Utah Department of Health & Human Services

Report immediately

Meningococcal disease (*Neisseria meningitidis*)

Disease plan

Quick links

Last updated: 06/30/2022, by Bree Barbeau, MPH

Questions about this disease plan?

Contact the Utah Department of Health and Human Services (DHHS), Office of Communicable Diseases (OCD): 801-538-6191.

Critical clinician information

Clinical Evidence

Signs/symptoms

- The clinical manifestations of invasive meningococcal disease can be quite varied, ranging from transient fever and bacteremia to fulminant disease. Acute systemic meningococcal disease is most frequently manifest by three syndromes:
  - Meningitis
  - Meningitis with accompanying meningococcemia
  - Meningococcemia without meningitis
- Other manifestations:
  - Bacteremic pneumonia
  - Epiglottitis
  - Urethritis
  - Arthritis
  - Pericarditis
  - Pharyngitis
  - Conjunctivitis (primary meningococcal conjunctivitis)

Period of communicability

- People are thought to be infectious until 24 hours after antibiotic therapy begins.

Incubation period

- Usually 3–4 days, with a range of 2–10 days.

Mode of transmission

- Respiratory droplets or direct contact. Close contact is necessary.

Laboratory testing

Type of lab test

- Culture
- PCR
- Serology
- Antigen tests

Type of specimens

- Culture—blood, CSF, pleural, or pericardial fluid (normally sterile site)
- PCR—blood, CSF, or other clinical specimens
- Serology—serum
- Antigen tests—CSF; urine and serum specimens can be unreliable

Treatment recommendations

Type of treatment

- Persons with suspected meningococcal disease should be treated promptly without waiting for laboratory confirmation. Once the diagnosis of meningococcal infection is seriously considered, ideally no more than 30 minutes should elapse before the administration of appropriate antibiotics.

- Cephalosporins should be used to treat suspected or culture-proven infection prior to availability of susceptibility results. If an organism is proven to be penicillin susceptible, the treatment can be switched to penicillin.

Case and contact management

Isolation of case

- Patient on respiratory isolation for 24 hours after starting antibiotic therapy.

Quarantine of contacts

- Not applicable.

Prophylaxis

- If the patient has a positive culture for *N. meningitidis*, all close contacts should be prophylaxed with antibiotics.
- Prophylaxis is not indicated if an identified exposure is brief and non-face-to-face contact or if *N. meningitidis* is isolated from a non-sterile site (non-invasive disease).
- Rifampin, ceftriaxone, ciprofloxacin, and azithromycin are recommended chemoprophylaxis regimens for high risk contacts of persons with invasive meningococcal disease.
- Existing vaccines are meningococcal polysaccharide vaccine (MPSV4) and meningococcal conjugate vaccine (MCV4). Widespread vaccination of contacts is not advised except during outbreaks.

Why is meningococcal disease important to public health?

Neisseria meningitidis is the leading cause of bacterial meningitis in children and young adults in the United States and is the second most common cause of community-acquired adult bacterial meningitis. *N. meningitidis* can cause both endemic and epidemic infection. Large numbers of individuals can become infected in a population within a short space of time.

This pathogen has the added capacity to cause epidemics in which all age groups in the population are at risk. While the worst of these epidemics have recently been largely confined to less well-developed areas of the world, epidemics have also occurred in areas of Europe and North America.

The annual incidence of invasive meningococcal disease in the United States varies in multi-year cycles; the most recent peak occurred during the mid-1990s. Subsequently, the incidence has declined annually. Routine use of meningococcal conjugate vaccine was recommended for adolescents in 2005. The predominant serogroups causing infection in the United States are serogroups B, C, and Y; each accounts for approximately one-third of cases. When a meningococcal case is identified, Utah public health ensures timely antimicrobial chemoprophylaxis of close contacts to prevent further disease transmission.

Disease and epidemiology

Clinical description

Acute systemic meningococcal disease is most frequently manifested by three syndromes:

- Meningococcal meningitis
- Meningitis with accompanying meningococcemia
- Meningococcemia without meningitis

The typical initial presentation of meningitis due to *N. meningitidis* consists of the sudden onset of fever, nausea, vomiting, headache, decreased ability to concentrate, and myalgias in an otherwise healthy patient.

