

# Invasive Meningococcal Disease

## Surveillance and Investigation Protocol

### Disease Summary

Invasive meningococcal disease is an infection caused by a bacteria called *Neisseria meningitidis*, otherwise known as meningococcus. The disease can be severe and include infections of the brain and its coverings (meningococcal meningitis) and the bloodstream (meningococemia).

The bacteria are spread through the exchange of respiratory secretions. Meningococcal disease can be treated with antibiotics, but quick medical attention is extremely important. To protect the health of the public, the West Virginia Reportable Disease Rule, 64CSR-7 requires reporting of this disease to the local health department within 24 hours of diagnosis for timely disease investigation and control.

### Healthcare Provider Responsibilities

1. Report all suspected cases of invasive meningococcal disease within 24 hours of diagnosis to the local health department (LHD).
2. Submit isolates of *Neisseria meningitidis* to the West Virginia Office of Laboratory Services (WV OLS) immediately for serogrouping. OLS may be accessed as follows:
  - a. Phone: 304-558-3530
  - b. Web: <http://www.wvdhhr.org/labservices/labs/micro/index.cfm>
  - c. Mailing address: 167 11<sup>th</sup> Ave.  
South Charleston, West Virginia 25303
3. Submit a laboratory report by faxing a copy of the report to the local health department.
4. Notify infection control immediately and institute control measures for invasive meningococcal disease immediately upon recognition:
  - a. The patient must be placed under droplet precautions until 24 hours have passed after initiation of effective antimicrobial therapy.
  - b. Provide prophylaxis for all high risk contacts (close contacts). If local health department assistance is needed notify your local health department immediately.
5. Complete the provider section of the West Virginia Electronic Disease Surveillance System (WVEDSS) form for meningococcal disease:  
<http://www.dhhr.wv.gov/oeps/disease/WVEDSS/Documents/N.%20Mening.pdf>

### Laboratory Responsibilities

1. Immediately notify the physician and infection control practitioner of a positive test result for *Neisseria meningitidis* from a normally sterile site.
2. Forward isolates cultured from normally sterile sites to WV OLS for serogrouping. OLS will forward isolates and specimens to Centers for Disease Control and Prevention (CDC) (see Appendix A) as needed. OLS may be accessed as follows:
  - a. Phone: 304-558-3530
  - b. Web: <http://www.wvdhhr.org/labservices/labs/micro/index.cfm>
  - c. Mailing address: 167 11<sup>th</sup> Ave.  
South Charleston, West Virginia 25303
3. Many reference and hospital laboratories in West Virginia report via ELR to the WVEDSS. For hospital laboratories that do not report via ELR, call and fax a copy of the positive test result of *Neisseria meningitidis* to your local health department within 24 hours of detection. For reference laboratories, please notify the West Virginia Division of Infectious Disease Epidemiology (DIDE) at 304-558-5358 ext. 1 (phone) and fax a copy of the test result to 304-558-8736.

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## Local Health Responsibilities

1. Educate the public about meningococcal meningitis, especially its transmission.
2. Educate providers and laboratories to report confirmed, probable, and suspect cases of invasive meningococcal disease within 24 hours to the local health department to assure management of close contacts, recognition of outbreaks, and facilitation of community education.
3. Educate the public and healthcare providers about meningococcal vaccine and its indications.
4. Inform laboratories to submit *all* invasive meningococcal isolates cultured from normally sterile sites to the West Virginia Office of Laboratory Services for serogrouping. This will determine if circulating strains are vaccine preventable, and assist with outbreak management. Remind OLS that isolates and specimens may need to be sent to CDC for further testing (see Appendix A).
5. Educate providers about prophylaxis for high risk contacts (close contact).
6. Upon receiving a report of invasive meningococcal disease:
  - a. Investigate the case. Check to confirm that the reported case meets the case definition. Meningococcus cultured from a non-sterile site (throat, sputum, etc.) does not need to be reported.
  - b. Assure that isolates and specimens are forwarded to the Office of Laboratory Services for serogrouping.
  - c. Identify all close contacts.
  - d. Recommend chemoprophylaxis regimens for high risk contacts and index cases of invasive meningococcal disease. For details, see **Chemoprophylaxis** section.
  - e. Alert close contacts (family, daycare, nursery school, etc.) to watch for early signs of illness, especially fever.
  - f. Enter reports of invasive meningococcal disease in WVEDSS. Document prophylaxis, vaccinations and results of laboratory tests. Forward all paperwork to DIDE.

## State Public Health Responsibilities

1. Review laboratory reports submitted in WVEDSS and assign to appropriate jurisdiction (local health) for investigation.
2. Remind healthcare providers, laboratories, and local health to submit meningococcal isolates and specimens accordingly and as recommend in Appendix A.
3. Ascertain case reports and review case investigations submitted in WVEDSS and notify CDC (through electronic case report submission to National Notifiable Disease Surveillance System (NNDSS) in a timely manner.
4. Provide technical expertise and guidance on surveillance, investigation, control measures and prevention of invasive meningococcal disease.
5. Assist local health jurisdictions in the prompt identification and management of close contacts.
6. In the event of an outbreak or cluster of cases:
  - a. Identify local health needs.
  - b. Support public health response.
  - c. Notify public health partners (LHD, OLS, CDC, Bureau for Public Health (BPH) through the State Epidemiologist/OEPS Director).
7. Complete the *Meningococcal Disease Supplemental Data* (see Appendix A) and submit to CDC as scheduled.
8. Update information sheets and protocol as new information becomes available.

