09-ID-09

Committee: Infectious

Title: Public Health Reporting and National Notification for Yellow fever

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]

Yellow fever virus (YFV), a flavivirus, is transmitted to humans through the bite of infected mosquitoes. YFV occurs in tropical regions of Africa and in parts of South America. YFV is a very rare cause of illness in U.S. travelers. A traveler's risk of acquiring yellow fever is determined by various factors, including immunization status, location of travel, season, duration of exposure, occupational and recreational activities while traveling, and local rate of virus transmission at the time of travel. The last epidemic of yellow fever disease in North America occurred in New Orleans in 1905. Ongoing surveillance is necessary to monitor the occurrence of disease and evaluate for possible introduction of the virus into the U.S.

Yellow fever disease is diagnosed based on symptoms, physical findings, laboratory testing, and the possibility of exposure to infected mosquitoes. Asymptomatic or clinically inapparent infection is believed to occur in the majority of persons infected with YFV. Incubation period is typically 3-6 days. Initial illness presents as a non-specific influenza-like syndrome with sudden onset of fever, chills, headache, backache, myalgias, prostration, nausea and vomiting. Most patients improve after the initial presentation. Approximately 15% of cases progress after a brief remission of hours to a day to develop more serious or toxic form of the disease, characterized by jaundice, hemorrhagic symptoms, and eventually shock and multisystem organ failure. The overall case-fatality ratio for cases with jaundice is 20%–50%.

Justification

Yellow fever meets the following criteria for a nationally and **immediately** notifiable condition as specified in CSTE position statement 08-EC-02:

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

- A majority of state and territorial jurisdictions—or jurisdictions comprising a majority of the US population—have laws or regulations requiring **immediate** reporting of yellow fever to public health authorities;
- The Centers for Disease Control and Prevention (CDC) requests **immediate** notification of yellow fever; and 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 yellow fever to facilitate timely, complete, and standardized local and national reporting of this condition.

IV. Goals of Surveillance

The goals of surveillance are to provide information on the temporal, geographic, and demographic occurrence of yellow fever, which will facilitate its prevention and control.

V. Methods for Surveillance

Surveillance for yellow fever 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 yellow fever.

	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. Cases of illness may also be ascertained by the secondary analysis of administrative health data or clinical data. 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:

An illness characterized by acute onset and constitutional symptoms followed by a brief remission and a recurrence of fever, hepatitis, albuminuria, and symptoms and, in some instances, renal failure, shock, and generalized hemorrhages, and any of the following:

- demonstration of yellow fever virus in tissue, blood, or other body fluid
- demonstration of yellow fever antigen in tissue, blood, or other body fluid
- demonstration of yellow fever genome in tissue, blood, or other body fluid
- fourfold or greater rise in yellow fever antibody titer in a patient AND no history of recent yellow fever vaccination AND no cross-reactions to other flaviviruses
- positive serology for yellow fever AND no history of yellow fever vaccination AND no cross-reactions to other flaviviruses.

a person whose healthcare record contains a diagnosis of yellow fever but not related to yellow fever vaccination

a person whose death certificate lists yellow fever as a cause of death or a significant condition contributing to death but not related to yellow fever vaccination.

Other recommended reporting procedures

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

[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; other clinical data systems (e.g., hospital discharge data systems serving multiple hospitals); or administrative data (e.g., healthcare provider billing data, vital records, and EMS data).

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	C
Chills		C	C
Severe headache		C	C
Back pain		C	C
Myalgia		C	C
Nausea		C	C
Vomiting		C	C
Hemorrhagic diathesis (gastrointestinal bleeding)		C	C
Petechiae		C	C
Purpura		C	C
Jaundice		C	C
Proteinuria		C	C
history of recent yellow fever vaccination		A	
history of yellow fever vaccination			A
healthcare record contains a diagnosis of yellow fever	S		
death certificate lists yellow fever as a cause of death or a significant condition contributing to death	S		
Laboratory findings			
fourfold or greater rise in yellow fever antibody titer		N	
cross-reactions to other flaviviruses		A	A
demonstration of yellow fever virus in tissue, blood, or other body fluid	S		
demonstration of yellow fever antigen in tissue, blood, or other body fluid	S		
demonstration of yellow fever genome in tissue, blood, or other body fluid	S		
antibody titer to yellow fever virus greater than or equal to 32 by complement fixation			O
antibody titer to yellow fever virus greater than or equal to 256 by			O

immunofluorescence assay			
antibody titer to yellow fever virus greater than or equal to 320 by hemagglutination inhibition			O
antibody titer to yellow fever virus greater than or equal to 160 by neutralization			O
positive serology for yellow fever by immunoglobulin M-capture enzyme immunoassay			O
Epidemiological risk factors			
recent travel to area with endemic yellow fever		C	C

