PLAGUE (*Yersinia pestis*)

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<th>Animal Group(s) Affected</th>
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<td>Rodents, human and non-human primates, felids, mustelids, lagomorphs</td>
<td>1) Vector-borne &gt;30 species of fleas, possibly lice and ticks 2) Aerosol 3) Direct contact with infected tissues, bite from infected animal 4) Oral - ingestion of infected tissue or feces 5) Fomites</td>
<td>Peracute mortality without signs; swelling, abscess and hemorrhage at inoculation site; lymphadenopathy; lethargy; fever  Three classic forms in humans 1) Bubonic 2) Septicemic 3) Pneumonic</td>
<td>Subclinical in resistant species, 80-100% mortality in others</td>
<td>Streptomycin, gentamicin, tetracyclines, ciprofloxacin, sulfonamides</td>
<td>Flea and rodent control program; quarantine prairie dogs and other rodents; personal protective equipment</td>
<td>Yes</td>
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Fact Sheet compiled by: Rae Gandolf

Sheet completed on: 1 January 2011; updated 1 November 2012

Fact Sheet Reviewed by: Tonie E. Rocke, Mark Drew, Genevieve Vega Weaver

Susceptible animal groups: > 200 different species of mammals including humans, rodents, felids, and black-footed ferrets. Between 30 and 40 rodent species are considered important as reservoir hosts. In the literature, susceptible species have commonly been grouped into four categories: (1) enzootic hosts (California voles, deer mice, grasshopper mice) (2) epizootic hosts (prairie dogs, ground squirrels) (3) resistant non-rodent hosts (coyotes, badgers, domestic dogs, ungulates) and (4) susceptible non-rodent hosts (bobcats, mountain lions, Canada lynx, black-footed ferrets, lagomorphs, primates including humans, domestic cats). More recently, however, the distinction between enzootic and epizootic host species has become less clear; it appears that both cycles can occur in the same species.

Causative organism: *Yersinia pestis* is a small, non-spore forming Gram-negative facultative anaerobic coccobacilli in the Enterobacteriaceae family consisting of one serotype that is divided into four biovars: Antiqua, Medievalis, Orientalis, and Microtus.

Zoonotic potential: Yes

Primary disease concerns: Urban human plague pandemics may occur; sylvatic plague is a major threat to black-footed ferret and prairie dog populations; felids (domestic cats, Canada lynx) are susceptible; they can develop a highly contagious form of the disease (pneumonic plague) and can further represent a health threat to people who come in contact with them.

Distribution: *Y. pestis* has a patchy global distribution in semi-arid regions of Africa, Middle East, Asia, and South America. In North America, it occurs in the western one third of the continent from Canada to Mexico. Plague is also divided into two epidemiologic forms: sylvatic and urban.

Incubation period: 1-6 days in humans; 1-4 days in felids; 3-7 days in black-footed ferrets

Clinical signs: Rodent species, such as prairie dogs, frequently present with peracute mortality and without


**Prevention and control:**
- Close parks and campgrounds during plague outbreaks to prevent transmission to humans from rodents.
- Quarantine any wild caught rodents, including prairie dogs, for at least two weeks and treat all animals with an insecticide. Flea and rodent control programs are critical in facilities that are located in plague endemic regions.
- Insecticides like deltamethrin and flea growth regulators like pyriproxyfen can be sprayed into prairie dog burrows to control flea populations to slow or stop outbreaks.
- Private ownership of prairie dogs is restricted or prohibited in some states in the U.S. Interstate shipment in
the U.S. is regulated by the Center for Disease Control.
- Personal protective gear should be used when handling any potential cases including during post-mortem examinations.
- An F1-V fusion protein vaccine for subcutaneous injection is used in black-footed ferrets. An oral vaccine has been recently developed for use in prairie dogs and appears to confer better immunity than the subcutaneous vaccine.

**Suggested disinfectant for housing facilities:** 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde, iodines, phenolics, formaldehyde, moist heat (121° C for at least 15 min), dry heat (160-170° C for at least 1 hour).

**Notification:** Nationally notifiable infectious disease. Report cases to the CDC.

**Measures required under the Animal Disease Surveillance Plan:** Reportable disease

**Measures required for introducing animals to infected animal:** Not recommended. Potential carrier animals should be screened for disease before introduction, and diseased animals must be quarantined during curative course of treatment.

**Conditions for restoring disease-free status after an outbreak:** *Yersinia pestis* is endemic to certain regions of the world. Sporadic and seasonal outbreaks occur in endemic regions. Within a limited environment such as a zoological facility, elimination of the rodent and flea population, along with proper disposal of infected tissues is critical to eliminating disease.

**Experts who may be consulted:**
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**References:**

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