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9. Summarize surveillance data and surveillance indicators and share with public health partners.

## **Occupational Health**

To minimize risk for transmission of infectious diseases pending laboratory confirmation, the Healthcare Infection Control Practices Advisory Committee (HICPAC) recommends empiric transmission-based precautions based on the patient's clinical presentation in addition to standard precautions. Precautions include:

- a. Droplet precautions for first 24 hours of antimicrobial treatment of the patient.
- b. Post-exposure chemoprophylaxis to healthcare workers exposed to respiratory secretion.
- c. Mask and face protection when there is risk of exposure to aerosolized secretions.

## **Disease Control Objectives**

Reduce the risk of secondary cases by early identification and prophylaxis of close contacts to cases.

## **Disease Prevention Objectives**

Reduce the risk of disease through the education of the general public to:

- a. Practice good hand washing and basic hygiene as a primary means of preventing spread of infectious agents.
- b. Not to share spoons, forks, cups, soft drink cans, sport water bottles, glasses, cigarettes, lipsticks or other items that may be covered with oral or nasal secretions.
- c. Practice cough etiquette and good hygiene.
- d. Get age-appropriate vaccination against meningococcal disease (see **Meningococcal vaccines** section).

## **Disease Surveillance Objectives**

- a. To determine the incidence of meningococcal disease in West Virginia;
- b. To detect trends in patient characteristics, antibiotic resistance, and serogroup specific incidence of disease;
- c. To identify cases promptly;
- d. To identify all close contacts of cases promptly;
- e. To promptly identify clusters or outbreaks of invasive meningococcal disease and initiate appropriate prevention and control measures.
- f. To provide data for evaluation of preventive measures for close contacts to prevent further spread of disease.

## **Public Health Significance**

### **CARRAIGE**

*Neisseria meningitidis* resides in the human nasopharynx and can be habitual components of the microbial flora in the buccal mucosa, anus, urethra, urogenital mucosa and dental plaque. Pharyngeal carriage can range from 8-25% of the population.

Relationship between asymptomatic carrier and development of invasive meningococcal disease is not completely known. Often humoral immune response is enough to prevent the spread of the organism and the occurrence of invasive disease. However, if humoral response is not adequate (due to lack of bactericidal antibodies) the bacteria can get into the bloodstream and circumvent immunologic response by several virulence factors.

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Repeated occurrence of carrier status, even not protective against subsequent new carriage can elicit a cross-protection against invasive disease.

### DISEASE

Invasive meningococcal disease is alarming to the general public and healthcare providers alike because of the potential for fulminant disease and death in previously healthy individuals. Responding to cases places heavy demands on clinical and public health disease control services. *Neisseria meningitidis* causes both endemic and epidemic disease, primarily meningitis and meningococemia. It is the leading cause of bacterial meningitis in children and young adults in the United States, with an estimated 1,400-2,800 cases each year. Ten to fourteen percent of cases are fatal. Of patients who recover, 11%-19% have permanent hearing loss or other serious sequelae. Incidence of meningococcal disease peaks in late winter to early spring. Attack rates are highest among children 3-12 months of age and then steadily decline among older age groups. The highest peak attack rate occurs in children younger than 1 year of age followed by adolescents 15 to 18 years of age. College freshmen students who live in dormitories have a higher rate of disease compared with individuals who are the same age and are not attending college. Close contacts of patients with the disease are at increased risk of becoming infected.

Persons who have certain medical conditions are at increased risk for developing meningococcal infection—persons with complement deficiency; persons with anatomic or functional asplenia; and selected research, clinical, laboratory or industrial workers who may be exposed to *Neisseria meningitidis* aerosols.

### DEFINITION OF TERMS

**Index case.** An index case or primary case of meningococcal disease is one that occurs in the absence of previous known close contact with another patient.

**Secondary case.** A secondary case of meningococcal disease is one that occurs among close contacts of a primary patient >24 hours after onset of illness in the primary patient.

**Co-primary cases.** Co-primary cases are two or more cases that occur among a group of close contacts with onset of illness separated by  $\leq 24$  hours.

**Close contacts.** Close contacts of a patient who has meningococcal disease include 1) household members; 2) child-care center contacts; and 3) persons directly exposed to the patient's oral secretions (e.g., by kissing, mouth-to-mouth resuscitation, endotracheal intubation, or endotracheal tube management).

### Clinical Description

The signs and symptoms of meningococcal disease can vary widely. A person may have either meningococcal meningitis or meningococemia, or both at the same time. The most common symptoms include:

- a. High fever
- b. Severe headache
- c. Difficulty breathing
- d. Stiff neck and back
- e. Painful joints and/or sore muscle

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- f. Discomfort looking into bright lights (Photophobia)
- g. Extreme sleepiness, drowsiness and confusion
- h. Vomiting and/or diarrhea
- i. Loss of consciousness/seizures
- j. Rash of red-purple pinpoint spots or larger bruises
- k. In babies under one year of age, the soft spot on the top of the head (fontanel) may bulge upward

In newborns and small infants, the classic findings of fever, headache and neck stiffness may be absent or difficult to detect, and the infant may show only extreme listlessness, irritability, poor feeding and sometimes vomiting.

