



Pneumonic Plague: Biological Weapon BACKGROUND

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Biological Weapon

Plague is an infectious disease of animals and humans caused by a bacterium named *Yersinia pestis*. *Yersinia pestis* is found in rodents and their fleas in many areas around the world, and can be grown in large quantities.

The primary infection due to this bacterium is bubonic plague. The less common, secondary infection from *Yersinia pestis*, is pneumonic plague.

If disseminated by aerosol, the result could be an epidemic of the **pneumonic form** with the potential for secondary spread of cases.

A bioterrorism attack would be characterized by pneumonic plague cases occurring simultaneously in persons 1 to 6 days following a common exposure, and in a secondary wave in unprotected case contacts.

A weapon designed to aerosolize the plague bacterium could cause a rapidly severe and fatal disease in exposed persons.

There are no effective environmental warning systems to detect an aerosol of plague bacilli.

The Disease

The typical sign of the most common form of human plague is a swollen and very tender lymph gland, accompanied by pain. The swollen gland is called a "bubo" (hence the term "bubonic plague").

Bubonic plague is suspected when a person develops a swollen gland, fever, chills, headache, and extreme exhaustion, and has a history of possible exposure to infected rodents, rabbits, or fleas. Infection of the lungs with the plague bacterium causes the pneumonic form of plague, a severe respiratory illness.

Although pneumonic plague is an uncommon form of the disease, large outbreaks of pneumonic plague have occurred. Primary pneumonic plague results from the inhalation of plague bacilli.

The first signs of illness from pneumonic plague would be expected to be fever, headache, weakness and cough with bloody, sometimes watery sputum. In 2 to 4 days the illness would lead to septic shock and, without early treatment, high mortality.

The Risk

Before antibiotic treatment, nearly 100 percent of cases of pneumonic plague were reported to be fatal. Few physicians in the United States have ever seen a case of pneumonic plague. A pneumonic plague outbreak would initially resemble an outbreak of other severe respiratory illnesses, but would quickly be distinguished by the rapid development of life threatening respiratory failure, sepsis, and shock.

Person-to-person transmission of pneumonic plague occurs through respiratory droplets, which can only infect those who have direct and close (within 6 feet) exposures to the ill patient. *Yersinia pestis* is very sensitive to the action of sunlight and does not survive long outside the host. Research suggests it may survive in the exposed environment for up to one hour.

Treatment

Confirmatory testing for *Yersinia pestis* usually takes from 24 to 48 hours; presumptive identification by fluorescent antibody testing takes less than 2 hours. Laboratory tests should be done, including blood cultures for plague bacteria and microscopic examination of lymph gland, blood, and sputum samples.

A patient diagnosed with suspected plague should be hospitalized and medically isolated. Antibiotic treatment should begin as soon as possible after laboratory specimens are taken. Streptomycin is the antibiotic of choice. Gentamicin is used when streptomycin is not available. Tetracycline and chloramphenicol are also effective.

In a community experiencing a pneumonic plague epidemic, all persons who develop a fever or new cough should promptly begin antibiotic treatment.

Persons having household, hospital, or other close contact with persons with untreated pneumonic plague should receive postexposure antibiotic treatment for 7 days. (Close contact is defined as contact with a patient at less than 6 feet). The use of disposable surgical masks is recommended to prevent the transmission of pneumonic plague to persons in close contact with cases.

The U.S. Public Health Service requires that all cases of suspected plague be reported immediately to local and state health departments and that the diagnosis be confirmed by CDC. As required by the International Health Regulations, CDC reports all U.S. plague cases to the World Health Organization.

Additional information about biological agents is available online at <http://www.bt.cdc.gov/bioagents.asp>