

Invasive Meningococcal Disease Protocol

Meningococcal disease

Causative bacterium: *Neisseria meningitidis*

Gram (–) negative diplococcus

- Classified into at least 13 serogroups
- Serogroups A, B, C, Y, and W-135 cause the majority of invasive disease

Case definition

At least one of the following:

- Isolation of *Neisseria meningitidis* from a normally sterile site (e.g., cerebrospinal fluid [CSF], blood, joint, pleural, pericardial fluid, or another normally sterile site)
Isolation from urine, sputum, abscesses or pharyngeal swabs does not meet the case definition.
- Visualization of Gram-negative diplococci on Gram stain of CSF or blood
- Molecular detection of *N. meningitidis* by polymerase chain reaction (PCR) test, performed on CSF only
- Positive antigen test for *N. meningitidis* performed on CSF only

Signs and symptoms

May include:

- fever
- severe headache
- confusion
- stiff/rigid neck
- nausea/vomiting
- seizures
- petechial or purpuric rash
- photophobia (aversion to lights)

CSF analysis can be used to distinguish between bacterial and viral meningitis. Detection of increased white blood cells (predominantly neutrophils), elevated protein, and a decreased glucose level in CSF are suggestive of a bacterial etiology, but are not specific to meningococcal disease.

Transmission

Transmission occurs via **direct contact with oral secretions**. The following exposures are examples of direct or intimate contact with oral secretions:

- Kissing
- Sharing eating utensils or drinking containers
- Sharing cigarettes (or other smoking materials)
- Performing CPR or endotracheal intubation
- Sharing toys in a day care setting with infants and toddlers

Incubation period: One to 10 days from exposure, generally three to four days

Period of communicability: Patient is considered infectious for seven days prior to onset and until 24 hours after the initiation of appropriate antibiotic therapy.

Asymptomatic carriage is relatively common; it is estimated that 5-10% of the population has *N. meningitidis* in their nose and throat at any given time, without illness.

Priority for local public health response

It is the responsibility of the clinician **and** the diagnosing laboratory to report a case of invasive meningococcal disease **by telephone** to local and/or state public health officials as soon as possible. Reporting via the Wisconsin Electronic Disease Surveillance System (WEDSS) is **not** sufficient notification.

1. Ascertain clinical history of patient and how diagnosis was made. Determine or confirm:
 - Clinical signs and symptoms
 - Date of illness onset
 - Laboratory test results (specimen source, culture, Gram stain, antigen test, and CSF analysis, if applicable)
 - Refer to *Case definition* on page 1
 - Dates and time of antibiotic treatment that patient received. Determine if antibiotic treatment was started prior to collection of specimens for culture. If the patient was seen as an outpatient prior to admission, check whether antibiotics were prescribed at that time.
 - Meningococcal vaccination history (include the date, type of vaccine [polysaccharide or conjugate], manufacturer, and lot number)
2. Report by phone immediately (per Wis. Admin. Code ch DHS 145) all potential cases of meningococcal disease to the Wisconsin Communicable Disease Epidemiology Section (CDES).
 - General number for CDES staff during weekdays: **608-267-9003**
 - Emergency number for on-call CDES staff after hours and on weekends: **608-258-0099**
(Emergency number is for local health departments and clinical practitioners only, please **do not distribute to the public.**)
3. Identify and advise direct contacts of case requiring prophylaxis (see *Contact investigation* on following page).
4. Ensure that the diagnosing lab will send the bacterial isolate (if available) to the Wisconsin State Laboratory of Hygiene (WSLH) for serogroup determination.
5. Determine if the case patient is a high school, college, or vocational student. If so:
 - What year in school is the student?*
 - Did the student reside in a residence hall or in an apartment or house with roommates?*
 - Had the student received the meningococcal vaccine?*
 - What activities/travel did the student participate in during the seven days prior to onset?*

**This information is specifically requested by and reported to the CDC as part of the MeningNet national surveillance project.*
6. Enhance surveillance for additional cases:
 - Rapidly investigate suspect cases
 - Alert physicians in area of case
7. Investigate potential links between cases.

Contact investigation—Who needs prophylactic treatment?

Interview the patient if possible. Otherwise, interview parents, family, and friends to identify contacts of the case patient during the seven days before illness onset.

