmental source of tularemia.

Clinical Description

Tularemia is 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

Clinical diagnosis is supported by evidence or history of a tick or deerfly bite, exposure to tissues of a mammalian host of *Francisella tularensis*, or exposure to potentially contaminated water.

Signs and Symptoms: Ulceroglandular tularemia presents with a local ulcer and regional lymphadenopathy, fever, chills, headache and malaise. Typhoidal tularemia presents with fever, headache, malaise, substernal discomfort, prostration, weight loss and a non-productive cough.

After an incubation period varying from 1-21 days (average 3-5 days), presumably dependent upon the dose of organisms, onset is usually acute. Tularemia typically appears in one of six forms in man depending upon the route of inoculation: typhoidal, ulceroglandular, glandular, oculoglandular, oropharyngeal, and pneumonic tularemia. In humans, as few as 10 to 50 organisms will cause disease if inhaled or injected intradermally, whereas approximately 10^8 organisms are required with oral challenge.

Typhoidal tularemia (5-15 percent of naturally acquired cases) occurs mainly after inhalation of infectious aerosols, but can occur after intradermal or gastrointestinal challenge. *F. tularensis* would presumably be most likely delivered by aerosol in a BW attack and would primarily cause typhoidal tularemia. It manifests as fever, prostration, and weight loss, but unlike most other forms of the disease, presents without lymphadenopathy. Pneumonia may be severe and fulminant and can be associated with any form of tularemia (30% of ulceroglandular cases), but it is most common in typhoidal tularemia (80% of cases). Respiratory symptoms, substernal

discomfort, and a cough (productive and non-productive) may also be present. Case fatality rates following a BW attack may be greater than the 1-3 % seen with appropriately treated natural disease. Case fatality rates are about 35% in untreated naturally acquired typhoidal cases.

Ulceroglandular tularemia (75-85 percent of cases) is most often acquired through inoculation of the skin or mucous membranes with blood or tissue fluids of infected animals. It is characterized by fever, chills, headache, malaise, an ulcerated skin lesion, and painful regional lymphadenopathy. The skin lesion is usually located on the fingers or hand where contact occurs.

Glandular tularemia (5-10 percent of cases) results in fever and tender lymphadenopathy but no skin ulcer.

Oculoglandular tularemia (1-2 percent of cases) occurs after inoculation of the conjunctivae by contaminated hands, splattering of infected tissue fluids, or by aerosols. Patients have unilateral, painful, purulent conjunctivitis with preauricular or cervical lymphadenopathy. Chemosis, periorbital edema, and small nodular lesions or ulcerations of the palpebral conjunctiva are noted in some patients.

Oropharyngeal tularemia refers to primary ulceroglandular disease confined to the throat. It produces an acute exudative or membranous pharyngotonsillitis with cervical lymphadenopathy.

Pneumonic tularemia is a severe atypical pneumonia that may be fulminant and with a high case fatality rate if untreated. It can be primary following inhalation of organisms or secondary following hematogenous / septicemic spread. It is seen in 30-80 percent of the typhoidal cases and in 10-15 percent of the ulceroglandular cases.

The case fatality rate without treatment is approximately 5 percent for the ulceroglandular form and 35 percent for the typhoidal form. All ages are susceptible, and recovery is generally followed by permanent immunity.

Diagnosis: Clinical diagnosis. Physical findings are usually non-specific. Chest x-ray may reveal a pneumonic process, mediastinal lymphadenopathy or pleural effusion. Routine culture is possible but difficult. The diagnosis can be established retrospectively by serology.

A clue to the diagnosis of tularemia subsequent to a BW attack with *F. tularensis* might be a large number of temporally clustered patients presenting with similar systemic illnesses and a non-productive pneumonia.

The clinical presentation of tularemia may be severe, yet non-specific. Differential diagnoses include typhoidal syndromes (e.g., salmonella, rickettsia, malaria) or pneumonic processes (e.g., plague, mycoplasma, SEB).

Radiologic evidence of pneumonia or mediastinal lymphadenopathy is most common with typhoidal disease. In general, chest radiographs show that approximately 50% of patients have pneumonia, and fewer than 1% have hilar adenopathy without parenchymal involvement. Pleural effusions are seen in 15% of patients with pneumonia. Interstitial patterns, cavitory lesions, bronchopleural fistulae, and calcifications have been reported in patients with tularemia pneumonia.

Laboratory

Laboratory diagnosis. Initial laboratory evaluations are generally nonspecific. Peripheral white blood cell count usually ranges from 5,000 to 22,000 cells per microliter. Differential blood cell counts are normal, with occasional lymphocytosis late in the disease. Hematocrit, hemoglobin, and platelet levels are usually normal. Mild elevations in lactic dehydrogenase, serum transaminases, and alkaline phosphatase are common. Rhabdomyolysis may be associated with elevations in serum creatine kinase and urinary myoglobin levels. Cerebrospinal fluid is usually normal, although mild abnormalities in protein, glucose, and blood cell count have been reported.

Tularemia can be diagnosed by recovery of the organism in culture from blood, ulcers, conjunctival exudates, sputum, gastric washings, and pharyngeal exudates. Recovery may even be possible after the institution of appropriate antibiotic therapy. The organism grows poorly on standard media but produces small, smooth, opaque colonies after 24 to 48 hours on media containing cysteine or other sulfhydryl compounds (e.g., glucose cysteine blood agar, thioglycollate broth). Isolation represents a clear hazard to laboratory personnel and culture should only be attempted in BSL-3 containment.

