

Meningococcal Disease

- Organism:** There are multiple serogroups of *Neisseria meningitidis*. Serogroups B, C, and Y cause the majority of disease in the United States. Serogroup W-135 causes a small proportion of disease, and serogroup A causes disease in developing countries and the Meningitis Belt of sub-Saharan Africa.
- Incubation period:** Usually 3 to 4 days but may range from 2 to 10 days.
- Infectious period:** Until meningococci are no longer present in discharges from nose and mouth, usually within 24 hours after appropriate antimicrobial treatment begins.
- Transmission route:** Transmission is by direct exposure to droplets or direct contact with discharges from the nose or throat of a colonized person—symptomatic or otherwise. It is important to distinguish colonization from disease. Colonization is common, but invasive disease is very rare.
- Treatment:** Standard therapy is Penicillin G or ampicillin. Alternative therapies include third generation cephalosporins or chloramphenicol. If the patient is not treated with a third-generation cephalosporin (ceftriaxone, cefotaxime) at some point during their illness, they should receive rifampin (or ciprofloxacin or ceftriaxone IM) to eradicate pharyngeal carriage of *N. meningitidis*.

Meningococcal disease is considered a very serious **medical and public health emergency**. The Section of Epidemiology (SOE) should notify appropriate partners (e.g., Immunization Program, PHNs, Preparedness Program, CDC Arctic Investigations Program (CDC-AIP), local healthcare providers, etc.) if any suspected cluster or outbreak occurs involving multiple cases of the same serogroup within in a short period of time.

Clinical Description: Meningococcal disease describes the spectrum of infections caused by *Neisseria meningitidis* (Nm), including meningitis, bacteremia, and bacteremic pneumonia. Meningococcal disease develops rapidly. Signs and symptoms include sudden onset of high fever, neck stiffness, confusion, nausea, vomiting, lethargy, and/or petechial or purpuric rash. Meningococcal disease is more commonly diagnosed among previously healthy infants, young children, adolescents, and young adults 16-23 years of age. **Illness associated with clinical purpura fulminans in the absence of a positive blood culture warrant investigation.** In the absence of associated invasive disease, the finding of *N. meningitidis* (Nm) in the nasopharynx, sputum, or other nonsterile site is not considered a remarkable event and is not reportable to public health.

Laboratory Specimens

- Blood culture— Specimens should be obtained prior to the start of antibiotic therapy but should not delay the initiation of treatment. WBC usually elevated 1000-5000/mm³ with a neutrophil predominance.
- CSF culture – Initial evaluation often includes lumbar puncture to determine if CSF findings are consistent with diagnosis. CSF findings may include elevated opening pressure, elevated protein, decreased sugar (<40mg/dl), and Gram stain showing gram-negative diplococci.
- If meningococcal disease is suspected, request Gram stain ASAP from petechiae or purpuric scraping, CSF or a sample of the buffy coat from spun blood.

- Isolates of Nm from normally sterile sites must be forwarded to the CDC-AIP laboratory in Anchorage for confirmation and serogroup identification.
Note: Clinical specimens may be submitted to CDC-AIP, on a case-by-case basis, for Nm PCR nucleic acid detection if an isolate is not recovered. SOE **must** consult with a CDC-AIP staff nurse or medical epidemiologist 907-729-3400 to receive approval prior to the submission of any clinical specimen(s) for PCR testing.
- Positive antigen test results from urine or serum samples are unreliable for diagnosis.

Case Investigation Checklist

- An investigation should begin immediately for any person, living or deceased, who is suspected of having invasive meningococcal disease.
- Confirm that the laboratory results indicate invasive disease.
 - Specimen from a normally sterile body site (e.g., blood, CSF, synovial, pleural, or pericardial fluid), and:
 - Gram-negative diplococci, not yet identified, observed on gram-stain from a normally sterile site specimen; or,
 - Isolation or detection of *Neisseria meningitidis* from a normally sterile site specimen by culture or PCR assay
- Review the medical records or speak to an infection preventionist or physician at the reporting facility to obtain demographics and case-patient symptoms.
- Ensure that appropriate control measures are implemented (see Control Measures section below)
- Interview the case (or proxy) to identify close contacts (see “close contacts” definition in Control Measures section, below).
- Contact the testing laboratory to ensure that the isolate or CSF sample material is forwarded to the CDC-AIP laboratory in Anchorage for confirmation and serogroup identification. See isolate note above in Laboratory Specimen section if an isolate is not available.
- Complete the [Meningococcal Disease Case Questionnaire](#) and submit the completed investigation form to AK-SOE by secure email doh.dph.epi.id.hipaa@alaska.gov or fax 907-563-7868.
- Enter all suspect, probable, and confirmed invasive meningococcal case surveillance data into the NEDSS Base System (NBS) following the [case data entry guide](#), and create a case notification to the NNDSS.