### **Etiologic Agent**

*Neisseria meningitidis* is a gram-negative diplococcus bacterium with at least 13 serogroups (A, B, C, D, 29E, H, I, K, L, W-135, X, Y, and Z). Strains belonging to groups A, B, C, Y and W-135 are implicated most frequently in invasive disease.

### **Reservoir**

Humans are the only known reservoir of *Neisseria meningitidis*

### **Mode of Transmission**

By direct contact, including respiratory droplets from nose and throat of infected people; infection usually causes only a subclinical mucosal infection; invasion sufficient to cause systemic disease is comparatively rare. Carrier prevalence of 25% or greater may exist without cases of meningitis. During epidemics, over half the men in a military unit may be healthy carriers of pathogenic meningococci. Fomite transmission is insignificant.

### **Incubation Period**

The incubation period is variable, 1-10 days, but usually less than 4 days.

### **Period of Communicability**

An infected person is infectious as long as meningococci are present in nasal and oral secretions or until 24 hours after initiation of effective antibiotic treatment. Communicability is limited. In studies of households with a case of meningococcal disease, only 3%-4% of households had secondary cases (most of which were 1 case).

### **Outbreak Recognition**

West Virginia averages 8 cases of meningococcal disease every year (2001-2016, range: 1-15). An outbreak is an unusual increase of disease caused by a single serogroup above the expected number of cases.

Outbreaks have occurred in communities and institutions, including child care centers, schools, colleges, and military recruit camps. In recent years, several outbreaks of serogroup B meningococcal disease have been reported on U.S. college campuses, including a prolonged outbreak in Ohio (2008-2010).

Outbreaks of serogroup C meningococcal disease (SCMD) have been occurring more frequently in the United States since the early 1990's, and the use of vaccine to control these outbreaks has increased.

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These outbreaks are characterized by increased rates of disease among persons who may have a common organizational affiliation or who live in the same community yet do not have close contact.

An organization-based outbreak of serogroup C meningococcal disease (SCMD) is defined as the occurrence of three or more confirmed or probable cases of SCMD during a period of  $\leq 3$  months in persons who have a common affiliation but no close contact per 100,000 persons.

A community based outbreak of serogroup C meningococcal disease (SCMD) is defined as the occurrence of three or more confirmed or probable cases during a period of  $\leq 3$  months among persons residing in the same area who are not close contacts of each other and who do not share a common affiliation, with a primary attack rate of at least 10 cases per 100,000 population.

Outbreak response requires detailed epidemiologic (contact tracing) and laboratory (serogrouping) investigation. If the outbreak strain is a vaccine strain, vaccination of at risk population should be considered.

### **Case Definition for Meningococcal Disease Council of State and Territorial Epidemiologists (CSTE 2015)**

#### **CLINICAL CRITERIA**

Clinical purpura fulminans\* in the absence of a positive blood culture.

#### **LABORATORY CRITERIA FOR DIAGNOSIS**

- a. Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF)
- b. Detection of *N. meningitidis* antigen
  - i. In formalin-fixed tissue by immunohistochemistry (IHC); or
  - ii. In CSF by latex agglutination
- c. 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
- d. Isolation of *N. meningitidis*
  - iii. From a normally sterile body site (e.g., blood or CSF, or less commonly, synovial, pleural, or pericardial fluid); or
  - iv. From purpuric lesions

The diagnosis of invasive meningococcal disease can be made by growing bacteria (culture) from a sample of spinal fluid, blood or other sterile fluids. The spinal fluid is obtained by performing a spinal tap, in which a needle is inserted into an area in the lower back where fluid in the spinal canal is readily accessible. Identification of the type of bacteria responsible is important for selection of correct antibiotics. Sensitivity of a bacterial culture may be low following antibiotic therapy.

A gram stain of a petechial or purpuric scraping, CSF, and buffy coat smear of blood showing gram-negative diplococci can be helpful when suspecting meningococcal disease.

Real-time PCR (rt-PCR) detects meningococcal DNA and is useful in clinical specimens in which the organism may not be detected, such as those who received antimicrobial treatment before cultures were obtained.

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Meningococcal serogroup testing is performed by the West Virginia Office of Laboratory Services.

### EPIDEMIOLOGIC LINKAGE

Not applicable for case classification.

### CASE CLASSIFICATION

#### Suspected

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

#### Probable

Detection of *N. meningitidis* antigen

- a. In formalin-fixed tissue by immunohistochemistry (IHC); or
- b. In CSF by latex agglutination

#### Confirmed

- a. 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
- b. Isolation of *N. meningitidis*
  - i. From a normally sterile body site (e.g., blood or CSF, or less commonly, synovial, pleural, or pericardial fluid); or
  - ii. From purpuric lesions.

\*Purpura fulminans is a progressive cutaneous hemorrhage and necrosis due to dermal vascular thrombosis and disseminated intravascular coagulation (DIC) caused by *Neisseria meningitidis*.



