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## Information and Specimen Submission Instructions for Suspected Feline Plague

This document provides information for veterinarians and others on how to collect and submit specimens from domestic cats for testing for the agent of plague, *Yersinia pestis*. Included in this packet are instructions for what types of specimens may be tested, how they should be collected, and the protocol for shipping. Also included is a brief clinical history form that must be completed and accompany any specimens.

### WHAT TO DO IF YOU HAVE A SUSPECT CASE OF FELINE PLAGUE

*Cats infected with plague can readily transmit disease to anyone who has contact with their tissues or secretions. Because plague in a cat poses a significant risk to human health, confirmation of the diagnosis should be pursued in a serious, safe, and expeditious manner.*

1. Notify the Health Officer or Communicable Disease Control Officer at your local health department that you have a patient for whom you would like to submit specimens for plague testing. Specimens received at the laboratory without prior notification will not be tested. You will be asked to discuss the clinical features of the case and to confirm that plague testing is indicated, prior to submission of specimens.
2. Fill out the clinical history form as completely as possible. A copy should be included with the specimens when they are shipped.
3. Collect, label, package, and ship specimens according to instructions on page 2 of this packet.
4. Specimens will be tested in a timely fashion and results relayed to you. Preliminary test results of swabs, exudates, and aspirates are generally available within 1-3 days of receipt, final results within 3-7 days. Serology results are usually available in 3-7 days.

## PROCEDURES FOR SUBMITTING SPECIMENS FOR PLAGUE TESTING FROM DOMESTIC CATS

Diagnosis of plague in cats is based on clinical presentation, history of potential contact with wild rodents and/or their fleas in an enzootic area, and serologic or bacteriologic confirmation. Laboratory confirmation of plague may be pursued through culture of *Y. pestis*, identification of *Y. pestis* by direct fluorescent antibody and/or PCR, and phage lysis, or documentation of a four-fold change in paired sera titres to *Y. pestis*.

**Clinical signs:** fever, swollen abscessed lymph nodes (especially submandibular, cervical), lethargy; anorexia, respiratory signs (cough, dyspnea, ocular or nasal discharge).

**History:** outdoor or indoor/outdoor lifestyle, propensity to “hunt”, known or suspected contact with wild rodents, residence in or recent travel to rural area recognized as enzootic for plague.

### Collection and packaging of tissues for testing

Mask, gloves, and eye protection should be worn at all times when handling cats suspected of having plague or their tissues. A cat suspected of having plague should be placed in isolation and the number of individuals who have contact with it should be minimized. Appropriate flea control should be implemented to suppress any plague-infected fleas.

#### Lymph node aspirate or exudate swab

1. Drainage from abscessed lymph nodes may be collected using a culture swab. Swab should be resealed and refrigerated until shipped.
2. Fluctuant but closed abscesses may be aspirated with needle and syringe. Needle should be safely re-capped, using the “one-hand” technique (see attached instructions), and the needle/syringe assembly should be refrigerated until shipped. Do not attempt to transfer the aspirate material to slides or another medium prior to shipping, as this may compromise the test procedure.

#### Pharyngeal swab

1. Nasal discharge, sputum, and/or pharyngeal secretions may be collected using a culture swab.
2. Swab should be resealed and refrigerated until shipped.

#### Carcass

1. Animal carcass must be placed in an appropriately sized clear plastic bag, double bagged, and frozen prior to shipment.

#### Blood or serum for serology

1. Collect 3-5 cc of blood in a standard “red top” clot tube.
2. Serum need not be separated, but specimen should be refrigerated until shipped.  
Note: Serologic results may be negative early in the course of illness. The California Laboratory Response Network does not routinely perform DFA on blood because of the generally low bacteremia in feline patients. You may consider submitting blood to your usual clinical laboratory for culture.

All specimens should be placed into a “Free Safe” ice chest or other similar insulated container with adequate gel packs to maintain temperature control during shipment. Specimen should be refrigerated. Each specimen should be clearly labeled with the patient name, client name, source of specimen (e.g., “aspirate, cervical LN”), date collected, contact person or agency, and phone number for notification of results.

Over-night shipment may be arranged through your local health department. Prior to shipping, contact your local health department so that the laboratory may be notified of the incoming specimens, as well as to receive any final shipping instructions. **Testing will be delayed for specimens received at the laboratory without prior telephone notification and authorization.**

**Feline Plague - Suspect Case  
Clinical History Form**

This form must be completed and included with specimens submitted for testing.

