



Infectious Disease Epidemiology Section
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Plague

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The United States worked with *Y. pestis* as a potential biowarfare agent in the 1950's and 1960's before the offensive biowarfare program was terminated, other countries are suspected of weaponizing this organism. The former Soviet Union had more than 10 institutes and thousands of scientists who worked with plague. During World War II, Unit 731, of the Japanese Army, reportedly released plague-infected fleas from aircraft over Chinese cities. This method was cumbersome and unpredictable. The U.S. and Soviet Union developed the more reliable and effective method of aerosolizing the organism. The interest in the terrorist potential of plague was brought to light in 1995 when Larry Wayne Harris was arrested in Ohio for the illicit procurement of a *Y. pestis* culture through the mail. The contagious nature of pneumonic plague makes it particularly dangerous as a biological weapon.

Epidemiology

Yersinia pestis is a rod-shaped, non-motile, non-sporulating, gram-negative bacterium of the family *Enterobacteraceae*. It causes plague, a zoonotic disease of rodents (e.g., rats, mice, ground squirrels). Fleas that live on the rodents can transmit the bacteria to humans, who then suffer from the bubonic form of plague. The bubonic form may progress to the septicemic and/or pneumonic forms. Pneumonic plague would be the predominant form resulting from a purposeful aerosol dissemination. All human populations are susceptible to the plague. Recovery from the disease is followed by temporary immunity. The organism remains viable in water, moist soil, and grains for several weeks. At near freezing temperatures, it will remain alive from months to years but is killed by 15 minutes of exposure to 55°C. It also remains viable for some time in dry sputum, flea feces, and buried bodies but dies within several hours of exposure to sunlight.

Plague is a disease typically involving rodents and their fleas which transfer the infection to various animals including man. Human plague in the United States is sporadic, with single cases or small common source clusters occurring in the western third of the country. No human-to-human transmission has occurred in the United States since 1924. Louisiana has never reported a case of plague. This is to say that it would indeed be unusual to see two cases of plague that are epidemiologically linked.

Plague is a serious illness and does need to be investigated thoroughly, regardless of ones suspicions about bioterrorism. In a biological warfare scenario, the plague bacillus could be delivered via contaminated vectors (i.e. fleas) causing the bubonic form of the disease or via aerosol causing the pneumonic form of the disease.

The incubation period is 2 to 6 days for bubonic plague and 2 to 4 days for primary pneumonic plague.

In man, the mortality of untreated bubonic plague is approximately 60 percent (reduced to <5% with prompt effective therapy), whereas in untreated pneumonic plague the mortality rate is nearly 100 percent, and survival is unlikely if treatment is delayed beyond 18 hours of infection. In the U.S. in the past 50 years, 4 of the 7 pneumonic plague patients (57%) died. Recent data from the ongoing Madagascar epidemic, which began in 1989, corroborate that figure; the mortality associated with respiratory involvement was 57%, while that for bubonic plague was 15%.

Clinical Description

Plague normally appears in three forms in man: bubonic, septicemic, and pneumonic. The bubonic form begins after an incubation period of 2-10 days, with acute and fulminant onset of nonspecific symptoms, including high fever, malaise, headache, myalgias and sometimes nausea and vomiting. Up to half of patients will have abdominal pain. Simultaneous with or shortly after the onset of these nonspecific symptoms, the bubo develops – a swollen, very painful, infected lymph node. Buboes are normally seen in the femoral or inguinal lymph nodes as the legs are the most commonly flea-bitten part of the adult human body. The liver and spleen are often tender and palpable. One quarter of patients will have various types of skin lesions: a pustule, vesicle, eschar or papule (containing leukocytes and bacteria) in the lymphatic drainage of the bubo, and presumably representing the site of the inoculating flea bite. Secondary septicemia is common, as greater than 80 percent of blood cultures are positive for the organism in patients with bubonic plague. However, only about a quarter of bubonic plague patients progress to clinical septicemia.

In those that do progress to secondary septicemia, as well as those presenting septicemic but without lymphadenopathy (primary septicemia), the symptoms are similar to other Gram-negative septicemias: high fever, chills, malaise, hypotension, nausea, vomiting, and diarrhea. However, plague septicemia can also produce thromboses in the acral vessels, with necrosis and gangrene, and DIC. Black necrotic appendages and more proximal purpuric lesions caused by endotoxemia are often present. Organisms can spread to the central nervous system, lungs, and elsewhere. Plague meningitis occurs in about 6% of septicemic and pneumonic cases.