Most diagnoses of tularemia are made serologically using bacterial agglutination or enzyme-linked immunosorbent assay (ELISA). Antibodies to *F. tularensis* appear within the first week of infection but levels adequate to allow confidence in the specificity of the serologic diagnosis (titer > 1:160) do not appear until more than 2 weeks after infection. Because cross-reactions can occur with *Brucella* spp., *Proteus* OX19, and *Yersinia* organisms and because antibodies may persist for years after infection, diagnosis should be made only if a 4-fold or greater increase in the tularemia tube agglutination or microagglutination titer is seen during the course of the illness. Titers are usually negative the first week of infection, positive the second week in 50-70 percent of cases and reach a maximum in 4-8 weeks.

Treatment

Treatment: Administration of antibiotics (streptomycin or gentamicin) with early treatment is very effective.

Since there is no known human-to-human transmission, neither isolation nor quarantine are required, since Standard Precautions are appropriate for care of patients with draining lesions or pneumonia. Strict adherence to the drainage/secretion recommendations of Standard Precautions is required, especially for draining lesions, and for the disinfection of soiled clothing, bedding, equipment, etc. Heat and disinfectants easily inactivate the organism.

Appropriate therapy includes one of the following antibiotics:

- Gentamicin 3 - 5 mg/kg IV daily for 10 to 14 days
- Ciprofloxacin 400 mg IV every 12 hours, switch to oral ciprofloxacin (500 mg every 12 hours) after the patient is clinically improved; continue for completion of a 10- to 14-day course of therapy
- Ciprofloxacin 750 mg orally every 12 hours for 10 to 14 days
- Streptomycin 7.5 - 10 mg/kg IM every 12 hours for 10 to 14 days

Streptomycin has historically been the drug of choice for tularemia; however, since it may not be readily available immediately after a large-scale BW attack, gentamicin and other alternative

drugs should be considered first. Requests for streptomycin should be directed to the Roerig Streptomycin Program at Pfizer Pharmaceuticals in New York (800-254-4445). Another concern is that a fully virulent streptomycin-resistant strain of *F. tularensis* was developed during the 1950s and it is presumed that other countries have obtained it. The strain was sensitive to gentamicin. Gentamicin offers the advantage of providing broader coverage for gram-negative bacteria and may be useful when the diagnosis of tularemia is considered but in doubt.

In a recent study of treatment in 12 children with ulceroglandular tularemia, ciprofloxacin was satisfactory for outpatient treatment (*Pediatric Infectious Disease Journal*, 2000; 19:449-453). Tetracycline and chloramphenicol are also effective antibiotics; however, they are associated with significant relapse rates.

Case Definition

Probable: a clinically compatible case with laboratory results indicative of presumptive infection

Confirmed: a clinically compatible case with confirmatory laboratory results

Prophylaxis

Prophylaxis: A live, attenuated vaccine is available as an investigational new drug. It is administered once by scarification. A two week course of tetracycline is effective as prophylaxis when given after exposure.

Vaccine: An investigational live-attenuated vaccine (Live Vaccine Strain - LVS), which is administered by scarification, has been given to >5,000 persons without significant adverse reactions and prevents typhoidal and ameliorates ulceroglandular forms of laboratory-acquired tularemia. Aerosol challenge tests in laboratory animals and human volunteers have demonstrated significant protection. As with all vaccines, the degree of protection depends upon the magnitude of the challenge dose. Vaccine-induced protection could be overwhelmed by extremely high doses of the tularemia bacteria.

Immunoprophylaxis. There is no passive immunoprophylaxis (i.e., immune globulin) available for pre- or post-exposure management of tularemia.

Pre-exposure prophylaxis: Chemoprophylaxis given for anthrax or plague (ciprofloxacin, doxycycline) may confer protection against tularemia, based on in vitro susceptibilities.

Post-exposure prophylaxis. A 2-week course of antibiotics is effective as post-exposure prophylaxis when given within 24 hours of aerosol exposure from a BW attack, using one of the following regimens:

- Ciprofloxacin 500 mg orally every 12 hours for 2 weeks
- Doxycycline 100 mg orally every 12 hours for 2 weeks
- Tetracycline 500 mg orally every 6 hours for 2 weeks

Isolation and Decontamination: Standard Precautions for healthcare workers. Organisms are relatively easy to render harmless by mild heat (55 degrees Celsius for 10 minutes) and standard disinfectants.

Infectious Disease Epidemiology: Epidemiologic Response Checklist

Consultation/ Confirmation

- Discuss bioterrorism event definitions with key public health personnel (health officer, communicable disease control staff, laboratorians, etc.)

