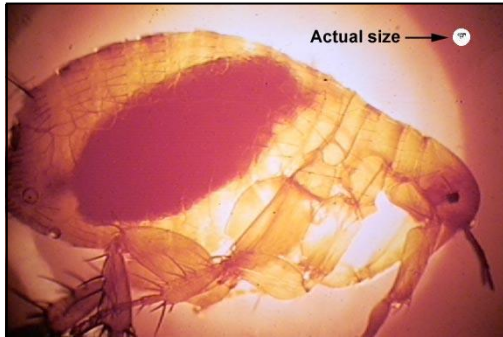


Plague is an infectious disease of animals and humans caused by the bacteria *Yersinia pestis*. People usually get plague through the bite of a plague-infected rodent flea or by handling an infected animal. It can occur in three forms: bubonic, septicemic, and pneumonic.

How is plague transmitted?

Fleas become infected with *Y. pestis* bacteria by feeding on plague-infected rodents, such as chipmunks, prairie dogs, ground squirrels, rabbits, mice, and rats and can then transmit the bacteria to healthy animals or humans. The bacteria multiply and block the flea's stomach, and the next time it tries to feed, the block makes it regurgitate bacteria into the feeding site. People can also become infected by handling or eating infected animals and, rarely, by inhaling respiratory droplets expelled by a coughing animal (especially domestic cats) or human infected with pneumonic plague. *Yersinia pestis* is so infectious and deadly when spread by the aerosol route (pneumonic plague) that it is considered a potential bioweapon. Wild carnivores can also become infected by eating other infected animals.



Male *Xenopsylla cheopis* (oriental rat flea) engorged with blood. This flea is a major plague vector throughout Africa, Asia, and South America. Both male and female fleas can transmit plague bacteria. Photo: CDC

How common is plague?

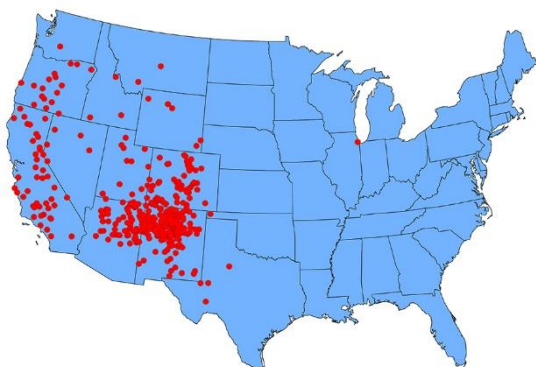
During the Middle Ages, plague epidemics were responsible for the death of millions of people in Europe, Asia, and Africa. Plague is much less common today, but outbreaks still occur in rural communities and villages. Large outbreaks are usually associated with infected rats and their fleas (especially the oriental rat flea, *Xenopsylla cheopis*) that live in and around homes, while isolated cases in the western and southwestern United States are usually caused by other wild rodents and their associated fleas. The World Health Organization reports 1,000 to 3,000 global cases annually, though the true number is likely much higher. In recent decades,

the United States reported an average of seven human plague cases a year (range: 1–17 cases per year). Most human cases in the United States occurred in northern New Mexico, northern Arizona, southern Colorado, California, southern Oregon, and western Nevada. Over 80% of plague cases diagnosed in the United States were the bubonic form. Plague does not currently occur in Australia or Western Europe.

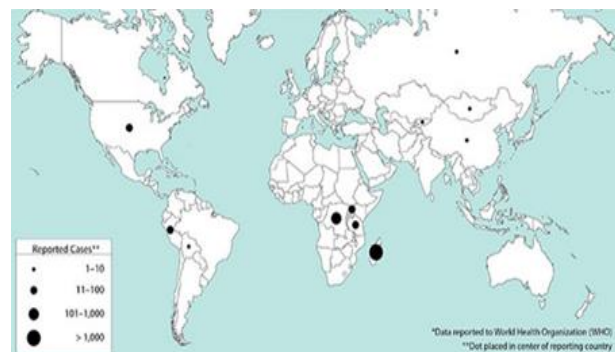


Prairie dogs are among the rodent species that can harbor *Y. pestis*-infected fleas. Photo: D. Draper, Utah DWR

Reported Plague Cases in the United States, 1970-2017



Reported Plague Cases by Country, 2010-2015 (CDC)



How do plague outbreaks occur?

