

09-ID-48

Committee: Infectious

Title: Public Health Reporting and National Notification for Measles

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

Because of successful implementation of measles vaccination programs, endemic measles transmission was declared eliminated in the United States in 2000 and in the World Health Organization (WHO) Region of the Americas in 2002. Despite significant advances in global measles control, the US remains at risk for measles importations and measles outbreaks, especially if importations occur into unvaccinated communities. To maintain measles elimination and to prevent re-establishment of endemic disease transmission, sustained high vaccine coverage and sensitive measles surveillance with rapid and robust public health response to every measles case is needed. All measles cases are a cause for concern. Delays in reporting of measles cases make the outbreak control that much more challenging.

Justification

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

- The condition has been declared eliminated (absence of endemic disease transmission) in the United States.
- A majority of state and territorial jurisdictions—or jurisdictions comprising a majority of the US population—have laws or regulations requiring **immediate** reporting of measles to public health authorities;
- The Centers for Disease Control and Prevention (CDC) requests **immediate** notification of measles; 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 its members adopt this standardized reporting definition and that CDC adopt the standardized notification criteria for measles to facilitate more timely, complete, and standardized local reporting and national notification of this condition.

IV. Goals of Surveillance

To rapidly identify and contain any measles importations into the United States

V. Methods for Surveillance

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

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

Source of data for case ascertainment	Coverage	
	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.¹

¹ “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

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. Acute illness with fever and rash in a person with any of the epidemiological linkages listed in Table **VI-B**.
2. Acute illness with fever and rash in a person for whom any of the laboratory tests listed in Table **VI-B** has been ordered.
3. Acute illness with fever $>101^{\circ}\text{F}$ and generalized, maculopapular rash in a person for whom there is not a more compelling diagnosis.

Other recommended reporting procedures

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

“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.

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*		
Human			
<i>Clinical Presentation</i>			
Fever (any)	N	N	N
Fever >101°F (38.3°C)			
Rash (any)	N	N	N
Rash: generalized, maculopapular			
<i>Laboratory tests</i>			
Culture measles virus		O	
PCR, measles-specific nucleic acid		O	
Measles IgM antibody		O	
Acute and convalescent anti-measles IgG antibodies		O	
<i>Epidemiological link</i>			
Contact of a confirmed measles case	O		
Belonging to a defined risk group during an outbreak	O		
Residence in a geographic area of the US where an outbreak of measles is occurring	O		
Travel during past 21 days to a geographic area where an outbreak of measles is occurring	O		

Notes:

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 in the same column (e.g., clinical presentation and laboratory findings)—in conjunction with all other “N” criteria in the same column—is required to report a case.

* 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.

Clinical information

Date of onset, fever

Date of onset, rash.

Epidemiological risk factors

Contact with measles case

Destination(s) of recent travel (if any)

Date of return from travel

Total doses measles-containing vaccine

Date of last measles vaccination

VII. Case Definition for Case Classification

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

- *Suspected*: any febrile illness that is accompanied by rash and that does not meet the criteria for probable or confirmed measles or any other illness
 - *Probable*:
 - In the absence of a more likely diagnosis, an illness characterized by
 - generalized rash lasting ≥ 3 days; and
 - temperature $\geq 101^{\circ}\text{F}$ or 38.3°C ; and
 - cough, coryza, or conjunctivitis; and
 - no epidemiologic linkage to a confirmed case of measles; and
 - noncontributory or no serologic or virologic testing.
 - *Confirmed*:
 - *laboratory confirmation by any of the following*
 - positive serologic test for measles immunoglobulin M antibody;
 - significant rise in measles antibody level by any standard serologic assay;
 - isolation of measles virus from a clinical specimen; or
 - detection of measles-virus specific nucleic acid by polymerase chain reaction
 - Note: A laboratory-confirmed case does not have to have generalized rash lasting ≥ 3 days; temperature $\geq 101^{\circ}\text{F}$ or 38.3°C ; cough, coryza, or conjunctivitis.
- OR
- an illness characterized by
 - generalized rash lasting ≥ 3 days; and
 - temperature $\geq 101^{\circ}\text{F}$ or 38.3°C ; and
 - cough, coryza, or conjunctivitis; and
 - epidemiologic linkage to a confirmed case of measles.

