09-ID-52

Committee: Infectious

Title: Public Health Reporting and National Notification for Plague

I. Statement of the Problem

CSTE position statement 07-EC-02 recognized the need to develop an official list of nationally notifiable conditions and a standardized reporting definition for each condition on the official list. The position statement also specified that each definition had to comply with American Health Information Community recommended standards to support "automated case reporting from electronic health records or other clinical care information systems." In July 2008, CSTE identified sixty-eight conditions warranting inclusion on the official list, each of which now requires a standardized reporting definition.

II. Background and Justification

Background[1]

Plague is a progressive and potentially fatal infectious disease of animals and humans caused by a bacterium named *Yersinia pestis*. The characteristic sign of plague is a very painful, usually swollen, and often hot-to-the touch lymph node, called a bubo. People usually get plague from being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Plague is also transmitted by inhaling infected droplets expelled from a person or animal, especially domestic cats, coughing with pneumonic plague. The finding of a bubo, accompanied with fever, extreme exhaustion, and a history of possible exposure to rodents, rodent fleas, wild rabbits, or sick or dead carnivores should lead to suspicion of plague. Modern antibiotics are effective against plague, but if an infected person is not treated promptly, the disease is likely to cause severe illness or death.

In North America, plague is found in certain animals—principally rock and ground squirrels—and their fleas from the Pacific Coast to the Great Plains, and from southwestern Canada to Mexico. Most human cases in the United States occur in two regions: (1) northern New Mexico, northern Arizona, and southern Colorado; and (2) California, southern Oregon, and far western Nevada. Plague also exists in Africa, Asia, and South America.

[1] Much of the material in the background is directly quoted from CDC's Web pages on plague. See the References for further information on this source.

Justification

Plague meets the definition of a nationally and **immediately** notifiable condition—as specified in CSTE position statement 08-EC-02—for the following reason(s):

- The condition is included on the list of Category A possible bioterrorism agents and toxins.
- A majority of state and territorial jurisdictions—or jurisdictions comprising a majority of the US population—have laws or regulations requiring **immediate** reporting of the condition to public health authorities
- The Centers for Disease Control and Prevention (CDC) requests **immediate-extremely urgent** notification of any cases suspected of being intentional. All other clusters of plague will be notified by standard means.
- The CDC has condition-specific policies and practices concerning its response to, and use of, notifications.

III. Statement of the desired action(s) to be taken

CSTE requests that CDC adopt this standardized reporting definition for plague to facilitate more timely, complete, and standardized local and national reporting of this condition.

IV. Goals of Surveillance

To provide information on the temporal, geographic, and demographic occurrence of plague to facilitate its prevention and control.

V. Methods for Surveillance

Surveillance for plague should use the sources of data and the extent of coverage listed in table V below.

Table V. Recommended sources of data and extent of coverage for ascertaining cases of plague

	Coverage	
Source of data for case ascertainment	Population-wide	Sentinel sites
clinician reporting	x	
laboratory reporting	x	
reporting by other entities (e.g., hospitals, veterinarians, pharmacies)	x	
death certificates	x	
hospital discharge or outpatient records	x	
extracts from electronic medical records	x	
telephone survey		
school-based survey		
other _____		

VI. Criteria for Reporting

Reporting refers to the process of healthcare providers or institutions (e.g., clinicians, clinical laboratories, hospitals) submitting basic information to governmental public health agencies about cases of illness that meet certain reporting requirements or criteria. The purpose of this section is to provide those criteria that should be used by humans and machines to determine whether a specific illness should be reported.[2]

A. Narrative description of criteria to determine whether a case should be reported to public health authorities

Report any illness to public health authorities that meets any of the following criteria:

1. A person for whom a diagnostic test specific for plague has been ordered (see table 2a).
2. A person with a history of exposure to rodents, rodent fleas, wild rabbits, or sick or dead carnivores AND a history of being in areas with endemic plague AND regional lymphadenitis (bubo), septicemia, pneumonia, *or* pharyngeal lymphadenitis.
3. A person whose healthcare record contains a diagnosis of plague.
4. A person whose death certificate lists plague as a cause of death or a significant condition contributing to death.

Other recommended reporting procedures

- All cases of plague should be reported.
- Reporting should be on-going and routine.
- Reporting should be immediate.

B. Table of criteria to determine whether a case should be reported to public health authorities

Table VI-B. Proposed Table of criteria to determine whether a case should be reported to public health authorities. Note: The following criteria are proposed for evaluation before general implementation. For purposes of currently implementing reporting the narrative description in VI-A, should be used.

Criterion	Reporting	
Clinical Presentation		
fever		C
chills		C

[2] "Human-based" criteria (described below under "A. Narrative") can be applied by medical care providers and laboratory staff based on clinical judgment and clinical diagnosis. Machine-based criteria (described below under "B. Table") can be applied using computerized algorithms that operate in electronic health record systems, including computerized records of laboratory test orders and laboratory test results.