Infant with purpura and necrosis caused by *N. meningitidis*.

### Preventive Interventions

1. To avoid further exposure advise individuals to:
  - a. Avoid sharing eating and drinking utensils.
  - b. Avoid sharing food, drinks, cigarettes, or mouth pieces from musical instruments.

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- c. Take care to cover your mouth when coughing or sneezing.
- d. Wash your hands frequently especially following exposure to respiratory secretions (coughing or sneezing).
- 2. To prevent additional cases:
  - a. Refer close contacts to health care providers for appropriate chemoprophylaxis.
  - b. Advise contacts of signs and symptoms of illness and refer them to their health care provider should they experience any symptoms compatible with invasive meningococcal disease.
- 3. Other preventive measures that would help protect individuals are:
  - a. Avoid smoking and smoky environments.
  - b. Get plenty of sleep, exercise regularly.
  - c. Eat a balanced diet and avoid excessive alcohol consumption.
  - d. Vaccinate as indicated.

## CHEMOPROPHYLAXIS

Close contacts of cases with invasive meningococcal disease are at high risk of infection and should receive chemoprophylaxis regardless of their immunization status.

Initiate chemoprophylaxis within 24 hours after index case is identified. Chemoprophylaxis given more than 2 weeks after exposure has little value.

Chemoprophylaxis is **RECOMMENDED** in High Risk (Close Contacts of a case):

- a. Household contact, especially children younger than 2 years of age;
- b. Child care or pre-school contact at any time during 7 days before onset of illness;
- c. Direct exposure to index patient’s secretions through kissing or through sharing tooth brushes or eating utensils, markers of close social contact, at any time during 7 days before onset of illness;
- d. Mouth-to-mouth resuscitation, unprotected contact during endotracheal intubation at any time 7 days before onset of illness;
- e. Frequently slept in same dwelling as index patient during 7 days before onset of illness;
- f. Passengers seated directly next to the index case during airline flights lasting more than 8 hours.

## Recommended Chemoprophylaxis Regimens for High-Risk Contacts and People with Invasive Meningococcal Disease

Infants, Children, and Adults	Dose	Duration	Efficacy, %	Cautions
<b>Rifampin</b> <1 month	5 mg/kg body weight, orally, every 12 hrs.	2 days	90-95	Can interfere with efficacy of oral contraceptives and some seizures and anticoagulant medications; can stain soft contact lenses <b>Not</b> recommended for use in pregnant women
≥1 month	10 mg/kg body weight (maximum 600 mg), orally every 12 hrs.	2 days		



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<b>Ceftriaxone</b> <15 years	125 mg, intramuscularly	Single dose	90-95	To decrease pain at injection site, dilute with 1% lidocaine
≥15 years	250 mg, intramuscularly	Single dose	90-95	To decrease pain at injection site, dilute with 1% lidocaine
<b>Ciprofloxacin*</b> ≥1 month	20 mg/kg (maximum 500 mg), orally	Single dose	90-95	Not recommended routinely for people <18 years of age; use may be justified after assessment of risks and benefits for the individual patient. Not recommended for use in pregnant women
<b>Azithromycin</b>	10 mg/kg (maximum 500 mg)	Single dose	90	Not recommended routinely equivalent to rifampin for eradication of <i>Neisseria meningitidis</i> from nasopharynx in one study

Use only if fluoroquinolone-resistant strains of *N. meningitidis* have not been identified in the community.  
Source: the American Academy of Pediatrics. Redbook, 30<sup>th</sup> (2015) Edition.

If antimicrobial agents other than ceftriaxone or cefotaxime are used for treatment of invasive meningococcal disease, the index case should receive a regimen of chemoprophylaxis before hospital discharge to eradicate nasopharyngeal carriage of *N. meningitidis*.

Chemoprophylaxis **NOT** recommended for the following persons:

- a. Persons having casual contact with the case and no direct contact with oral secretions, e.g. school or work mates;
- b. Persons who had contact only with a high risk contact, i.e. no direct contact with the index case;
- c. Health care professionals without direct exposure to patient’s oral secretions.

For outbreaks of meningococcal disease:

- a. Check to confirm that the reported cases meet the confirmed or probable case definition.
- b. Assure that all isolates are forwarded to Office of Laboratory Services for serogrouping.
- c. Consult DIDE as soon as possible for recommendations on outbreak control.
- d. Assure that close contacts are identified and prophylaxed in a timely manner.
- e. Chemoprophylaxis for people other than those at high risk should be administered only after consultation with public health authorities.

Mass chemoprophylaxis (i.e., administration of antibiotics to a large population) is not recommended to control large outbreaks of disease. The disadvantages (cost of the drug and administration, difficulty of ensuring simultaneous administration of drugs to substantial populations, drug side effects, and emergence of resistant organisms) often outweigh the benefit. Multiple sources and prolonged risk for exposure also makes this approach impractical and unlikely to succeed.

In outbreaks involving smaller populations (e.g., an outbreak in a single school), administration of chemoprophylaxis might be considered. When making a decision about initiating mass chemoprophylaxis, public health officials should consider not only the potential for prevention of new cases but also the

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logistics, cost, and potential for developing antimicrobial resistance. If mass chemoprophylaxis is undertaken, it should be administered to all targeted persons at the same time.

