

PUBLIC HEALTH REFERENCE SHEET

Meningococcal Disease



Name	Causative agent <i>Neisseria meningitidis</i> EXCLUDES: Viral/aseptic meningitis
Reservoir & Transmission	Humans People spread meningococcal bacteria to others by exchanging respiratory and throat secretions during close or lengthy contact. People with meningococcal disease and those who carry the bacteria asymptotically in the nasopharynx can spread the bacteria.
Incubation Period	3–4 days, with a range of 2–10 days
Common Symptoms	Fever, headache, and stiff neck in meningococcal meningitis cases, and sepsis and rash in meningococemia. Meningococcal disease manifests most commonly as meningitis and/or meningococemia that may progress rapidly to purpura fulminans (i.e., a hemorrhagic condition and clotting disorder which manifests as blood spots, bruising and discoloration of the skin), shock, and death.
Gold Standard Diagnostic Test	Gram stain of cerebrospinal fluid (CSF)
Risk Groups	Anyone can contract meningococcal disease, but risk is highest in infants, teens, and young adults; those that spend time in large groups (e.g., college campuses, new military recruits); people with certain medical conditions; people who receive complement inhibitors; and people traveling to a country where meningococcal disease is epidemic or highly endemic.
Geographic Significance	Worldwide, but greatest incidence occurs in the meningitis belt of Africa

What is meningococcal disease?

Meningococcal disease can refer to any illness caused by the bacteria *Neisseria meningitidis*, also known as meningococcus. These illnesses include infections in the lining of the brain and spinal cord (meningitis), bloodstream (bacteremia or septicemia), and can be fatal.

There are multiple serogroups of *N. meningitidis*. Serogroups B, C, and Y cause the majority of disease in the United States. Serogroup W and nongroupable strains cause a small portion of disease.

What is the occurrence of meningococcal disease?

N. meningitidis is found worldwide, but incidence is greatest in the meningitis belt (stretching from Senegal in the west to Ethiopia in the east) of sub-Saharan Africa. Meningococcal disease is hyperendemic in this region, and periodic epidemics during the dry season (December–June) reach an incidence of up to 1,000 cases per 100,000 population. By contrast, rates of disease in Australia, Europe, South America, and the United States range from 0.10 to 2.4 cases per 100,000 population per year (CDC, 2023). In the U.S., outbreaks are rare, and rates of meningococcal disease have declined since the 1990s. In 2019, about 375 total cases of meningococcal disease were reported. Meningococcal disease incidence historically had a cyclical pattern, with peaks in incidence occurring every 7–10 years and a seasonal pattern with peak incidence in late winter and early spring. Outbreaks typically occur in schools, colleges, communal living, and prisons.

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How is meningococcal disease transmitted?

Meningococci spread through respiratory secretions and require close contact for transmission. Both asymptomatic carriers and people with overt meningococcal disease can be sources of infection. Asymptomatic carriage is transient and typically affects approximately 5% to 10% of the population at any given time.

Who is at risk for meningococcal disease?

- Household or close contacts of case patients at highest risk for developing meningococcal disease
- Infants less than 1 year old, adolescents and young adults 16 through 23 years old, and adults over 85 years of age have higher rates of disease than other age groups
- People with certain medical conditions such as functional or anatomic asplenia, persistent complement component deficiencies (e.g., C3, C5-9, properdin, factor H, factor D) and HIV infection
- People who receive complement inhibitors (e.g., eculizumab and ravulizumab)
- Microbiologists who are routinely exposed to isolates of *N. meningitidis*
- People identified as being at increased risk because of an outbreak of meningococcal disease
- People traveling to a country where meningococcal disease is epidemic or highly endemic
- First-year college students who live in residence halls
- Military recruits

What are the signs and symptoms of meningococcal disease?

- Per CDC, meningococcal disease generally occurs 1–10 days after exposure and presents as meningitis in approximately 50% of cases in the United States. Meningococcal meningitis is characterized by sudden onset of headache, fever, and neck stiffness, sometimes accompanied by nausea, vomiting, photophobia, or altered mental status. Meningococcal disease progresses rapidly and has a case-fatality rate of 10%–15%, even with antimicrobial drug treatment. Without rapid treatment, fatality rates can be much higher.
- Approximately 30% of people with meningococcal disease are present with meningococcal sepsis, known as meningococemia. Symptoms of meningococemia can include abrupt onset of fever, chills, vomiting, diarrhea, and a petechial or purpuric rash, which can progress to purpura fulminans. Meningococemia often involves hypotension, acute adrenal hemorrhage, and multiorgan failure. An additional 15% of meningococcal disease cases in the United States, primarily among adults >65 years of age, present as bacteremic pneumonia.
- Among infants and children aged <2 years, meningococcal disease can have nonspecific symptoms. Neck stiffness, usually seen in people with meningitis, might be absent in this age group.

