Meningococcal Disease Information and Investigation Guidelines

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1.) Disease Description

Meningococcal disease usually presents clinically as one of three syndromes: meningitis, meningococcemia (meningococcal septicemia), or bacteremic pneumonia. The two most common presentations are meningococcal meningitis accounting for around 50% of cases, and meningococcemia accounting for approximately 37% of cases. Meningococcal meningitis is an inflammation of the meninges, the tissue that covers the brain and spinal cord. Meningococcemia is an extremely severe, invasive infection of the blood stream. These disease presentations may occur independently or at the same time depending on the location of the bacteria in the body.

2.) Infectious Agent

Meningitis can be caused by many different organisms, including bacteria, viruses, parasites, and fungi. Bacterial meningitis is generally more severe than viral meningitis. The term "meningococcal disease" refers only to disease caused by the bacteria *Neisseria meningitidis*; an aerobic, gram-negative, diplococcus. There are 13 serogroups of *N. meningitidis*. Serogroups A, B, C, W, X, and Y account for nearly all cases of invasive disease worldwide. In the United States, serogroups B, C, and Y together account for over 90% of cases. The proportion of cases caused by each serogroup varies by age group. Serogroup B causes approximately 60% of cases among children less than 5 years old. Serogroups C, Y, and W, which are covered by meningococcal conjugate vaccines, cause approximately two out of three cases of meningococcal disease among persons 11 years old and older.

3.) Symptoms

Meningococcal disease signs and symptoms can include high fever, headache, stiff neck, photophobia, nausea/vomiting, hypotension, weakness, confusion, shock, and coma. A petechial rash and/or purpura fulminans (systemic peripheral gangrene) may be observed in cases of meningococcemia. The rash develops rapidly and usually appears around the armpits, groin, and ankles. The rash may have macules or vesicles and is non-blanching (does not fade when direct pressure is applied). Symptoms in infants may be difficult to notice or present differently from older children and adults. Fever, irritability, lethargy, vomiting, and refusing foods can all be symptoms of meningococcal disease in infants. Once clinical disease presents, symptoms may develop rapidly within a few hours, or over the course of 1-2 days.

4.) Incubation Period

The time from exposure to the development of clinical symptoms can range from 2-10 days, usually 3-4 days. The vast majority of individuals who come into contact with the *N. meningitidis* bacteria will not develop meningococcal disease.

5.) Incidence

Rates of meningococcal disease have been declining in the United States since the late 1990s. In 2019, there were approximately 371 total cases of meningococcal disease reported (rate of 0.11 cases per 100,000 population) in the United States. Meningococcal disease is seasonal. The occurrence of meningococcal disease is highest during the winter and spring with the number of cases generally peaking each year in January through March. The incidence of meningococcal disease from 2010 to 2019 is highest among infants and children under 5 years, adolescents and young adults aged 16-23 years, and adults 80 years and older. Rates of disease tend to decrease after infancy then increase during adolescence and young adulthood.

6.) Transmission

The bacteria that causes meningococcal disease is contagious and spread from respiratory and nasopharyngeal secretions. Humans are the only reservoir. Fortunately, *N. meningitidis* bacteria are not as contagious as other respiratory pathogens such as rhinovirus (the common cold) and influenza virus. Most people exposed to *N. meningitidis* will not develop illness. Around 5-10% of the population are asymptomatic nasopharyngeal carriers. Transmission of the bacteria on objects is generally not significant, although attention should be paid in daycares and other settings where children may place toys or other objects in their mouths. Casual contact is usually not enough to spread the bacteria to other individuals. Close, prolonged, or direct contact with oral or nasal secretions is generally necessary for transmission. Types of close contact include kissing, sharing eating or drinking utensils, sharing cigarettes, performing CPR with breathing techniques, etc.

7.) Communicability

Infection may be spread as long as there are live bacteria in nasal and throat secretions. A person is usually considered infectious 7 days prior to meningococcal symptom onset until 24 hours after appropriate antibiotic therapy is started. Bacteria are generally no longer present in the nasopharyngeal tract after 24 hours of appropriate antibiotic therapy. Hospitalized cases should be placed under droplet precautions until at least 24 hours of appropriate treatment has been completed.