Pneumonic plague is an infection of the lungs due to either inhalation of the organisms (primary pneumonic plague), or spread to the lungs from septicemia (secondary pneumonic plague). After an incubation period varying from 1 to 6 days for primary pneumonic plague (usually 2-4 days, and presumably dose-dependent), onset is acute and often fulminant. The first signs of illness include high fever, chills, headache, malaise, and myalgias, followed within 24 hours by a cough with bloody sputum. Although bloody sputum is characteristic, it can sometimes be watery or, less commonly, purulent. Gastrointestinal symptoms, including nausea, vomiting, diarrhea, and abdominal pain, may be present. Rarely, a cervical bubo might result from an inhalational exposure. The chest X-ray findings are variable, but most commonly reveal bilateral infiltrates, which may be patchy or consolidated. The pneumonia progresses rapidly, resulting in dyspnea, stridor, and cyanosis. The disease terminates with respiratory failure, and circulatory collapse.

Laboratory

Nonspecific laboratory findings include a leukocytosis, with a total WBC count up to 20,000 cells with increased bands, and greater than 80 percent polymorphonuclear cells. One also often finds increased fibrin split products in the blood indicative of a low-grade DIC. The BUN, creatinine, ALT, AST, and bilirubin may also be elevated, consistent with multiorgan failure.

Presumptive diagnosis can be made by Gram, Wright, Giemsa or Wayson stain of blood, sputum, CSF, or lymph node aspirates. Definitive diagnosis requires culture of the organism from those sites. When available, immunofluorescent staining is very useful.

Definitive diagnosis relies on culturing the organism from blood, sputum, CSF, or bubo aspirates. The organism grows slowly at normal incubation temperatures, and may be misidentified by automated systems because of delayed biochemical reactions. It may be cultured on blood agar, MacConkey agar or infusion broth. Most naturally occurring strains of *Y. pestis* produce an F1-antigen *in vivo*, which can be detected in serum samples by immunoassay. A four-fold rise in antibody titer in patient serum is retrospectively diagnostic. PCR (using specific primers), although not sufficiently developed and evaluated for routine use, is a very sensitive and specific technique, currently able to identify as few as 10 organisms per ml. Most clinical assays can be performed in Biosafety Level 2 (BSL-2) labs, whereas procedures producing aerosols or yielding significant quantities of organisms require BSL-3 containment.

Treatment

Early administration of antibiotics is critical, as pneumonic plague is invariably fatal if antibiotic therapy is delayed more than 1 day after the onset of symptoms. Choose one of the following: streptomycin, gentamicin, ciprofloxacin, or doxycycline for 10-14 days. Chloramphenicol is the drug of choice for plague meningitis.

Streptomycin, gentamicin, doxycycline, and chloramphenicol are highly effective, if begun early. Plague pneumonia is almost always fatal if treatment is not initiated within 24 hours of the onset of symptoms. Dosage regimens are as follows: streptomycin, 30 mg/kg/day IM in two divided doses; gentamicin, 5mg/kg IM or IV once daily, or 2mg/kg loading dose followed by 1.75 mg/kg IM or IV every 8 hours; doxycycline 200 mg initially, followed by 100 mg every 12 hours. Duration of therapy is 10 to 14 days. While the patient is typically afebrile after 3 days, the extra week of therapy prevents relapses. Results obtained from laboratory animal, but not human, experience, indicate that quinolone antibiotics, such as ciprofloxacin and ofloxacin, may also be effective. Recommended dosage of ciprofloxacin is 400mg IV twice daily. Chloramphenicol, 25 mg/kg IV loading dose followed by 15 mg/kg IV four times daily x 10-14 days, is required for the treatment of plague meningitis.

Usual supportive therapy includes IV crystalloids and hemodynamic monitoring. Although low-grade DIC may occur, clinically significant hemorrhage is uncommon, as is the need to treat with heparin. Endotoxic shock is common, but pressor agents are rarely needed. Finally, buboes rarely require any form of local care, but instead recede with systemic antibiotic therapy. In fact, incision and drainage poses a risk to others in contact with the patient; aspiration is recommended for diagnostic purposes and may provide symptomatic relief.