Epidemiologic Classification of Internationally-Imported and U.S.-Acquired

Internationally imported case: An internationally imported case is defined as a case in which measles results from exposure to measles virus outside the United States as evidenced by at least some of the exposure period (7–21 days before rash onset) occurring outside the United States and rash onset occurring within 21 days of entering the United States and there is no known exposure to measles in the U.S. during that time. All other cases are considered U.S.-acquired.

U.S.-acquired case: An U.S.-acquired case is defined as a case in which the patient had not been outside the United States during the 21 days before rash onset or was known to have been exposed to measles within the United States.

U.S.-acquired cases are subclassified into four mutually exclusive groups:

Import-linked case: Any case in a chain of transmission that is epidemiologically linked to an internationally imported case.

Imported-virus case: a case for which an epidemiologic link to an internationally imported case was not identified, but for which viral genetic evidence indicates an imported measles genotype, i.e., a genotype that is not occurring within the United States in a pattern indicative of endemic transmission. An endemic genotype is the genotype of any measles virus that occurs in an endemic chain of transmission (i.e., lasting ≥ 12 months). Any genotype that is found repeatedly in U.S.-acquired cases should be thoroughly investigated as a potential endemic genotype, especially if the cases are closely related in time or location.

Endemic case: a case for which epidemiological or virological evidence indicates an endemic chain of transmission. Endemic transmission is defined as a chain of measles virus transmission that is continuous for ≥ 12 months within the United States.

Unknown source case: a case for which an epidemiological or virological link to importation or to endemic transmission within the U.S. cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically to assure that they do not represent a sustained U.S.-acquired chain of transmission or an endemic chain of transmission within the U.S.

Note: Internationally imported, import-linked, and imported-virus cases are considered collectively to be import-associated cases.

States may also choose to classify cases as “out-of-state-imported” when imported from another state in the United States. For national reporting, however, cases will be classified as either internationally imported or U.S.-acquired.

B. Classification Tables

Table VII 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.

Criterion	Case Definition		
	Confirmed	Probable	Suspected
Human			
<i>Clinical Presentation</i>			
Fever (any)			N
Cough	O	O	
Coryza	O	O	
Conjunctivitis	O	O	
Fever $\geq 101^{\circ}\text{F}$ (38.3°C)	N	N	
Rash: generalized	N	N	N
Rash: lasting ≥ 3 days	N	N	
<i>Positive Laboratory Results</i>			
Culture measles virus	S		
PCR, measles-specific nucleic acid	S		
Measles IgM test	S		
Significant rise in serum anti-measles IgG antibody	S		
<i>Epidemiological link</i>			
Contact of a confirmed measles case	O		
Belonging to a defined risk group during an outbreak	O		
Residence in a geographic area of the US where an outbreak of measles is occurring	O		
Travel during past 21 days to a geographic area where an outbreak of measles is occurring	O		

Notes:

S = This criterion alone is sufficient to report or confirm a case

N = This criterion in conjunction with all other “N” and any “O” criteria in the same column is required to report or confirm a case.

O = At least one of these “O” criteria in each category in the same column (e.g., clinical presentation and laboratory findings)—in conjunction with all other “N” criteria in the same column—is required to report or confirm a case.

VIII. Period of Surveillance

Surveillance should be on-going.

IX. Data sharing/release and print criteria

Notification to CDC for confirmed cases of measles is recommended.

