

14-ID-06

**Committee:** Infectious Disease

**Title:** Revision of the National Surveillance Case Definition for Meningococcal Disease

### I. Statement of the Problem

The current case definition for meningococcal disease, approved in the 2009 CSTE Position Statement 09-ID-42 entitled, "Public Health Reporting and National Notification for Meningococcal Disease," includes polymerase chain reaction (PCR) positive cases as "probable" cases. Since PCR was first added to the meningococcal disease case definition in 2005, significant improvements have been made in both the quality of PCR and the assays used for the detection of *Neisseria meningitidis*. PCR assays are also now available to detect six of the meningococcal serogroups, including all of the major serogroups which cause disease in the United States.

### II. Background and Justification

#### Background

During 2005-2011, an estimated 800-1,200 cases of meningococcal disease occurred annually in the United States, representing an incidence of 0.3 cases per 100,000 population. Incidence has declined annually since a peak of disease in the late 1990s. Although disease incidence is currently at historic lows, the overall case-fatality ratio remains at 10%-15%, and 11%-19% of survivors have long term sequelae (e.g., neurologic disability, limb or digit loss, and hearing loss).

Serogroups B, C, and Y are the major causes of meningococcal disease in the United States, each accounting for approximately one third of cases. However, the proportion of cases caused by each serogroup varies by age group. Approximately 60% of disease among children 0-59 months is caused by serogroup B *N. meningitidis*, which is not prevented by currently licensed vaccines. Serogroups C, Y, or W, which are included in vaccines available in the United States, cause 73% of all cases of meningococcal disease among persons aged  $\geq 11$  years.

In the United States, approximately 98% of cases of meningococcal disease are sporadic; however, outbreaks of meningococcal disease continue to occur. With high rates of vaccination with the quadrivalent meningococcal conjugate vaccine in adolescents and college-aged persons, outbreaks of serogroup C and Y disease are rare in this age group. Several recent outbreaks of serogroup B meningococcal disease on college campuses highlight the challenge of control of serogroup B meningococcal disease. Surveillance for meningococcal disease is needed to monitor trends in disease incidence, changes in epidemiology and serogroup distribution, and the effect of vaccination on the incidence of disease.

#### Justification

In the clinical setting, the diagnosis of meningococcal disease is based on clinical presentation, as well as a variety of laboratory tests (culture, PCR, etc.). Culture remains the gold standard laboratory test for identification of *N. meningitidis* with virtually 100% specificity. However, *N. meningitidis* has fastidious growth requirements and culture has poor sensitivity in specimens from persons who have received antibiotics.

PCR is a rapid test and has high sensitivity. Although the specificity can vary, considerable improvements have been made in the quality of PCR testing performed in many laboratories during the last decade as a

result of both improvements in the assays and communication and training efforts from CDC. Availability of PCR in public health laboratories has also expanded over the last several years as a result of these efforts.

Given the current low incidence of meningococcal disease in the United States and the public concern that surrounds every case, it is important that cases of meningococcal disease be appropriately identified and classified in national burden estimates. With the increased reliability of PCR and its ability to detect not only *N. meningitidis* but its serogroup, classifying cases as “confirmed” more accurately describes our confidence in PCR as a reliable diagnostic test.

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

1. The meningococcal disease case definition should be updated to classify PCR positive meningococcal cases as “confirmed” cases.
2. Criteria should be added to include medical examiner reporting of *N. meningitidis* to public health agencies.
3. Utilize standard sources (e.g., reporting\*) for case ascertainment for meningococcal disease. Surveillance for meningococcal disease should use the following recommended sources of data to the extent of coverage presented in Table III.

**Table III. Recommended sources of data and extent of coverage for ascertainment of cases of meningococcal disease.**

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, poison centers)	X	
Death certificates	X	
Hospital discharge or outpatient records	X	
Extracts from electronic medical records	X	
Telephone survey		
School-based survey		
Other _____		

4. Utilize standardized criteria for case identification and classification (Sections VI and VII) for meningococcal disease and add meningococcal disease to the *Nationally Notifiable Condition List*.