Surveillance

Plague is a reportable condition. It should be reported immediately by phone because of concern about bioterrorism as a cause. Upon report of a case, consider active surveillance for more cases.

Case Definition

Clinical description: A disease characterized by fever and leukocytosis that presents in one or more of the following principal clinical forms:

- Regional lymphadenitis (bubonic plague)
- Septicemia without an evident bubo (septicemic plague)
- Plague pneumonia, resulting from hematogenous spread in bubonic or septicemic cases (secondary plague pneumonia) or inhalation of infectious droplets (primary plague pneumonia)
- Pharyngitis and cervical lymphadenitis resulting from exposure to larger infectious droplets or ingestion of infected tissues (pharyngeal plague)
- Plague is transmitted to humans by fleas or by direct exposure to infected tissues or respiratory droplets.

Laboratory criteria for diagnosis:

Isolation of *Yersinia pestis* from a clinical specimen, or
Fourfold or greater change in serum antibody to *Y. pestis*

Case classification:

Probable: a clinically compatible illness with supportive laboratory results (demonstration of a single serologic test result suggestive of recent infection with no history of immunization, or demonstration of a Fraction I antigen in blood, bubo aspirate, or tissue by antigen detection -- enzyme-linked immunosorbent assay (ELISA) or fluorescent assay (FA))

Confirmed: a case that is laboratory confirmed

Case investigation

The purpose of investigation is

- to identify and confirm cases,
- to trace the source of infection with particular attention to the possibility of bioterrorism,
- to search for other exposed individuals,

Steps in the investigation:

- Upon receipt of a report of plague immediately contact the Infectious Disease Epidemiology Section.
- Contact the physician and/or hospital to confirm the diagnosis.
- Obtain clinical details.
- Ask if any plague specific laboratory tests were performed. Request that an isolate be submitted to the state lab for confirmation.
- Attempt to identify
 - Travel history to the western United States
 - History of flea bites
 - Contact with rodents or their excreta
 - Handling of ill animals
 - Hunting in endemic areas

Post-Exposure prophylaxis (PEP)

Antibiotics: Face-to-face contacts (within 2 meters) of patients with pneumonic plague or persons possibly exposed to a plague aerosol in a plague BW attack) should be given antibiotic prophylaxis for seven days or the duration of risk of exposure plus seven days. If fever or cough occurs in these individuals, treatment with antibiotics should be started. Because of oral administration and relative lack of toxicity, the choice of antibiotic for prophylaxis is doxycycline 100 mg orally twice daily. Ciprofloxacin 500 mg orally twice daily has also shown to be effective in preventing disease in exposed mice, and may be more available in a wartime setting as it is also distributed in blister-packs for anthrax post-exposure prophylaxis. Tetracycline, 250mg orally four times daily, and chloramphenicol, 25 mg/kg orally four times daily, are acceptable alternatives. Contacts of bubonic plague patients need only be observed for symptoms for a week. If symptoms occur, start treatment antibiotics.

Immunization

Vaccine: No vaccine is currently available for prophylaxis of plague. A licensed, killed whole cell vaccine was available in the U.S. from 1946 until November 1998. It offered protection against bubonic plague, but was not effective against aerosolized *Y. pestis*. Presently, an F1-V antigen (fusion protein) vaccine is in development at USAMRIID. It protected mice for a year against an inhalational challenge, and is now being tested in primates.

Hospital precaution and isolation:

Use Standard Precautions for bubonic plague patients. Suspected pneumonic plague cases require strict isolation with Droplet Precautions for at least 48 hours of antibiotic therapy, or until sputum cultures are negative in confirmed cases. If competent vectors (fleas) and reservoirs (rodents) are present, measures must be taken to prevent local disease cycles. These might include, but are not limited to, use of flea insecticides, rodent control measures (after or during flea control), and flea barriers for patient care areas. *Y. pestis* can survive in the environment for varying periods, but is susceptible to heat, disinfectants, and exposure to sunlight. Soap and water is effective if decontamination is needed.

Prevention

- Ensure that homes and surrounding areas are rodent free.
- Treat pets with insecticides to prevent flea infestations.
- Wear gloves when handling or hunting wildlife.
- Do not camp near rodent burrows and avoid handling wild rodents.
- Report dead and sick animals to park rangers or health authorities.

