Feline Plague in California

by Curtis L. Fritz, DVM, PhD, Division of Communicable Disease Control, California Department of Public Health (CDPH), Sacramento, California

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.