Laboratory Confirmation

- Identify point of contact (POC) at appropriate state public health laboratory in a potential bioterrorist event

Notification

- Establish local notification network to be activated in case of a possible bioterrorist event; disseminate contact information and notification protocol
- Establish relationships with local Office of Emergency Preparedness and FBI contacts to be notified in a suspected bioterrorist event and maintain up-to-date contact information

Coordination

- Establish Epidemiologic Response as a part of local Incident Command System
- Identify personnel available for epidemiologic investigation and perform inventory of skills and duties
- Establish contacts at regional and Parrish health units identify potential personnel resources available for epidemiologic “mutual aid”
- Establish contacts at the local FBI office for coordination with epidemiologic/ criminal Investigation

Communication

- Identify epidemiologic investigation spokesperson and Public Information Officer (PIO)
- Establish communication protocol to be implemented during an epidemiologic investigation between PIO and epidemiologic investigation spokesperson
- Establish a plan for rapid dissemination of information to key individuals: FAX, Email, website on the internet (if capability exists)

Epidemiologic Investigation

A. Case Finding

- Establish plans/ capacity to receive a large number of incoming telephone calls
- Develop telephone intake form
- Identify individuals available to perform telephone intake duties
- Identify potential reporting sources (persons/ facilities) to receive case definition
- Establish a plan for rapid dissemination of case definition to potential reporting sources

B. Case Interviews

- Obtain appropriate case investigation questionnaires
- Identify personnel available to conduct case interviews
- Establish a protocol for training case interviewers
- Obtain template outbreak disease-specific investigation questionnaires

C. Data Analysis

- Obtain template database for data entry
- Assure Epi Info software is installed on data entry computers
- Identify personnel available for data entry
- Identify personnel with skills to perform descriptive and analytic epidemiologic analysis
- Develop/ obtain data analysis plan
- Develop/ obtain outbreak investigation monitoring tool

Contact Tracing

- Establish a system for locating contacts and familiarize personnel with contact tracing protocol(s)
- Obtain Contact Tracing Forms
- Obtain contact management algorithms for diseases that are communicable from person-to-person
- Obtain treatment/ prophylaxis guidelines
- Develop local drug and vaccine distribution plan
- Establish a system for daily monitoring of all contacts under surveillance

Public Health Recommendations

- Obtain treatment and prophylaxis recommendations for bioterrorist threat agents
- Develop or obtain bioterrorist disease-specific fact sheets
- Establish contact with key health care providers/ facilities and establish protocol for rapid dissemination of recommendations regarding treatment, prophylaxis, personal protective equipment, infection control, and isolation/ quarantine

Consultation / Confirmation

- Disease scenario meets the bioterrorist event definition

Laboratory Confirmation

- Lab specimens are en route to the local public health laboratory/ Laboratory Response Network

Notification

- Department of Health and Human Services
State Medical Officer
(225)342-3417 (regular business hours)
(800)990-5366 pin 6710 (pager for evenings, weekends, holidays)
- State Epidemiologist (504)458-5428 Mobile
- Public Health Lab (504)568-5371
- Public Health Lab Pager (800)538-5388
- OPH Regional Offices (Internal Notification Network)
- Louisiana EOC (225)-925-7500
- Louisiana State Police (800)469-4828 (Crisis Management Center)
- Louisiana Department of Agriculture- Office of Animal Health
State Veterinarian Office: (225)935-2168 Mobile: (225)933-8121

Coordination

- Epidemiology personnel identified for investigation
- Additional epidemiology personnel support requested (From other regions) Investigation activities coordinated with FBI

Communication

- Epidemiology investigation spokesperson identified
- Communication protocol established between epidemiologic investigation spokesperson and Public Information Officer (PIO)

Epidemiologic Investigation

- Hypothesis-generating interviews conducted
- Preliminary epidemiologic curve generated
- Case definition established

A. Case finding

- Telephone hotline established
- Telephone intake form distributed
- Case definition disseminated to potential reporting sources
 - Hospitals
 - Physicians
 - Laboratories
 - EMS
 - Coroner
 - Media

B. Case interviews

- Interviewers trained
- Uniform multi-jurisdictional outbreak investigation form(s) obtained

C. Data Analysis

- Uniform multi-jurisdictional database template for data entry obtained
- Epidemiologic curve generated
- Cases line-listed
- Case descriptive epidemiology completed
 - Age, gender, race
 - Illness onset
 - Clinical profile
 - % Laboratory confirmed
 - Hospitalization rate
 - Case fatality rate
 - Case geographic distribution mapped (GIS mapping if available)
 - Analytic epidemiology completed
 - Disease risk factors identified
 - Mode of transmission identified
 - Source of transmission identified
 - Population at continued risk identified

Contact Tracing

- Contact tracing forms distributed
- Health education materials available
- Contact management triage algorithm reviewed with staff
- Treatment/ prophylaxis guidelines available
- Treatment/ prophylaxis distribution plan in place
- System in place for locating contacts
- Tracking system in place to monitor contacts' trends/ gaps

