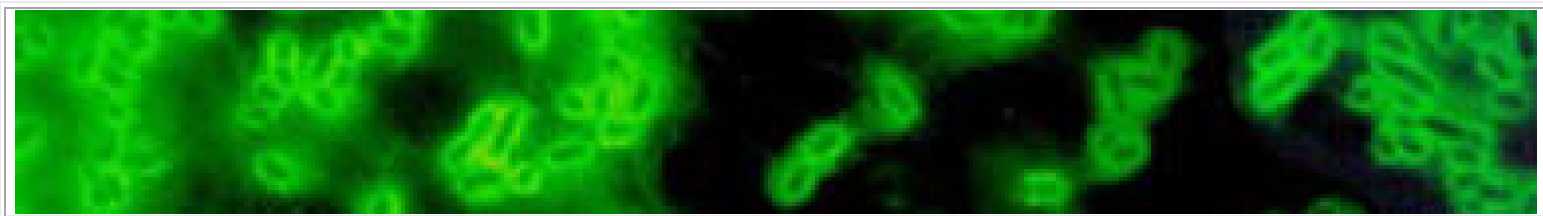




PLAGUE: INFORMATION FOR VETERINARIANS

General Information

Plague is caused by *Yersinia pestis*, a Gram-negative bacterium that is endemic to most of the western United States. Epidemics of plague occur in wild rodents (rock squirrels, prairie dogs, ground squirrels, chipmunks, packrats, and others) and most people acquire plague by the bite of an infected rodent flea. However, cats are particularly susceptible and can play a role in transmission to humans by a variety of mechanisms including transporting infected fleas or rodent/rabbit carcasses into the residential environment, direct contact contamination with exudates or respiratory droplets, and by bites or scratches. Cat associated human cases were first reported in 1977. Since then, 22 human cases have been associated with cat exposure. **Of these, 5 were in veterinarians or their assistants.** Dogs are frequently infected with *Y. pestis* and develop antibodies to the organism, and occasionally exhibit clinical signs. Dogs can transport infected fleas or rodent/rabbit carcasses into the residential environment. Ungulates have rarely been identified as infected with *Y. pestis*. Clinical signs, treatment and prevention information for people is available at USAMRIID's [Virtual Naval Hospital](#) web site.



Plague in Cats

Clinical features

In endemic areas, plague should be considered in the differential diagnosis of fever of unknown origin in cats. In a study of plague in cats by Eidson (1991), 53% of cats had bubonic plague, 8% were septicemic, and 10% had plague pneumonia. In 29% of the cats, the form of illness was unknown but was presumed to be septicemic. Of cats with bubonic plague, 75% had submandibular lymphadenitis. Abscessed lymph nodes may be clinically indistinguishable from abscesses due to other causes (e.g. bite wounds). Fever, lethargy and anorexia are common and oral lesions are often present. In addition to pneumonia, cats with advanced disease may develop DIC, multi-organ failure and other complications of Gram-negative sepsis. Untreated, approximately 38% of cases will be fatal.

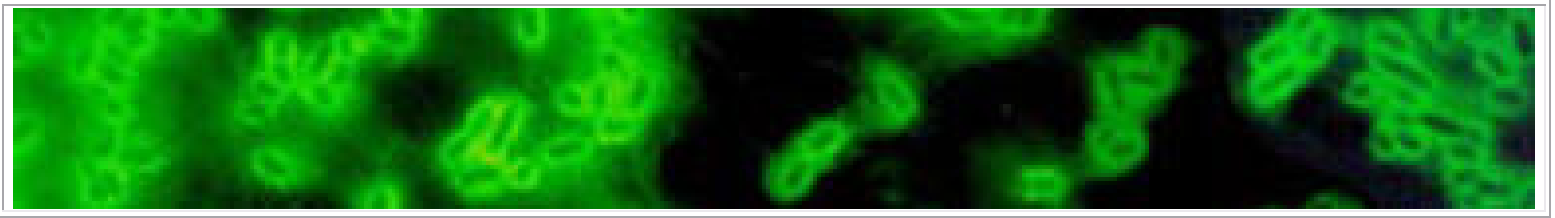
Laboratory Diagnosis

Because of zoonotic concerns, it is important to collect and submit samples for diagnostic testing. Samples should be placed on ice or frozen, and shipped overnight if possible (see next page).

Antemortem Samples *Fluorescent antibody (FA) and culture:* Swab of lesions using culturette (oral cavity, draining lymph nodes), and/or lymph node aspirate are the preferred samples, if available. If evidence of plague pneumonia, perform pharyngeal swab using culturette. Aspirates may be left in the syringe for shipment or transferred to culturette. *Serology:* Acute and convalescent serum (0.5 ml),

collected at least 14 days apart. **NOTE: It is preferable to collect specimens for culture prior to administering antibiotics, but samples should still be collected if antibiotics have been given.**

Postmortem Samples Lymph node aspirate, tissues from lymph node, liver, spleen, lung, bone marrow or whole blood. Tissue samples should be placed in a clean container, (do NOT use formalin or alcohol). As an alternative, the entire carcass may be submitted.