Myalgias may be an important differential sign, and occasionally the pain is quite intense. These are generally more painful than myalgias seen in viral influenza. Disease progression is usually rapid with transition from health to severe disease in a matter of hours.

Meningitis is observed in approximately 50% of invasive cases and is characterized by abrupt onset of fever, headache, and stiff neck. These clinical features may be accompanied by nausea, vomiting, photophobia, and altered mental status. In infants, symptoms may have a slower onset, signs may be nonspecific, and neck stiffness may not be present. Approximately 30% of

meningococcal disease cases present as bacteremia without meningitis. A portion of these cases will present as meningococcemia, the most severe manifestation of meningococcal bacteremia. Signs of meningococcemia include sudden onset of fever and a characteristic petechial or purpuric rash, which may progress to purpura fulminans. The clinical course can include hypotension, acute adrenal hemorrhage, multiorgan failure, shock, and death. Patients with severe meningococcemia often respond poorly to treatment, and death can occur within hours of onset.

Petechial lesions are common, but may be missed. Lesions can occur in obscure places such as the hard palate and conjunctiva, but are generally seen on the trunk and lower limbs. It is important for healthcare providers to carefully examine the patient, as petechia can sometimes be found only in pressure points, such as under socks or underwear elastic. The petechial rash corresponds to thrombocytopenia and is an indicator of disseminated intravascular coagulation (DIC), a frequent complication of meningococcal sepsis in children. Some patients may also present with a maculopapular rash, but it could be transient.

Because endemic meningococcal infection often occurs during the late winter when concurrent influenza virus is in the community, many cases of meningococcal disease are mistaken initially for severe "flu." It is not uncommon for other cases to be reported in the region or for the patient to have been a contact of a previously-diagnosed case.

The clinical expression of this infection ranges widely, thus a high index of suspicion and careful search for clues of disease are required to make a diagnosis, particularly in the absence of an epidemic. Other manifestations of N. meningitidis can include:

- Bacteremic pneumonia
- Epiglottitis
- Urethritis
- Arthritis
- Pericarditis
- Pharyngitis
- Conjunctivitis (Primary meningococcal conjunctivitis)

Patients can progress between manifestations during the course of illness.

Complications

A number of complications have been documented in patients with meningococcal meningitis at the time of presentation or, more commonly, later in the recovery phase of illness. These include immune complex-associated complications such as arthritis without the recovery of organisms, pleurisy, vasculitis, and pericarditis. Epiglottitis, conus medullaris syndrome, and cranial nerve dysfunctions, especially sixth, seventh, and eighth, can also occur.

Causative agent

Meningococcal meningitis is caused by the Gram-negative diplococci *N*. *meningitidis*. The sides are flattened and this organism is recognizable in Gram stain by an experienced microscopist. There is a polysaccharide capsule surrounding the organism; differences in this capsule are the basis for the serogroup. This organism is fastidious in its growth requirements, but virtually all clinical microbiology laboratories can grow it in culture.

There are at least 13 serogroups of this organism: A, B, C, D, X, Y, Z, E, W-135, H, I, K, and L. In the United States, serogroups B, C, and Y cause approximately one-third of invasive meningococcal disease cases.

Differential diagnosis

N. *meningitidis* is an invasive bacterial disease and must be differentiated from bacteria that create similar symptoms, such as Streptococcus pneumoniae, Group A and B strep, and Haemophilus influenzae. Neisseria species have a characteristic appearance on Gram stain (Gram-negative diplococci) which can assist with discrimination, especially when antibiotics have been started prior to collection of specimens for bacterial culture.

Laboratory identification

N. *meningitidis* is not difficult to identify in the laboratory and is typically diagnosed by isolation of *N*. *meningitidis* from a normally sterile site. Typical specimens to obtain include blood, CSF, synovial, pleural, or pericardial fluid.

