Invasive Meningococcal Disease Management Protocol and Risk Assessment

What is meningococcal disease?

Caused by the bacterium: ***Neisseria meningitidis***

Gram (-) negative diplococcus

- Six serogroups, A, B, C, W, X, and Y, cause the majority of invasive disease worldwide.
- Can lead to infections of the lining of the brain and spinal cord (meninges) and blood infection (bacteremia or sepsis) which are often severe or can be fatal.

Signs and symptoms may include:

• Fever.	• Stiff/immobile neck.	• Severe headache.
• Petechial or purpuric rash.	• Nausea/vomiting.	• Photophobia (aversion to light).
• Altered mental status.	• Seizures.	

Transmission occurs through direct contact with oral secretions, such as:

- Kissing.
- Sharing eating utensils or drinking containers (glasses, water bottles).
- Sharing cigarettes, e-cigarettes, vapes, or other smoking materials.
- Performing CPR or endotracheal intubation.

Case definition

Confirmed

- Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (for example, 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, synovial, pleural, or pericardial fluid); **or**
  - From purpuric lesions.

Probable

- Detection of *N. meningitidis* antigen
  - In formulin-fixed tissue by immunohistochemistry (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.

! Urine, sputum, throat, and bronchoalveolar lavage (BAL) specimens are not considered sterile sites.

CSF analysis can be used to distinguish between bacterial and viral meningitis. The detection of increased white blood cells (predominantly neutrophils), high protein levels and low levels of glucose in the CSF suggest a bacterial cause instead of viral.

Incubation period: It takes about 1–10 days from exposure, generally 3–4 days, until a person gets sick.

Infectious period: A patient is considered contagious for a period of 7 days prior to onset of illness until 24 hours after the initiation of appropriate antibiotic therapy.

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

Meningococcal pneumonia

Pneumonia, with the sole cause being *N. meningitidis,* without concurrent sepsis or meningitis is uncommon. Sputum samples may contain *N. meningitidis* flora picked up from the nasopharynx. Typically these are non-typeable strains. A true meningococcal pneumonia case is characterized as a chest x-ray confirmed pneumonia with *N. meningitidis* being the predominant organism.

Although communicability is a theoretic possibility, the Centers for Disease Control and Prevention (CDC) does not recommend treatment of direct contacts of case patients with meningococcal pneumonia. Local and Tribal health departments (LTHDs) can collect laboratory and radiography results, and then consult with the Wisconsin Department of Health Services Bureau of Communicable Diseases at DHSDPHBCD@wisconsin.gov to determine whether chemoprophylaxis and/or follow up with contacts are needed.

Public health response

Invasive meningococcal disease is a Category 1 reportable disease. Category 1 diseases must be reported immediately by telephone of the patient's local health officer, or their designee. It is the responsibility of the clinician, infection control practitioner (IP), **and** the laboratory to ensure the reporting of a suspect case of meningococcal disease **by telephone** to their LTHD and/or state public health staff as soon as possible. Entering the case into the Wisconsin Electronic Disease Surveillance System (WEDSS) is **not** sufficient notification.

1. Gather clinical history of the patient to identify and confirm:

- Clinical signs and symptoms.
- Date of illness onset.
- Laboratory test results including specimen source, Gram stain and culture results, and CSF analysis if applicable.
- Dates and time of antibiotic treatment:
  - If antibiotics were given prior to blood or CSF collection, culture results may be negative.
  - Determine if the patient was on antibiotics before illness onset. PCR testing is still an option.
- Meningococcal vaccination history including the date, name of vaccine, and manufacturer.

The "Search WIR" button in WEDSS will upload vaccine data into the record.

2. Immediately report all suspect cases of meningococcal disease by phone to the patient's LTHD or to the DHS Bureau of Communicable Diseases.

- The general number of DHS BCD staff should be used during weekdays: **(608) 267-9003**
- LTHDs and clinicians can contact DHS BCD after business hours and on weekends **(800) 943-0003** (option 4).

3. Identify direct contacts of the case. Advise them that they should receive preventative antibiotic prophylaxis.

(see *Contact investigation* on the following page).

4. Ensure the diagnosing laboratory will send the bacterial isolate to the Wisconsin State Laboratory of Hygiene (WSLH) for serogroup identification.

5. Determine if the case is a high school, college, or vocational student.

- What year in school is the student?
- Did the student live in a residence hall, an apartment, or a house with roommates?
- Have the roommates received the meningococcal vaccine?
- What activities/travel did the students participate in during the seven days prior to onset?

6. Determine if there are other risk factors for meningococcal disease. The following information is requested by and reported to the CDC for national MenigNet surveillance.

- Does the person take a complement inhibitor drug (for example, Soliris)?
- Is the person experiencing homelessness or are they housing insecure?
- Is the person a man who has sex with men (MSM)?
- Is the person living with HIV?

7. Enhance surveillance for additional cases:

- Rapidly investigate additional suspect cases.
- Consider alerting clinicians, health, and school officials in your area of the case, especially if the case had a lot of contacts in a group or school environment.