- 4a. Immediately notifiable, extremely urgent (within 4 hours)
- 4b. Immediately notifiable, urgent (within 24 hours)
- 4c. Routinely notifiable

CSTE recommends that all States and Territories enact laws (statute or rule/regulation as appropriate) to make this disease or condition reportable in their jurisdiction. Jurisdictions (e.g. States and Territories) conducting surveillance (according to these methods) should submit case notifications\*\* to CDC.

5. CDC should publish data on meningococcal disease as appropriate in *MMWR* and other venues (see Section IX).

CSTE recommends that all jurisdictions (e.g. States or Territories) with legal authority to conduct public health surveillance follow the recommended methods as outlined above.

Terminology:

\* Reporting: process of a healthcare provider or other entity submitting a report (case information) of a condition under public health surveillance TO local or state public health.

\*\*Notification: process of a local or state public health authority submitting a report (case information) of a condition on the Nationally Notifiable Condition List TO CDC.

#### IV. Goals of Surveillance

To provide information regarding the epidemiology of meningococcal disease to facilitate prevention and control efforts.

**V. Methods for Surveillance: Surveillance for meningococcal disease should use the recommended sources of data and the extent of coverage listed in Table III.**

#### VI. Criteria for case identification

##### A. Narrative: A description of suggested criteria for case ascertainment of a specific condition.

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

1. An illness characterized by sepsis AND purpura or a petechial rash.
2. A person found dead with a purpuric rash.
3. Any person with laboratory evidence of meningococcal infection in a normally sterile site (e.g., cerebrospinal fluid [CSF] or blood). Laboratory evidence includes a positive culture for *N. meningitidis*, a PCR test positive for *N. meningitidis*-specific nucleic acid, a latex agglutination test positive for *N. meningitidis* or Gram-negative diplococci identified, or detection of *N. meningitidis* in formalin-fixed tissue by immunohistochemistry (IHC).
4. A person whose healthcare record contains a diagnosis of invasive meningococcal disease.
5. A person whose death certificate lists meningococcal disease as a cause of death or a significant condition contributing to death.
6. A person found dead for whom purulent exudate was present on meninges as viewed by a medical examiner.
7. A person found dead for whom purpuric rash and/or hemorrhagic organs (particularly adrenals) were present as viewed by a medical examiner.

Other recommended reporting procedures:

- All cases of invasive meningococcal disease should be reported.
- Reporting should be on-going and routine.
- Frequency of reporting should follow the state health department's routine schedule.

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

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

Criterion	Reporting		
<i>Clinical Evidence</i>			
Petechial Rash	O		
Purpura	O	N	
Sepsis	N		
Death		N	
Healthcare record contains a diagnosis of meningococcal disease			S
Death certificate lists meningococcal disease as a cause of death or a significant condition contributing to death			S
Medical examiner case of person found dead with purulent exudate on meninges			S
Medical examiner case of person found dead with purpuric rash and/or hemorrhagic organs (particularly adrenals)			S
<i>Laboratory Evidence</i>			
Isolation of <i>Neisseria meningitidis</i> from a normally sterile site			S
Evidence of <i>N. meningitidis</i> DNA using a validated polymerase chain reaction (PCR) obtained from a specimen collected from a normally sterile site			S
<i>N. meningitidis</i> antigen identified by immunohistochemistry (IHC) on formalin-fixed tissue			S
<i>N. meningitidis</i> antigen identified in CSF by latex agglutination			S
Gram-negative diplococci from a normally sterile site			S

Notes:

S = This criterion alone is sufficient to identify a case for reporting.

N = All “N” criteria in the same column are necessary to identify a case for reporting.

O = At least one of these “O” (Optional) criteria in each category (i.e., clinical evidence and laboratory evidence) in the same column – in conjunction with all “N” criteria in the same column – is required to identify a case for reporting. (These optional criteria are alternatives, which means that a single column will have either no O criteria; no column should have only one O.)