It is not necessary to restrict travel to areas with an outbreak, close schools or universities, or cancel sports or social events.

Use of meningococcal vaccine as an adjunct to chemoprophylaxis:

- Rationale: Secondary cases can occur many weeks after the onset of illness of the index case.
- For control of outbreaks due to serogroup A, C, Y, W - use the meningococcal conjugate vaccine for children  $\geq$  2 months or older and adults.
- For those at increased risk for disease due to serogroup B meningococcal disease outbreak, Advisory Committee on Immunization Practices (ACIP) recommends using either of the two serogroup B vaccine on people  $>$  10 years or older.
- Use same vaccination product for all doses.

## MENINGOCOCCAL VACCINES

Meningococcal vaccines are safe, well tolerated and highly efficacious against the most relevant invasive serogroups. Vaccines elicit a long-lasting immune response in many age groups and induce herd immunity.

Meningococcal vaccines are available to help protect against the most commonly seen meningococcal serogroups (B, C, and Y) in the United States. However, these vaccines may not prevent all cases.

There are three types of meningococcal vaccines licensed in the United States for use in children and adults against serogroups A, C, Y, W, and B.

- a. The meningococcal polysaccharide vaccine, MPSV4, was licensed in 1981 for use in children 2 years of age and older.
- b. The meningococcal conjugate vaccine, MCV4, was licensed in 2005 for use in people 2 to 55 years of age.
- c. The meningococcal recombinant B vaccine is approved for use in persons aged 10–25 years who are at increased risk for serogroup B meningococcal infection.

### Meningococcal serogroup covered by each vaccine:

Trade name	Type of Vaccine	Meningococcal Serogroups Covered
Bexsero <sup>®</sup>	Recombinant	B
Menactra <sup>®</sup>	Conjugate	A, C, W, Y
MenHibrix <sup>®</sup>	Conjugate	C, Y (and <i>Haemophilus influenzae</i> type b [Hib])
Menomune <sup>®</sup>	Polysaccharide	A, C, W, Y
Menveo <sup>®</sup>	Conjugate	A, C, W, Y
Trumenba <sup>®</sup>	Recombinant	B

**Meningococcal vaccines. (Minimum age: 6 weeks for Hib-MenCY [MenHibrix], 9 months for MenACWY-D [Menactra], 2 months for MenACWY-CRM [Menveo], 10 years for serogroup B meningococcal [MenB] vaccines: MenB-4C [Bexsero] and MenB-FHbp [Trumenba])**

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### Routine vaccination:

- Administer a single dose of Menactra or Menveo vaccine at age 11 through 12 years, with a booster dose at age 16 years.
- Adolescents aged 11 through 18 years with human immunodeficiency virus (HIV) infection should receive a 2-dose primary series of Menactra or Menveo with at least 8 weeks between doses.
- For children aged 2 months through 18 years with high-risk conditions.

### Catch-up vaccination:

- Administer Menactra or Menveo vaccine at age 13 through 18 years if not previously vaccinated.
- If the first dose is administered at age 13 through 15 years, a booster dose should be administered at age 16 through 18 years with a minimum interval of at least 8 weeks between doses.
- If the first dose is administered at age 16 years or older, a booster dose is not needed.
- For other catch-up guidance, see <https://www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html>

### Clinical discretion:

Young adults aged 16 through 23 years (preferred age range is 16 through 18 years) may be vaccinated with either a 2-dose series of Bexsero or a 3-dose series of Trumenba vaccine to provide short-term protection against most strains of serogroup B meningococcal disease. The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses.

### Vaccination of persons with high-risk conditions and other persons at increased risk of disease:

#### **A. Children with anatomic or functional asplenia (including sickle cell disease):**

##### **1. Meningococcal conjugate ACWY vaccines:**

###### **Menveo**

- Children who initiate vaccination at 8 weeks.* Administer doses at 2, 4, 6 and 12 months of age.
- Unvaccinated children who initiate vaccination at 7 through 23 months.* Administer two doses, with the second dose at least 12 weeks after the first dose AND after the first birthday.
- Children 24 months and older who have not received a complete series.* Administer two primary doses at least 8 weeks apart.

###### **MenHibrix**

- Children who initiate vaccination at 6 weeks.* Administer doses at 2, 4, 6 and 12 through 15 months of age.
- If the first dose of MenHibrix is given at or after 12 months of age, a total of 2 doses should be given at least 8 weeks apart to ensure protection against serogroups C and Y meningococcal disease.

###### **Menactra**

- Children 9 through 23 months;* administer two primary doses at least 12 weeks apart.
- Children 24 months and older who have not received a complete series.* Administer two primary doses at least 8 weeks apart. If Menactra is administered to a child with asplenia (including sickle cell disease), do not administer Menactra until 2 years of age and at least 4 weeks after the completion of all PCV13 doses.