- Data reported to NCIRD staff is summarized weekly internally via an NCIRD weekly surveillance report for vaccine preventable diseases. Electronic reports of measles cases in NNDSS are also summarized weekly in the MMWR Tables. However, because of delays in data entry and data transmission via NNDSS, these two data sources may not correspond. Annual case data on measles is also summarized in the yearly Summary of Notifiable Diseases. Cumulative data is used for Healthy People 2010 reviews.
- State-specific compiled data will continue to be published in the weekly and annual MMWR. In addition to those reports, the frequency of reports/feedback to the states and territories will be dependent on the current epidemiologic situation in the country. Frequency of cases, epidemiologic distribution, importation status, transmission risk, and other factors will influence frequency and method of communication and information feedback. For example, during 2008, because of the higher than expected number of cases and some of their unusual epidemiologic characteristics, we have already summarized and published 2008 measles case data in three separate MMWR articles.
- State-specific compiled data will continue to be published in the weekly reports and annual MMWR Surveillance Summaries. All cases are verified with the state (s) before publication. Data are also included in PAHO and WHO annual reports. The frequency of release of additional publication of this data will be dependent on the current epidemiologic situation in the country. These publications might include annual epidemiologic summaries in the MMWR or manuscripts in peer-reviewed journals.
- As part of an effort to document measles elimination in the Americas, we currently report data on all suspect cases of measles known to NCIRD to PAHO on a weekly basis. Information on sex, age, rash onset, vaccination status, genotype and source (import, import-associated etc.) is provided. No personal identifying or state specific information is re-released to PAHO or WHO.

X. References

Centers for Disease Control and Prevention (CDC). Case definitions for infectious conditions under public health surveillance. MMWR 1997;46(No. RR-10):1–57. Available from: <http://www.cdc.gov/mmwr/>

Centers for Disease Control and Prevention (CDC). National notifiable diseases surveillance system: case definitions. Atlanta: CDC. Available from: <http://www.cdc.gov/ncphi/diss/nndss/casedef/index.htm> Last updated: 2008 Jan 9. Accessed:

Council of State and Territorial Epidemiologists (CSTE). CSTE official list of nationally notifiable conditions. CSTE position statement 07-EC-02. Atlanta: CSTE; June 2007. Available from: <http://www.cste.org>.

Council of State and Territorial Epidemiologists (CSTE). Criteria for inclusion of conditions on CSTE nationally notifiable condition list and for categorization as immediately or routinely notifiable. CSTE position statement 08-EC-02. Atlanta: CSTE; June 2008. Available from: <http://www.cste.org>.

Council of State and Territorial Epidemiologists, Centers for Disease Control and Prevention. CDC-CSTE Intergovernmental Data Release Guidelines Working Group (DRGWG) Report: CDC-ATSDR Data Release Guidelines and Procedures for Re-release of State-Provided Data. Atlanta: CSTE; 2005. Available from: <http://www.cste.org/pdffiles/2005/drgwgreport.pdf> or <http://www.cdc.gov/od/foia/policies/drgwg.pdf>.

Heymann DL, editor. Control of communicable diseases manual. 18th edition. Washington: American Public Health Association; 2004.

Gershon AA. Measles Virus (Rubeola). In: Mandell GL, Bennett JE, Dolin R, editors. Principles and Practice of Infectious Diseases, 6th edition. Philadelphia: Churchill Livingstone; 2005.

Orenstein WA, Papania MJ, Wharton ME. Measles elimination in the United States. J Infect Dis. 2004;189 Suppl 1:S1-3.

XI. Coordination:

Agencies for Response:

- (1) Thomas R Frieden, MD, MPH
Director
Centers for Disease Control and Prevention
1600 Clifton Road, NE
Atlanta GA 30333
(404) 639-7000
txf2@cdc.gov

XII. Submitting Author:

- (1) Paul Cieslak, MD
Manager, Acute and Communicable Disease Prevention
Oregon Department of Human Services
800 NE Oregon St./Suite 772
Portland, OR 97232
(971) 673-1111
paul.r.cieslak@state.or.us

Co-Authors:

- (1) Associate Member
Harry F. Hull, Medical Epidemiologist
HF Hull & Associates, LLC
1140 St. Dennis Court
Saint Paul, MN 55116
(651) 695-8114
hullhf@msn.com
- (2) Associate Member
Cecil Lynch, Medical Informaticist
OntoReason
7292 Shady Woods Circle
Midvale, UT 84047
(916) 412.5504
clynch@ontoreason.com
- (3) Associate Member
R. Gibson Parrish, Medical Epidemiologist
P.O. Box 197
480 Bayley Hazen Road
Peacham, VT 05862
(802) 592-3357
gib.parrish@gmail.com