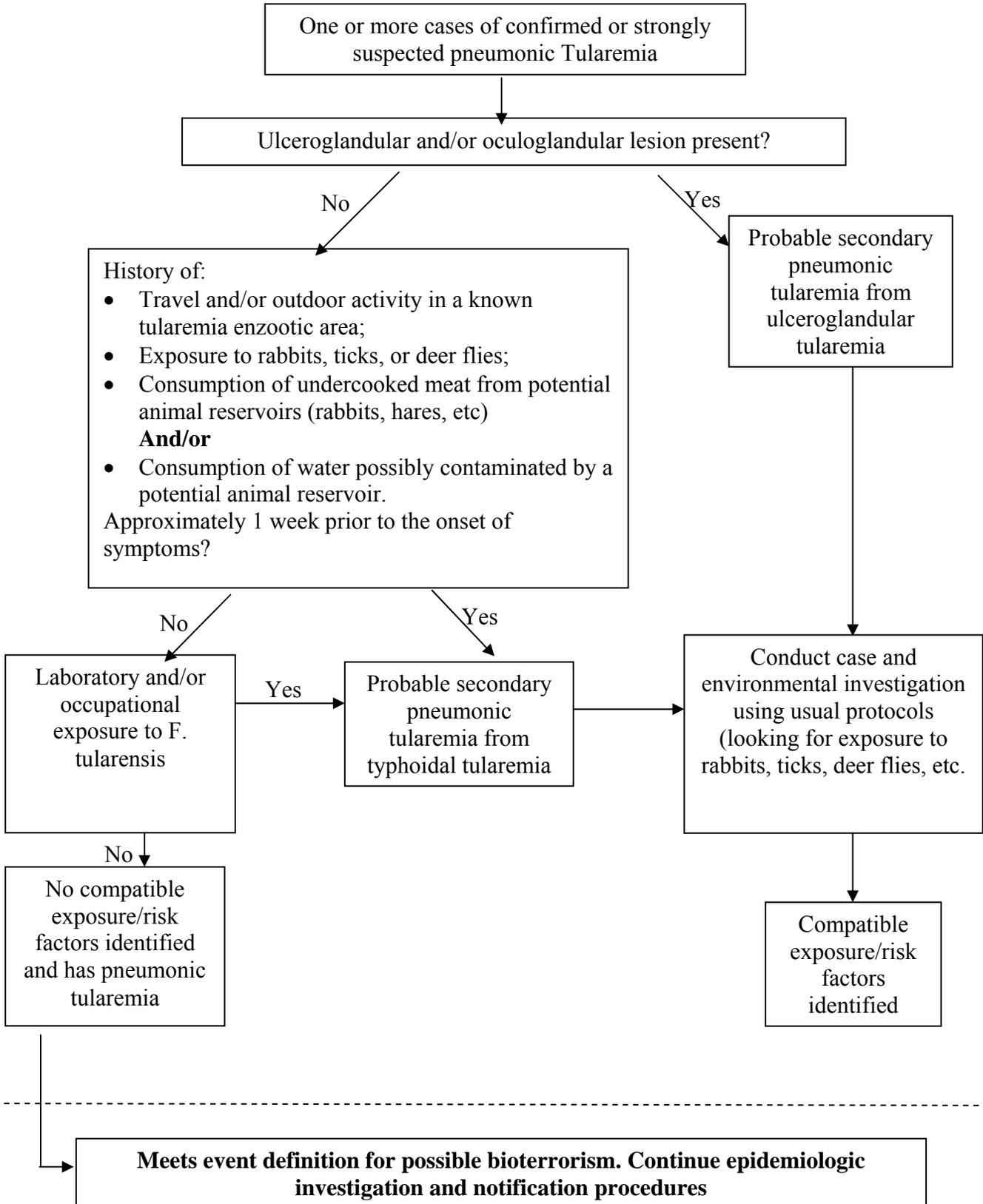
Laboratory

- Establish point of contact (POC) at appropriate Level A and/ or Level B public health laboratory to refer queries regarding specimen packaging, storage and shipping guidelines in a potential bioterrorist event [See Laboratory Section's Bioterrorism Plan]

Public Health Recommendations

- See Medical Response Section Bioterrorism Plan

Tularemia Investigation Algorithm



TULAREMIA

Case investigation form

ID NUMBER: _____

INTERVIEWER: _____ JOB TITLE: _____

DATE OF INTERVIEW: ____/____/____

PERSON INTERVIEWED: Patient Other

IF OTHER, NAME OF PERSON _____

TELEPHONE _____ - _____ - _____

DESCRIBE RELATIONSHIP _____

DEMOGRAPHIC INFORMATION

LAST NAME: _____ FIRST NAME: _____

DRIVER LICENCE OR SOCIAL SECURITY NUMBER (Circle one): _____

SEX: Male Female DATE OF BIRTH: ____/____/____ AGE ____

RACE: White Black Asian Other, specify _____ Unknown

ETHNICITY: Hispanic Non-Hispanic Unknown

HOME PHONE: () _____ - _____ WORK/OTHER PHONE: () _____ - _____

HOME ADDRESS STREET: _____

CITY: _____ STATE: _____ ZIP: _____

EMPLOYED: Yes No Unknown

BRIEF DESCRIPTION OF JOB: _____

SCHOOL/PLACE OF EMPLOYMENT: _____

DEPARTMENT _____ FLOOR: _____ ROOM: _____

WORK/SCHOOL ADDRESS: STREET: _____ CITY: _____

STATE: _____ ZIP: _____

ARE YOU A:

- LAB WORKER/TECHNICIAN: Yes No Unknown
- TAXIDERMIST: Yes No Unknown
- VETERINARIAN: Yes No Unknown
- FARMER: Yes No Unknown
- ABATTOIR: Yes No Unknown
- BUTCHER: Yes No Unknown
- OTHER FOOD PREPERATION: Yes No Unknown

HOBBY:

- Do you work with fibers/wool/animal skin/or other animal product? Yes No Unknown
- Have you been camping in past two months? Yes No Unknown
- Have you stayed in cabins in the past two months? Yes No Unknown
- Have you been hunting? Yes No Unknown
- Have you skinned or dressed and animal? Yes No Unknown
- Have you had an animal stuffed or mounted? Yes No Unknown