##### **2. Meningococcal B vaccines**

There are 2 recombinant serogroup meningococcal vaccines licensed in the United States - MenB-4C (Bexsero™) or MenB-FHbp (Trumenba™)

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- a. *Persons 10 years or older who are at increased risk of meningococcal disease.* These include persons with persistent complement component deficiencies (including persons taking the drug eculizumab [Soliris®], which impairs complement function); persons who have anatomic or functional asplenia, including sickle cell disease; microbiologists who are routinely exposed to isolates of *Neisseria meningitidis*; or anyone identified to be at increased risk because of a serogroup B meningococcal disease outbreak.
  - b. Providers may also consider serogroup B meningococcal vaccination for *adolescents and young adults 16 through 23 years of age*. The preferred age for serogroup B meningococcal vaccination is 16 through 18 years of age. This is an ACIP category B recommendation, meaning the recommendation is for individual clinical decision making
  - c. There is no preference for one brand of serogroup B meningococcal vaccine. Administer a 2 dose (0, 1-6 months) series of Bexsero, at least 1 month apart or a 3-dose series (0, 1-2 months, and 6 months) of Trumenba, with the second dose at least 2 months after the first and the third dose at least 6 months after the first. The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses.
  - d. Serogroup B meningococcal vaccine may be administered simultaneously or at any interval with other live or inactivated vaccines, including meningococcal conjugate vaccines.
- B. For children who travel to or reside in countries in which meningococcal disease is hyperendemic or epidemic, including countries in the African meningitis belt or the Hajj:** Administer an age-appropriate formulation and series of Menactra or Menveo for protection against serogroups A and W meningococcal disease. Prior receipt of MenHibrix is not sufficient for children traveling to the meningitis belt or the Hajj because it does not contain serogroups A or W.
- C. For children at risk during a community outbreak attributable to a vaccine serogroup:** Administer or complete an age- and formulation-appropriate series of MenHibrix, Menactra, Menveo, Bexsero, or Trumenba.

For more information about each vaccine, vaccine schedule and specific indications, please consult the Immunization Program.

### Treatment

1. Fluid resuscitation and empiric management of shock.
2. Management of increased intracranial pressure.
3. Start extended-spectrum cephalosporins promptly after obtaining cultures.

### Surveillance Indicators

1. Proportion of meningococcal cases with complete information (age and event date).
2. Number of confirmed cases.
3. Proportion of meningococcal cases with complete vaccine history (with/without manufacturer name).
4. Proportion of meningococcal cases with serogroup testing.
5. Proportion of cases with known outcome.
6. Proportion of meningococcal cases reported in a timely manner.
7. Proportion of meningococcal cases with timely initiation of control measures.
8. Proportion of cases with isolates submitted to CDC
9. Percent of isolates shipped to CDC during assigned submission schedule

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8. Centers for Disease Control and Prevention. National Center for Immunization and Respiratory Diseases. Using Surveillance Indicators for Vaccine-Preventable Diseases (VPDs): National Notifiable Diseases Surveillance System (NNDSS). February 2017.
9. Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases, 13<sup>th</sup> edition – Supplement.

# **Invasive Meningococcal Disease**

## **Surveillance and Investigation Protocol**



### **Appendix A.**

## **Protocol for Enhanced Meningococcal Disease Surveillance for the ELC VPD Surveillance Coordination Sites**

Last Updated: 09/22/2017

# Invasive Meningococcal Disease Surveillance and Investigation Protocol



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# Invasive Meningococcal Disease Surveillance and Investigation Protocol



## Data Transmission Instructions

Sites should submit the following variables to CDC via the provided **MENINGOCOCCAL DISEASE SUPPLEMENTAL DATA** spreadsheet.

If any variable is not routinely collected or is not known, unknown is an acceptable response. **Only enter a yes/no response if status is known. Please only leave variables blank where they do not apply (college student/MSM outside of defined age/sex group), otherwise enter unknown.**

Please submit these spreadsheets to [meningnet@cdc.gov](mailto:meningnet@cdc.gov).

Variables (for all cases):

- NNDSS Case ID
- State ID
- Date of Birth or Age
- Sex
- Case Status (confirmed or probable)
- Event Date
- Lab confirmation method (culture/PCR)
- Serogroup
- Outcome (alive/dead)
- Source of isolate (blood/csf)
- Outbreak/cluster related
- MSM (men who have sex with men)
- HIV status
- Homeless
- College student
- Taking eculizumab/Soliris
- GI symptoms
- Quadrivalent (MenACWY/MCV4) vaccination history
- Serogroup B vaccination history

For matching data to cases reported through NNDSS

### Variable definitions and instructions:

**NNDSS Case ID:** Unique case ID transmitted to CDC in NNDSS. This may be auto generated at your state and may be different from the State ID used to identify cases in your state system. This ID is 6 digits at CDC, so if this ID is longer at your state, we are likely receiving the last 6 digits. Having this Case ID will allow direct linkage to the NNDSS data so data will no longer need to be matched based on date of birth and event date.

**State ID:** Unique ID number for each case used in your state. This may be the same as the NNDSS case ID.

**Laboratory ID:** Complete if an isolate was sent to CDC. The unique ID used by your state lab. This may be the same as the State ID, but in most cases, a different ID is being received on the shipping spreadsheet than the supplemental data spreadsheet. This column should match the shipping

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spreadsheet state ID column.

