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## Meningococcal Disease

### Overview<sup>1, 2, 3, 6, 9, 11</sup>


Meningococcal disease is an acute and often a serious illness caused by the bacterium *Neisseria meningitidis* (*N. meningitidis*). This bacterium has at least 13 different serogroups. Five of these serogroups, A, B, C, Y, and W-135, cause almost all invasive disease. The relative importance of these five serogroups depends on geographic location and other factors. Humans are the only host for *N. meningitidis*. Meningococcal disease is more commonly diagnosed among infants, adolescents, and young adults. *N. meningitidis* bacteria are spread through the exchange of respiratory and throat secretions like spit (e.g., by coughing, sneezing, kissing, living in close quarters, sharing of drinking glasses, eating utensils, or cigarettes). Host factors that increase risk of disease include asplenia, certain immunodeficiencies, and genetic risk factors. Environmental risk factors include household exposure; concurrent upper respiratory infections; crowded housing; and active or passive smoking.

The incubation period ranges from 1 to 10 days (usually less than 4 days) after exposure.<sup>2</sup> The period of communicability varies, but usually lasts less than 24 hours after onset of appropriate antibiotic treatment. Meningococcal disease can include a variety of serious clinical illnesses, including meningitis (infection of the lining of the spinal cord), septicemia or bacteremia (bacteria in the blood), and rarely, pneumonia (infection of the lungs).

When someone has meningococcal meningitis the symptoms include sudden onset of fever, headache, and stiff neck. It is often accompanied by other symptoms, such as nausea, vomiting, photophobia (increased sensitivity to light), and altered mental status (confusion). In newborns and infants, the classic symptoms of fever, headache, and neck stiffness may be absent or difficult to notice. The infant may appear to be slow or inactive, irritable, vomiting, or feeding poorly. In young children, doctors may also look at the child's reflexes, which can also be a sign of meningitis. Another common outcome of meningococcal infection is either septicemia or bacteremia. Symptoms may include; fatigue, vomiting, cold hands and feet, cold chills, severe aches or pain in the muscles, joints, chest or abdomen, rapid breathing, diarrhea, and in the later stages, a dark purple rash.

Meningococcal disease is potentially fatal and should always be viewed as a medical emergency which requires prompt treatment. Consequently, empiric antibiotic treatment must be started early in the course of the disease, after appropriate cultures have been obtained, because of the short period of time between progressions from initial symptoms to death. A systematic study of the occurrence of symptoms, before hospitalization, in children and adolescents (aged 16 or younger) with meningococcal disease was conducted with the following results: (1) Nonspecific symptoms occurred for the first 4 to 6 hours, (2) More severe symptoms developing by 8 hours, such as leg pains, cold hands, cold feet, and abnormal skin color, (3) The median time to hospital admission was 19 hours, and (4) By 24 hours children were close to death.<sup>6, 11</sup>

Although meningococcal disease can be very serious, meningococcal disease can be treated with antibiotics that prevent severe illness and reduce the spread of infection from person-to-person. However, the case-fatality rate in the U.S. is still 10%-14%. Of patients who recover 11%-19%

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will have permanent hearing loss, mental retardation, loss of limbs, or other serious sequelae. If you get meningococcal disease twice, it is highly possible that you have an underlying immune deficiency, which your doctor should evaluate.

Vaccination is the best way to prevent meningococcal disease. There are two kinds of meningococcal vaccine currently licensed in the U.S:

- Meningococcal conjugate vaccine (MCV4) which is the preferred vaccine for people 55 years of age and younger.
- Meningococcal polysaccharide vaccine (MPSV4) has been available since the 1970s. It is the only meningococcal vaccine licensed for people older than 55 years of age.

Both vaccines can prevent 4 types of meningococcal disease (serotypes A, C, Y, and W-135).

For a more complete description of meningococcal disease refer to:

- *Control of Communicable Diseases Manual (CCDM)*, American Public Health Association, 2008.
- American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. 2012.
- *Epidemiology and Prevention of Vaccine-Preventable Diseases*, “Pink Book”, CDC. 12th ed., second printing, May 2012: <http://www.cdc.gov/vaccines/pubs/pinkbook/mening.html>.
- Apicella, Michael A. *Neisseria meningitidis*. In: Gerald L. Mandell, John E. Bennett, & Raphael Dolin, Eds. *Principles and Practice of Infectious Diseases*, 7<sup>th</sup> ed. 2010.

