

Virginia Department of Health

Plague: Overview for Healthcare Providers

Organism	<i>Yersinia pestis</i> are gram-negative, rod-shaped bacteria belonging to the family <i>Enterobacteriaceae</i>
Reporting to Public Health	Suspected or confirmed cases require <u>immediate</u> notification to the local health department (LHD). See http://www.vdh.virginia.gov/local-health-districts/
Infectious Dose	~100 to 500 organisms by inhalation
Occurrence	<ul style="list-style-type: none"> • Plague occurs worldwide, but primarily in sub-Saharan Africa. • In the United States, plague is rare (1-17 cases/year), with most cases reported in the southwest and western regions. • Plague does not occur naturally in Virginia.
Natural Reservoir	<ul style="list-style-type: none"> • Primarily rodents (e.g., ground squirrels, prairie dogs, chipmunks, wood rats, deer mice and voles) and their fleas. • Rabbits, hares, wild carnivores, or domestic cats can also be infection sources.
Route of Infection	<ul style="list-style-type: none"> • Bite of infected flea • Unprotected handling of infected animal tissues or laboratory specimens • Respiratory droplets from people or animals with plague pharyngitis or pneumonic plague • Aerosolized bacteria could be used for bioterrorism attack, resulting in pneumonic plague.
Communicability	<ul style="list-style-type: none"> • Infected fleas can remain infectious for months under suitable environmental conditions. • Bubonic plague and septicemic plague are not usually transmitted from person to person unless there is direct contact with infected body fluids or tissues. • Pneumonic plague is usually highly communicable by respiratory droplets within a close distance (< 6 feet) when patient is symptomatic and has had less than 48 hours of appropriate antibiotic therapy. Patients are usually no longer infectious after 48 hours of appropriate antibiotic treatment with clinical improvement.
Risk factors	<ul style="list-style-type: none"> • Traveling to plague-endemic areas (e.g., sub-Saharan Africa) • Handling infected animals (e.g., veterinarians, hunters, pet owners) or plague cultures (e.g., laboratorians) • Camping or hiking in areas where plague-infected animals or fleas reside.
Case-Fatality Rate	<ul style="list-style-type: none"> • ~11% in U.S. with treatment. Fatality rate might be higher in developing countries. • The case-fatality rate is lower for bubonic plague than for septicemic or pneumonic plague.
Incubation Period	1–6 days for pneumonic plague, 2–8 days for bubonic plague, 1–7 for septicemic plague
Clinical Description	<ul style="list-style-type: none"> • There are 3 main clinical forms of plague: bubonic, pneumonic and septicemic • Bubonic plague: acute onset of fever and painful swollen lymph nodes (buboes), most commonly in the inguinal, axillary, or neck region. Headache, weakness, chills, nausea, vomiting, and diarrhea are common. Untreated bubonic plague can lead to septicemic plague and pneumonic plague. • Pneumonic plague: fever, chills, headache, malaise, and productive, bloody cough. Rapid development of dyspnea, stridor, cyanosis, and respiratory failure. • Septicemic plague: fever, respiratory distress, purpuric skin lesions; gastrointestinal symptoms (nausea, vomiting, diarrhea, and abdominal pain) might be present. Can progress rapidly to septic shock, intravascular coagulopathy, meningitis, or coma.
Differential Diagnosis	<ul style="list-style-type: none"> • Bubonic: cat scratch disease (<i>Bartonella</i>), ulceroglandular tularemia, adenitis due to staphylococcal, streptococcal, or filarial infection, tuberculosis, nontuberculosis mycobacterial infection, lymphogranuloma venereum, <i>Capnocytophaga canimorsus</i> infection, chancroid, strangulated inguinal or femoral hernia, lymphadenopathy due to nonspecific infections, appendicitis, cellulitis

	<ul style="list-style-type: none"> • Pneumonic: Other bacterial pneumonia (<i>Mycoplasma</i>, <i>Legionella</i>, <i>Staphylococcus</i>, <i>Streptococcus</i>, <i>Haemophilus</i>, <i>Klebsiella</i>) and viral pneumonia (influenza, respiratory syncytial virus, hantavirus, severe acute respiratory syndrome), Chlamydia infection, Q fever, inhalation anthrax, tularemia • Septicemic: Other gram-negative sepsis and gram-positive sepsis (<i>Staphylococcus</i>), meningococemia, rickettsial infections, malaria
Radiography	Pulmonary infiltrates or consolidation on chest radiograph for pneumonic plague
Specimen Collection and Laboratory Testing	<ul style="list-style-type: none"> • If plague is suspected, notify LHD immediately to discuss the case and laboratory testing. • Specimens may be sent to Division of Consolidated Laboratory Services (DCLS) <u>after</u> LHD has been consulted and testing has been approved by VDH. • Pre-treatment specimens should be collected if possible, but treatment should not be delayed. • Specimens to test depend on clinical presentation, but could include lymph node aspirate (≥ 1 mL) for culture; blood (in liquid blood culture bottles per clinical lab guidelines) for culture; lower respiratory tract specimen (>1 ml for induced sputum, tracheal aspirate, BAL, or pleural fluid) for culture; acute and convalescent serum (>2 ml each) for serology. • For questions about specimen collection, contact the DCLS Emergency Officer 24/7 at 804-335-4617.
Treatment	<ul style="list-style-type: none"> • Gentamicin and fluoroquinolones are typically first-line treatments in the United States. • Information on choice of drugs, dosing and duration of treatment is available at https://www.cdc.gov/plague/healthcare/clinicians.html. • For additional information on dosing, please consult the package inserts.
Post-Exposure Prophylaxis (PEP)	<ul style="list-style-type: none"> • PEP is indicated in persons with known exposure to plague, such as close contact with a pneumonic plague patient or direct contact with infected body fluids or tissues. • Information on PEP is available at https://www.cdc.gov/plague/healthcare/clinicians.html.
Vaccine	A vaccine for plague is not commercially available in the United States.
Infection Control	<ul style="list-style-type: none"> • Use Standard Precautions for all types of plague • Patients with pneumonic signs should also be isolated and placed on Droplet Precautions until patient has received at least 48 hours of effective antibiotic therapy.