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

C. Disease Specific Data Elements:

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

Clinical Information:
Date of onset of fever
Date of onset of other constitutional symptoms consistent with yellow fever infection

Epidemiologic Risk Factors:
Destination(s) of recent travel (if any)
Date of return from travel
Epidemiologically linked to a traveler with confirmed yellow fever

Immunization History
Yellow fever vaccination history

VII. Case Definition for Case Classification:

A. Narrative description of criteria to determine whether a case should be classified as confirmed or probable (presumptive) is provided:

Clinical description

A mosquito-borne viral illness characterized by acute onset and constitutional symptoms followed by a brief remission and a recurrence of fever, hepatitis, albuminuria, and symptoms and, in some instances, renal failure, shock, and generalized hemorrhages

Laboratory criteria for diagnosis

- Fourfold or greater rise in yellow fever antibody titer in a patient who has no history of recent yellow fever vaccination and cross-reactions to other flaviviruses have been excluded or
- Demonstration of yellow fever virus, antigen, or genome in tissue, blood, or other body fluid

Case classification

Probable: a clinically compatible case with supportive serology (stable elevated antibody titer to yellow fever virus [e.g., greater than or equal to 32 by complement fixation, greater than or equal to 256 by immunofluorescence assay, greater than or equal to 320 by hemagglutination inhibition, greater than or equal to 160 by neutralization, or a positive serologic result by immunoglobulin M-capture enzyme immunoassay]. Cross-reactive serologic reactions to other flaviviruses must be excluded, and the patient must not have a history of yellow fever vaccination.)

Confirmed: a clinically compatible case that is laboratory confirmed

B. Classification Tables

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

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
Clinical Presentation			
Fever	O	O	O
Chills	O	O	O
severe headache	O	O	O
back pain	O	O	O
Myalgia	O	O	O

Nausea	O	O	O
Vomiting	O	O	O
hemorrhagic diathesis (gastrointestinal bleeding)	O	O	O
Petechiae	O	O	O
Purpura	O	O	O
Jaundice	O	O	O
Proteinuria	O	O	O
history of recent yellow fever vaccination		A	
history of yellow fever vaccination			A
Laboratory findings			
fourfold or greater rise in yellow fever antibody titer		N	
cross-reactions to other flaviviruses		A	A
demonstration of yellow fever virus in tissue, blood, or other body fluid	O		
demonstration of yellow fever antigen in tissue, blood, or other body fluid	O		
demonstration of yellow fever genome in tissue, blood, or other body fluid	O		
antibody titer to yellow fever virus greater than or equal to 32 by complement fixation			O
antibody titer to yellow fever virus greater than or equal to 256 by immunofluorescence assay			O
antibody titer to yellow fever virus greater than or equal to 320 by hemagglutination inhibition			O
antibody titer to yellow fever virus greater than or equal to 160 by neutralization			O
positive serology for yellow fever by immunoglobulin M-capture enzyme immunoassay			O
Epidemiological risk factors			
recent travel to area with endemic yellow fever	C	C	C

Notes:
S = This criterion alone is sufficient to classify a case
N = All "N" criteria in the same column—in conjunction with at least one of any "O" criteria in each category (e.g., clinical presentation and laboratory findings) in the same column—are required to classify a case.
O = At least one of any "O" criteria in each category (e.g., clinical presentation and laboratory findings) in the same column—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 definition.

C = This finding corroborates (i.e., supports) the diagnosis of—or is associated with—yellow fever, but is not included in the case classification definition.

VIII. Period of Surveillance

Surveillance should be on-going.

IX. Data sharing/release and print criteria

- Notification to CDC for probable and confirmed cases of Yellow fever is recommended.

- All cases are verified with the state health departments before publication. Individual case notifications are made to state and local health departments and international partners depending on circumstances and action needed. Importation status, transmission risk, and other factors will influence frequency and method of communication and information feedback. Final data are published annually in the MMWR Summary of Notifiable Diseases, posted on the CDC DVBID website, and presented or published at scientific meetings and in peer-reviewed literature.

- No personal identifying information will be released or published.

- Data from these notifications will be shared with international partners (e.g., PHAC, ECDC, WHO).

X. References

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