### **2015 Case Definition Meningococcal Disease**<sup>5</sup> – (1/15)

#### ***Clinical Criteria***

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


#### ***Laboratory Criteria for Diagnosis***

- Gram-negative diplococci, not yet identified, isolated from a normally sterile body site [e.g., blood or cerebrospinal fluid (CSF)]
- Detection of *N. meningitidis* antigen
  - In formulin-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.

(Continued on next page.)

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### ***Case Classification***

#### **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 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.

#### **Probable**

- Detection of *N. meningitidis* antigen
  - In formalin-fixed tissue by IHC; **OR**
  - In CSF by latex agglutination.

#### **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).

### **Information Needed for Investigation**

**Verify Clinical Diagnosis.** Because of the risks of severe morbidity and death, effective antibiotics should be administered promptly to patients suspected of having meningococcal disease; do not wait for confirmation by culture to begin treatment<sup>10</sup> (see [Meningococcal Disease Treatment Overview](#)). Obtain demographic, clinical, laboratory information, and other epidemiological information necessary to complete the “[Disease Case Report](#)” (CD-1), and the “[Record of Investigation of Bacterial Meningitis or Bacteremia Case Report](#)” (CD-2M) from the attending physician, hospital and/or laboratory, and patient or a knowledgeable family member. **NOTE:** *Ensure appropriate confirmatory laboratory tests are performed.*

**Establish the Extent of Illness.** Determine if household or other close contacts are or have been ill by contacting the patient, family members, or health care provider. Contacts who have or develop a febrile illness should receive *prompt* medical evaluation, and if indicated, antimicrobial treatment appropriate for invasive meningococcal infection. Appropriate laboratory testing should be done (see [Laboratory Procedures](#)), but treatment should *not* be delayed.<sup>2</sup> Determine if the case provided child or patient care for anyone outside the household.

**Identification of High-Risk of Exposure Contacts.**<sup>2, 6, 10</sup> Identify all high-risk of exposure contacts (i.e. close contacts who may have been exposed to the respiratory aerosols of a case in the 7 days before the onset of symptoms in the case and until the case has 24 hours of effective antimicrobial therapy). All high-risk of exposure contacts should receive chemoprophylaxis (*regardless of immunization status*). Chemoprophylaxis ideally should be initiated *within 24 hours after the case is identified*; prophylaxis given more than two weeks after exposure has little value. **COMMENT:** *Interview the case, their household members, and close friends* (for cases that are adolescents and/or young adults, close friends may be the only source of information

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about contacts during school or in other non-household settings). **NOTE:** *The rationale behind this methodology is to eradicate carriage from asymptomatic carriers who may be a potential source of further cases; and eradicate carriage for those who have just acquired the organism and may themselves be at risk of developing meningococcal disease.*


### Examples of High-risk of Exposure Contacts.<sup>2</sup>

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

See the following table extracted from the American Academy of Pediatrics, *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. for recommended chemoprophylaxis regimens.

**TABLE 1 - Recommended Chemoprophylaxis Regimens for High Risk Contacts and People with Invasive Meningococcal Disease<sup>2</sup>**

Age of Infants, Children, and Adults	Dose	Duration	Efficacy, %	Cautions
<b>Rifampin<sup>a</sup></b>				
< 1 mo	5 mg/kg, orally, every 12 h	2 days		
≥ 1 mo	10 mg/kg (maximum 600 mg), orally, every 12 h	2 days	90–95	Can interfere with efficacy of oral contraceptives and some seizure and anticoagulant medications; can stain soft contact lenses
<b>Ceftriaxone</b>				
< 15 y	125 mg, intramuscularly	Single dose	90–95	To decrease pain at injection site, dilute with 1% lidocaine
≥ 15 y	250 mg, intramuscularly	Single dose	90–95	To decrease pain at injection site, dilute with 1% lidocaine
<b>Ciprofloxacin<sup>a,b</sup></b>				
≥ 1 mo	20 mg/kg (maximum 500 mg), orally	Single dose	90–95	Not recommended routinely for people younger than 18 years of age; use may be justified after assessment of risks and benefits for the individual patient

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<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
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<sup>a</sup> Not recommended for use in pregnant women.

