

PLAGUE

Disease Overview

A bacterial infection caused by *Yersinia pestis*. Wildlife reservoirs exist worldwide and are maintained within wild rodents and vector fleas. Foci of plague is found in the western United States and South America.

Symptoms

Plague has three possible presentations: bubonic, septicemic and pneumonic. Initial symptoms of all three forms are nonspecific with fever, chills, malaise, muscle soreness, nausea, prostration, sore throat and headache.

Plague - bubonic is acquired cutaneously, lymphadenitis often develops into the characteristic inflamed and pus-filled buboes. The location of buboes varies. Septicemic plague can occur subsequent to bubonic plague.

Plague – pneumonic may be secondary to bubonic or septicemic plague with dissemination of bacteria to the lungs or may be primary from respiratory spread by direct contact with a pneumonic plague patient and inhalation of respiratory droplets. Symptoms include cough, difficulty breathing and expectoration.

Reservoir

Wildlife reservoirs - wild rodents.

Mode of Transmission

Infection is spread through bites of fleas of wild rodents or through skin abrasions or bites when handling wild rodents. Fleas may transfer the bacteria to other mammals, including rabbits and domestic cats, which may then cause human infection.

Plague - bubonic is not usually transmitted person to person unless there is contact with pus from suppurating buboes.

Plague – pneumonic can be transmitted person to person through respiratory droplets spread.

Incubation Period

From 1-7 days.

Primary **pneumonic plague** has a short incubation period lasting 1- 4 days.

Period of Communicability

Patients are infectious until appropriate chemotherapy has been started (at least 48 hours) and favorable clinical response is seen.

Risk Factors

Increased risk of acquiring/and or severe illness:

- Travel to endemic areas with natural foci
- Poor rodent sanitation practices and occupational exposure in endemic areas
- Exposure to clinical case of pneumonic plague

Surveillance Case Definition

Confirmed case

Clinical evidence of illness with laboratory confirmation of infection:

- Isolation of *Yersinia pestis* from body fluids
OR
- A significant (i.e. fourfold or greater) rise in serum antibody titre to *Y. pestis* fraction 1 (F1) antigen by EIA or passive hemagglutination/inhibition titre

Probable case

Clinical evidence of illness with any of the following laboratory evidence:

- Demonstration of elevated serum antibody titre(s) to *Y. pestis* F1 antigen (without documented significant [i.e. fourfold or greater] change) in a patient with no history of plague immunization
OR
- Demonstration of *Y. pestis* F1 antigen by immunofluorescence
OR
- detection of *Y. pestis* nucleic acid
OR
- >1:10 passive hemagglutination/inhibition titre in a single serum sample in a patient with no history of vaccination or previous infection
OR
- Detection of *Y. pestis* antibody by EIA

Diagnosis and Laboratory Guidelines

Testing is done at the National Microbiology Laboratory. Cultures are done from appropriate clinical specimens (e.g. blood, tissues and cerebral spinal fluid). Preliminary serological tests are polymerase chain reaction (PCR) tests on antibodies, followed by confirmatory testing for positive samples. Confirmatory tests include direct fluorescent antibody staining and other tests.

Turnaround time is 4 days for a preliminary result and 14 days for the final result.

Reporting

Per Policy 2.2 Disease and Event notification to OCMOH and Disease and Event Reporting section

- CD Urgent Notification for **Plague**
- Routine Surveillance (RDSS) for all confirmed cases of **Plague**

Case Management

Education

Case or relevant caregiver should be informed about:

- Nature of infection, length of communicable period, mode of transmission and disease ecology.

- Animal handling precautions, including do not handle sick or dead animal bodies or use gloves plus face and eye protection
- Rodent and flea control if there is local acquisition.
- Avoid touching infected tissues, materials, or body fluids from a plague-infected person. Keep a minimum of 1 metre (3 feet) between you and anyone who may have the lung form of plague (pneumonia).
- Use appropriate biosafety precautions in laboratories.

Investigation

Every case should be followed up as soon as possible to determine the source of exposure and eliminate the possibility that the case is a result of bioterrorism.

Exclusion/Social Distancing

Infection control precautions are required to protect those who may be exposed to infected patients.

Plague – pneumonic patients are highly infectious and should be strictly isolated (precaution of airborne spread until 48h of initiating antibiotic therapy).

Treatment

Antibiotics

Immunization

Not widely available

Contact Management

Close contacts of pneumonic plague are household members and those who have been within 2 metres of a coughing patient in the previous 7 days. People who had some contact with a person with pneumonic plague (but not close contact) in the previous 7 days should be **monitored for fever or cough**.

Close contacts of bubonic plague are those that have had direct contact with infected body fluids or tissues (for example fluids from buboes).

Per case management

Education

Same as for case management

Investigation

Every case should be followed up as soon as possible to determine the source.

Social Distancing

Close contacts refusing chemoprophylaxis should be maintained in strict isolation with careful surveillance for 7 days.

Prophylaxis

Household or face to face contacts should be offered antibiotic chemoprophylaxis. Contacts should be self-monitoring for symptoms for 7 days or be under public health surveillance.

Outbreak Management

Search for common source of infection and activate local outbreak management plan.

Management of Special Situations

Potential Agents of Bioterrorism

Plague is a potential agent of bioterrorism because it is highly infectious in aerosol form. Consider bioterrorism for two or more cases linked in time and place or a single confirmed case if not explained either occupational risk or exposure in an endemic area; or if investigating a pneumonic case.

If bioterrorism is suspected:

- Consult with the **RMOH IMMEDIATELY**
- Inform relevant agencies and partners including OCMOH, local law enforcement and others as appropriate.
- Take any relevant actions to prevent further human exposures.