- Culture—typically, *N*. *meningitidis* is identified via Gram stain of the blood and/or CSF and subsequent culture. The morphology of the organism is sufficient to suspect meningococcal disease rapidly through the Gram stain. The confirmatory culture should be available the next day. Ideally, both CSF and blood cultures should be collected before initiating antibiotic therapy. When this is not possible, both blood and CSF culture should be collected as soon as possible after the initiation of antimicrobial therapy. Cultures can be rendered sterile as soon as 2 hours after initiation of antimicrobial therapy.
    - UPHL: *N*. *meningitidis* isolates are required to be submitted to the Utah Public Health Laboratory (UPHL) for serotype determination.
- PCR amplification (DNA detection)—PCR amplification has the advantage of being rapid and less susceptible to the influence of prior antibiotic treatment than culture. PCR is highly sensitive and specific.

- Serologic testing—may be used as part of evaluation if meningococcal disease is suspected, but should not be used to establish a diagnosis.
- Antigen tests—antigen tests for CSF, urine, and serum are available. Tests which detect polysaccharide antigen in CSF are rapid and specific, but false negative results are common, particularly with serogroup B disease. However, the tests using urine or serum specimens are unreliable. Samples positive for *N. meningitidis* by antigen testing should be reflexed to culture, if possible, so the serotype can be determined.

Treatment

Immediate recognition and treatment of meningococcal disease is critical. Persons with suspected meningococcal disease should be treated promptly without waiting for laboratory confirmation. Early and appropriate antibiotic treatment markedly improves the outcome of meningococcal infections.

Antibiotic therapy—once the diagnosis of meningococcal infection is seriously considered, ideally no more than 30 minutes should elapse before the administration of appropriate antibiotics. Blood and/or CSF samples should be drawn and antibiotic therapy should not be delayed while waiting for cultures to be performed. Pre-treatment with antibiotics can substantially diminish the probability of a positive CSF culture, but the diagnosis can often still be established.

Third-generation cephalosporins, such as cefotaxime or ceftriaxone, should be used to treat suspected (e.g., Gram stain with gram-negative diplococci) or culture-proven meningococcal infection prior to susceptibility results being available. If the organism is proven to be penicillin susceptible, the treatment can then be switched to penicillin, although it is also reasonable to continue therapy with a third-generation cephalosporin. Clinicians should consult with an infectious disease specialist or appropriate reference to verify current therapies. Drugs that are not effective include first-generation cephalosporins and sulfonamides.

Case fatality

The case fatality is highly variable and depends on the disease manifestation and availability of appropriate health care. Meningitis or pneumonia fatality is about 7–13%, whereas fatality with septicemia can be as high as 19%. Of those who survive invasive disease, 10%–20% experience sequelae, including limb loss from gangrene, extensive skin scarring, neurosensory hearing loss, mild to moderate cognitive defects, or seizure disorders.

Reservoir

Humans are the only known reservoir. Up to 25% of the population may carry *N*. *meningitidis* in their nasal mucosa without symptoms. In closed populations, such as military or residential living centers, carriage rates can be much higher. Carriage can be infrequent, intermittent, or long-lasting.

Transmission

Carriers spread the organism via the respiratory route. Transmission is relatively inefficient, and close contact is necessary.

Susceptibility

Meningococcal disease rates in children younger than 1 year of age peak at 0–6 months. More than 50% of meningococcal disease in children 0–6 months is caused by serogroup B. In time, children gradually become exposed to meningococci and develop bactericidal antibodies. By the time they reach adulthood, 65–85% of persons have antibodies against meningococcal disease.

Individuals thought to be at higher risk include those with underlying immune deficiencies (asplenia, complement deficiency). Other risk factors include crowding (such as living in a dormitory or military barracks), tobacco smoke (use or exposure), and microbiologists who are routinely exposed to isolates of *N*. *meningitidis*. Outbreaks typically occur in closed settings such as childcare centers, schools and colleges (especially students who live in dormitories), and military training camps.

Household contacts are at increased risk (from 500- to 800-fold higher than non-household contacts) of disease development following exposure.

Incubation period

The incubation period is usually 3–4 days, with a range of 2–10 days.