<sup>b</sup> Use only if fluoroquinolone-resistant strains of *N meningitidis* have not been identified in the community; Centers for Disease Control and Prevention. Emergence of fluoroquinolone-resistant *Neisseria meningitidis*—Minnesota and North Dakota, 2007–2008. *MMWR Morbidity Mortal Wkly Rep.* 2008; 57(7):173–175.

Because secondary cases can occur several weeks or more after onset of disease in the index case, meningococcal vaccine is an adjunct to chemoprophylaxis when an *outbreak* is caused by a serogroup prevented by a meningococcal vaccine.<sup>2</sup> For control of meningococcal outbreaks caused by vaccine-preventable serogroups (A, C, Y, and W-135), see the [Outbreak Investigation and Control](#) section contained below in this document.

**Provide Information on Meningococcal Disease to Contacts and the General Public as needed.** Efforts should be made to promote meningococcal disease awareness to high-risk contacts, medical providers, and the public as needed to reduce the risk of infection. Information on meningococcal disease prevention can be found on CDC’s website at:

<http://www.cdc.gov/meningococcal/about/index.html> or several excellent fact sheets are available from the Immunization Action Coalition at:

<http://www.immunize.org/catg.d/p4210.pdf> - Meningococcal: Questions and Answers, Information about the disease and vaccines.


<http://www.immunize.org/catg.d/p4316.pdf> - Meningococcal disease is serious...Make sure your child is protected!

<http://www.immunize.org/catg.d/p2018.pdf> - Meningococcal Vaccination Recommendations by Age and/or Risk Factor.

Contacts should be encouraged to seek medical evaluation immediately if he or she develops a febrile illness. Meningococcal disease cases should be reported promptly. Active or passive exposure to tobacco smoke and concurrent upper respiratory tract infections increase the risk of meningococcal disease.<sup>8</sup> A [sample parent](#) and [physician notification letters](#) are provided in this manual section. These may be adapted if necessary, duplicated, and distributed as needed.

**Meningococcal Disease Surveillance.** Conduct close surveillance of high-risk contacts for at least 10 days after the case’s onset of illness to assure prompt medical evaluation, and treatment of anyone who develops a febrile illness.<sup>6</sup> Establish close contact with key, local medical providers to assure prompt reporting of any additional cases.

Review WebSurv to determine if there are cases related by person, place, time, and serogroup. Is an outbreak or cluster suspected? Information obtained through the [Record of Investigation of](#)

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[Bacterial Meningitis or Bacteremia Case Report](#) (CD-2M) is used to: (1) Characterize persons or geographic areas in which additional efforts may be needed to raise awareness and reduce disease incidence, (2) To detect outbreaks of meningococcal disease so that appropriate control measures can be promptly instituted, and (3) To assess changes in the epidemiology of meningococcal disease over time, to permit the most efficient allocation of resources and formulation of the most effective disease control and prevention policies. In addition, meningococcal serogroup surveillance data are important to monitor the impact of the meningococcal vaccines and to determine the epidemiologic link between cases in cluster or outbreak situations.

### **Notification**

- If meningococcal disease is suspected, the local public health agency (LPHA) should contact the [District Communicable Disease Coordinator](#), the [Senior Epidemiology Specialist for the District](#), or the Missouri Department of Health and Senior Services (MDHSS) - BCDCP, phone (573) 751-6113, Fax (573) 526-0235, or for afterhours notification contact the MDHSS/ERC at (800) 392-0272 (24/7).
- If a case(s) is associated with a child care center, BCDCP or the LPHA will contact the BEHS, phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a long-term care facility, BCDCP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.
- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center BCDCP or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.