**Date of Birth or Age:** Date of birth is preferred if known

**Case Status:** Only confirmed and probable cases need reported on the spreadsheet

**Lab confirmation method:** Laboratory method used to diagnose/confirm the case.

**Outbreak/cluster related:** Clusters will be defined as 2 or more cases of the same serogroup in an organization in <3 months (not including secondary cases) OR an increase in disease rates in a community or a specific population in a community (rate 2 times the rate during the same time period in prior years). Outbreaks will be defined as 3 or more cases of the same serogroup occurring in <3 months which gives an attack rate of >10/100,000 population

**MSM (Men who have sex with men):** Case reported in a man identified as an MSM. **Complete this variable for any male cases 16 years of age and older.**

The CDC's HIV/STD Program has recommended the following questions be used to assess MSM status during case investigations:

1. During the past 12 months, have you had sex with only males, only females, or with both males and females?

- 1=Males only
- 2=Females only
- 3=Both Males and Females
- 4=Unknown
- 9=refused

2. Do you consider yourself to be...

- 1=Heterosexual/Straight
- 2=Gay/Lesbian/Homosexual
- 3=Bisexual
- 4=Other
- 9=Refused

3. Thinking back to the 3 months before you were diagnosed with meningococcal disease, how many MEN did you have sex with during that time?

A separate case report form should also be completed and submitted to [meningnet@cdc.gov](mailto:meningnet@cdc.gov) for each MSM case identified. The case report form can be found at: <http://www.cdc.gov/meningococcal/surveillance/index.html>

**HIV status:** For 2015, this variable was only 13% complete, so we are strongly encouraging states to begin matching their meningococcal disease cases with their state's HIV registries in order to

# Invasive Meningococcal Disease

## Surveillance and Investigation Protocol

obtain more complete information. This could be done once at the end of the year.

**Homeless:** An individual who: lacks a fixed, regular, and adequate nighttime residence; has a primary nighttime residence that is a public or private place not designed for or ordinarily used as a regular sleeping accommodation, including a car, park, abandoned building, bus or train station, airport, or camping ground; is living in a supervised publicly or privately operated shelter designated to provide temporary living arrangements (including hotels and motels paid for by Federal, State or local government programs for low-income individuals or by charitable organizations, congregate shelters, and transitional housing).

**College student:** Case attending a college or university at the time of disease onset. **Complete this variable for cases age 15-24 years only.**

**Taking eculizumab/Soliris:** Case taking eculizumab/Soliris at the time of disease onset.

**GI Symptoms:** The United Kingdom and Chile have recently reported increases in serogroup W meningococcal disease; many of these serogroup W cases first presented with GI symptoms instead of more typical meningococcal disease symptoms<sup>1-4</sup>. Because of this, some cases were initially misdiagnosed when first presenting for care. We have also observed a high proportion of cases with GI symptoms in one serogroup W cluster in the US as well. For this reason we are interested in learning if this is being observed nationally, or for other serogroups. Complete this variable for cases of all serogroups and ages.

1. Ladhani S.N., Beebejaun K., Lucidarme J., Campbell H., Gray S., Kaczmarek E. Increase in endemic Neisseria meningitidis capsular group W sequence type 11 complex associated with severe invasive disease in England and Wales. Clin Infect Dis. 2015; 60:578–585.
2. Cameron C, McDonald E, Smith-Palmer A, et al. Increased incidence of Meningococcal serogroup W in Scotland in 2015. Poster presented at: International Pathogenic Neisseria Conference; 5 Sep- 9 Sep; Manchester, UK.
3. Campbell H, Parikh S, Beebejaun K, et al. Symptoms and diagnoses of invasive meningococcal disease in England 2014. Poster presented at: International Pathogenic Neisseria Conference; 5 Sep- 9 Sep; Manchester, UK.
4. Moreno G, López D, Vergara N, Gallegos D, Advis MF, Loayza S. Caracterización clínica de los casos de enfermedad meningocócica por serogrupo W135 confirmados durante el año 2012 en Chile. [Clinical characterization of cases with meningococcal disease by W135 group in Chile, 2012]. Rev Chilena Infectol. 2013;30(4):350-60.

## Isolate Submission Instructions

We are requesting all meningococcal isolates (all serogroups, all age-groups) be submitted to CDC. **The completed ENHANCED MENINGOCOCCAL DISEASE SURVEILLANCE SHIPPING SPREADSHEET must be e-mailed to CDC before a shipment is sent and a hard copy of the spreadsheet must also be included in every isolate shipment.**

Please send electronic spreadsheets to [meningnet@cdc.gov](mailto:meningnet@cdc.gov).

