

# Facts About Plague

## History

Plague is believed to have been introduced to North America from Asia, arriving for the first time at about the year 1900 during the peak of the last worldwide outbreak when it was spread from port-to-port by ships and ship rats. The disease gained a foothold among California ground squirrels in the San Francisco Bay Area and during the next 50 years it moved eastward among wild rodents to its present distribution, which includes Colorado. It was first seen in the state in San Miguel County in 1941 and appeared in several east-slope locations in 1943. Plague is now firmly established and is now frequently detected in rock squirrels, prairie dogs, wood rats and other species of ground squirrels and chipmunks. It is also seen in fox squirrels, an introduced tree squirrel common in city parks and Front Range residential areas. Wild rabbits also became involved in the plague cycle.

## Cause and Treatment

The causative bacterium *Yersinia pestis* is transmitted to people through flea bite and direct contact with infected animals. Each rodent species is host to one or more species of fleas which, when infected, are carriers. These fleas generally do not infest other animals unless their natural hosts are unavailable. Rock squirrels (*Spermophilus variegatus*) are closely related to California ground squirrels and are the most significant plague host in Colorado. Their principal flea *Diamesus montanus* is an aggressive parasite and will readily bite other animals and people. Domestic cats and dogs can also contract plague by infective fleas. They may carry infected fleas home to their owners or, especially with cats, serve as a direct source of infection.

In man, the incubation period (interval between exposure and appearance of symptoms) is usually 2-6 days. Typical symptoms include sudden onset of fever and chills, severe headache, muscle aches, nausea, vomiting and a general feeling of systemic illness. Extreme pain and swelling in a lymph node draining the infection site is a suggestive symptom of bubonic plague. (The swollen, painful node is called a "bubo"). Other forms of the disease include septicemic illness with no bubo developing, and pneumonic plague in which the lungs are involved. The septicemic and pneumonic forms are the most serious. In addition, pneumonic plague can be spread by inhalation of infective droplets expelled by another human or animal with plague pneumonia.

Treatment with antibiotics is effective during the early stages of disease. If diagnosis and appropriate treatment are delayed, life-threatening complications may follow. A doctor or hospital emergency room should be consulted as soon as symptoms appear and a history of exposure to potentially infected animals is very important in evaluating the risk from plague.

Anti-plague vaccine is not readily available. It may be advantageous for researchers or people working with plague-infected animals to be vaccinated but it is not indicated for the general public.

## Control and Prevention

**Environmental Control:** The use of insecticide dusting powder to kill fleas on rodents is effective in controlling plague in relatively small high-human-use areas. This powder is directly in the rodent burrow or in bait station tubes so that rodents may be dusted as they run through the tube, attracted by food. Rodent population control is not recommended unless there are adequate professional observers to evaluate and safeguard the use of toxicants. Poisoning of colony rodents such as prairie dogs should not be routinely employed because this releases fleas to the environment causing additional risk to people and domestic pets. Closure of specific plague-infested campgrounds and restricted access to hazardous areas may be warranted in cases when active animal plague is observed.

### Individual Precautions:

- DO NOT feed or entice any rodent or rabbit species into your yard, back porch or patio
- Eliminate rodent harborage such as piles of lumber, broken cement, trash and weeds around your home or recreational cabin
- Make sure that houses and outbuildings are as rodent-proof as possible. Keep foundations in good repair and eliminate overhanging trees from roof and windows
- When camping or hiking, do not linger in rodent-infested areas. Do not catch, play with or attempt to hand feed wild rodents
- Avoid contact with all sick and dead rodents and rabbits. Look for the presence of blow flies or dead animal smell as evidence of animal die-offs. Report such areas to local or state health departments or to the appropriate campground office

- While hiking, treat pants, socks, shoe tops, arms and legs with insect repellants
- Keep all dogs leashed, or better yet, leave them at home when hiking or camping. This is a good reason to restrain cats and dogs from roaming at all times
- Insecticide powders or shampoos should be used on cats and dogs every few days while in plague areas but the effectiveness of flea-repellant collars has not been proven
- If you hunt or trap rabbits or carnivorous wild animals such as coyotes and bobcats, protect your hands and face while skinning or handling these animals. Fresh pelts may be treated with flea powder
- Bites from wild carnivores and from cats and dogs have caused human plague. Such animals may be infected, carry the bacteria in their mouths or may transport infective fleas
- Cats sometimes exhibit swelling and sores around the mouth head and neck when infected. Seek professional veterinarian care for such animals and do not handle suspiciously sick pets without gloves and face protection
- Remember the incubation period of 2-6 days and consult a physician if sudden unexplained illness occurs within that period after activities in the outdoors

### Summary

**Factors to remember:** Illness from plague can be treated successfully and cured if it is diagnosed early in its course. History of possible exposure is very important because symptoms resemble those of many other infectious diseases. If precautions are taken, the probability of an individual contracting plague, even in an active plague area, is quite low. We want to raise the level of alertness among residents and visitors so that the hazard is recognized. Control and prevention efforts are directed toward breaking the infection cycle of the disease in rodents, their fleas and other animals. Cats and dogs are important in the transmission scheme because they are often in close contact with people. Plague cannot be eliminated from our natural environment, our current objective is to prevent human cases.

In Colorado, local health departments and county environmental health officers have training in plague surveillance and control. Their agencies should be contacted whenever your observations, especially large-scale rodent die-offs, arouse suspicions about this disease.

Laboratory diagnostic support and additional information is available through the Colorado Department of Public Health & Environment, Disease Control & Environmental Epidemiology Division which may be reached at 303-692-2700. For after hours emergencies, consultation is available at 303-370-9395.