PUBLIC HEALTH REFERENCE SHEET
Plague

Name	*Yersinia pestis,* the plague bacillus
Reservoir & Transmission	Wild rodents Rodent flea bite; contact with contaminated fluid or tissue; person-to-person inhalation of infectious droplets
Incubation Period	From 1–7 days; Bubonic: 2–8 days; Pneumonic: 1–3 days
Common Symptoms	Characterized by fever, chills, headache, malaise, prostration, and leukocytosis that manifests as one of the four major clinical forms: • Bubonic: Regional lymphadenitis (bubo) around infected flea bite. Most often inguinal; alternatively cervical or axillary • Septicemic: Without an evident bubo, abdominal pain, shock, bleeding into the skin and other organs, skin turns black and dies • Pneumonic: Rapidly developing pneumonia with shortness of breath, chest pain, cough, and sometimes bloody or watery mucous • Pharyngeal: Pharyngitis and cervical lymphadenitis
Gold Standard Diagnostic Test	Fluorescent Antibody (FA) test: antigen capture by enzyme-linked immunosorbent assay (ELISA) or dipstick formats; or polymerase chain reaction (PCR); or by a four-fold or greater rise or fall in antibody titer. Isolation of *Y. pestis* by culture of bubo aspirates, blood, CSF, or sputum samples
Risk Groups	Susceptibility among humans is general; Veterinary staff, hunters, trappers, trekkers, and farmers during or following outbreak; areas with poor rodent sanitation practices
Geographic Significance	Most common in rural areas of Central and Southern Africa, Central Asia and the Indian subcontinent, the Northeastern South America, and parts of the Southwestern United States

What is plague?
Plague is an infectious disease caused by the *Yersinia pestis* bacteria, a gram-negative coccobacillus. Plague is a Centers for Disease Control and Prevention (CDC) Category A Bioterrorism Agent.

What is the occurrence of plague?
Plague was first introduced into the United States (U.S.) in 1900, by rat-infested steamships that sailed from affected areas, mostly Asia. Between 1900 and 2012, 1,006 confirmed or probable human plague cases occurred in the U.S. Over 80% of U.S. plague cases have been the bubonic form. Per CDC, in recent decades in the U.S., an average of seven human plague cases is reported each year (range: 1–17 cases per year), with most in Northern New Mexico, northern Arizona, southern Colorado, California, southern Oregon, and far western Nevada. Cases can occur any time of the year, though in the U.S., most are acquired from late spring to early fall. Plague is endemic to rural areas in central and southern Africa, especially eastern Democratic Republic of the Congo, northwestern Uganda, and Madagascar; parts of the southwestern United States; the northeastern part of South America; central Asia; and the Indian subcontinent. There have been no reported cases among travelers returning to the U.S. in over 40 years.

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How is plague transmitted?

Y. pestis transmission usually occurs through the bite of infected rodent fleas. Less common exposures include handling infected animal tissues (e.g., among hunters and wildlife personnel), inhaling infectious droplets from cats or dogs with plague; and, rarely, contact with a patient who has pneumonic plague. Cats can be infected by eating infected rodents and pose a risk of transmitting infectious plague droplets to humans. Several cases of human plague have occurred in the U.S. in recent decades because of contact with infected cats.

Who is at risk for plague?

- Human plague occurs in areas where the bacteria are present in wild rodent populations. Humans are more at risk of exposure during cooler summers that follow wet winters in areas with multiple types of rodents living in high densities and in diverse habitats.
- Veterinary staff, hunters, trappers, trekkers, and farmers operating during or following a plague outbreak.

What are the signs and symptoms of plague?