HOW MANY PEOPLE RESIDE IN THE SAME HOUSEHOLD? _____

LIST NAME(S), AGE(S), AND RELATIONSHIPS (use additional pages if necessary):

	PERSON 1	PERSON 2	PERSON 3	PERSON 4	PERSON 5	PERSON 6
Name						
Age						
Relationship						

HOUSEHOLD PETS:

Does your household have any pets (indoor or outdoor)? Yes No Unknown

If so what type of pet: _____

Have any of the pets been ill or died recently? Yes No Unknown

If so describe: _____

CLINICAL INFORMATION (as documented in admission history of medical record or from case/proxy interview)

CHIEF COMPLAINT: _____

DATE OF ILLNESS ONSET: ____/____/____

Briefly summarize History of Present Illness:

SIGNS AND SYMPTOMS

- Cough Yes No Unknown
- If yes, sputm production Yes No Unknown
- If yes, any blood Yes No Unknown

- Chest Pain Yes No Unknown
- Shortness of breath Yes No Unknown
- Stridor or wheezing Yes No Unknown
- Cyanosis Yes No Unknown
- Conjunctivitis Yes No Unknown
- Tender or enlarged lymph nodes Yes No Unknown
- Fever Yes No Unknown

If yes, Maximum temperature _____ oF
Antipyretics taken Yes No Unknown

- Headache Yes No Unknown
- Stiff neck Yes No Unknown
- Muscle aches Yes No Unknown
- Fatigue Yes No Unknown
- Joint pains Yes No Unknown
- Altered mental status Yes No Unknown
- Unconscious/unresponsive Yes No Unknown
- Sore throat Yes No Unknown
- Nausea Yes No Unknown
- Diarrhea Yes No Unknown
- Vomiting Yes No Unknown
- Rash Yes No Unknown

If yes, describe: _____

Other Symptom or abnormality: _____

PAST MEDICAL HISTORY:

Do you have a regular physician? Yes No Unknown
If yes, Name: _____ Phone Number: (_____) _____ - _____

Are you allergic to any medications? Yes No Unknown
If yes, list: _____

Are you currently taking any medication: Yes No Unknown
If yes, list: _____

Have you had any wound or lesion in the past several months?
 Yes No Unknown
If yes, where: _____ Appearance: _____

Hypertension Yes No Unknown
Neurologic Condition Yes No Unknown
Diabetes Yes No Unknown
Cardiac disease Yes No Unknown
Seizures Yes No Unknown

Other Pulmonary Disease Yes No Unknown

If yes, describe: _____

Malignancy Yes No Unknown

If yes, specify type: _____

Currently on treatment: Yes No Unknown

HIV infection Yes No Unknown

Currently pregnant Yes No Unknown

Other immunocompromising condition (e.g., renal failure, cirrhosis, chronic steroid use)

Yes No Unknown

If yes, specify disease or drug therapy: _____

Other underlying condition(s):

Prescription medications:

SOCIAL HISTORY:

Current alcohol abuse: Yes No Unknown

Past alcohol abuse: Yes No Unknown

Current injection drug use: Yes No Unknown

Past injection drug use: Yes No Unknown

Current smoker: Yes No Unknown

Former smoker: Yes No Unknown

Other illicit drug use: Yes No Unknown

If yes, specify: _____

HOSPITAL INFORMATION:

HOSPITALIZED: Yes No

NAME OF HOSPITAL: _____

DATE OF ADMISSION: ___/___/___ DATE OF DISCHARGE ___/___/___

ATTENDING PHYSICIAN:

LAST NAME: _____ FIRST NAME: _____

Office Telephone: () ___ - ___ Pager: () ___ - ___ Fax: () ___ - ___

MEDICAL RECORD ABSTRACTION :

MEDICAL RECORD NUMBER: _____

WARD/ROOM NUMBER: _____

ADMISSION DIAGNOSIS(ES): 1) _____
2) _____
3) _____

PHYSICAL EXAM:

Admission Vital Signs:

Temp: ___ (Oral / Rectal F / C) Heart Rate: ___ Resp. Rate: ___ B/P: ___/___

Mental Status: Normal Abnormal Not Noted

If abnormal, describe: _____

Respiratory status: Normal spontaneous Respiratory distress Ventilatory support

If abnormal, check all that apply:

Rales Stridor/wheezin Decreased or absent

Other (specify: _____)

Skin: Normal Abnormal Not Noted

If abnormal, check all that apply:

Edema Chest wall edema Cyanosis Erythema

Petechiae Sloughing/necrosis Purpura Rash

If rash present, describe type and location on body : _____

DIAGNOSTIC STUDIES:

Test	Results of tests done on Admission (___/___/___)	Abnormal test result at any time (specify date mm/dd/yyyy)
Hemoglobin (Hb)		(___/___/___)
Hematocrit (HCT)		(___/___/___)
Platelet (plt)		(___/___/___)
Total white blood cell (WBC)		(___/___/___)
WBC differential:		(___/___/___)
% granulocytes (PMNs)		(___/___/___)
% bands		(___/___/___)
% lymphocytes		(___/___/___)
Renal function: BUN/Cr		(___/___/___)
Liver enzymes: ALT/AST		(___/___/___)
Blood cultures:	<input type="checkbox"/> positive (specify _____) <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done (___/___/___)	<input type="checkbox"/> positive (specify _____) <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done (___/___/___)