8.) Groups with Increased Risk for Disease

- Household contacts of meningococcal disease case patients and people with direct contact to case patient's oral and nasal secretions
- Infants
- People with active or passive exposure to smoking
- People with concurrent or recent viral infections
- People in crowded living situations such as multiple families living in a single unit, homeless shelters, or refugee camps
- People in group living situations, such as a college dormitory or fraternity/sorority, or military barracks
- Men who have sex with men

- People with persistent complement component deficiencies
- People who use complement inhibitors such as eculizumab (Soliris®) and ravulizumab (Ultomiris®)
- People with immune deficiencies including HIV infection, those on medications that suppress immune function, or patients with anatomic or functional asplenia
- Travelers to areas with high levels of endemic or epidemic meningococcal disease
- People with exposure to a community or organizational setting where an outbreak of meningococcal disease is occurring
- Microbiologists or laboratorians who work with the *N. meningitidis* bacteria

9.) Severity

Nearly all untreated cases of meningococcal disease result in death. Despite the susceptibility of the *N. meningitidis* bacteria to many common antibiotics, even with treatment ~10-15% of cases are fatal. Among those who survive infection, approximately 1 in 5 will have long-term adverse effects (e.g., brain damage, hearing loss, loss of limb use, nervous system problems, etc.)

10.) Diagnosis

Once a diagnosis of meningococcal infection is suspected, treatment should not be delayed for laboratory confirmation. Cerebrospinal fluid (CSF) from a lumbar puncture (LP or spinal tap) in conjunction with a blood draw are the primary specimens used to diagnose meningococcal disease. Unless contraindicated, a lumbar puncture and blood sample should be taken immediately prior, or concurrently to starting antibiotic therapy. CSF and blood PCR/cultures should be initiated as soon as possible to attempt to identify the infectious agent. Gram stains should immediately be done in effort to visualize the gram-negative diplococci bacteria.

In the event an LP is delayed, a blood specimen should be drawn immediately prior or concurrent to administration of antibiotic therapy and before a CT scan is performed. The administration of antibiotics prior to collecting clinical samples may result in no culture growth, but other clinical and laboratory evidence may still be used to determine the likely cause of disease. CSF from a bacterial meningitis case may appear cloudy or milky, have increased protein, have increased pressure, have decreased glucose, and a high number of white blood cells with neutrophils usually predominating. PCR and latex agglutination may also be of use in cases suspected to be culture-negative due to the prior administration of antibiotics.

Blood, CSF, or other sterile site isolates are required to be submitted to the Michigan Department of Health and Human Services (MDHHS) Bureau of Laboratories (BoL) for serogrouping from every case of meningococcal disease diagnosed in Michigan. Additional information can be found at: http://www.michigan.gov/mdhhslab

11.) Case Definition

MDHHS uses the Centers for Disease Control and Prevention (CDC) case definition for meningococcal disease developed by the Council of State and Territorial Epidemiologists (CSTE). Normally sterile sites include CSF, blood, joint fluid, pleural fluid, and pericardial fluid. Isolation of the bacteria from a purpuric lesion is also considered confirmatory. Isolation of the bacteria from non-sterile sites such as urine, sputum, or nasopharyngeal samples does not meet the case definition for meningococcal disease. Approximately 5-10% of the population asymptomatically carries *N. meningitidis* in their noses and throats; nasopharyngeal colonization is not considered invasive disease. Carriage is generally transient and usually resolves within several weeks.

Confirmed*:*

- Isolation of *Neisseria meningitidis* from a normally sterile body site or from purpuric lesions; or
- 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

Probable*:*

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

Suspect*:*

- 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

12.) Case Treatment

Appropriate antibiotic therapy should be started as soon as possible. For meningococcal disease, treatment with cefotaxime, ceftriaxone, penicillin G, or ampicillin is recommended depending on patient age and bacterial susceptibility. The normal duration of therapy for bacterial meningitis caused by *N. meningitidis* is at least 7 days, depending on the patient's clinical response. If an antimicrobial other than cefotaxime or ceftriaxone is used for treatment, then rifampin, ciprofloxacin or ceftriaxone are recommended prior to hospital discharge in order to eradicate nasopharyngeal carriage.