Period of communicability

People are thought to be infectious until 24 hours after initiation of antibiotic therapy.

Epidemiology

The epidemiology of meningococcal meningitis is still unclear. Various questions remain unanswered regarding the sporadic, episodic nature of this disease, the susceptibility of certain populations, carrier eradication, and transmission. *N*. *meningitidis* is the second most common cause of community-acquired adult bacterial meningitis, and the leading cause in children and young adults since the availability of the HIB vaccine. People may be more likely to acquire *N*. *meningitidis* with co-morbidity of a viral infection.

One of the unusual features of *N*. *meningitidis* is that it can be carried in the throats of healthy individuals. However, there is a positive relationship between the rate of carriage (or possibly transmission, not carriage) in a population, and the onset, rise, and decline of an epidemic. Other respiratory diseases usually cause no change or decrease in the carriage rate of *N*. *meningitidis*. Carriers fall into 3 groups—chronic, intermittent, and transient. Chronic carriers can be colonized for up to 2 years. The carrier state appears to immunize the carrier.

There is a correlation between the capsular phase variation, bacterial invasion, and disease outbreaks. People with invasive disease are more likely to have been recently colonized; disease is thought to occur within the first week of acquisition.

Shifts in the age distribution of cases can forecast the onset of an epidemic situation. Epidemics tend to occur in 5–19-year olds. Fewer than 2% of meningococcal meningitis cases are due to outbreaks. Outbreaks are most likely to occur in childcare settings, military recruit camps, schools, and colleges.

Epidemic potential is related to serogroup. Epidemics are most likely to occur among the poorest socioeconomic groups, where crowding and lack of sanitation is common.

Typical causes of epidemic invasive disease (worldwide)		
Serogroup	**Where**	**Attack rate**
A	Less developed countries	Up to 500 cases per 100,000 population/year
B	Developed countries	50–100 cases per 100,000 population/year
C	Developed and undeveloped countries	Up to 500 cases per 100,000 population/year

Public health control measures

Public health responsibility

Public health has the primary responsibility to identify and provide prophylaxis for contacts of identified cases. Other important public health responsibilities include:

- Investigate cases to determine possible linkage to other cases in Utah or beyond.
- Collect demographic information to identify at risk populations.
- Encourage at risk populations to receive immunization.
- Monitor levels of disease in the community.
- Analyze disease trends.
- Track age distribution and types of invasive meningococcal disease reported to public health.
- Monitor reported serogroups, and collect and report sufficient information to determine whether there is a changing pattern, and whether vaccine is covering the majority of reported cases.

Prevention

Prevention methods for meningococcal disease include: vaccination, use of droplet precautions, treatment of cases, and chemoprophylaxis of close contacts following identification of an index case.

Droplet precautions should be continued for 24 hours after institution of effective antibiotics in patients with suspected or confirmed *N. meningitidis* infections.

Chemoprophylaxis

If a patient has a positive culture for *N. meningitidis*, all close contacts should be provided prophylaxis with antibiotics. See identifying case contacts for information to determine who is considered a close contact of a case.

Prophylaxis is not indicated if exposure to the case is brief (non-face-to-face contact, such as standing in the doorway of a patient's room, cleaning a patient's room, delivering a medication or food tray, starting an IV, or performing a routine physical exam). Unprotected direct contact with the respiratory secretions or saliva of a person colonized with *N. meningitidis*, without clinical disease, is not considered an exposure. This includes a majority of healthcare workers, unless there was direct exposure to respiratory secretions (as with suctioning or intubation).

Additionally, prophylaxis is not recommended for close contacts of patients with evidence of *N. meningitidis* only in non-sterile sites such as an oropharyngeal swab, endotracheal secretions, or conjunctival swab. Reports of secondary cases after close contact to persons with non-invasive pneumonia or conjunctivitis are rare.

The rate of secondary disease in contacts is highest immediately after onset of disease in the index patient. Because of this, antibiotic prophylaxis should be administered as early as possible (ideally <24 hours after the index patient is identified). Antibiotic prophylaxis administered >14 days after exposure to the index patient is not recommended.