Test	Results of tests done on Admission (___/___/___)	Abnormal test result at any time (specify date mm/dd/yy)
Respiratory secretions:	<input type="checkbox"/> expectorated sputum <input type="checkbox"/> induced sputum <input type="checkbox"/> bronchial alveolar lavage (BAL)	<input type="checkbox"/> expectorated sputum <input type="checkbox"/> induced sputum <input type="checkbox"/> bronchial alveolar lavage (BAL)
Specimen Type:	<input type="checkbox"/> tracheal aspirate	<input type="checkbox"/> tracheal aspirate (___/___/___)
Respiratory secretions:	<input type="checkbox"/> PMNs <input type="checkbox"/> epithelial cells	<input type="checkbox"/> PMNs <input type="checkbox"/> epithelial cells
Gram Stain (Check all that apply)	<input type="checkbox"/> gram positive cocci <input type="checkbox"/> gram negative cocci <input type="checkbox"/> gram positive rods <input type="checkbox"/> gram negative coccobacilli <input type="checkbox"/> gram negative rods <input type="checkbox"/> gram negative rods with bipolar staining (safety pins) <input type="checkbox"/> other _____	<input type="checkbox"/> gram positive cocci <input type="checkbox"/> gram negative cocci <input type="checkbox"/> gram positive rods <input type="checkbox"/> gram negative coccobacilli <input type="checkbox"/> gram negative rods <input type="checkbox"/> gram negative rods with bipolar staining (safety pins) <input type="checkbox"/> other _____ (___/___/___)
Respiratory secretions analysis: Bacterial culture	<input type="checkbox"/> positive (specify _____) <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done	<input type="checkbox"/> positive (specify _____) <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done (___/___/___)
Respiratory secretions analysis: Viral culture	<input type="checkbox"/> positive (specify _____) <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done	<input type="checkbox"/> positive (specify _____) <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done (___/___/___)
Respiratory secretions analysis: Influenza antigen	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done (___/___/___)
Respiratory secretions: Other test (e.g., DFA, PCR, etc)		(___/___/___)
Chest radiograph	<input type="checkbox"/> normal <input type="checkbox"/> unilateral, lobar/consolidation <input type="checkbox"/> bilateral, lobar/consolidation <input type="checkbox"/> interstitial infiltrates <input type="checkbox"/> widened mediastinum <input type="checkbox"/> pleural effusion <input type="checkbox"/> other _____	<input type="checkbox"/> normal <input type="checkbox"/> unilateral, lobar/consolidation <input type="checkbox"/> bilateral, lobar/consolidation <input type="checkbox"/> interstitial infiltrates <input type="checkbox"/> widened mediastinum <input type="checkbox"/> pleural effusion <input type="checkbox"/> other _____ (___/___/___)
Legionella urine antigen	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> pending <input type="checkbox"/> not done (___/___/___)

Test	Results of tests done on Admission (___/___/___)	Abnormal test result at any time (specify date mm/dd/yy)
Other pertinent study results (e.g., chest CT, pleural fluid)		(___/___/___)
Other pertinent study results (e.g., toxin assays)		(___/___/___)

PULMONOLOGY CONSULTED: Yes No Unknown

Date of Exam: ___/___/___

Name of neurologist: Last Name _____ First Name _____

Telephone or beeper number () _____ - _____

INFECTIOUS DISEASE CONSULT: Yes No Unknown

Date of Exam: ___/___/___

Name of ID physician: Last Name _____ First Name _____

Telephone or beeper number () _____ - _____

HOSPITAL COURSE:

A. antibiotics: Yes No Unknown

If yes, check all that apply:

- | | |
|--|---|
| <input type="checkbox"/> Amoxicillin | <input type="checkbox"/> Cefuroxime (Ceftin) |
| <input type="checkbox"/> Ampicillin | <input type="checkbox"/> Cefalexin (Keflex, Keftab) |
| <input type="checkbox"/> Ampicillin and sulbactam (Unasyn) | <input type="checkbox"/> Ciprofloxacin (Cipro) |
| <input type="checkbox"/> Augmentin (amoxicillin and clavulanate) | <input type="checkbox"/> Clarithromycin (Biaxin) |
| <input type="checkbox"/> Azithromycin (Zithromax) | <input type="checkbox"/> Doxycycline (Doryx, Vibramycin) |
| <input type="checkbox"/> Cefazolin (Ancef, Kefzol) | <input type="checkbox"/> Erythromycin (E-Mycin, Ery-Tab, Eryc) |
| <input type="checkbox"/> Cefepime (Maxipime) | <input type="checkbox"/> Gentamicin (Garamycin) |
| <input type="checkbox"/> Cefixime (Suprax) | <input type="checkbox"/> Levofloxacin (Levaquin) |
| <input type="checkbox"/> Cefotentan (Cefotan) | <input type="checkbox"/> Nafcillin |
| <input type="checkbox"/> Cefotaxime (Claforan) | <input type="checkbox"/> Ofloxacin (Floxin) |
| <input type="checkbox"/> Cefoxitin (Mefoxin) | <input type="checkbox"/> Streptomycin |
| <input type="checkbox"/> Ceftazidime (Fortaz, Tazicef, Tazidime) | <input type="checkbox"/> Ticarcillin and clavulanate (timentin) |
| <input type="checkbox"/> Ceftizoxime (Cefizox) | <input type="checkbox"/> Trimethoprim-sulfamethoxazole (Bactrim, Cotrim, TMP/SMX) |
| <input type="checkbox"/> Ceftriaxone (Rocephin) | <input type="checkbox"/> Vancomycin (Vancocin) |
| <input type="checkbox"/> other _____ | |