### **Control Measures**

**Meningococcal Disease Treatment Overview.** The clinical presentation of meningococcal meningitis is similar to other forms of bacterial meningitis. Consequently, empiric therapy with broad-spectrum antibiotics (e.g., third-generation cephalosporin, vancomycin) should be started promptly, after appropriate cultures have been obtained. Many antibiotics are effective for *N. meningitidis* infection, including penicillin. Few penicillin-resistant strains of meningococcus have been reported in the United States. Once *N. meningitidis* infection has been confirmed, penicillin alone is recommended.<sup>3</sup> **NOTES:** For patients who receive penicillin, eradication of nasopharyngeal carriage with rifampin, ciprofloxacin, or ceftriaxone is recommended prior to discharge from the hospital.<sup>10</sup> For hospitalized meningococcal disease cases in addition to standard precautions, droplet precautions are recommended until 24 hours after initiation of effective antimicrobial therapy.<sup>2</sup> Some experts recommend that patients with invasive meningococcal disease be evaluated for a terminal complement deficiency. If a deficiency is detected, patients should receive a meningococcal conjugate vaccine if nine months of age or older, patients should be counseled about the risk of recurrent invasive meningococcal disease.<sup>2</sup> For additional information on the medical management of meningococcal disease cases see the, American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. 2012, or *Principles and Practice of Infectious Diseases*, 7<sup>th</sup> ed.,

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Pennsylvania: Churchill Livingstone Elsevier, 2010, or other suitable reference; several such references are listed at the end of this document.


**Meningococcal Vaccine.** CDC's Advisory Committee on Immunization Practices (ACIP) recommends routine administration of a MenACWY vaccine for all persons aged 11 through 18 years. A single dose of vaccine should be administered at age 11 or 12 years and a booster dose should be administered at age 16 years. Adolescents who receive their first dose at age 13 through 15 years should receive a booster dose at age 16 through 18 years. The minimum interval between doses of MenACWY is 8 weeks. Adolescents who receive a first dose after their 16<sup>th</sup> birthday do **not** need a booster dose unless they become at increased risk for meningococcal disease. Persons aged 19 through 21 years are **not** recommended routinely to receive MenACWY. MenACWY may be administered up to age 21 years as catch-up vaccination for those who have not received a dose after their 16<sup>th</sup> birthday. Health-care personnel should use every opportunity to provide the booster dose when indicated, regardless of the vaccine brand used for the previous dose or doses.<sup>1</sup> ACIP also recommends routine vaccination of persons aged  $\geq 2$  months at increased risk for meningococcal disease, including :

- Persons aged  $\geq 2$  months with certain medical conditions such as anatomical or functional asplenia, or complement component deficiency (dosing schedule and interval for booster dose varies by age at time of previous vaccination).
- Special populations such as unvaccinated or incompletely vaccinated first-year college students living in residence halls, military recruits, or microbiologists with occupational exposure (indication for booster dose 5 years after prior dose if at continued risk).
- Persons aged  $\geq 9$  months who travel to or reside in countries in which meningococcal disease is hyperendemic or epidemic, particularly if contact with the local population will be prolonged.
- Vaccination of persons in at-risk groups to control outbreaks.

For more information on vaccine, a report from the Centers for Disease Control and Prevention, [Prevention and Control of Meningococcal Disease: Recommendations of the Advisory Committee on Immunization Practices \(ACIP\), MMWR March 22, 2013 / 62\(RR02\);1-22](#) compiles and summarizes all recommendations from ACIP regarding prevention and control of meningococcal disease in the United States. *COMMENTS: The currently available vaccines do not cover all serogroups of N. meningitidis. Also, like with any vaccine, meningococcal vaccines are not 100% effective. This means that even if you have been vaccinated, there is still a chance you can develop a meningococcal infection.*

**Postexposure Chemoprophylaxis of High-Risk of Exposure Contacts.** All high-risk of exposure contacts should receive appropriate antimicrobial prophylaxis *as soon as possible* (see [Identification of High-Risk of Exposure Contacts](#) and [Examples of High-Risk of Exposure Contacts](#) for more information). Ideally, chemoprophylaxis should begin within 24 hours of diagnosis of the primary case. Close surveillance of this group, for at least 10 days is recommended, to ensure prompt treatment in the absence of effective chemoprophylaxis.<sup>6</sup> Beginning chemoprophylaxis more than 2 weeks after exposure to the index case would be too



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late to prevent secondary cases.<sup>6</sup> Throat and nasopharyngeal cultures are of no value in deciding who should receive chemoprophylaxis and are *not* recommended. A contact does *not* require prophylaxis if the *only* exposure occurred 24 hours or more after the case began appropriate antimicrobial treatment.<sup>2</sup>

Rifampin, ceftriaxone, ciprofloxacin, and azithromycin are appropriate drugs for chemoprophylaxis in adults, but neither rifampin nor ciprofloxacin are recommended for pregnant women. The drug of choice for most children is rifampin. For more information see [TABLE 1 - Recommended Chemoprophylaxis Regimens for High Risk Contacts and People with Invasive Meningococcal Disease](#)<sup>2</sup>.


