

Virginia Department of Health Plague: Overview for Healthcare Providers

Organism	<i>Yersinia pestis</i> are small gram-negative, rod-shaped bacteria (safety pin appearance) 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 https://www.vdh.virginia.gov/health-department-locator/
Infectious Dose	<100 colony-forming units 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 occurs naturally in the Western U.S. (e.g., Arizona, Colorado, New Mexico, and Utah); it 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 body fluids, 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. • Domestic cats can develop pneumonic plague by eating infected rodents and pose a risk of transmitting infectious plague droplets to their owners or veterinarians
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"> • Untreated bubonic plague is 50–60%; septicemic and pneumonic plague invariably fatal • ~11% in U.S. with treatment. Fatality rate might be higher in developing countries.
Incubation Period	1–3 days for pneumonic plague, 2–8 days for bubonic plague, poorly defined 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, headache, chills, weakness, and painful swollen lymph nodes (buboes), most commonly in the inguinal, axillary, or neck region. Nausea, vomiting, and diarrhea are common. Untreated bubonic plague can lead to septicemic plague and pneumonic plague. • Pneumonic plague: fever, headache, weakness, and productive cough (possibly bloody). Rapid development of pneumonia with dyspnea, chest pain, stridor, cyanosis, and respiratory failure. • Septicemic plague: fever, chills, extreme weakness, abdominal pain, shock, and bleeding into the skin and other organs. Respiratory distress and gastrointestinal symptoms (nausea,

	<p>vomiting, and diarrhea) might be present. Can progress rapidly to septic shock, intravascular coagulopathy, meningitis, or coma.</p> <ul style="list-style-type: none"> • Rare forms include pharyngeal, meningitic, cutaneous, ocular, and gastrointestinal
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 • 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), 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. • Do not wait for diagnostic test results if plague is suspected; confirmatory diagnosis can be established later with specialized lab tests. Disease can progress rapidly to death without appropriate antibiotic therapy. • Specimens to test depend on clinical presentation but could include culture isolates submitted on slants; lymph node aspirate (≥1 mL) 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"> • Begin appropriate therapy as soon as plague is suspected • Gentamicin and fluoroquinolones are first-line treatments in the United States • Information on choice of drugs, dosing, and duration of treatment for adults, children, and pregnant women is available at https://www.cdc.gov/plague/healthcare/clinicians.html • For additional information on dosing, please consult the drug package inserts
Preexposure Prophylaxis (PrEP)	<ul style="list-style-type: none"> • If standard and droplet precautions can be maintained, no need for PrEP for individuals caring for pneumonic plague patients • In cases of mask shortages, patient overcrowding, poor ventilation, or other situations, PrEP might be warranted if there are sufficient antimicrobial supplies • Information on PrEP for children and adults is available at https://www.cdc.gov/plague/healthcare/clinicians.html
Postexposure Prophylaxis (PEP)	<ul style="list-style-type: none"> • PEP is indicated in persons with known exposure to plague, such as close (<6 ft), sustained contact with a pneumonic plague patient, or direct contact with infected body fluids or tissues • Information on PEP for children and adults 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.