B. antivirals : Yes No Unknown

If yes, check all that apply:

- Acyclovir (Zovirax)
- Amantadine (Symmetrel)
- Oseltamivir (Tamiflu)
- Rimantidine (Flumadine)
- Zanamivir (Relenza)
- other _____

C. Did patient require intensive care: Yes No Unknown

If patient was admitted to Intensive Care Unit:

a. Length of stay in ICU, in days: _____

b . Was patient on mechanical ventilation: Yes No Unknown

WORKING OR DISCHARGE DIAGNOSIS(ES) :

1) _____

2) _____

3) _____

OUTCOME:

- Recovered/discharged
- Died
- Still in hospital: improving ? worsening ?

Risk Exposure Questions

The following questions pertain to the 2 week period prior to the onset of your illness/symptoms:

Occupation (provide information for all jobs/ volunteer duties)

1. Please briefly describe your job/ volunteer duties: _____

2. Does your job involve contact with the public? : Yes No

If "Yes", specify _____

3. Does anyone else at your workplace have similar symptoms?

Yes No Unknown

If "Yes", name and approximate date on onset (if known) _____

Knowledge of Other Ill Persons

4. Do you know of other people with similar symptoms? : Yes No Unknown
(If Yes, please complete the following questions)

Name of ill Person	AGE	Sex	Address	Phone	Date of Onset	Relation To you	Did they seek Medical care? Where	Diagnosis
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Travel*

*Travel is defined as staying overnight (or longer) at somewhere other than the usual residence

8. Have you traveled anywhere in the last two weeks? : Yes No Unknown

Dates of Travel: ____/____/____ to ____/____/____

Method of Transportation for Travel: _____

Where Did You Stay? _____

Purpose of Travel? _____

Did You Do Any Sightseeing on your trip? : Yes No

If yes, specify: _____

Did Anyone Travel With You? : Yes No

If yes, specify: _____

Are they ill with similar symptoms? : Yes No Unknown

If yes, specify: _____

Public Functions/Venues (during 2 weeks prior to symptom onset)

Category	Y/ N/ U	Description of Activity	Location of Activity	Date of Activity	Time of Activity (start, end)	Others ill? (Y/N/U)
9. Airports						
10. Beaches						
11. Bars/Clubs						
12. Campgrounds						
13. Carnivals/Circus						
14. Casinos						
15. Family Planning Clinics						
16. Government Office Building						
17. Gym/Workout Facilities						
18. Meetings or Conferences						
19. Movie Theater						
20. Museums						
21. Parks						
22. Parties (including Raves, Prom, etc)						
23. Performing Arts (ie Concert, Theater, Opera)						
24. Picnics						
25. Political Events (including Rallies)						
26. Religious Gatherings						
27. Shopping Malls						
28. Sporting Event						
29. Street Festivals, Flea Markets, Parades						
30. Tourist Attractions (ie French Quarter, Aquarium)						

Transportation

Have you used the following types of transportation in the 2 weeks prior to onset?

31. Bus/Streetcar: Yes No Unknown

Frequency of this type of transportation: Daily Weekly Occasionally Rarely

Bus Number: _____ Origin: _____

Any connections? Yes No (Specify: Location _____ Bus# _____)

Company Providing Transportation: _____ Destination: _____

32. Train: Yes No Unknown

Frequency of this type of transportation: Daily Weekly Occasionally Rarely

Route Number: _____ Origin: _____

Any connections? Yes No (Specify: Location _____ Route # _____)

Company Providing Transportation: _____ Destination: _____

33. Airplane: Yes No Unknown

Frequency of this type of transportation: Daily Weekly Occasionally Rarely

Flight Number: _____ Origin: _____

Any connections? Yes No (Specify: Location _____ Flight # _____)

Company Providing Transportation: _____ Destination: _____

34. Ship/Boat/Ferry: Yes No Unknown

Frequency of this type of transportation: Daily Weekly Occasionally Rarely

Ferry Number: _____ Origin: _____

Any connections? Yes No (Specify: Location _____ Ferry # _____)

Company Providing Transportation: _____ Destination: _____

35. Van Pool/Shuttle: Yes No Unknown

Frequency of this type of transportation: Daily Weekly Occasionally Rarely

Route Number: _____ Origin: _____

Any connections? Yes No (Specify: Location _____ Route # _____)

Company Providing Transportation: _____ Destination: _____

Food & Beverage

36. During the 2 weeks before your illness, did you eat at any of the following *food establishments or private gatherings with food or beverages?*

Food Establishment	Y/ N/ U	Name of Establishment	Location of Meal	Date of Meal	Time of Meal (start, end)	Food and Drink items consumed	Others ill? (Y/N/U)
Cafeteria at School, hospital, or other Casino or mall food court							
Grocery Store or Corner Store Concert, movie, or other entertainment Dinner party, birthday party or other celebration Gas station or convenience store Plane, boat, train, or other							
Picnic, Barbecue, Crawfish boil, or potluck Outdoor farmers market, festival, or swap meet Restaurant, fast-food, or deli Sporting event or snack bar Street vended food							
Other food establishment							
Other Private Gathering							