**C. Disease-specific data elements**

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

*Epidemiological Risk Factors*

Immunization History

Date and type of meningococcal vaccine received (MenACWY-D, MenACWY-CRM, HibMenCY, MPSV4)

International travel in past 30 days

Countries visited and Dates

Contact with a confirmed case of meningococcal disease

**VII. Case Definition for Case Classification**

**A. Narrative: Description of criteria to determine how a case should be classified.**

**Suspected:**

- Clinical purpura fulminans in the absence of a positive blood culture; or
- Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF)

**Probable**

- Detection of *N. meningitidis* antigen
  - In formalin-fixed tissue by immunohistochemistry (IHC); or
  - In CSF by latex agglutination

**Confirmed**

- Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g., blood or CSF), using a validated polymerase chain reaction (PCR) assay; or
- Isolation of *N. meningitidis*
  - From a normally sterile body site (e.g., blood or CSF, or less commonly, synovial, pleural, or pericardial fluid); or
  - From purpuric lesions.

**Clinical Criteria**

Clinical purpura fulminans in the absence of a positive blood culture

**Laboratory Criteria**

- Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF)
- Detection of *N. meningitidis* antigen
  - In formalin-fixed tissue by immunohistochemistry (IHC); or
  - In CSF by latex agglutination
- Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g., blood or CSF), using a validated polymerase chain reaction (PCR) assay; or
- Isolation of *N. meningitidis*
  - From a normally sterile body site (e.g., blood or CSF, or less commonly, synovial, pleural, or pericardial fluid); or
  - From purpuric lesions.

**Epidemiologic Linkage**

Not applicable for case classification.

**Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance**

**B. Classification Tables**

Criterion	Case Definition		
	Suspected	Probable	Confirmed
<i>Clinical Evidence</i>			
Purpura fulminans	N		
<i>Laboratory Evidence</i>			
Isolation of <i>Neisseria meningitidis</i> from a normally sterile body site			S
Isolation of <i>Neisseria meningitidis</i> from a purpuric lesion			S

Detection of <i>N. meningitidis</i> -specific nucleic acid in a specimen obtained from a normally sterile body site using a validated polymerase chain reaction (PCR) assay				S
Detection of <i>N. meningitidis</i> antigen in formalin-fixed tissue by immunohistochemistry (IHC)			S	
Detection of <i>N. meningitidis</i> antigen in CSF by latex agglutination			S	
Identification of Gram-negative diplococci in a specimen from a normally sterile body site		S		

Notes:

S = This criterion alone is sufficient to classify a case

N = All "N" criteria in the same column are necessary to classify a case

**VIII. Period of Surveillance**

Surveillance should be on-going.

**IX. Data sharing/release and print criteria**

Notification to CDC for confirmed and probable meningococcal disease is recommended.

- Data on reported *N. meningitidis* cases are summarized monthly for NCIRD staff and distributed internally via the NCIRD monthly surveillance report for vaccine preventable diseases. Cases of *N. meningitidis* reported electronically through NNDSS are summarized weekly in the MMWR Notifiable Diseases Tables and yearly in the MMWR Surveillance Summaries. Aggregate data will be published in reports, the MMWR, and peer-reviewed journals as the public health need arises.
- State-specific compiled data will continue to be published in the weekly and annual MMWR. The frequency of other feedback to states and territories and of published reports will be dependent on the current epidemiologic situation and public health need.
- State-specific compiled data will continue to be published in the weekly reports and annual MMWR Surveillance Summaries. Aggregate data are included in PAHO and WHO annual reports. The frequency of additional publication of this data, in the MMWR and peer-reviewed journals, is dependent on disease epidemiology and public health need.
- Currently aggregate data on *N. meningitidis* cases reported to NNDSS are summarized in yearly reports to PAHO. No personal identifying or state specific information is re-released to PAHO, WHO, or other parties.

**X. References**

Council of State and Territorial Epidemiologists (CSTE). Public Health Reporting and National Notification for Meningococcal Disease. 09-ID-42 Atlanta: CSTE; June 2009. Available from: <http://www.cste.org>

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