13.) Contact Prophylaxis

Recommended chemoprophylaxis for Close Contacts (see Table 1)

Antibiotic prophylaxis (chemoprophylaxis) is recommended for close contacts who have had direct contact with the case patient during the 7 days prior to illness onset and up to 24 hours after appropriate antibiotic therapy was started. Prophylaxis for contacts should ideally be started within 24 hours of the case patient's diagnosis (clinical or laboratory). Prophylaxis administered greater than 14 days after last exposure to the case while infectious is not considered beneficial. The risk of secondary disease among close contacts is highest during the first few days after onset, which is why immediate prophylaxis is recommended. Generally, prophylaxis is not necessary for casual contacts in classrooms or work environments, or for emergency response professionals who have used standard precautions. Due to the rate of asymptomatic carriage of *N. meningitidis*, nasal swab screening is not considered useful in determining the need for prophylaxis or treatment. All contacts should be advised to monitor for the development of symptoms consistent with meningococcal disease, particularly fevers, rashes, and severe headache. Signs and symptoms will generally present within 2 weeks, but a small risk of disease may persist for up to 2 months. Chemoprophylaxis is recommended for all close contacts, even those who have received meningococcal immunization(s) in the past.

13.1) Close Contact Examples:

- Household members or anyone who has slept in the same household as the case-patient
- Daycare or childcare contacts, includes staff and attendees
- People who have had direct contact with oral or nasal secretions from the case-patient
- People who have shared food, beverage, toothbrush, eating utensils, or cigarettes with the case-patient
- Individuals who have provided direct patient care for 4 or more hours during the infectious period
- Medical personnel who have had direct, unprotected contact with oral or nasal secretions such as performing CPR with airway support or intubation
- Anyone seated directly next to a case on a prolonged airline flight or other mode of transportation (≥ 8 hours)

13.2) Persons/Settings to Consider and Evaluate for Contact Follow-up and Prophylaxis:

- Family / friends
- Roommates / housemates
- Boyfriend / girlfriend / intimate partners
- Places of employment
- School (close friends of older children, generally not the entire classroom)
- Daycare (in home and facility)
- Before or after school care programs
- Social gatherings (particularly parties where drinking and sharing of cigarettes or other drugs may have occurred)

- Extracurricular activities and sports events
- Church / places of worship attendance and social groups
- Hospital and emergency medical personnel
- Seat mates with extended contact (≥ 8 hours) on transportation (plane, bus, etc.)

13.3) Meningococcal pneumonia

Currently, in the United States, there are no definitive guidelines regarding prophylaxis for close contacts exposed to a meningococcal pneumonia case. Prophylaxis should be given to close contacts of a meningococcal pneumonia case with invasive disease where *N. meningitidis* is isolated from a sterile site (blood, CSF, joint, etc.) The recommendations are less clear when a case has clinically compatible disease, but *N. meningitidis* is isolated from only a sputum specimen. High rates of asymptomatic carriage in the nasopharyngeal tract make it difficult to determine whether the illness, in the absence of sterile site cultures, is truly due to *N. meningitidis*. Transmission of *N. meningitidis* due to meningococcal pneumonia appears to be rare. However, with the absence of CDC or clinical practice standard guidelines, in cases of suspected meningococcal pneumonia without clear evidence of invasive disease, physicians and public health professionals should use their best judgment when deciding whether the chemoprophylaxis of close contacts is appropriate.

14.) Disease Prevention

There are several ways to reduce the risk of meningococcal disease including: the use of meningococcal vaccine for appropriate groups; not sharing drinking glasses, water bottles, eating utensils, cigarettes, cosmetics or balms for the lips; stop smoking/avoid exposing children to second-hand smoke; and avoiding contact with oral and nasal secretions of ill individuals. Frequent hand washing should be encouraged. Staying up to date on recommended vaccinations for other respiratory diseases such as influenza and pneumococcal disease may also provide some degree of protection.