It is important to talk to friends of adolescent-aged case patients. Parents might not be aware of intimate partners and other potential exposures, such as shared cigarettes, marijuana joints, and/or drinks.

Chemoprophylaxis is recommended for the following high-risk contacts:

- Household contacts, especially children younger than 2 years of age
- Child care or pre-school contacts (both attendees and staff)
- Intimate partners
- Ambulance/EMS and other healthcare personnel exposed to respiratory secretions (e.g., during mouth-to-mouth resuscitation, endotracheal intubation, suctioning)
- Other persons who had direct exposure to index patient's oral secretions through kissing, drinking from the same glass or bottle, or sharing eating utensils, a toothbrush, or smoking material. Consider contacts at:
 - After-school programs
 - Social and sporting events
 - Church or workplace

Chemoprophylaxis is generally not recommended for the following low-risk contacts:

- Casual contact at school and work, without direct exposure to index patient's oral secretions
- Contact of a contact, with no direct exposure to the index patient
- Health care professional contact without direct exposure to patient's oral secretions

Mass vaccination or mass chemoprophylaxis is only recommended in outbreak situations. The Wisconsin Communicable Disease Epidemiology Section (CDES) will help determine if such measures are necessary.

Persons with less direct contact can be monitored for signs and symptoms of disease for the duration of the incubation period. Promptly evaluate and treat as necessary if potential symptoms develop.

Chemoprophylaxis

- Ideally, provide chemoprophylaxis to contacts within 24 hours of diagnosis of index case.
- Chemoprophylaxis administered more than 14 days after contact with patient occurred has little value (Red Book 2015).
- Chemoprophylaxis is only necessary for people exposed directly to the patient's oral secretions while he/she was infectious (patient is considered infectious for 7 days prior to date of illness onset and until 24 hours after initiation of appropriate antibiotic therapy—Red Book, 2015).

Antibiotic regimens

The following regimens are appropriate for chemoprophylaxis of contacts.

Agent*	Dose	Duration	Cautions
Rifampin			
	Adults: 600 mg, p.o., b.i.d.	2 days	Not recommended during pregnancy
	Children \geq 1 month: 10 mg/kg, p.o., b.i.d.	2 days	Stains urine and tears; avoid contact lens use
	Children < 1 month: 5 mg/kg, p.o., b.i.d.	2 days	
Ciprofloxacin			
	Adults only: 500 mg, p.o.	1 dose	Not recommended during pregnancy or lactation
Ceftriaxone			
	Adults: 250 mg, i.m.	1 dose	May be mixed with 1% xylocaine to reduce injection pain
	Children < 15 years: 125 mg, i.m.	1 dose	

*Certain antibiotics could decrease the effectiveness of oral contraceptives.

Red Book: 2015 Report of the Committee on Infectious Diseases, 30th ed., pg. 552.

Ensure terminal prophylaxis of case patient. Antimicrobial therapy of invasive meningococcal disease with agents other than a third-generation cephalosporin or ciprofloxacin might not reliably eliminate nasopharyngeal carriage of *N. meningitidis*. If the patient was not treated therapeutically with a third-generation cephalosporin or ciprofloxacin, ensure that the patient receives one of the three antibiotics in the table above to eliminate nasopharyngeal carriage (terminal prophylaxis) prior to discharge from hospital.

Chemoprophylaxis of contacts after exposure to case patients on aircraft

Risk is related to the duration of the flight and seating proximity to the case patient.

- For flights > 8 hours, including ground time, passengers seated in the same row, directly adjacent to the case patient should be considered for chemoprophylaxis.
- For flights \leq 8 hours, no prophylaxis is advised.
- Personnel from the airlines, CDC quarantine stations, Wisconsin Division of Public Health, and local health departments should collaborate to determine the identities and risk of aircraft passengers and crewmembers.

Roles and responsibilities during a case of meningococcal disease

Local Health Department (LHD)

See *Priority for local public health response* on page 2

Hospital Infection Preventionist (IP)

1. Notify LHD about any confirmed or suspect cases of meningococcal disease by phone immediately. Provide LHD with details about the clinical history and laboratory diagnosis.
2. Identify medical personnel (including EMTs) directly exposed to saliva of case patient via resuscitation/endotracheal tube management. Arrange for chemoprophylaxis for these persons and notify LHD that they have been treated.
3. Ensure case patient receives terminal prophylaxis to eliminate carriage before release from the hospital.
4. Request that the laboratory send the bacterial isolate to the WSLH for serogroup determination.