8. If there are multiple cases, investigate potential links between them.

Contact investigation: Who needs prophylactic treatment?

Post-exposure chemoprophylaxis:

Ideally, chemoprophylaxis should be provided to direct and household contacts within 24 hours of diagnosis of the index case. Chemoprophylaxis is only necessary for people exposed **directly** to the case patient's oral secretions while they were infectious. A patient is considered infectious for seven days prior to their onset date of illness through 24 hours after the start of appropriate antibiotic therapy. Prophylaxis is not indicated more than 14 days after exposure to patient (Red Book, 2018–21. p. 554–554). **Chemoprophylaxis should be offered even if a contact has been vaccinated, as vaccines are not 100% effective.**

To identify direct contacts during the seven days before illness onset, interview the patient. If this is not possible, interview family, friends, and others such as work and activity acquaintances.

It is important to talk directly to non-adult patients and/or interview their friends **alone**. Parents may not be aware of intimate partners and other exposures, such as shared cigarettes, drugs, and drinking activities. A young person may not be willing to share important details in front of a parent.

Chemoprophylaxis **is recommended** for the following **high-risk contacts:**	Chemoprophylaxis generally **not recommended** for the following **low-risk contacts:**
• Any person who had direct exposure to index patient's oral secretions through kissing, drinking from the same glass or bottle, sharing eating utensils, a toothbrush, or smoking material • Household contacts, especially children under 2 • Intimate partners • Child care or preschool contacts (attendees and staff) • Ambulance, EMS, and other health care personnel exposed **directly** to respiratory secretions (during mouth-to-mouth resuscitation, endotracheal intubation, suctioning) • Any persons who had direct saliva contact at events or activities such as during school sports practices, after-school programs, church programs, social events, or workplace	• Casual contacts (for example, school, work) with no direct exposure to the patient's oral secretions • People in the same room after patient was there but had not contact • Contact of a contact (secondary contact) with no direct exposure to the patient • Health care professionals without direct exposure to patient's oral secretions There is no length of distance (for example, "3-foot rule") that can determine a person's risk. The risk is determined by direct contact with saliva, not distance. Well people who do not meet direct contact criteria can self-monitor for signs and symptoms of disease during the incubation period, and should promptly seek evaluation is symptoms develop

Chemoprophylaxis of contacts after exposure to a case on an aircraft

The risk of infection is related to the length of the flight and one's seating proximity to the case. For flights less than eight hours, including ground time, passengers seated in the same row directly adjacent to the case should be considered for chemoprophylaxis. For flights more than or equal to eight hours, no prophylaxis of nearby passengers is advised. Personnel from the airline, CDC quarantine station, LTHD, and DHS will collaborate to determine the risk and identify passengers seated around the case and crew members that may have had close interactions.

Mass vaccination or chemoprophylaxis is only recommended during outbreak situations. DHS will work with LTHDs to determine if this is necessary.

Ensure terminal prophylaxis of the patient.

- Ceftriaxone clears nasopharyngeal carriage effectively after one dose.
- Treatment of meningococcal disease with agents other than a third-generation cephalosporin (such as ceftriaxone) or ciprofloxacin may not reliably eliminate nasopharyngeal carriage of *N. meningitidis*.
- If the patient was not treated therapeutically with a third-generation cephalosporin (such as ceftriaxone) or ciprofloxacin, ensure that the patient receives rifampin or azithromycin as indicated in the table to clear nasopharyngeal carriage (terminal prophylaxis) before leaving the hospital.

Chemoprophylaxis regimens

The following regimens are appropriate for chemoprophylaxis, and elimination of nasal carriage, in high-risk contacts (Red Book, 2018–21, p.555).

Age	Dose	Duration	Cautions
Rifampin			
Adults and children 1 month or older	15–20 mg/kg, p.o., (max. 600 mg), orally every 12 hours.	2 days	• Not recommended for use during pregnancy. • Can interfere with the efficacy of oral contraceptives and some seizure and anticoagulant medications. Can stain soft contact lenses.
Children less than 1 month	5 mg/kg, orally, every 12 hours.	2 days	Discuss with an infectious disease expert.
Ceftriaxone			
Less than 15 years	125 mg, intramuscularly	1 dose	To decrease pain at injection site, dilute with 1% lidocaine.
15 years or older	250 mg, intramuscularly	1 dose	To decrease pain at injection site, dilute with 1% lidocaine.
Ciprofloxacin*			
1 month or older	20 mg/kg (max. 500 mg), orally.	1 dose	Not recommended for use during pregnancy
Azithromycin			
	10 mg mg/kg (max. 500 mg)	1 dose	Not recommended routinely; equivalent to rifampin for the eradication of N. meningitidis from nasopharynx in one study of adults.

***Restriction on ciprofloxacin use**: Due to detection of ciprofloxacin-resistant strains of *N. meningitidis,* Wisconsin is under a two-year restriction for ciprofloxacin use.