14.1) Meningococcal Vaccines

Five meningococcal vaccines are available in the U.S. against *N. meningitidis:* two quadrivalent vaccines effective against serogroups A, C, W, and Y (Menveo® and MenQuadfi®); two recombinant vaccines specific for *N. meningitidis* serogroup B (Trumenba® and Bexsero®); and one pentavalent vaccine that covers all five serogroups (Penbraya™).

Meningococcal Serogroup ACWY Vaccines

- **Menveo®** (MenACWY-CRM)- Meningococcal conjugate vaccine, licensed in 2010
  - effective against *N. meningitidis* serogroups A, C, W, and Y
  - approved for use in people ages 2-55 years old as a single dose
  - in children initiating vaccination at 2 months, licensed as a four-dose series
  - in children initiating vaccination at 7-23 months, licensed as a two-dose series

- **MenQuadfi®** (MenACWY-TT)- Meningococcal conjugate vaccine, licensed in 2020

- effective against *N. meningitidis* serogroups A, C, W, and Y
- approved for use in people ages 2 years and older as a single dose

Meningococcal Serogroup B Vaccines

- **Trumenba®** (MenB-FHbp)- Meningococcal recombinant vaccine, licensed in 2014
  - effective against *N. meningitidis* serogroup B
  - approved for use in people 10- 25 years of age as a two or three-dose series, depending on time between doses
- **Bexsero®** (MenB-4C)- Meningococcal recombinant vaccine, licensed in 2015
  - effective against *N. meningitidis* serogroup B
  - approved for use in people 10- 23 years of age as a two-dose or three-dose series, depending on if the person is at an increased risk for serogroup B meningococcal disease

Meningococcal Serogroup ABCWY Vaccine

- **Penbraya™** (MenACWY-TT/MenB-FHbp)- Meningococcal conjugate vaccine, licensed in 2023
  - effective against *N. meningitidis* serogroups A, B, C, W, and Y
  - approved for use in healthy people 16-23 years of age as a two-dose series only when MenACWY and MenB are being received at the same visit

14.2) Advisory Committee on Immunization Practices (ACIP) Meningococcal Vaccine Guidelines

For the most current vaccination recommendations, visit: ACIP Recommendations: Meningococcal Vaccine | ACIP Recommendations | CDC

Individuals Recommended to be Vaccinated for Meningococcal Disease with MenACWY Vaccine:

- Routine vaccination for adolescents aged 11 or 12 years, with a booster dose at age 16 years
- Routine vaccination of persons aged ≥2 months at increased risk for meningococcal disease (dosing schedule varies by age and indication, and interval for booster dose varies by age at time of previous vaccination)
- Persons with certain medical conditions including anatomic or functional asplenia, complement component deficiencies (e.g., C3, C5-C9, properdin, factor H, or factor D), complement inhibitor (e.g., eculizumab [Soliris] or ravulizumab [Ultomiris]) use, or human immunodeficiency virus infection
- Microbiologists with routine exposure to *Neisseria meningitidis* isolates
- Persons at increased risk during an outbreak (e.g., in community or organizational settings, and among men who have sex with men [MSM])

- Persons who travel to or live in countries in which meningococcal disease is hyperendemic or epidemic
- Unvaccinated or undervaccinated first-year college students living in residence halls
- Military recruits
- Booster doses for previously vaccinated persons who become or remain at increased risk

Routine MenACWY Vaccination of Children and Adults (See Table 2)

Current meningococcal ACIP guidelines recommend routine vaccination with one of the meningococcal conjugate vaccines, Menveo®, or MenQuadfi® at age 11 or 12 years with a booster dose at age 16 years. Children who receive MenACWY before age 10 years and with no ongoing risk for meningococcal disease for which boosters are recommended should still receive MenACWY according to the recommended adolescent schedule, with the first dose at age 11–12 years and a booster dose at age 16 years. Adolescents who receive their first dose of meningococcal vaccine at age 13-15 years should receive a single booster dose between the ages of 16-18 years with at least 8 weeks between primary and booster doses. Individuals who receive their first dose of vaccine on or after age 16 do not need a booster dose, unless they become at increased risk for meningococcal disease. Individuals aged 19-21 years may receive a single MenACWY dose as part of catch-up vaccination for those who have not received a dose after their 16th birthday. Both MenACWY vaccines are interchangeable; the same product is recommended but not required for all doses. Routine vaccination of healthy individuals who are not at increased risk for meningococcal disease is not recommended for children aged 2 months-10 years or after age 21 years.