Client/owner: Last name \_\_\_\_\_ First name \_\_\_\_\_ Phone # \_\_\_\_\_

Patient name \_\_\_\_\_

Species: \_\_\_\_\_

Age \_\_\_\_\_ Sex: M MC F FS

Date of onset \_\_\_\_\_

Clinical signs \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

History \_\_\_\_\_  
\_\_\_\_\_

Specimen(s) submitted      Lymph node aspirate/swab  
   Pharyngeal swab  
   Carcass  
   Whole blood/serum

Date specimen(s) collected \_\_\_\_\_

Veterinarian name \_\_\_\_\_

Contact name (if different than above) \_\_\_\_\_

Name and address of Veterinary Hospital \_\_\_\_\_

Phone # \_\_\_\_\_ Fax # \_\_\_\_\_

Name of local public health official notified \_\_\_\_\_

Phone # \_\_\_\_\_ Fax # \_\_\_\_\_

# The “One-Hand” Technique for Recapping

Accidental needlesticks can occur when staff attempt to recap needles. Recapping is a dangerous practice: under most circumstances, needles should be disposed without recapping them.

When it is necessary to recap a needle, use the following “one-hand” technique:

## Step 1

Place the cap on a flat surface, then remove your hand from the cap.



## Step 2

With one hand, hold the syringe and use the needle to “scoop up” the cap.



## Step 3

When the cap covers the needle completely, use the other hand to secure the cap on the needle hub. Be careful to handle the cap at the bottom only (near the hub).



# Feline Plague in California

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In December 2009, two six-month-old cats from the same household in Kern County, California, presented to a local veterinarian with a two-day history of lethargy and anorexia. Upon examination, both cats were febrile (up to 107° F) and had submandibular swelling. One cat died after two days hospitalization; the other cat recovered following empirical antimicrobial treatment. A pharyngeal swab from the surviving cat was tested at the Tulare County Public Health Laboratory and *Yersinia pestis* was detected by polymerase chain reaction (PCR). *Y. pestis* was also identified in liver and spleen from the dead cat by PCR, direct fluorescent antibody (DFA), and culture. In consultation with Kern County public health officials, two owners, one cat-sitter, and three veterinary staff who had close contact with the cats initiated antimicrobial prophylaxis. The California Department of Public Health Microbial Diseases Laboratory cultured *Y. pestis* from the carcass of a chipmunk recovered from the owners' garbage and with which the cats had contact one week prior to onset.

Plague — infection with *Y. pestis* — is endemic throughout the southwestern United States, including much of California. Each year, serologic or microbiologic evidence of infection with *Y. pestis* is observed in numerous mammalian species, including domestic cats. In 2009, in addition to the cats in the preceding case report, plague was detected in a domestic cat from Nevada County. In the last 15 years, 30 cats from six California counties (Kern, Los Angeles, Nevada, Placer, Plumas, Shasta) have been diagnosed with plague.

Cats are the domestic species that is most susceptible to plague. As in humans, three clinical syndromes have been described: bubonic, septicemic, and pneumonic. Bubonic is the most common manifestation and is characterized by high fever (105° F or greater), lethargy, and lymphadenopathy. As cats are most typically exposed through the oral route, via predation on infected rodents, the cervical, submandibular, and retropharyngeal nodes are most commonly affected. Septicemic plague may occur subsequent to (secondary) or in the absence of (primary) overt lymphadenopathy. Characterized by fever, marked leukocytosis, DIC, and shock, septicemic plague is usually fatal within 1-2 days in untreated patients. Plague pneumonia may develop secondary to septicemia or be contracted directly through inhalation of infectious respiratory droplets. Cats with plague pneumonia develop respiratory signs that include dyspnea, sneezing, coughing, hemoptysis, and nasal discharge.

Like septicemic plague, plague pneumonia is rapidly fatal.

Diagnosis of plague in cats is based on clinical presentation, history of potential contact with wild rodents and/or their fleas, and serologic or bacteriologic confirmation. Specimens appropriate for testing include serum, whole blood, pharyngeal swab, lymph node aspirate, and abscess swab. Observation of bipolar stained gram-negative rods in blood or lymph node aspirates may provide provisional evidence of plague.