Wisconsin State Laboratory of Hygiene (WSLH)

1. Serogroup the bacterial isolate and perform antibiotic susceptibility testing. Notify CDES of results.
2. Perform PFGE or PCR testing on bacterial isolates if requested by CDES.
3. Report results to submitting laboratory and CDES.
4. Send specimens to CDC for cases eligible for the Meningococcal Conjugate Vaccine study.

Wisconsin Communicable Disease Epidemiology Section (CDES)

1. Coordinate investigations that are multi-jurisdictional.
2. Assist in determining which persons need chemoprophylaxis.
3. Enhance surveillance for additional cases, as needed. Provide templates of letters to the LHD (e.g., to health care providers, to parents of children in school or daycare, to workplaces).
4. Confirm that the bacterial isolate is received at the WSLH for serogroup determination.
5. Request PCR from WSLH on culture-negative isolates when appropriate.
6. Review historical and prospective data and investigate links between cases.
7. Request PFGE analysis of select isolates when a possible link is identified.
8. If necessary, review clinical and laboratory data if case status is in doubt.
9. Follow CDC's MeningNet protocols to determine if case is eligible for the Meningococcal Conjugate Vaccine (MCV4) study. Process case as necessary. Enroll cases and controls.

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Meningococcal pneumonia

Although communicability is a theoretic possibility, data are conflicting as to whether to support the chemoprophylaxis of direct contacts of case patients with meningococcal pneumonia. Collect information on laboratory (e.g., Gram stain) and radiography results and contact CDES to determine whether chemoprophylaxis and/or follow up with contacts are needed.

Meningococcal vaccine

Currently, there are five meningococcal vaccines licensed in the United States:

- Menomune[®] (MPSV4): meningococcal (A, C, Y, W-135) polysaccharide vaccine
- Menactra[®] (MCV4): meningococcal (A, C, Y, W-135) polysaccharide diphtheria toxoid conjugate vaccine
- Menveo[®] (MCV4): meningococcal (A, C, Y, W-135) oligosaccharide diphtheria CRM₁₉₇ conjugate vaccine
- Trumenba[®] (MenB-FHbp): meningococcal (B) recombinant vaccine
- Bexsero[®] (MenB-4C): meningococcal (B) recombinant vaccine

Populations at increased risk of meningococcal disease for whom vaccination is recommended

See the recommended immunization schedules for children, adolescents, and adults:

<http://www.cdc.gov/vaccines/schedules/index.html>

MCV4 recommendations

- Young adolescents aged 11-12 years, with a one-time booster at age 16-18 years. (**Note:** No booster is needed if the primary dose is given at or after age 16 years.)
- Newly aggregated adults (e.g., college freshmen living in dormitories, military recruits)
- Incoming refugees from or travelers to areas of endemic meningococcal disease (See **Meningococcal Disease** in the CDC Yellow Book at: <http://wwwnc.cdc.gov/travel/>)
- Microbiologists who routinely work with isolates of *N. meningitidis*
- Persons who have had a splenectomy or have abnormal splenic function
- Persons with certain immune deficiencies (e.g., complement deficiencies)
- Persons who have received cochlear implants, have permanent CSF shunts or physical characteristics such as facial fractures, making them more susceptible to *N. meningitidis*
- For details and additional at-risk populations, please see: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a1.htm>

MenB recommendations

- May be administered at any time to adolescents and young adults ages 16 through 25 years to provide short-term protection against meningococcal disease caused by most serogroup B strains.
- The Advisory Committee on Immunization Practices (ACIP) recommends the vaccine be administered to persons aged 16-23 years, with a preferred age range of 16-18 years to maximize the likelihood that protection would last during the years when they are at greatest risk of meningococcal disease.
- MenB vaccines are routinely recommended only for persons aged 10 years and older who are identified as being at increased risk because of medical conditions such as complement component deficiencies and functional or anatomic asplenia.
- The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses.
- For additional information, please see: <http://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/mening.html>

References

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