If a patient was treated with antibiotics before culture was obtained, and no bacteria are found, the decision to administer prophylaxis to close contacts becomes more difficult. Each situation should be reviewed individually to determine the likelihood of invasive meningococcal disease. The DHHS epidemiologist can assist with this review process.

Note: rifampin and ciprofloxacin are not recommended for pregnant or women who may be pregnant.

Recommended chemoprophylaxis regimens for high-risk contacts and persons with invasive meningococcal disease

Drug	Age	Dose	Duration	Efficacy (%)	Cautions
Rifampin	<1 month	5mg/kg, orally, every 12 hours	2 days		Discussion with an expert for infants <1 month
Rifampin	≥1 month	10mg/kg (maximum 600 mg), orally, every 12 hours	2 days	90–95	Can interfere with efficacy of oral contraceptives and some seizure prevention and anticoagulant medications; may stain soft contact lenses. Not recommended for pregnant women.
Ceftriaxone	<15 years	125mg, intramuscularly	Single dose	90–95	To decrease pain at the injection site, dilute with 1% lidocaine.
Ceftriaxone	≥15 years	250mg, intramuscularly	Single dose	90–95	To decrease pain at the injection site, dilute with 1% lidocaine.
Ciprofloxacin[a]	≥1 month	20mg/kg (maximum 500 mg), orally	Single dose	90–95	Not recommended for pregnant women.

Azithromycin		10 mg/kg (maximum 500 mg)	Single dose	90	Not recommended routinely. Equivalent to rifampin for eradication of *N. meningitidis* from nasopharynx in 1 study.

[a]Use only if fluoroquinolone-resistant strains *of N. meningitidis have* not been identified in the community.

Source*:* American Academy of Pediatrics. Meningococcal Infections. In: Kimberlin DW, Jackson MA, Long SS, Brady MT, editors. Red Book: 2018–2021 Report of the Committee on Infectious Diseases, Itasca, IL: American Academy of Pediatrics; 2018:550-61.

Vaccine

Types of vaccine

- Meningococcal polysaccharide vaccine (MPSV4)
    - Menomune
- Meningococcal conjugate vaccine (MCV4)
    - MenHibrix
    - Menactra
    - Menveo

Both MPSV4 and MCV4 can prevent four types (A, C, Y, and W-135) of meningococcal disease, including 2 of the 3 most common types in the United States.

- Serogroup B meningococcal vaccine (MenB)
    - MenB-FHbp
    - MenB-4C

The recommendation from the Advisory Committee on Immunization Practices (ACIP) for MenB vaccine use in persons 10 years of age or older who are at increased risk for meningococcal disease is:

- Persons with persistent complement component deficiencies including persons taking eculizumab or ravulizumab-cwvz.
- Persons with anatomic or functional asplenia, including sickle cell disease.
- Microbiologists routinely exposed to isolates of N. meningitidis.
- Persons identified at increased risk because of a serogroup B meningococcal disease outbreak.

[ACIP vaccination recommendations]

- 0–18 year routine vaccination:
  - 2 doses of MCV4 are recommended for all adolescents 11–18 years of age. First dose at 11–12 years, and a booster at age 16.
  - If the first dose is given between 13–15 years of age, the booster should be given between 16–18 years of age.
  - If the first dose is given after the age of 16, a booster is not needed unless the individual is at increased risk for meningococcal disease.
  - Routine vaccination of healthy persons who are not at increased risk for meningococcal disease is not recommended after age 21 years.
- People at increased risk:
  - College freshmen living in dormitories.
  - Laboratory personnel who are routinely exposed to meningococcal bacteria.
  - United States military recruits.
  - Anyone traveling to, or living in, a part of the world where meningococcal disease is common, such as parts of Africa.
  - Anyone who has a removed or damaged spleen.
  - Anyone who has persistent complement component deficiency including persons taking eculizumab or ravulizumab-cwvz.
  - People who might have been exposed to meningitis during an outbreak.

Case investigation

Reporting

All cases of invasive meningococcal disease are immediately reportable in Utah. This disease should be reported when suspected, not just when confirmed.