What are potential complications of meningococcal disease?

About 10 to 15 in 100 people with meningococcal disease will die. Up to 1 in 5 survivors will have long-term disabilities, such as loss of limb(s), deafness, nervous system problems, and brain damage (CDC, 2023).

How is meningococcal disease diagnosed?

Early diagnosis and treatment are critical. If bacterial meningitis is suspected, collect blood for culture immediately and perform a lumbar puncture (LP) to collect cerebrospinal fluid (CSF) for microscopic examination and Gram stain. In general, diagnosis is made by isolating *N. meningitidis* from a normally sterile body site (e.g., blood, CSF) either by culture or by PCR

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detection of *N. meningitidis*-specific nucleic acid. State health departments can provide diagnostic and testing support, if needed. Signs and symptoms of meningococcal meningitis are like those of other causes of bacterial meningitis (e.g., *Haemophilus influenzae*, *Streptococcus pneumoniae*). Proper treatment and prophylaxis depend on correctly identifying the causative organism.

How is meningococcal disease treated?

- Meningococcal disease can be rapidly fatal and should always be viewed as a medical emergency. As soon as disease is suspected and blood cultures and CSF have been collected, deliver appropriate treatment; if the LP is to be delayed for any reason (e.g., imaging studies of the head prior to LP), administer antimicrobial drugs immediately after collecting blood cultures. Begin empiric antimicrobial drug treatment early and prior to receiving diagnostic test results.
- Third-generation cephalosporins are recommended for empiric treatment. Although ampicillin or penicillin also can be used for treatment, determine meningococcal isolate susceptibility before switching to one of these antibiotics; recent reports indicate emerging penicillin resistance among meningococcal isolates in the United States. If a patient presents with suspected bacterial meningitis of uncertain etiology, some treatment algorithms recommend empiric use of dexamethasone as well as an antimicrobial drug until a bacterial etiology is established; if meningococcal meningitis is confirmed or suspected, steroids can be discontinued (CDC, 2023).
- Due to increased reports of ciprofloxacin-resistant, β -lactamase-producing *N. meningitidis* serogroup Y cases since June 2020 in the United States, clinicians and public health staff should—
 - Consider antimicrobial susceptibility testing on meningococcal isolates to inform prophylaxis decisions if their state has reported a case of meningococcal disease caused by ciprofloxacin-resistant strains within the past 2 years.
 - Update prophylaxis practices around *N. meningitidis* cases as needed based on detection of ciprofloxacin-resistance cases. View CDC guidance on changing prophylaxis antibiotics in areas with ciprofloxacin resistance.
<https://www.cdc.gov/meningococcal/outbreaks/changing-prophylaxis-antibiotics.html>

How can meningococcal disease be prevented?

- CDC recommends meningococcal vaccination for all preteens and teens. CDC also recommends clinicians vaccinate children and adults who are at increased risk for meningococcal disease. See Meningococcal Vaccination: Information for Healthcare Professionals <https://www.cdc.gov/vaccines/vpd/mening/hcp/index.html> for information on all meningococcal vaccine recommendations by vaccine, age, and indication.
- CDC also recommends chemoprophylaxis for close contacts of patients with meningococcal disease, regardless of immunization status. See the “Chemoprophylaxis” section of the meningococcal chapter in the Manual for the Surveillance of Vaccine-Preventable Diseases <https://www.cdc.gov/vaccines/pubs/surv-manual/chpt08-mening.html> for additional guidance.
- Travelers should receive vaccines 7–10 days before travel to enable time for protective antibody levels to develop. All meningococcal vaccines are inactivated and can be given to people who are immunosuppressed.

What are some Public Health considerations?

- One case of meningococcal disease may warrant an outbreak investigation. Notify your Defense Center for Public Health immediately.

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- When reporting meningococcal disease in the Disease Reporting System internet (DRSi)—
 - Specify the serogroup (A, B, C, Y, Z, W135), if known.
 - Note the patient’s meningococcal immunization history.
 - Specify the clinical form of the disease.

References:

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events: Guidelines and Case Definitions*.

<https://www.health.mil/Reference-Center/Publications/2022/11/01/Armed-Forces-Reportable-Medical-Events-Guidelines>

Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*. 21st Edition. Washington, DC: APHA Press.

McNamara, Lucy and Blain, Amy. “Meningococcal Disease.” CDC Yellow Book 2024: Travel-Associated Infections & Diseases. Centers for Disease Control and Prevention, 2023.

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“Meningococcal Disease,” Centers for Disease Control and Prevention (CDC), last reviewed February 7, 2022.

<https://www.cdc.gov/meningococcal/clinical-info.html>

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