Human plague cases are often preceded by an outbreak in susceptible wild rodent populations. When large numbers of rodents die, their hungry, infected fleas seek other blood sources. Humans living nearby are at increased risk, especially if living in crowded or unsanitary conditions.

What are the different forms of plague?

- Bubonic plague is the most common form of plague and usually occurs after the bite of an infected flea. The key feature of bubonic plague is a swollen, painful lymph node, usually in the groin, armpits, or neck. Swelling usually occurs in the lymph node closest to the bite site. Other symptoms include fever, chills, headache, and extreme exhaustion. A person usually becomes ill with bubonic plague 1–6 days after being bitten by an infected flea. The bacteria can spread to other parts of the body and can cause septicemic or pneumonic plague if not treated early.
- Septicemic plague occurs when plague bacteria multiply in the bloodstream. Symptoms include high fever, exhaustion, light-headedness, and abnormal pain. Septicemic plague can quickly cause shock and organ failure.
- Pneumonic plague occurs when plague bacteria infect the lungs. Symptoms include high fever, severe pneumonia, chills, cough, difficulty breathing, and coughing bloody mucus. Pneumonic plague is almost always fatal if not treated rapidly.



How is plague treated?

Plague is a severe disease and can be fatal if left untreated. The earlier patients seek medical care and receive appropriate treatment, the better their chances of making a full recovery. Infected individuals should be hospitalized and isolated immediately if plague is suspected. Plague can be successfully treated with antibiotics. Identify and evaluate people who have been in close contact with a plague patient to prevent spread.

How can plague be prevented?

There is no vaccine for plague. Use the following preventive measures to avoid plague:

- Eliminate rodent habitat around homes, sheds, garages, and recreational areas by removing brush, rock piles, trash, building materials, and firewood. Make your home and outbuildings rodent-proof.
- Keep pet food and bird seed in rodent-proof containers.
- Avoid handling sick or dead animals, and report them to the local health department.
- If you have to handle potentially infected animals, wear gloves to prevent contact between your skin and the plague bacteria, and wash your hands thoroughly afterward.
- Use flea-control products to keep fleas off your pets. Free-roaming animals are more likely to come in contact with plague-infected animals or fleas and could bring them home. If your pet becomes sick, seek veterinary care as soon as possible. Do not allow pets to hunt or roam in rodent habitat like prairie dog colonies.
- If you live in a plague-transmission area, do not allow outdoor dogs or cats sleep on your bed.
- Use the DoD Insect Repellent System to prevent flea bites:
 - Wear long pants tucked into boots or socks, long sleeves, and shirt tucked into pants. It is easier to spot fleas on light-colored clothing.
 - Wearing permethrin-treated clothing, using DEET-based insect repellent on bare skin, and sleeping under permethrin-treated bed nets will provide maximum protection from flea bites.
- Soldiers should avoid close contact with local human populations or domestic/wild animals during deployments.
 - Wear a tight-fitting, disposable surgical mask if required to interact with a suspected pneumonic plague patient. In emergency situations, a makeshift face coverings made of layers of cloth may be helpful.



For additional information, visit:

Centers for Disease Control and Prevention (CDC): Plague <https://www.cdc.gov/plague/index.html>

New Mexico Department of Health: Plague <https://nmhealth.org/about/erd/ideb/zdp/plg/>

World Health Organization (WHO): Plague <https://www.who.int/en/news-room/fact-sheets/detail/plague>