Individuals Recommended to be Vaccinated for Meningococcal Disease with MenB Vaccine:

Routine vaccination of persons aged ≥10 years at increased risk for meningococcal disease (dosing schedule varies by vaccine brand; boosters should be administered at 1 year after primary series completion, then every 2–3 years thereafter). Those at increased risk include:

- Persons with certain medical conditions, such as anatomic or functional asplenia, complement component deficiencies, or complement inhibitor use including individuals taking eculizumab (Soliris®) or ravulizumab (Ultomiris®)
- Microbiologists with routine exposure to *N. meningitidis* isolates
- Persons at increased risk during an outbreak (e.g., in community or organizational settings, and among MSM)
- Vaccination of adolescents and young adults aged 16–23 years with a 2-dose MenB series on the basis of shared clinical decision-making. The preferred age for MenB vaccination is 16–18 years. Booster doses are not recommended unless the person becomes at increased risk for meningococcal disease
- Booster doses for previously vaccinated persons who become or remain at increased risk

Routine MenB Vaccination of Children and Adults (See Table 2)

MenB vaccination with Trumenba® or Bexsero® is not routinely recommended for all adolescents. However, a MenB vaccine series may be administered to individuals aged 16-23 years-old to provide short term protection against serogroup B meningococcal disease. Current CDC and ACIP guidelines recommend a MenB series for persons aged 16–23 years (preferred age 16–18 years) on the basis of shared clinical decision-making between the provider and patient (or parent/guardian). Considerations for this decision include the seriousness of meningococcal infections and high rates of death and permanent sequalae from invasive disease; the low number of MenB cases in the United States; increased risk among college students; the protection provided by MenB vaccines against most serogroup B strains; the short duration of MenB protection from vaccination (antibody waning within 1-2 years of primary series); evidence to-date showing no effect on meningococcal carriage. Serogroup B vaccination is not currently routinely recommended for incoming college students unless there is a meningococcal disease outbreak at the institution.

In October 2014, the FDA licensed Trumenba® for use in people 10–25 years of age, currently as a two or three-dose series, depending on underlying health condition. In January 2015, the FDA licensed Bexsero® for use in people 10–25 years of age as a two-dose series. In October 2024, the ACIP updated its recommendations for Bexsero® to align more with Trumenba® as a two or three-dose series, with underlying health conditions being the determinant.The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses in a series. If an individual decides to switch products, it is recommended that they wait at least 1 month between products and receive the full series of their second vaccine. Based on current data, MenB vaccines may be administered at the same time as other age- appropriate vaccinations, but should be injected into a separate anatomic site, if possible. The safety of MenB vaccines in pregnant or lactating women has not been established. MenB vaccination should be deferred in pregnant or lactating women unless the woman is at increased risk of meningococcal disease and her health care provider has determined the benefit of vaccination outweighs the potential risks.

MenACWY and MenB Vaccination Recommendations for Special Populations and Persons at Increased Risk (See Tables 3-11) Including:

- *Persons with persistent complement component deficiencies (C3, C5-9, properdin, factor D, and factor H), or individuals using a complement inhibitor, including eculizumab (Soliris®) or ravulizumab (Ultomiris®)*
- *Persons with anatomic or functional asplenia, including those with sickle cell disease*
- *Persons with Human Immunodeficiency Vir*us infection
- *Microbiologists routinely exposed to N. meningitidis*
- *Persons exposed during an outbreak of meningococcal disease due to a vaccine-preventable serogroup*
- *Persons who travel or reside in countries where meningococcal disease is hyperendemic or epidemic (sub-Saharan Africa during December-June; Mecca, Saudi Arabia during Hajj; other countries with epidemic travel advisories).*
- *College freshmen (first-year) students living in residence halls*
- *Military recruits*

Recommendations for use of Penbraya™ (MenACWY-TT/MenB-FHbp) (see Table 12)

Penbraya™ may be used when both MenACWY and MenB vaccination are indicated at the same visit for 1) healthy persons aged 16–23 years (routine schedule) when shared clinical decision-making favors administration of MenB vaccine and 2) persons aged ≥10 years who are at increased risk for meningococcal disease (e.g., because of persistent complement deficiencies, complement inhibitor use, or functional or anatomic asplenia).