**Important:** Chemoprophylaxis is not recommended for close contacts of patients with evidence of *Neisseria meningitidis* only in nonsterile sites such as an oropharyngeal swab, endotracheal secretions, or conjunctival swab. Reports of secondary cases after close contact to persons with noninvasive pneumonia or conjunctivitis are rare; there is no evidence of substantive excess risk. Furthermore, there is no indication to treat persons who are asymptomatic nasopharyngeal carriers.<sup>4</sup>

#### **Guidelines for Antimicrobial Prophylaxis Provided by MDHSS to Local Pharmacies.**

If contacts can pay for antimicrobial prophylaxis, or have insurance that will pay (including Medicaid), then one of these sources should be used. **NOTE:** *Some retail pharmacy chains offer a free antibiotic program to their patrons. Ciprofloxacin (generic Cipro) is generally included on the list of approved antibiotics that are provided free of charge at these pharmacies. These resources should also be explored when trying to get contacts prophylaxed in a timely manner.* If the contact is unable to obtain chemoprophylaxis from any of the above means, then MDHSS can supply **rifampin** or **ciprofloxacin**. Since chemoprophylaxis should begin within 24 hours of diagnosis of the primary case, generally this will mean MDHSS will be replacing the pharmacy's supply of rifampin or ciprofloxacin used to fill approved prescriptions, if needed. In addition, MDHSS will pay up to \$3.00 per prescription (administrative costs to the pharmacy) for each rifampin or ciprofloxacin prescription dispensed by the pharmacy for approved prescriptions.

Contact the [District Communicable Disease Coordinator](#), the [Senior Epidemiology Specialist for the District](#), or MDHSS - BCDPCP, phone (573) 751-6113, to receive approval, or for afterhours, contact the MDHSS/ERC at (800) 392-0272 (24/7). In order to receive medications and/or administrative payment for **approved** chemoprophylaxis of meningococcal disease the pharmacy must:

1. Submit a bill to the MDHSS district office (or to the local public health agency, which can then be forwarded to the MDHSS district office). The bill must be labeled "Bill to Missouri Department of Health and Senior Services, Bureau of Communicable Disease Control and Prevention, P. O. Box 570, Jefferson City, MO 65102-0570."
2. The bill must include the invoice date; to include the month, day, and year the service was provided. The invoice should include the pharmacy's name and address, number of clients receiving approved rifampin or ciprofloxacin prescriptions, and the total amount requested.

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3. A list of names of the persons receiving rifampin or ciprofloxacin must be attached to the bill.
4. Partial or open bottles of MDHSS medication become the property of the pharmacy.
5. Unopened bottles of MDHSS rifampin or ciprofloxacin should be retrieved from the pharmacy and returned to the MDHSS district office.
6. Physicians or health care providers may wish to provide chemoprophylaxis for persons not meeting the criteria for high-risk contacts. MDHSS is unable to provide rifampin, ciprofloxacin, or administrative cost reimbursement, unless these guidelines are followed and the person meets the definition of a [high-risk of exposure contact](#) as described above.

### **Outbreak Investigation and Control.**<sup>10</sup>

More than 98% of meningococcal disease cases in the United States are sporadic, while the other 2% are associated with outbreaks. Historically, the majority of outbreaks have been caused by serogroup C, although in recent years serogroup Y and serogroup B outbreaks have been reported (CDC, unpublished data).


An organization-based outbreak is defined as the occurrence of three or more confirmed or probable cases of meningococcal disease of the same serogroup in a period of 3 months or less among persons who have a common affiliation but no close contact with each other, resulting in a primary disease attack rate of 10 or more cases per 100,000 persons. In some instances the attack rate will be greater than 10 cases per 100,000 population with only two or three cases. In these situations, vaccination may be considered after only two primary cases are identified. Examples of an organization-based outbreak include cases in schools, churches, and universities.