CSTE reporting criteria

Criterion	Reporting		
Clinical evidence			
Petechial rash	O		
Purpura	O	N	
Sepsis	N		
Death		N	
Healthcare record contains a diagnosis of meningococcal disease			S
Death certificate lists meningococcal disease as a cause of death or a significant condition contributing to death			S

Medical examiner case of person found dead with purulent exudate on meninges			S
Medical examiner case of person found dead with purpuric rash and/or hemorrhagic organs (particularly adrenals)			S
Laboratory evidence			
Isolation of *N. meningitidis* from a normally sterile site			S
Evidence of *N. meningitidis* DNA using a validated polymerase chain reaction (PCR) obtained from a specimen collected from a normally sterile site			S
N. meningitidis antigen identified by immunohistochemistry (IHC) on formalin-fixed tissue			S
N. meningitidis antigen identified in CSF by latex agglutination			S
Gram-negative diplococci from a normally sterile site			S

S = This criterion alone is sufficient to identify a case for reporting.
N = All "N" criteria in the same column are necessary to identify a case for reporting.
O = At least one of these "O" (optional) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to identify a case for reporting. (Optional criteria are alternatives, which means a single column will have either no O criteria; no column should have only one O.)

Case definition (2015)

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).

Probable

- Detection of *N. meningitidis* antigen
    - In formalin-fixed tissue by immunohistochemistry (IHC), or
    - In CSF by latex agglutination.

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 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.

Clinical criteria

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

Laboratory criteria

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

CSTE case classification criteria

	Case definition			
Criterion	Suspected		Probable	Confirmed
Clinical evidence				
Purpura fulminans	N			
Laboratory evidence				
Isolation of *N. meningitidis* from a normally sterile body site				S
Isolation of *N. meningitidis* from a purpuric lesion				S
Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site using a validated polymerase chain reaction (PCR) assay				S

Detection of *N. meningitidis* antigen in formalin-fixed tissue by immunohistochemistry (IHC)			S	
Detection of *N. meningitidis* antigen in CSF by latex agglutination			S	
Identification of Gram-negative diplococci in a specimen from a normally sterile body site		S		

Notes:

S = This criterion alone is sufficient to classify a case

N = All "N" criteria in the same column are necessary to classify a case

Case investigation process

- Confirm diagnosis (if a patient does not have a confirmed diagnosis, but the clinician determines that the disease was likely due to bacterial meningitis, it may be prudent to continue with chemoprophylaxis).
- Determine who is at risk. People thought to be at highest risk include household, childcare, and nursery school contacts. In addition, close contacts include people who have had contact with the patient's oral secretions, such as kissing, sharing toothbrushes, sharing utensils, sharing food (food that might have oral secretions, not just eating at the same table), and people who frequently ate or slept in the same dwelling as the patient. The patient is infectious during the following period of time:
    - From 7 days before the onset of disease UNTIL successful completion of 24 hours of antibiotics.
- Identify all close contacts to the patient that occurred during the above risk period.
- Notify DHHS.
- Ensure contacts are offered prophylaxis:
    - Ideally, this should occur within 24 hours after the case is identified.
    - Prophylaxis given more than 14 days after onset of illness in the index case is of limited or no value.
- All close contacts should be observed for 10 days following exposure. If any febrile illness develops, contacts should receive immediate medical attention.
- For patients on airline flights longer than 8 hours, passengers sitting directly next to the patient are candidates for prophylaxis.
- Unless health care workers provide mouth-to-mouth resuscitation or have unprotected contact during endotracheal intubation in the 7 days prior to onset of disease or after disease onset, but before 24 hours of antimicrobial therapy is completed, they are considered low risk.
- Consider starting enhanced surveillance for additional cases of illness.
- Ensure the organism is serogrouped. Contact the diagnosing laboratory and instruct the laboratory to send the specimen to the UPHL for serogroup testing.

- If more than 1 case is found:
    - Notify the DHHS vaccine preventable diseases epidemiologist and request assistance if needed.
    - Investigate for possible links between cases.
    - Determine if the outbreak is limited to an organization (e.g., childcare, school) or is community-wide.
    - Determine the target group for vaccination.
    - Consider enhanced surveillance or special case-finding methods.
- Ensure information essential to trend analysis is completely filled out before the investigation is closed. Examples of such information would be: onset date, was patient hospitalized, how long was patient hospitalized, did patient die, etc.

