PLAGUE

REPORTING INFORMATION
- Class A(1)
- Report immediately by telephone
- Report of suspected and confirmed cases is universally required by International Health Regulations

AGENT
Yersinia pestis, the plague bacillus, a gram-negative coccobacillus; enterobacteriaceae

Infectious Dose: A single bite of an infectious flea. Each bite releases several thousand plague bacilli from the gut of the flea. Inhalation of a droplet of infectious mucous from a pneumonic plague patient.

CASE DEFINITION

Clinical description

Plague is transmitted to humans by fleas or by direct exposure to infected tissues or respiratory droplets; the disease is characterized by fever, chills, headache, malaise, prostration, and leukocytosis that manifests in one or more of the following principal clinical forms:
- Regional lymphadenitis (bubonic plague)
- Septicemia without an evident bubo (septicemic plague)
- Plague pneumonia, resulting from hematogenous spread in bubonic or septicemic cases (secondary pneumonic plague) or inhalation of infectious droplets (primary pneumonic plague)
- Pharyngitis and cervical lymphadenitis resulting from exposure to larger infectious droplets or ingestion of infected tissues (pharyngeal plague)

Laboratory criteria for diagnosis

Presumptive
- Elevated serum antibody titer(s) to *Yersinia pestis* fraction 1 (F1) antigen (without documented fourfold or greater change) in a patient with no history of plague vaccination or
- Detection of F1 antigen in a clinical specimen by fluorescent assay

Confirmatory
- Isolation of *Yersinia pestis* from a clinical specimen or
- A fourfold or greater change in serum antibody to *Y. pestis* F1 antigen

Case classification

Suspected: A clinically compatible case without presumptive or confirmatory laboratory results
Probable: A clinically compatible case with presumptive laboratory results
Confirmed: A clinically compatible case with confirmatory laboratory results

SIGNS AND SYMPTOMS
Bubonic plague accounts for 90%-95% of cases. Lymphadenopathy and fever with malaise, nausea, vomiting, and diarrhea characterize bubonic plague. Involvement of the lungs results in the very rare but highly contagious pneumonic form. Untreated bubonic plague has a case fatality rate of 50%-60%; for untreated pneumonic plague, the rate is near 100%

DIAGNOSIS
See case definition.
Evaluation of clinical specimens (CSF, bubo aspirates, etc.) by FA, and antibody testing (ELISA serology) is available at the CDC. Proper protocol is to send the serum or other sample(s) to CDC through the ODHL. Call ODH (614) 644-4659 to arrange for shipment of serum or other specimens to CDC.

EPIDEMIOLOGY

Source
Plague is a worldwide zoonosis involving mammals and their fleas. Endemic foci persist in Africa, Asia, South America, and the western United States.

Occurrence
Endemic plague has not been reported from Ohio. Approximately 90% of the cases in the United States are reported from New Mexico, Arizona, California, and Colorado. From 1990-1997, annual case reports ranged from 2-17, with one or two fatalities per year in the period 1992-96.

Mode of Transmission
The pneumonic form is spread through airborne droplets. The bubonic form is transmitted through the bite of an infected flea and by handling infected tissues.

Period of Communicability
Bubonic plague is not transmitted person-to-person. The pneumonic form is highly contagious. There is no carrier state.

Incubation Period
2-7 days.

PUBLIC HEALTH MANAGEMENT
Case
Investigation

Plague should be considered in the febrile patient who has a history of travel to endemic areas, especially during the summer months (June to September). Travel history and contacts should be determined for the two weeks prior to the onset of illness.

Treatment/therapy

Streptomycin is the drug of choice. Alternatives include gentamicin, tetracyclines, and chloramphenicol

Isolation

The Ohio Administrative Code (OAC 3701-3-13 [T]) states that "a person with plague shall be isolated until completion of forty-eight hours of effective antimicrobial therapy." Cases of pneumonic plague should be held in strict respiratory isolation. Bubonic cases with no cough and a negative chest X-ray need only mask and gown isolation precautions.

Public Health Significance

High, especially for pneumonic plague, which is highly contagious

Contacts
Persons exposed to plague patients who have pneumonia or to *Yersinia pestis* aerosols in the laboratory should be given 7 to 10 days course of antimicrobial therapy regardless of vaccination history.

Prevention and Control
Travelers

Travelers to western states (especially New Mexico and Arizona) should be warned to avoid handling living or dead wild animals and their fleas and to stay away from burrows. Gloves should be worn when skinning animals. Pets should be restrained and not allowed contact with wild rodents. Fleas should be controlled. Dogs and cats should not be fed raw rodents or rabbit meat. Rodent infestation should be discouraged around houses and yards. Insect repellents should be used to prevent flea bites; follow label instructions and avoid overuse.

Vaccination

Although various modifications of killed plague vaccine have been available since World War II, its efficacy in protecting humans has not been adequately demonstrated, especially for pneumonic plague. The vaccine does appear to be effective in preventing flea-borne transmission. Vaccination is recommended only for those who are at high risk of exposure (e.g., laboratory staff working with infectious specimens or cultures; mammologists, etc., working in endemic areas). For details and indications refer to the ODH immunization manual or call ODH Immunization at (614) 466-4643.

SPECIAL INFORMATION

Plague is a candidate for acts of biological terrorism, especially due to the high contagious potential of the pneumonic form of the disease.