Roles and responsibilities during a case investigation

Local or Tribal Health Department

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

Hospital Infection Preventionist (IP)

- Notify the LTHD of any suspect cases by phone as soon as possible. Entering a case into the WEDSS system does not count as notification. Provide details about the case's clinical history, diagnosis, and laboratory results.
- Identify medical personnel/EMTs that were directly exposed to the saliva of the patient (for example, resuscitation/endotracheal tube placement). Arrange for chemoprophylactic treatment. Being in the same room as the patient is **not** considered direct contact.
- Ensure the patient receives terminal prophylaxis before leaving the hospital.
- Ensure the laboratory will send the bacterial isolate to the WSLH for serogroup testing as mentioned on page 3.

Wisconsin State Laboratory of Hygiene (WSLH)

- Report results to the submitting laboratory and DHS. Perform confirmation, serogrouping, and antibiotic susceptibility testing of the isolate.
- Forward isolates to CDC, for whole genome sequence (WGS) testing during outbreaks, and other national surveillance activities.

Wisconsin Department of Health Services Bureau of Communicable Diseases

- Review the case's clinical and laboratory data to confirm case status.
- Assist the LTHD in determining which contacts need chemoprophylaxis.
- Coordinate investigations that are multi-jurisdictional and conduct enhanced surveillance to look for potential links between cases.
- Provide template letters to the LHD for clinicians, schools, daycares, and workplaces.
- Confirm that the bacterial isolate is received at the WSLH for serogroup determination.
- Request PCR testing from WSLH on culture-negative isolates when appropriate.

The general number for BCD should be used during weekdays: **(608) 267-9003.** The emergency number for on-call BCD staff can be used after business hours and on weekends: **(800) 943-0003 (option 4)**. The on-call phone number is for LTHDs and clinicians only.

Vaccination

Currently in the U.S., there are three types of licensed meningococcal vaccines.

MenACWY vaccines: Protect against serogroups A, C, W, Y

Manufacturers: Menovo (Novartis) and MenQuadfi (Sanofi Pasteur)

Population	Guidance
Adolescents/young adults	• All 11–12-year-olds should receive a MenACWY vaccine, and a booster dose at age 16.
People who may be at increased risk	• 2 months and older: A 2–4-dose primary series; regular booster doses if they remain at increased risk. • Under 7 years: Booster dose three years after completion of the primary series, and every five years after. • 7 years and older: Booster dose every five years.
During an outbreak	• Populations at increased risk during an outbreak may receive a booster dose if five or more years have passed since their most recent MenACWY vaccine.

MenB vaccines: Protect against serogroup B

Manufacturers: Bexsero (Novartis), Trumenba (Wyeth)

MenB vaccines require more than 1 dose for maximum protection. Individuals must receive the same vaccine product for all doses.

Population	Guidance
Adolescents/young adults	• Administer 2 doses, 6 months apart, to those who want MenB vaccination. The preferred age is 16–18 years.
People who may be at increased risk	• Three dose primary series, with second dose 1 to 2 months after the first dose and third dose 6 months after the first dose; regular booster doses 1 year after series completion and every 2 to 3 years thereafter.
Outbreak	• Individuals for whom a year or more has passed since their most recent MenB vaccine may be recommended a booster dose.

MenABCWY vaccines: Protect against serogroups A, B, C, W, and Y

Manufacturers: Penbraya (Pfizer) and Penmenvy (GSK)

People with prolonged increased risk for serogroup A, C, W, or Y **and** B meningococcal disease need regular boosters. However, the recommended interval between doses varies by age and vaccine type. MenABCWY vaccine can be used only when both MenACWY and MenB vaccines are indicated at the same visit. Otherwise, MenACWY and MenB vaccines should be given separately, as appropriate.

References

Heymann DL, ed. Meningococcal infection. In: *Control of Communicable Diseases Manual*. 21st ed. Washington, DC: American Public Health Association, 2022:404–409.

American Academy of Pediatrics. Meningococcal infections. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *Red Book*: *2018 Report of the Committee on Infectious Diseases*. 33rd ed. Itasca, IL: American Academy of Pediatrics; 2024:585–599.

Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Hall E., Wodi A.P., Hamborsky J., et al., eds. 14th ed. Washington, D.C. Public Health Foundation, 2021.

Centers for Disease Control and Prevention. Exposure to patients with meningococcal disease on aircrafts – United States, 1999-2001. *MMWR* 2001;50(23):485–489.

MacNeil JR, Rubin L, Folaranmi T, et al. Use of Serogroup B Meningococcal Vaccines in Adolescents and Young Adults: Recommendations of the Advisory Committee on Immunization Practices, 2015. *MMWR*. 2015;64(4):1171–1176.

Prevention and Control of Meningococcal Disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*. 2013;62(RR02):1–22.

MMWR, October 23, 2015, Vol 64 #41 Use of Serogroup B Meningococcal Vaccines in Adolescents and Young Adults: Recommendations of the Advisory Committee on Immunization Practices, 2015