Control Measures

Cases

- Investigate reports of suspected invasive meningococcal disease promptly to identify at-risk contacts.
- Empirical therapy for suspected meningococcal disease should include cefotaxime or ceftriaxone. Once the microbiologic diagnosis is established, treatment options include cefotaxime, ceftriaxone, penicillin, or ampicillin. Providers should ascertain the susceptibility of meningococcal isolates to penicillin before using penicillin or ampicillin for treatment.
- In addition to standard precautions, droplet precautions are recommended until 24 hours after initiation of effective antimicrobial therapy.
- Clothing or bedding that is soiled with nasal or throat discharges should be disinfected. A patient’s hospital room should be terminally cleaned upon discharge.

Contacts

- Close contacts definition: Close contacts of a patient who has meningococcal disease include household members (including dormitory room, barracks), childcare centers contacts, and persons directly exposed to the patient’s oral/nasal secretions (e.g., kissing, mouth-to-mouth resuscitation, unprotected endotracheal intubation, or unprotected endotracheal tube management)

- Regardless of immunization status, close contacts including household contacts of all people with invasive meningococcal disease (see Table below), whether endemic or in an outbreak situation, are at high risk of infection and should promptly receive chemoprophylaxis. Chemoprophylaxis should be provided even if the close contact has received meningococcal vaccine.

American Academy of Pediatrics (AAP) Red Book* – Disease Risk for Contacts of People with Invasive Meningococcal Disease

High risk: chemoprophylaxis recommended (close contacts)
<ul style="list-style-type: none"> • Household contacts • Childcare 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 contact, at any time during 7 days before onset of illness. • Mouth-to-mouth resuscitation, unprotected contact during endotracheal intubation at any time from 7 days before onset of illness to 24 h after initiation of effective antimicrobial therapy • 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 (gate to gate), or passengers seated within one seat in any direction from an index case on a flight of any duration if the index case was coughing or vomiting during the flight
Low risk: chemoprophylaxis not recommended
<ul style="list-style-type: none"> • Casual contact: no history of direct exposure to index patient's oral secretions (e.g., school or work) • Indirect contact: only contact is with a high-risk contact, no direct contact with the index patient. • Health care personnel without direct exposure to patient's oral secretions
In outbreak or cluster
<ul style="list-style-type: none"> • Chemoprophylaxis for people other than people at high risk (close contacts) should be administered only after consultation with local public health authorities

*AAP Red Book: 2021-2024 Report of the Committee on Infectious Diseases

Recommended prophylaxis regimens:

American Academy of Pediatrics (AAP) Red Book - Recommended Chemoprophylaxis Regimens for High-Risk Contacts and People with Invasive Meningococcal Disease*

Age of Infants, Children, and Adults	Dose	Duration	Efficacy %	Cautions
Rifampin^a				
<1 mo	5 mg/kg per dose, orally every 12 h	2 days	90-95	Discussion with an expert for infants < 1 mo
≥1 mo	10 mg/kg per dose, (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
Ceftriaxone				
< 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
Ciprofloxacin^{a,b}				
≥ 1 mo	20 mg/kg (maximum 500 mg), orally	Single dose	90-95	
Azithromycin				
	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 of young adults

*AAP Red Book: 2021-2024 Report of the Committee on Infectious Diseases

^a Not recommended for use in pregnant women.

^b Use only if fluoroquinolone-resistant strains of *N. meningitidis* have not been identified in the community
McNamara LA, Potts C, Blain AE, et al. Detection of ciprofloxacin-resistant, β -lactamase-producing *Neisseria meningitidis* serogroup Y isolates — United States, 2019-2020. [MMWR Morb Mortal Wkly Rep. 2020;69\(24\):735-739.](#)

- Chemoprophylaxis medications should be ordered by the primary provider of the patient and/or family, or by a SOE licensed provider if needed. Persons should receive medications through community/retail/clinical pharmacies locations. If someone has no insurance or is unable to pay for medications, then payment can be arranged by the Administrative Assistant for SOE.
 - A signed copy of the AK-SOE Standing Order for Chemoprophylaxis is available on the SOE network drive in the Meningococcal MMM folder and the Drug Room folder.
- Close contacts should be monitored for signs of illness, especially fever, for up to 10 days.
- Close contacts should be provided meningococcal disease facts sheets and other information.
 - [Meningococcal Disease Fact Sheet by AK DOH](#)
 - [Meningococcal Disease Fact Sheet by CDC](#)