Management and Therapy

In addition to thorough physical examination, auscultation and x-rays of the chest should be done to check for the possibility of plague pneumonia.

A flea control product should be applied to the cat and premises. Antibiotic therapy should be started promptly. **The treatment of choice is streptomycin**; however, due to the difficulty in obtaining streptomycin, gentamicin (2-3 mg/kg tid, IM or SQ [bacteriocidal]) is frequently used with success. Doxycycline (5 mg/kg bid, PO [bacteriostatic]), tetracycline (22 mg/kg tid, PO [bacteriostatic]) and chloramphenicol (50 mg/kg bid, PO [bacteriostatic]) are alternative first-line antibiotics for uncomplicated cases. Sulfonamides can be used but only if other drugs are not available. In people, it is recommended to continue antimicrobial treatment for 10 days, or at least 3 days after the patient has become afebrile and recovered clinically.

Because of the risk of disease transmission to their owners, cats should not be sent home immediately, but should be hospitalized and placed in isolation, especially if there is evidence of pneumonia. The duration of infectivity in treated cats has not been studied, but **cats are thought to be noninfectious after 48 hours of appropriate antibiotic therapy with evidence of clinical improvement.** Patients receiving parenteral antibiotics may be switched to oral therapy upon clinical improvement.

Contacting Health Officials

It is **extremely important** that county or state public health officials be notified promptly when plague is suspected in a cat. Health officials can assist in follow-up of potentially exposed persons, conduct community education, and in addition, should be notified before shipping samples for diagnostic purposes. In many western states, the state public health laboratory is able to do some or all of the testing described above. In the event that your state public health laboratory is unable to perform necessary tests, samples can be tested at the Centers for Disease Control and Prevention laboratory in Fort Collins, Colorado (address below)

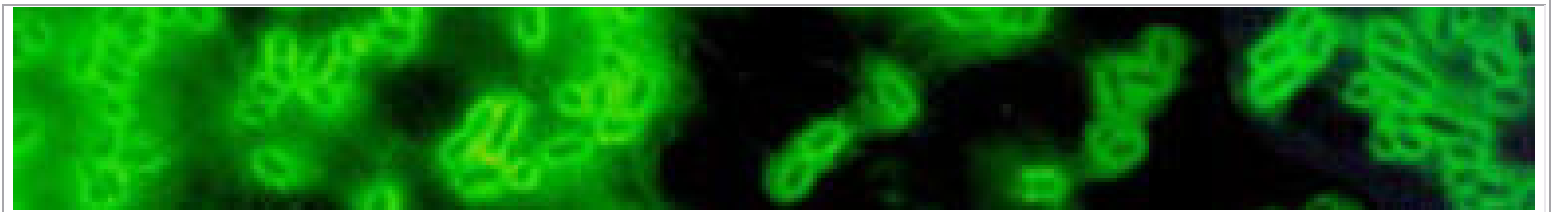
Risks to Veterinarians, Veterinary Staff and Pet Owners

Every case of cat plague represents a potential risk for human exposure and illness. **Acquiring primary pneumonic plague from cats is a particular risk for veterinarians, their assistants and pet owners.** In addition, bubonic plague or primary plague septicemia can result from contact with infected tissues, exudates, or fleas.

Personal Protection Any exudates and the oral cavity should be considered infectious. In pneumonic plague, spread occurs by respiratory droplet, requiring close patient contact for transmission to occur. **Masks and gloves should be worn when examining and treating cats suspected of having plague.** Surgical masks may not provide protection from respiratory droplet exposure via inhalation and a **well-fitted N-95 rated mask is recommended.** Exudates should be considered infectious and any material used for treating suspect cats should be disinfected, autoclaved, or incinerated.

Veterinary clinic personnel should be advised of these risks and advised to consult their physician and local or state health department in the event of possible exposure to an infected cat. If you suspect that you have been exposed to *Y. pestis* and develop febrile illness, seek medical attention immediately. The usual incubation period for bubonic plague in humans is 2 to 6 days. The incubation period for primary pneumonic plague is considerably shorter, only 1 to 3 days. **Most human fatalities are a result of a delay in appropriate antimicrobial therapy.**

Advising clients Owners of cats with suspected plague should be advised to consult their physician and local or state health department. Animal owners in plague endemic areas should be advised to confine pets and to apply a flea control product such as a spray or powder at least weekly to pets which go outside. This is especially important during the most common periods of plague transmission (March through October). Clients should be warned that pets should not share sleeping areas with family members. All ill animals, especially cats, should be seen by a veterinarian.



Suggested References

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- Rosser WW. Bubonic plague. *J Am Vet Med Assoc* **191**(4):406-409, 1987.
- Gage KL, Dennis DT, Orloski KA, et al. Cases of human plague associated with exposure to infected domestic cats. *Clin. Infect. Dis.* **30**:893-900. 2000.

This document is based on one developed and distributed by the Bacterial Zoonoses Branch, Division of Vector-Borne Infectious Diseases, Centers for Disease Control and Prevention, Rampart Road, Foothills Campus, Ft. Collins, Colorado 80521; (970) 221-6400. Duplication and distribution is encouraged. Additional copies of this document or additional information about plague may be obtained from CDC at the above address.