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
 - 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

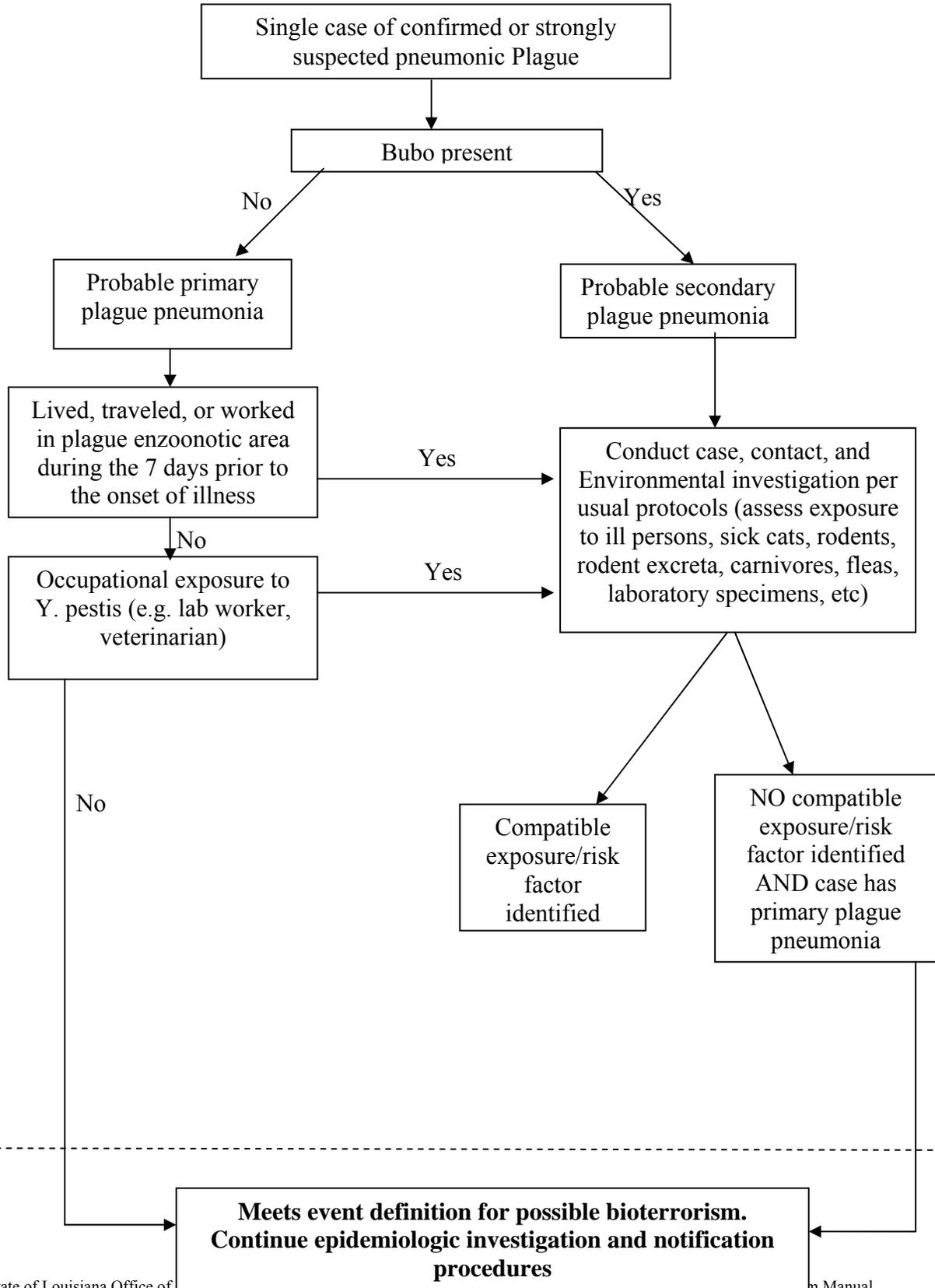
Laboratory

- 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

Plague Investigation Algorithm



PNEUMONIC PLAGUE

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

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: _____

HOSPITAL NAME: _____

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 : _____

Other abnormal physical findings (describe): _____

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:

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

ADDITIONAL COMMENTS:

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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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						
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: _____