Laboratory confirmation requires specialized procedures such as DFA, PCR, and phage lysis available only at Biosafety Level II laboratories. Diagnostic support for suspected cases of feline plague in



California is available through the Public Health Laboratory Response Network.

Because of the rapidly fatal course, appropriate treatment of cats suspected of having plague should not be delayed pending laboratory confirmation. The antibiotic of choice is streptomycin (5 mg/kg IM bid X 21 days); however, gentamicin, tetracyclines, and trimethoprim-sulfa have also demonstrated clinical effectiveness.

Cats can pose a risk of plague transmission to humans via infectious respiratory droplets, infectious tissues such as abscess fluid, bites or scratches, or by harboring infected fleas. Since 1927, 62 cases of plague have been diagnosed in humans in California; of these, four had documented contact with a plague-infected cat and an additional four were suspected of having exposure to a cat with plague. Five of the eight case-patients were veterinarians who were exposed via client-owned cats. All four case-patients with confirmed exposure to an infected cat developed plague pneumonia and three (75%) died; this contrasts with an overall case-fatality rate of 24% for all California plague cases during the same period. A review of 23 cat-associated plague cases that occurred in the United States between 1977 and 1998 reported that six patients were veterinarians or veterinary technicians.

Cats suspected of plague should be hospitalized and placed in isolation. All veterinary staff should wear masks, gowns, and gloves when handling a suspect cat and potentially contaminated tissues or materials. The number of staff members who have contact with the cat should be minimized. Materials and surfaces with which the cat has had contact should be promptly disinfected. Hospital-wide flea control measures should be implemented.

California law (California Code of Regulations § 2500) requires that veterinarians immediately notify their local health officer of any animal they suspect of having plague. Public health officials will work with the veterinarian to evaluate the risk of exposure for staff, clients, and others and their need for prophylactic antibiotics. A seven-day course of tetracycline will be initiated for persons deemed to have had close contact with a plague-infected cat, particularly if the cat has respiratory signs or draining abscesses. All persons with unprotected contact with a plague-infected cat should diligently monitor their temperature and general health for 10 days following exposure and consult their physician if they develop a fever or other symptoms.

Questions on plague in domestic cats may be directed to your local health department or the CDPH Infectious Diseases Branch (916-552-9730).

**TABLE 1. PLAGUE IN DOMESTIC CATS: PROCEDURES FOR VETERINARIANS**

**Evaluation of suspect cases:**

**Clinical signs:** fever; swollen abscessed lymph nodes (esp. submandibular, cervical); lethargy; anorexia; respiratory signs (cough, dyspnea, nasal discharge)

**History:** outdoor or indoor/outdoor; propensity to “hunt”; known or suspected contact with wild rodents

**Location:** Sierra Nevada (esp. Tahoe area), the Tehachapi Range, and coastal counties



**Diagnosis**

**Tissues:** blood; serum; lymph node aspirate or exudate swab; pharyngeal swab; carcass

**Diagnostic tests:** direct fluorescent antibody; passive hemagglutination and inhibition; culture; polymerase chain reaction

**Procedures:** Testing is available through the California Public Health Laboratory Network. Contact your local health department for instructions on collection, packaging, and shipping of specimens.

**Treatment**

**Hospitalize:** Maintain in isolation until complete clinical recovery

**Abscesses:** Lance and drain, flush with chlorhexidine

**Antibiotics:** Streptomycin (5 mg/kg bid X 21 days) is the drug of choice; alternatively, tetracycline (20 mg/kg tid), gentamicin (2-4 mg/kg sid or bid), or trimethoprim-sulfonamide (15 mg/kg bid) may be used.

**Control**

- Call your local health department immediately to alert them that you are evaluating a cat suspected of having plague.
- Limit staff contact with cat, tissues, and potentially contaminated equipment and materials.
- Wear disposable gown, gloves, mask, and eye protection when handling cat and tissues.
- Promptly dispose of potentially contaminated materials as biohazardous waste.
- Implement hospital-wide flea control measures.
- Discuss with clients their possible risk of exposure to plague and advise that they consult with their physician.

**Questions?**

Detailed instructions for collecting and submitting for testing specimens from suspect feline plague patients are available at the CDPH Web site (<http://www.cdph.ca.gov/HealthInfo/discond/Pages/Plague.aspx>) or by contacting your local health department.