Outbreaks

- A meningococcal disease outbreak occurs when multiple cases of the same serogroup (type) happen in a population over a short time period.
- Outbreaks can occur in communities, schools, colleges, prisons, and other populations. Depending on the population size and specific circumstances, public health may declare an outbreak after just two cases.

Identifying case contacts

Case contacts are those who:

- Live in the same household (especially young children); this includes roommates.
- Share the same sleeping space (e.g., military barracks or dorm rooms) in the 7 days prior to illness onset and until 24 hours after initiation of appropriate antibiotic.
- Contacts at daycare or nursery in the 7 days prior to illness onset and until 24 hours after initiation of appropriate antibiotic.
- Any intimate contact of case in the 7 days prior to illness onset and until 24 hours after initiation of appropriate antibiotic.
- Close social contacts (through kissing, sharing water bottles, cutlery, or very close friends) who had contact with the case in the 7 days prior to illness onset and until 24 hours after initiation of appropriate antibiotic.
- Travelers who had direct contact with respiratory secretions of a case or who were seated directly next to a case on a prolonged flight (lasting ≥8 hours).

Isolation and quarantine requirements

Isolation: Patients should be on respiratory isolation until 24 hours after starting antibiotic therapy.

Hospital: Patients should be on respiratory isolation until 24 hours after starting antibiotic therapy.

Quarantine: Not applicable.

Case contact management

Those who meet the criteria of a case contact should have:

- Prophylactic antibiotics
    - Throat or nasopharyngeal cultures are of no value in determining who should receive prophylaxis.
- Fever surveillance
    - Initiate appropriate antibiotic therapy for individuals with preliminary signs of disease.

Infection control recommendations for healthcare personnel

Healthcare-associated transmission of *N*. *meningitidis* is uncommon. In rare instances, *N. meningitidis* has been transmitted from patients to healthcare personnel (HCP) through contact with the respiratory secretions of patients with meningococcal disease and handling isolates of *N. meningitidis*.

Transmission prevention of *N. meningitidis* in healthcare settings involves:

- In addition to standard precautions, place patients with known or suspected meningococcal disease in droplet precautions;
- Rapid diagnosis and treatment of patients with clinical infection;
- Appropriate administration of postexposure prophylaxis (PEP) to persons exposed to *N. meningitidis*; and
- Exclude potentially infectious HCP from work.

Guidelines for meningococcal vaccination of certain HCP are maintained by the Advisory Committee of Immunization Practices (ACIP) and described in Immunization of health-care personnel: recommendations of the ACIP. Vaccination is recommended for HCP who are employed as microbiologists and are exposed routinely to isolates of *N. meningitidis.*

- Administer antimicrobial prophylaxis to healthcare personnel, regardless of vaccination status, who have an unprotected exposure to *N. meningitidis*
    - Unprotected is defined as exposure to patient secretions (e.g., mouth-to-mouth resuscitation, endotracheal intubation, endotracheal tube management) in the 7 days prior to illness onset or after illness onset but before patient received 24 hours of appropriate antibiotic therapy.
- Exclude healthcare personnel with invasive *N. meningitidis* disease from work until 24 hours after the start of effective antimicrobial therapy.
- Work restrictions are not necessary for healthcare personnel who only have nasopharyngeal carriage of *N. meningitidis*.

N. meningitidis can be transmitted person-to-person through unprotected direct contact with the respiratory secretions or saliva of a person with clinical disease, such as meningitis or bacteremia. Exposures in healthcare may include mucous membrane contact with infectious secretions from close, face-to-face contact during activities such as mouth-to-mouth resuscitation, endotracheal tube placement or management, or open airway suctioning while not wearing or correctly using recommended personal protective equipment.