Special Circumstances

- Air Travel: Any case of meningococcal disease in a person who has recently traveled should be reported to the local CDC Anchorage Port Health Station (formerly Quarantine Station) by calling 907-271-6301 (24-hour access). They will determine whether an air travel contact investigation is indicated.
 - For travelers, antimicrobial chemoprophylaxis should be considered for any passenger who had direct contact with respiratory secretions from an index patient or for anyone seated directly next to an index patient on a prolonged flight (i.e., one lasting more than 8 hours), or within one seat in any direction on a flight of any duration if the index patient was coughing or vomiting on the flight.
 - US Port Health Protection resources: <https://www.cdc.gov/quarantine/contact-investigation.html>
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- Case Attends a Daycare Facility/School/Other Institution: If the case attended any such facility for at least 4 hours (cumulatively) during the week before onset, then within 24 hours of the initial report:
 1. Public health should immediately contact facility administrators to recommend that the institution rapidly communicate with its population and help guide messaging.
 2. Information that should be communicated include:
 - a. Notification about the case (obtain consent if the name of the case is to be released)
 - b. Reassurance that the chance of another case is remote
 - c. Signs and symptoms of invasive meningococcal disease and instructions to seek care promptly if they occur. Persons should monitor themselves for illness for a 10-12 day period.
 - d. Chemoprophylaxis is not needed unless individuals have been contacted by public health authorities.
 3. If Case Attends Daycare: The parents of children who are in the same classroom as the case should be notified (preferably in writing) of the occurrence of meningococcal disease in the facility. The notice should advise parents to:
 - a. Seek chemoprophylaxis for their attending children without delay.
 - b. Watch their children carefully for a 2-week period for signs of illness, especially fever, and seek medical care immediately if illness should occur.
 - c. Advise parents that an elevated risk may persist for up to 2 months following the occurrence of a case.

- d. Instruct the day-care operator to notify the SOE immediately if another person becomes ill with signs and symptoms of meningococcal disease over the next 2 months.
- e. Chemoprophylaxis should also be given to all staff who were assigned to work in the ill child's classroom.
- f. Children and staff in other rooms are usually not at elevated risk, and do not need chemoprophylaxis.

[Adapted from Oregon Public Health Meningococcal Disease Investigation Guidelines, June 2021.](#)

- **Outbreak:** A meningococcal disease outbreak occurs when multiple cases of the same serogroup (type) happen in a population over a short period of time. Outbreaks can occur in communities, schools, colleges, prisons, and other populations. Depending on the population size and specific circumstances, health officials may declare an outbreak after just two cases.
 - View [CDC guidance](#) for the evaluation and public health management of suspected outbreaks of meningococcal disease in the United States.

Vaccination

The [Advisory Committee on Immunization Practices \(ACIP\) recommends routine vaccination for preteens, teens, and others at increased risk for meningococcal disease](#). These vaccines help protect against three serogroups (B, C, and Y) of *Neisseria meningitidis* bacteria commonly seen in the United States. Like any vaccine, meningococcal vaccines are not 100% effective. This means there is still a chance someone can develop meningococcal disease after vaccination. People should know the symptoms of meningococcal disease since early recognition and quick medical attention are extremely important.

The two types of meningococcal vaccines licensed in the United States are:

- Meningococcal conjugate (MenACWY) vaccines
- Serogroup B meningococcal (MenB) vaccines

The number of vaccine doses (i.e., 2- or 4-dose primary series or a single dose with or without a booster dose) and vaccine product are determined by the indication for vaccination and age.

Meningococcal vaccination is recommended for groups at increased risk for disease, including adolescents, persons with certain medical conditions, and persons with increased risk for exposure.

- Routine vaccination of adolescents aged 11 through 18 years (a single dose of vaccine should be administered at age 11 or 12 years, with a booster dose at age 16 years for persons who receive the first dose before age 16 years) ([1-5-7](#)).
- Routine vaccination of persons aged ≥ 2 months at increased risk for meningococcal disease, including ([7-11](#)):
 - Persons aged ≥ 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 ≥ 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 (see [Appendix B](#)) to control outbreaks. Mass vaccination may be indicated in certain community-based or organization-based (e.g., university) outbreaks

when certain criteria are met. See CDC guidance available here:
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a3.htm?s_cid=rr6202a3_w

Reporting and Data Entry Requirements

- Enter *suspect, confirmed and probable* cases into NBS.
- Complete the meningococcal disease FTR template for *suspect, confirmed and probable* cases. A detailed written report should also be written in a large outbreak or investigation.

References:

CDC Meningococcal Disease publications webpage:
<http://www.cdc.gov/meningococcal/pubs-tools/publications.html>

CDC 2015 Case Definition Meningococcal Disease webpage:
<http://www.cdc.gov/nndss/script/casedef.aspx?CondYrID=955&DatePub=2015-01-01>

CDC. Epidemiology and Prevention of Vaccine-Preventable Diseases: The Pink Book (14th edition, 2021) Chapter 14; Meningococcal Disease <https://www.cdc.gov/vaccines/pubs/pinkbook/mening.html>

CDC. Manual for the Surveillance of Vaccine-Preventable Diseases. Chapter 8: Meningococcal Disease <https://www.cdc.gov/vaccines/pubs/surv-manual/chpt08-mening.html>

Red Book: 2021-2024 Report of the Committee on Infectious Diseases, American Academy of Pediatrics.

Control of Communicable Diseases Manual, 20th Edition Edited by David L. Heymann Washington, DC: American Public Health Association, 2015.

CDC. Infection Control in Healthcare Personnel. Epidemiology and Control of Selected Infections Transmitted Among Healthcare Personnel and Patients (2022).
<https://www.cdc.gov/infectioncontrol/guidelines/healthcare-personnel/selected-infections/meningococcal-disease.html>

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March 22, 2013 / 62(RR02);1-22
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a1.htm>