The variables on shipping spreadsheet will include:

State ID:	ID assigned by the state; used to link lab and national/supplemental data
Accession #:	ID assigned by the state lab; usually the state lab accession or identification #
Specimen source:	Sterile site source of isolate
Culture date:	Date of collection of the isolate

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Date sent to CDC: Date the isolate will be sent to CDC  
State serogroup: State laboratory results for serogroup for *N. meningitidis*  
Test used to serogroup: List method used by state laboratory to serogroup (PCR, SASG, etc.)  
Viable: Indicate if isolate is viable at site lab. Enter 'yes' if an isolate is viable and 'no' if an isolate is non-viable  
DOB: Date of birth of the case patient; or age in years at disease onset (if DOB is not available)  
Previously submitted\*: Please indicate if the isolate has previously been submitted to CDC  
Date previously submitted: If previously submitted, please indicate the date it was previously submitted

**\*If previously submitted, you do not need to resend unless requested specifically.**

## **Shipping instructions:**

1. All vials should be labeled with the accession number as listed on the Excel shipping spreadsheet. Labels that can withstand dry ice and water should be used. Large labels that require "flagging" should not be used (i.e., those where the label wraps around and the excess length is stuck to itself) as they can become ripped and samples could be misidentified.
  - a. If sending an isolate culture on a slant, label the slant with the state ID, accession number, and data prepared/inoculated.
  - b. All non-viable isolates should be sent in the **original/primary tube/vial/slant/plate** and labeled with the state ID and accession number.
2. Isolates should be shipped by FedEx or Express mail.
3. Viable and non-viable isolates may be shipped together in the same package
4. All isolates should be sent in compliance with shipping regulations for infectious substances. Additionally, each package should have the following written on the outside of the package: "DO NOT expose to extreme temperatures". If shipping via FedEx, no shippers' declaration required.
5. Transport :
  - a. All *Neisseria meningitidis* isolates should be pure, fresh cultures. Inoculate these cultures on chocolate agar slants and incubate overnight at @ 37°C in a 5% CO<sub>2</sub> atmosphere. After overnight incubation, cultures can be sent on chocolate agar slants and at ROOM TEMPERATURE.
  - b. *Neisseria meningitidis* isolates can also be sent using silica gel packages. If shipping isolates on silica, labs should collect the isolate's overnight growth from the chocolate or blood agar plate with a sterile swab. The swab should then be placed into the silica gel package and shipped with ICE PACKS. If ice packs are not available, ship the isolates at ROOM TEMPERATURE and DO NOT use dry ice.
6. Special Instructions:
  - a. **If more than 10 isolates are being shipped, all isolates should be sent frozen.**
  - b. Packages containing isolates should not have the names of laboratory staff on the shipping documents

## **Address:**

**ATTN: STAT Lab  
c/o Meningitis Laboratory Unit 10/44**

October 2017

# Invasive Meningococcal Disease Surveillance and Investigation Protocol

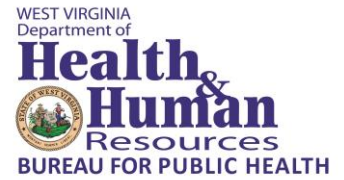


**Centers for Disease Control and Prevention  
1600 Clifton Road NE, Atlanta, GA 30333**

Laboratory Contact:

Melissa Whaley or Laurel Thompson Jenkins  
E-mail: [dbq3@cdc.gov](mailto:dbq3@cdc.gov) and [knt9@cdc.gov](mailto:knt9@cdc.gov)  
Tel: (404) 639-5009  
Fax: (404) 639-4421

# Invasive Meningococcal Disease Surveillance and Investigation Protocol



## Data and Isolate Shipping Schedule

Please send both the **MENINGOCOCCAL DISEASE SUPPLEMENTAL DATA** spreadsheet and the **ENHANCED MENINGOCOCCAL DISEASE SURVEILLANCE SHIPPING SPREADSHEET** to [meningnet@cdc.gov](mailto:meningnet@cdc.gov) and ship isolates to CDC during your sites scheduled month below. **Please submit the week of the 15<sup>th</sup> of your designated month.**

Submission Month	
October 2017	Arizona, California, Indiana, Kentucky, Maine, Missouri, New Jersey, New York, South Carolina, Utah
November 2017	Alabama, Houston, Iowa, Kansas, Mississippi, Montana, New Hampshire, Oklahoma, Houston, Texas
December 2017	Arkansas, Chicago, Colorado, Florida, Illinois, Louisiana, West Virginia
January 2018	LA County, Massachusetts, Michigan, NYC, Palau, Tennessee, US Virgin Islands, Washington
February 2018	Alaska, Nebraska, Nevada, North Carolina, North Dakota, Ohio, Pennsylvania, Philadelphia, Puerto Rico, Rhode Island, Vermont, Virginia, Wisconsin [Connecticut, Maryland, Georgia, Minnesota, New Mexico]*
March 2018	Arizona, California, Indiana, Kentucky, Maine, Missouri, New Jersey, New York, South Carolina, Utah
April 2018	Alabama, Houston, Iowa, Kansas, Mississippi, Montana, New Hampshire, Oklahoma, Houston, Texas
May 2018	Arkansas, Chicago, Colorado, Florida, Illinois, Louisiana, West Virginia
June 2018	LA County, Massachusetts, Michigan, Palau, Tennessee, US Virgin Islands, Washington
July 2018	Alaska, Nebraska, Nevada, North Carolina, North Dakota, NYC, Ohio, Pennsylvania, Philadelphia, Puerto Rico, Rhode Island, Vermont, Virginia, Wisconsin [Connecticut, Georgia, Maryland, Minnesota, New Mexico]*

\*Data only (Submit all isolates through ABCs)