- Plague illness has 3 possible clinical presentations: bubonic (the most common), pneumonic, or septicemic.
    - Bubonic plague - The incubation period of bubonic plague is 2 to 8 days. Symptoms include fever, headache, chills, weakness, and one or more swollen, painful lymph nodes (buboes). The bacteria multiply in a lymph node near where the bacteria entered the human body, most often (>90%) inguinal, otherwise cervical, or axillary. If not treated with appropriate antibiotics, the bacteria can spread to other parts of the body.
    - Septicemic plague - The incubation period of septicemic plague is poorly defined but is likely within days of exposure. Symptoms include fever, chills, extreme weakness, abdominal pain, shock, and possibly bleeding into the skin and other organs. Skin and other tissues may turn black and die, especially on fingers, toes, and the nose, however without an evident bubo. Septicemic plague can occur as the first symptom of plague or may develop from untreated bubonic plague.
    - Pneumonic plague -The incubation period of pneumonic plague is usually 1 to 3 days. Symptoms include fever, headache, weakness, and a rapidly developing pneumonia with shortness of breath, chest pain, cough, sometimes bloody or watery mucous, and may cause respiratory failure and shock. Primary pneumonic plague may develop from inhaling infectious droplets. Secondary pneumonic plague is from hematogenous spread in bubonic or septicemic cases. Pneumonic plague is the most serious form of the disease and is the only form of plague that can be spread from person-to-person by infectious droplets.
- Pharyngeal plague is rare and presents with fever, sore throat, and cervical lymphadenitis; in its early stages, it may be clinically indistinguishable from more common causes of pharyngitis. Plague pharyngitis is the result from exposure to larger infectious droplets or ingestion of infected tissues. Cervical or submandibular buboes usually develop secondary to the pharyngeal involvement.

What are potential complications of plague?

Complications can include septic shock, organ failure, and death, particularly if left untreated. Meningitis can develop in up to 10% of patients with plague.

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How is plague diagnosed?

Y. pestis can be isolated from bubo aspirates, blood cultures, or sputum culture if pneumonic. One serum specimen should be taken as early in the illness as possible, followed by a convalescent sample 4–6 weeks or more after disease onset. State public health laboratories or CDC laboratories can confirm diagnosis by culture or serologic tests for the *Y. pestis* F1 antigen. Plague is a nationally notifiable disease. For diagnostic support, clinicians can contact CDC's Division of Vector-Borne Diseases (970-221-6400; dvbid@cdc.gov).

How is plague treated?

- Treatment for plague differs by clinical presentation and illness severity. The decision to initiate antibiotic therapy for plague should be made based on clinical signs and symptoms and a careful patient history. A recent flea bite, exposure to areas with rodents, or contact with a sick or dead animal are risk factors for plague in endemic areas. A confirmatory diagnosis can be established later using specialized laboratory tests. Never delay or withhold treatment pending the receipt of laboratory test results.
- Several different classes of antimicrobials effectively treat plague, but aminoglycosides and fluoroquinolones are considered first-line. Treating physicians can use doxycycline for bubonic or pharyngeal plague, but these should not be used for pneumonic or septicemic plague, or plague meningitis. If plague meningitis is suspected, use dual antibiotic therapy with chloramphenicol and a fluoroquinolone or aminoglycoside. For full treatment recommendations, refer to CDC online resources for clinicians at https://www.cdc.gov/plague/healthcare/clinicians.html.

How can plague be prevented?

- People can prevent plague by reducing contact with fleas and potentially infected rodents and other wildlife. Although a live attenuated vaccine has been in use in Russia since the 1930s, no plague vaccine is currently available for commercial use in the United States or western Europe. A killed whole-cell vaccine was available in the United States for people with occupational risk, but this vaccine was discontinued in 1999. Australia continued to use this vaccine until 2005. Newer vaccines using a recombinant F1 antigen are in development, but none are commercially available or currently approved for use by the U.S. Food and Drug Administration.
- Oral antibiotics, including doxycycline, ciprofloxacin, and levofloxacin can be prescribed for postexposure prophylaxis.

What are some public health considerations?

- When reporting plague in the Disease Reporting System internet (DRSi), document—
    - The clinical form of the infection.
    - Relevant travel and deployment history occurring within the incubation period.
    - The circumstances under which the case patient was exposed including duty exposure, occupational activities, environmental exposures, or other high-risk activities.
- Epidemiologically linked cases include any of the following:
    - A person who is epidemiologically linked to a person or animals with laboratory evidence within the prior 2 weeks of symptom onset date; or
    - Close contact with a confirmed pneumonic plague case, including but not limited to presence within 6 feet of a person with active cough due to pneumonic plague; or

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    - A person that lives in or has traveled within 2 weeks of illness onset to a geographically localized area with confirmed plague epizootic activity in fleas or animals as determined by the relevant local authorities.
- Serial or subsequent plague infections in one individual should only be reported as a new case if there is a new epidemiologically compatible exposure and new onset of symptoms.
- In the unlikely circumstance that a natural source of infection cannot be identified, public health and law enforcement authorities might suspect deliberate use. Public health response and measures to prevent the spread during bioterrorism events involving plague can be found at https://www.cdc.gov/plague/healthcare/bioterrorism-response.html.