Brief, non-face-to-face contact, such as standing in the doorway of a patient's room, cleaning a patient's room, delivering a medication or food tray, starting an IV, or performing a routine physical exam, is generally not considered an exposure. Unprotected direct contact with the respiratory secretions or saliva of a person colonized with *N. meningitidis*, without clinical disease, is not considered an exposure.

Exposures to *N. meningitidis* in laboratory settings are described in Biosafety in microbiological and biomedical laboratories (BMBL), 6th edition.

In the setting of a healthcare facility meningococcal disease outbreak, meningococcal vaccination or use of chemoprophylaxis in a wider group than exposed HCP may be considered in consultation with public health officials.

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Version control

V.08.15: Updated format of document. Updated case definition, current immunization information, added new Utah-specific data, and updated references and content.

V.08.19:: Added Critical Clinician Information and Rules for Entering Laboratory Test Results section.

V.03.22: Added Infection Control Recommendations for Healthcare Personnel.

V.04.22: Updated UT-NEDSS Minimum Required Fields by Tab.

V.06.22: Updated formatting and writing style to match new departmental guidelines. Updated references to conform to APA 7th edition citation style

UT-NEDSS minimum/required fields by tab

Demographic

- Birth sex
- Address at diagnosis county
- Birth date
- Ethnicity
- First name
- Last name
- Race
- Ethnicity
- Address at diagnosis state

Clinical

- Date of diagnosis
- Died
- Date of death
- Onset date
- Signs and symptoms
- Syndrome:
- Was the patient taking eculizumab/Soliris at the time of disease onset?
- Documented or self-reported HIV status at the time of event
- Was the patient homeless at time of symptom onset?
- Has the patient ever been vaccinated against meningococcus?
    - Date of vaccine?
    - What type of vaccine?

Laboratory

- Organism
- Specimen source
- Collection date
- Test result
- Test type
- Serogroup

Epidemiological

- Daycare association
- Is patient (15–24 years only) currently attending college?
- Is this case epi-linked to anyone?

Investigation

No required fields

Contacts

No required fields

Reporting

- First reported to public health date

Administrative

- Outbreak associated
- Outbreak name
- State case status
- Outbreak associated

Rules for entering test results

The following rules describe how laboratory results reported to public health should be added to new or existing events in UT-NEDSS. These rules have been developed for the automated processing of electronic laboratory reports, although they also apply to manual data entry.

Test-specific rules

Test specific rules describe what test type and test result combinations are allowed to create new morbidity events in UT-NEDSS, and what test type and test result combinations are allowed to update existing events (morbidity or contact) in UT-NEDSS.

Test type	Test result	Create a new event	Update an existing event
Culture	Equivocal/other	Yes	Yes
	Positive	Yes	Yes
	Negative	No	Yes
PCR/amplification	Equivocal/other	Yes	Yes
	Positive	Yes	Yes
	Negative	No	Yes
Typing/identification	Equivocal/other	Yes	Yes
	Positive	Yes	Yes
	Negative	No	Yes

Whitelist rules

Whitelist rules describe how long an existing event can have new laboratory data appended to it. If a laboratory result falls outside the whitelist rules for an existing event, it should not be added to that event, and should be evaluated to determine if a new event (CMR) should be created.

Meningococcal disease (*Neisseria meningitidis*) morbidity whitelist rule: If the specimen collection date of the laboratory result is 60 days or less after the event date of the morbidity event, the laboratory result should be added to the morbidity event.

Meningococcal disease (*Neisseria meningitidis*) contact whitelist rule: If the specimen collection date of the laboratory result is 30 days or less after the event date of the contact event, the laboratory result should be added to the contact event.

Graylist rule

We often receive laboratory results through ELR that cannot create cases, but can be useful if a case is created in the future. These laboratory results go to the graylist. The graylist rule describes how long an existing event can have an old laboratory result appended to it.

Meningococcal disease (*Neisseria meningitidis*) graylist rule: If the specimen collection date of the laboratory result is 30 days before to 7 days after the event date of the morbidity event, the laboratory result should be added to the morbidity event.

Other electronic laboratory processing rules

If an existing event has a state case status of "not a case," ELR will never add additional test results to that case. New labs will be evaluated to determine if a new CMR should be created.