A community-based outbreak is defined as the occurrence of three or more confirmed or probable primary cases of meningococcal disease in a period of 3 months or less among persons residing in the same area who are not close contacts and who do not share a common affiliation, with a primary attack rate of 10 or more cases per 100,000 population. Examples of a community-based outbreak include a neighborhood, town, or county.

Mass chemoprophylaxis is not recommended for control of large outbreaks of disease for multiple reasons: cost of drug and administration, difficulty of ensuring simultaneous administration of drugs to substantial populations, drug side effects, and emergence of resistant organisms. In most outbreak settings, these disadvantages outweigh the potential benefit. Situations in which mass chemoprophylaxis could be successful include those involving limited or closed populations, such as a single school or residential facility. If the decision is made to use mass chemoprophylaxis, it should be administered to all persons.

It is possible that even in a vaccine-preventable, organization-based outbreak, antibiotic distribution may be a more timely intervention, since preventive antibodies take 7–10 days to develop after vaccination. Again, the potential benefit of mass chemoprophylaxis must be weighed against the possible emergence of antibiotic resistance and the logistics of launching a prophylaxis campaign.

When deciding to implement a mass vaccination campaign to prevent meningococcal disease, one must consider whether the cases represent an outbreak or an unusual clustering of endemic

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cases. Mass vaccination programs are expensive, require considerable public health effort, and may create excessive concern among the public. Because the number of cases in outbreaks is usually not substantial, this determination requires evaluation and analysis of the patterns of disease occurrence.

Vaccination of the population at risk should be considered if the attack rate is greater than 10 cases per 100,000 population, but the actual attack rate at which the decision to vaccinate is made will vary. The following factors should be considered when making the decision to vaccinate:


- Completeness of case reporting and number of possible cases of meningococcal disease for which bacteriologic confirmation or serogroup data are not available.
- Occurrence of additional cases of meningococcal disease after recognition of a suspected outbreak (e.g., if the outbreak occurred 2 months previously and no additional case have occurred, vaccination might be unlikely to prevent additional cases of meningococcal disease).
- Logistic and financial considerations.
- Current meningococcal vaccines licensed in the United States are not effective against *N. meningitidis* serogroup B.

**Important:** *At present, a MenB vaccine has not been licensed by the U.S. Food and Drug Administration (FDA) for use in the United States. However, FDA’s current regulations allow the use of a drug or vaccine that is not approved in the United States to treat serious or immediately life-threatening diseases or conditions when there are no comparable or satisfactory alternative treatment options. The mechanism allowing such use is known as an expanded access Investigational New Drug Application (IND). For more information on the possible use of MenB vaccine not licensed in the United States using the IND with CDC as the sponsor, see CDC’s “[Interim Guidance for Control of Serogroup B Meningococcal Disease Outbreaks in Organizational Settings](#)”.*<sup>12</sup>

Restricting travel to areas with an outbreak, closing schools or universities, or cancelling sporting or social events are not recommended measures for outbreak control in the United States. A crucial part of managing suspected meningococcal disease outbreaks and promoting early case recognition is educating communities, physicians, and other healthcare workers about meningococcal disease.

### **Laboratory Procedures**<sup>10</sup>

- Invasive meningococcal disease is typically diagnosed by isolation of *N. meningitidis* from a normally sterile site. Typically, the isolate comes from blood or CSF, but it can also be from joint, pleural, or pericardial fluid. Aspirates or skin biopsies of purpura or petechiae can yield meningococci in cases of meningococcemia. However, sensitivity of bacterial culture may be low, particularly when performed after initiation of antibiotic therapy.
- Polymerase chain reaction (PCR) or immunohistochemistry (IHC) may be used to establish a probable case. Real-time PCR detects DNA of meningococci in blood, CSF, or other clinical specimens. **COMMENT:** *A major advantage of PCR is that it allows for detection*