Criterion	Reporting	
headache		C
prostration		C
malaise		C
regional lymphadenitis (bubo)		O
septicemia		O
pneumonia		O
pharyngeal lymphadenitis		O
healthcare record contains a diagnosis of plague	S	
death certificate lists plague as a cause of death or a significant condition contributing to death	S	
Laboratory findings		
leukocytosis		
elevated serum antibody titer(s) to *Y. pestis* fraction 1 (F1) antigen (without documented fourfold or greater change) in a patient with no history of plague vaccination	S*	
detection of *Y. pestis* F1 antigen in a clinical specimen by fluorescent assay	S*	
isolation of *Y. pestis* from a clinical specimen	S*	
fourfold or greater change in serum antibody titer to *Y. pestis* F1 antigen	S*	
Epidemiological risk factors		
history of exposure to rodents, rodent fleas, wild rabbits, or sick or dead carnivores		N
history of being in areas with endemic plague (e.g., NM, AZ, CO, CA, TX)		N
work in a microbiology laboratory that handles *Y. pestis* or is in a plague endemic area		
vaccination for plague		

Notes:
S = This criterion alone is sufficient to report a case.
N = This criterion in conjunction with all other "N" and any "O" criteria in the same column is required to report a case.
O = At least one of these "O" criteria in each category (e.g., clinical presentation and laboratory findings) is required to report a case.
C = This finding corroborates (i.e., supports) the diagnosis of—or is associated with—plague, but is not required for reporting.
* A requisition or order for any of the "S" or "N" laboratory tests is sufficient to meet the reporting criteria. A requisition or order for any of the "O*" laboratory tests—in conjunction with all other "N" criteria in the same column AND at least one of any "O" criteria in the other non-laboratory categories in the same column—is sufficient to meet the reporting criteria.

C. Disease Specific Data Elements:

Disease-specific data elements to be included in the initial report are listed below.

Environmental risk factors
Contact with animal
• animal type
• contact type
• contact date
• contact location
History of flea bites
Travel
• travel date
• travel location
Vaccination for plague
• vaccination date
• vaccination location
Occupational risk factors
Work in a microbiology laboratory that handles *Y. pestis* or is in a plague endemic area

VII. Case Definition

A. Narrative description of criteria to determine whether a case should be classified as confirmed, probable (presumptive), or suspected (possible).

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 *Y. pestis* from a clinical specimen, or
- Fourfold or greater change in serum antibody titer 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

B. Classification Tables

Table VII-B lists the criteria that must be met for a case to be classified as confirmed, probable (presumptive), or suspected (possible).

Table VII-B. Proposed table of criteria to determine whether a case is classified. Note: The following criteria are proposed for evaluation before general implementation. For purposes of current notification, the narrative description in VII-A, should be used.

	Case Definition		
Criterion	Confirmed	Probable	Suspected
Clinical Presentation			
fever	C	C	C
chills	C	C	C
headache	C	C	C
prostration	C	C	C
malaise	C	C	C
regional lymphadenitis (bubo)	O	O	O
septicemia	O	O	O

Criterion	Case Definition		
	Confirmed	Probable	Suspected
pneumonia	O	O	O
pharyngeal lymphadenitis	O	O	O
healthcare record contains a diagnosis of plague			
death certificate lists plague as a cause of death or a significant condition contributing to death			
Laboratory findings			
leukocytosis	C	C	C
elevated serum antibody titer(s) to *Y. pestis* fraction 1 (F1) antigen (without documented fourfold or greater change) in a patient with no history of plague vaccination		O	
detection of *Y. pestis* F1 antigen in a clinical specimen by fluorescent assay		O	
isolation of *Y. pestis* from a clinical specimen	O		
fourfold or greater change in serum antibody titer to *Y. pestis* F1 antigen	O		
Epidemiological risk factors			
history of exposure to rodents, rodent fleas, wild rabbits, or sick or dead carnivores			
history of being in areas with endemic plague (e.g., NM, AZ, CO, CA, TX)			
work in a microbiology laboratory that handles *Y. pestis* or is in a plague endemic area			
vaccination for plague		A	

Notes:
O = At least one of these "O" criteria in each category (e.g., clinical presentation and laboratory findings)—in conjunction with all other "N" criteria in the same column—is required to classify a case.
A = This criterion must be absent (i.e., NOT present) for the case to meet the reporting criteria or case classification.
C = This finding corroborates (i.e., supports) the diagnosis of—or is associated with—plague, but is not included in the case definition.

VIII. Period of Surveillance

Surveillance should be on-going.

IX. Data sharing/release and print criteria

Notification to CDC for all cases of plague prior to classification is recommended.

Expectations for sharing case data

- State and territorial health agencies will notify CDC **immediate-extremely urgent** all reports suspected of being intentional. All other cases will use **standard** notification.
- State and territorial health agencies will submit individual reports of confirmed cases of plague to CDC **weekly**.
- CDC will submit aggregate national counts of reports of cases of plague to WHO **annually**.

Limitations on releasing case data

- Release of any identifying data to any entity other than to another state's or territory's health agency or to the CDC requires a signed data sharing agreement using a format pre-approved by the state or territorial health agency. (Refer to the *CDC-CSTE Intergovernmental Data Release Guidelines Working Group Report: CDC-ATSDR Data Release Guidelines and Procedures for Re-release of State-Provided Data* for further information.)

Restrictions on printing counts of case data

- CDC will only publish data on **confirmed** cases of plague. Provisional data will not be used until verification procedures are complete.

X. References

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