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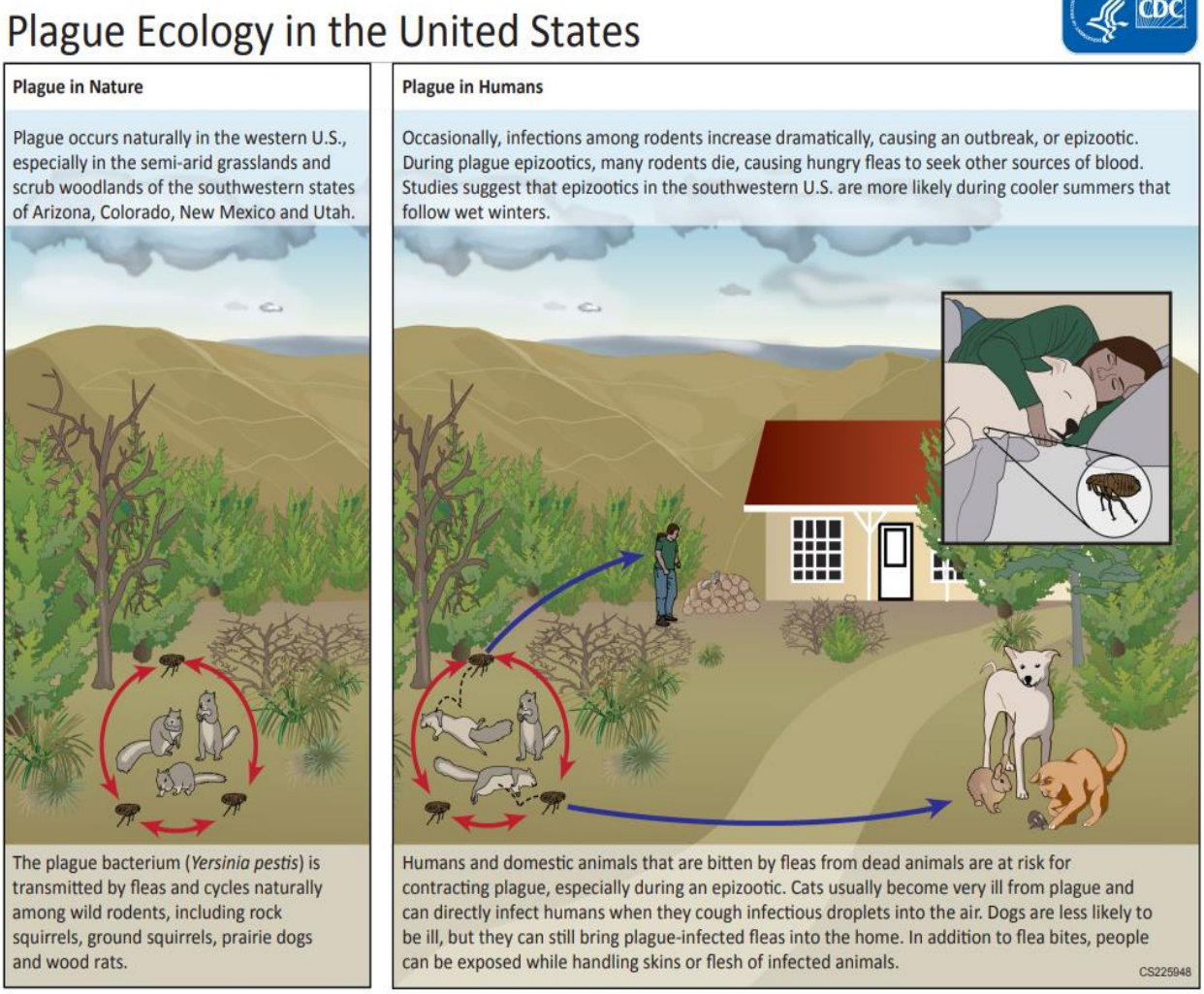

Source: https://www.cdc.gov/plague/index.html

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