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*of N. meningitidis from clinical samples in which the organism could not be detected by culture methods, such as when a patient has been treated with antibiotics before obtaining a clinical specimen for culture. Even when the organisms are nonviable following antimicrobial treatment, PCR can still detect N. meningitidis DNA. Because of the severity of meningococcal disease, it is critical to treat the patient as soon as infection is suspected, and not to delay to obtain culture or laboratory results first.*

- A Gram stain of cerebrospinal fluid showing gram-negative diplococci strongly suggests meningococcal meningitis.
- Kits to detect polysaccharide antigen in cerebrospinal fluid are rapid and specific, but false-negative results are common, particularly in serogroup B disease. Antigen agglutination tests of urine or serum are unreliable.
- Serologic testing (e.g., enzyme immunoassay) for antibodies to polysaccharide may be used as part of the evaluation if meningococcal disease is suspected but should not be used to establish the diagnosis.


**NOTE:** Initial clinical specimen testing is **NOT** provided by the Missouri State Public Health Laboratory (MSPHL). However, private laboratories that obtain positive test results are required by the state reporting rule to send positive isolates of the cultured organism to the MSPHL for confirmation and epidemiological testing. The MSPHL performs this testing at no charge to the submitting laboratory. *N. meningitidis* testing to be performed by the MSPHL should go through the Special Bacteriology Unit, phone (573) 751-3334 before submission. Information on acceptable specimen types, collection, shipment, and testing to be performed by the MSPHL can be viewed at: <http://health.mo.gov/lab/specialbacteriology.php>.

### **Reporting Requirements**

Meningococcal disease is a Category 2(A) disease and shall be reported to the [local health authority](#) or to the Missouri Department of Health and Senior Services (MDHSS) within 24 hours of first knowledge or suspicion by telephone, facsimile, or other rapid communication. The MDHSS may be contacted after hours through the MDHSS/ERC at (800) 392-0272 (24/7).

As a Nationally Notifiable Condition, **confirmed** and **probable** cases are a **STANDARD** report to the Centers of Disease Control and Prevention (CDC). **STANDARD** reporting requires the Missouri Department of Health and Senior Services (MDHSS) to report to CDC by electronic transmission via WebSurv within the next normal reporting cycle.


1. For confirmed, probable, and suspect cases; local public health agencies should complete a “[Disease Case Report](#)” (CD-1) and a “[Record of Investigation of Bacterial Meningitis or Bacteremia Case Report](#)” (CD-2M).
2. MDHSS will submit weekly electronic reports to CDC.
3. Entry of the CD-1 by the local public health agencies into WebSurv negates the need for the paper CD-1 to be forwarded to the District Health Office.
4. Send the completed CD-2M or CDC form to the [District Communicable Disease Coordinator](#).

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5. All outbreaks or suspected outbreaks must be reported as soon as possible (by phone, fax, or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the “[Missouri Outbreak Surveillance Report](#)” (CD-51) and faxing or e-mailing it.
6. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

## **References**

1. Centers for Disease Control and Prevention. Prevention and Control of Meningococcal Disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP), *Recommendations and Reports*. MMWR March 22, 2013 / 62(RR02); 1-22. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a1.htm> (1/15).
2. American Academy of Pediatrics. *Meningococcal Disease*. In: Pickering LK, Baker CJ, Kimberlin DW, Long SS, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29<sup>th</sup> ed. Elk Grove Village, IL: American Academy of Pediatrics 2012: 500-509.
3. Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*, Meningococcal Disease. Atkinson W, Hamborsky J, Wolfe S, eds. 12<sup>th</sup> ed., second printing. Washington DC: Public Health Foundation, 2012: 193-204. <http://www.cdc.gov/vaccines/pubs/pinkbook/mening.html> (1/15).
4. Centers for Disease Control and Prevention. *Morbidity and Mortality Weekly Report* (MMWR). *Appendix A. Recommendations and Reports*. MMWR March 22, 2013 / 62(RR02); 23-24. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a2.htm> (1/15).
5. CDC’s National Notifiable Diseases Surveillance System (NNDSS) and Case Definitions. <http://www.cdc.gov/nndss/> (1/15).
6. Apicella, Michael A. *Neisseria meningitidis*. In: Gerald L. Mandell, John E. Bennett, & Raphael Dolin, Eds. *Principles and Practice of Infectious Diseases*, 7<sup>th</sup> ed., Pennsylvania: Churchill Livingstone Elsevier, 2010: 2737-2749.
7. Centers for Disease Control and Prevention. *Morbidity and Mortality Weekly Report* (MMWR). *Appendix B. Recommendations and Reports*. MMWR March 22, 2013 / 62(RR02); 25-27. [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a3.htm?s\\_cid=rr6202a3\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a3.htm?s_cid=rr6202a3_w) (1/15).
8. American Public Health Association. *Meningococcal Infection and Meningococcal Meningitis*. In: Heymann D ed. *Control of Communicable Diseases Manual*. 19<sup>th</sup> ed. Washington, D.C. American Public Health Association, 2008: 415-421.
9. Centers for Disease Control and Prevention, Meningococcal Vaccine: Who and When to Vaccinate. <http://www.cdc.gov/vaccines/vpd-vac/mening/who-vaccinate-hcp.htm> (1/15).
10. Centers for Disease Control and Prevention, *Chapter 8: Meningococcal Disease, Manual for the Surveillance of Vaccine-Preventable Diseases* (5th Edition, 2011) <http://www.cdc.gov/vaccines/pubs/surv-manual/chpt08-mening.html> (1/15).
11. Thompson MJ, Ninis N, Perera R, et al. Clinical recognition of meningococcal disease in children and adolescents. *Lancet*. 2006: 367-397.