37. During the 2 weeks before your illness, did you consume any free *food samples* from.....?
Grocery store Yes No Unknown

Race/competition Yes No Unknown

Public gathering? Yes No Unknown

Private gathering? Yes No Unknown

If "YES" for any in question #37, provide date, time, location and list of food items consumed:

Date/Time: _____

Location (Name and Address): _____

Food/drink consumed: _____

Others also ill? Yes No Unknown

(explain): _____

38. During the 2 weeks before your illness, did you consume any of the following *products*?

Vitamins Yes No Unknown

Specify (Include Brand Name): _____

Herbal remedies Yes No Unknown

Specify (Include Brand Name): _____

Diet Aids Yes No Unknown

Specify (Include Brand Name): _____

Nutritional Supplements Yes No Unknown

Specify (Include Brand Name): _____

Other Ingested non-food Yes No Unknown

Specify (Include Brand Name): _____

39. During the 2 weeks before your illness, did you consume any unpasteurized products (ie milk, cheese, fruit juices)? Yes No Unknown

If yes, specify name of item: _____

Date/Time: _____

Location (Name and Address): _____

Others also ill?: Yes No Unknown

(explain): _____

40. During the 2 weeks before your illness, did you purchase food from any internet grocers?

Yes No Unknown

If yes, specify date / time of delivery: _____ Store/Site: _____

Items purchased: _____

41. During the 2 weeks before your illness, did you purchase any mail order food? Yes No

Unknown

If yes, specify date/time of delivery: _____

Store purchased from: _____

Items purchased: _____

42. Please check the routine sources for drinking water (check all that apply):

- Community or Municipal
- Well (shared)
- Well (private family)
- Bottled water (Specify Brand: _____)
- Other (Specify: _____)

Aerosolized water

43. During the 2 weeks prior to illness, did you consume water from any of the following sources (check all that apply):

- Wells
- Lakes
- Streams
- Springs
- Ponds
- Creeks
- Rivers
- Sewage-contaminated water
- Street-vended beverages (Made with water or ice and sold by street vendors)
- Ice prepared w/ unfiltered water (Made with water that is not from a municipal water supply or that is not bottled or boiled)
- Unpasteurized milk
- Other (Specify: _____)

If "YES" for any in question #43, provide date, time, location and type of water consumed:

Date/Time: _____

Location (Name and Address): _____

Type of water consumed: _____

Others also ill?: Yes No Unknown

(explain): _____

44. During the 2 weeks prior to illness, did you engage in any of the following recreational activities (check all that apply):

- Swimming in public pools (e.g., community, municipal, hotel, motel, club, etc)
- Swimming in kiddie/wading pools
- Swimming in sewage-contaminated water
- Swimming in fresh water, lakes, ponds, creeks, rivers, springs, sea, ocean, bay (please circle)
- Wave pools ? Water parks ? Waterslides ? Surfing
- Rafting ? Boating ? Hot tubs (non-private) ? Whirlpools (non-private)
- Jacuzzis (non-private) ? Other (Specify: _____)

If "YES" for any in question #44, provide date, time, location and type of activity:

Date/Time: _____

Location (Name and Address): _____

Type of water consumed: _____

Others also ill?: Yes No Unknown

(explain): _____

45. During the 2 weeks prior to illness, were you exposed to aerosolized water from any of the following non-private (i.e., used in hospitals, malls, etc) sources (check all that apply):

- Air conditioning at public places
- Respiratory devices
- Vaporizers
- Humidifiers
- Misters
- Whirlpool spas
- Hot tub
- Spa baths
- Creek and ponds
- Decorative fountains
- Other (please explain) _____

If "YES" for any in question #45, provide date, time, and location of exposure to aerosolized water:

Date/Time: _____
Location (Name and Address): _____
Explanation of aerosolized water: _____
Others also ill: Yes . No Unknown
(explain): _____

Recreation (Activities that are not related to work)

46. In the past two weeks, did you participate in any outdoor activities?

- Yes . No Unknown

(If "yes", list all activities and provide locations)

47. Do you recall any insect or tick bites during these outdoor activities?

- Yes . No Unknown

(If "yes", list all activities and provide locations of activities)

48. Did you participate in other indoor recreational activities (i.e. clubs, crafts, etc that did not occur in a private home)?

- Yes . No Unknown

(List all activities and provide location)

Vectors

49. Do you recall any insect or tick bites in the last 2 weeks?
Yes No Unknown

Date(s) of bite(s): _____ Bitten by: Mosquito
Tick Flea Fly Other:
Where were you when you were bitten? _____

50. Have you had any contact with wild or domestic animals, including pets?
Yes No Unknown

Type of Animal: _____
Explain nature of contact: _____
Is / was the animal ill recently; Yes No Unknown
If yes please describe the animal's symptoms:

Date / Time of contact: _____
Location of contact: _____

51. To your knowledge, have you been exposed to rodents/rodent droppings in the last 2 weeks?
Yes No Unknown

If yes, explain type of exposure: _____
Date/Time of exposure: _____
Location where exposure occurred: _____