

Plague Fact Sheet

I. Etiology

Plague is an acute bacterial disease caused by the gram-negative bacillus, *Yersinia pestis*. It occurs in 3 forms: pneumonic (pulmonary), bubonic (lymph node infection), and septicemic (blood stream infection). As a biological weapon, the bacillus would be distributed by aerosolization, so that it is inhaled by the intended victims, causing rapid, fulminant pulmonary disease.

II. Mode of Transmission

A bioterrorism attack would most likely be characterized by pneumonic cases occurring simultaneously in people from 1 to 6 days following a common exposure to aerosolized bacillus, and in a secondary wave of people infected by inhalation of droplets from those initially infected. Bubonic and septicemic forms of the disease are not likely to be implicated in a bioterrorist attack.

- Plague is normally transmitted from an infected rodent to man by infected fleas.
- Bioterrorism-related outbreaks are likely to be transmitted through dispersion of an aerosol.
- Person-to-person transmission of pneumonic plague is possible via large aerosol droplets.

III. Incubation Period

The incubation period is 2-8 days if due to flea borne transmission. The incubation period may be shorter for pulmonary exposure (1-3 days).

IV. Period of Communicability

Patients with pneumonic plague may have coughs productive of infectious particle droplets. Droplet precautions, including the use of a mask for patient care, will be implemented until the patient has completed 72 hours of antimicrobial therapy.

V. Clinical Features

In all 3 forms, plague initially begins with a flu-like prodrome, including fever, chills, myalgia, chest pain, weakness and headache and progressing to hemoptysis and muco-purulent sputum with x-ray evident of bronchial pneumonia. Diarrhea, nausea, vomiting and abdominal pain are common. In addition, specific clinical features of each form include:

1. Pneumonic Plague

- Within 24 hours of the onset of the prodrome, chest discomfort, cough, and shortness of breath develops.
- By day 2-4, the patient begins coughing blood; progresses rapidly to dyspnea, stridor, cyanosis, respiratory failure, circulatory collapse and death.
- CXR shows patchy, often bilateral, infiltrates and/or consolidated bronchopneumonia.
- Incubation 1-6 days after exposure.
- Communicable from the onset of symptoms until sputum cultures are negative in a confirmed case, or until the completion of 72 hours of antibiotic therapy and symptoms have subsided in a suspected case.
- Mortality rate is extremely high if antibiotic therapy is not initiated within 18-24 hours of onset of symptoms.

2. Bubonic Plague

- Transmitted to humans through bites of infected fleas or rodents and rarely by contact with pus by draining buboes.
- Within 24 hours of inoculation, bacteria are transported to the lymph nodes, which become swollen. The swollen lymph nodes are known as buboes. Buboes should not be aspirated, except for diagnosis.
- Incubation is from 1-10 days after inoculation.

3. Septicemic Plague

- Usually a secondary infection to Bubonic and Pneumonic Plague.
- DIC, characterized by purpuric skin lesions and thrombosis.
- May be secondary to pneumonic or bubonic forms, rarely, a primary infection.
- Meningitis occurs in 5% of cases.
- Incubation is from 1-10 days.
- Is not usually transmitted person to person, but contact with blood and body fluids should be avoided.

VI. Infection Control Practices for Patient Management

A. Isolation Precautions

1. Standard precautions are used for the care of all patients.

Standard precautions include the routine use of clean gloves for contact with non-intact skin. Gowns, goggles, masks, and other PPE must be worn to prevent contact with body fluids,

Hand washing – Hands are washed after touching body fluids or items contaminated with body fluids, whether or not gloves are worn. Hands are washed immediately after gloves are removed and between patient contacts. Either plain or antimicrobial-containing soaps may be used.

Clean, non-sterile gloves are worn when touching blood, body fluids, excretions, secretions, or contaminated items. Gloves are changed between tasks and between procedures on the same patient if contact occurs with contaminated material. Hands are washed promptly after removing gloves and before leaving a patient care area.

2. Pneumonic plague requires strict respiratory precautions

Personnel should wear submicron masks when providing all patient care. Three consecutive negative sputums at least 8 hours apart will be obtained prior to discontinuation of respiratory isolation in confirmed pneumonic plague. In suspected cases, 72 hours of antibiotic therapy will be completed with a decrease in symptoms before isolation is discontinued. A submicron mask should be placed on the patient for transport. The patient will be carefully monitored for tolerance of the mask.

B. Room Placement

1. **Pneumonic plague** – negative pressure room is not required. Private room placement is preferable, but cohorting patients with lab confirmed pneumonic plague is acceptable.
2. **Bubonic or septicemic plague** – Private room placement is preferable, but cohorting patients with lab confirmed plague may be necessary.

C. Patient Transport – Standard precautions should be used. Patients with known or suspected pneumonic plague will wear a submicron mask during transport.

- D. Principles of standard precautions should be applied for equipment and environmental cleaning.
- E. Linen is handled in accordance with standard precautions.
- F. All waste is considered contaminated.
- G. No special discharge instructions are needed; however, home care providers shall be taught to use standard precautions.
- H. Strict standard precautions should be used for post-mortem care. In addition to standard precautions, surgical masks should be worn during autopsies.

VII. Post Exposure Management

In situations where the possibility of gross exposure to *Y. pestis* exists, cleansing of skin and potentially contaminated fomites (e.g., clothing or environmental surfaces) may be necessary to reduce the risk for exposure. The plan for decontaminating patients exposed to plague includes the following:

- Instruct patients to remove contaminated clothing and place in plastic biohazard bags for incineration.
- Handle clothing minimally to avoid agitation.
- Instruct patients to shower thoroughly with soap and water, providing assistance as necessary.
- Instruct personnel regarding standard precautions and wearing appropriate barriers when handling contaminated clothing or other contaminated fomites.
- Decontaminate environmental surfaces using a hospital-approved disinfectant.
- Surfaces where the aerosol may have settled should be cleaned with a hospital-approved disinfectant.