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12. Centers for Disease Control and Prevention. *Interim Guidance for Control of Serogroup B Meningococcal Disease Outbreaks in Organizational Settings*. Meningococcal Outbreak Working Group. <http://www.cdc.gov/meningococcal/downloads/interim-guidance.pdf> (1/15).

### Sample Physician Notification Letter

[Date]

[Health Care Provider's name]

[Address]


[City, State, Zip Code]

Dear [Dr.] \_\_\_\_\_:

A case of [meningococcal disease] [meningococcal meningitis] has been diagnosed in a child at the \_\_\_\_\_ (name) \_\_\_\_\_ [child care center / head start / school]. Children from this [child care center / head start / school] are being referred to their medical providers for chemoprophylaxis. Please be alert to the presence of this disease in your community and report any suspected cases promptly.

If you have any questions, please contact the \_\_\_\_\_ (local) \_\_\_\_\_ Health Department at [phone number].

Sincerely,

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**Sample Letter to Parents of Children Exposed to Meningococcal Disease at Child Care Centers / Head Starts / Nursery Schools**

[Date]

To Parents of Children at:

\_\_\_\_\_ (name) \_\_\_\_\_

[Child Care Center /Head Start / School]

Dear Parent:

A child who attends the \_\_\_\_\_ (name) \_\_\_\_\_ [child care center / head start / school] in the \_\_\_\_\_ classroom has been diagnosed with [meningococcal meningitis / meningococcal disease].

So that others do not get this illness, the Missouri Department of Health and Senior Services and the \_\_\_\_\_ (local) \_\_\_\_\_ County Health Department recommends that children who have had close contact with the ill child from \_\_\_\_\_ to \_\_\_\_\_ receive preventive medication. Preventive treatment will help protect your child from becoming ill. An antibiotic is usually used for this treatment.

All persons who were in contact with the sick child should be watched. Anyone who has an unusual fever, headache, stiff neck, rash or any other unusual symptoms should contact their health care provider immediately. Meningococcal disease can progress very rapidly and lead to severe illness and even death.

An information sheet on meningococcal disease is enclosed. [Examples are:]

<http://www.immunize.org/catg.d/p4210.pdf> or

<http://www.immunize.org/catg.d/p4316.pdf>

If you have additional questions please contact your health care provider or the \_\_\_\_\_ (local) \_\_\_\_\_ Health Department at [phone number].

Sincerely,

NOTE: If arrangements have been made for [rifampin or ciprofloxacin] prophylaxis, you will need to add a paragraph regarding this. Example:

The Missouri Department of Health and Senior Services and \_\_\_\_\_ (local) \_\_\_\_\_ Health Department will provide [rifampin / ciprofloxacin] free-of-charge for your child. You may pick up the prescription at \_\_\_\_\_ pharmacy after \_\_\_\_\_ a.m./p.m.