Different manufacturer's serogroup B-containing vaccines are not interchangeable like the ACWY conjugate vaccines. **Penbraya™** includes Trumenba® (MenB-FHbp) for serogroup B coverage. For subsequent doses after **Penbraya™** , administer any MenACWY vaccine when MenB isn't indicated. Only administer Trumenba® for additional MenB dose(s) when MenACWY isn't indicated.

The licensed dosing interval for **Penbraya™** is 6 months apart. Healthy young adults (16-23) who receive 1 dose of **Penbraya™** based on shared clinical decision-making should complete the MenB series 6 months later.

14.4 Vaccination Contraindications and Adverse Events

Meningococcal vaccine is contraindicated in individuals who have had a severe (life-threatening) allergic reaction to previously administered meningococcal vaccine or any other vaccine component. People who have ever had Guillain-Barré Syndrome (GBS) should consult with their doctor prior to getting vaccinated, but GBS is no longer considered a contraindication or precaution to vaccination. Individuals who are moderately or severely ill should wait until they are recovered to receive meningococcal vaccine; those with mild illness can usually be vaccinated.

Most people will have no adverse effects from meningococcal vaccine. Some individuals will develop mild redness or pain at the injection site or a low-grade fever. These side effects generally resolve after 1-2 days. Serious allergic reactions to the meningococcal vaccines are rare. Adverse events occurring after administration of any vaccine should be reported to the Vaccine Adverse Event Reporting System (VAERS): http://vaers.hhs.gov.

14.5 Vaccination Standing Orders

Standing orders for the administration of meningococcal vaccine can be found on the formerly Immunization Action Coalition's website at www.immunize.org. Specific links to the standing orders documents can be found below.

Standing Orders for Administering Meningococcal Vaccine (ACWY) to Children & Teens
http://www.immunize.org/catg.d/p3081a.pdf

Standing Orders for Administering Meningococcal Vaccine (ACWY) to Adults
http://www.immunize.org/catg.d/p3081.pdf

Standing Orders for Administering Meningococcal B Vaccine to Adolescents and Adults
http://www.immunize.org/catg.d/p3095.pdf

Proper vaccine storage and handling guidance for meningococcal vaccines can be found at: http://www.immunize.org/packageinserts/pi_meningococcal.asp and http://www.immunize.org/packageinserts/pi_meningococcal_b.asp

15.) Surveillance for Outbreaks

In the U.S., only about 1 in 20 cases are related to outbreaks. In order to ascertain whether an outbreak is occurring, clinical samples must be collected to determine the serogroup of *N. meningitidis* causing disease and, if warranted, to conduct whole genome sequencing (WGS). Outbreaks will be caused by a single serogroup and are generally very closely related strains.

A meningococcal disease outbreak occurs when multiple cases of the same serogroup happen in a defined 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, health officials may declare an outbreak after just two related cases. General guidelines to assist in determining whether an outbreak is occurring differ by setting and population. In an organization, this may include 2-3 outbreak-associated cases within 3-month period. In some situations, such as an outbreak in a large university (>20,000 undergraduate students) where no identifiable subgroup at risk within the population can be identified, it may be reasonable to declare an outbreak after 3 cases. In a community setting, this may include multiple outbreak-associated cases with an incidence of meningococcal disease that is above the expected community incidence during a 3-month period. Each suspected outbreak should be assessed on a case-by-case basis.

Please contact the MDHHS Communicable Disease Division immediately at 517-335-8165 if you suspect an outbreak of meningococcal disease. Antimicrobial chemoprophylaxis of close contacts of a patient with meningococcal disease is important to prevent secondary cases, regardless of whether a meningococcal outbreak is suspected. The use of MenACWY or MenB vaccine may be considered for broader prophylaxis efforts in outbreak situations. A defined population must be determined and consultation with the local and state health departments should occur prior to undertaking prophylactic vaccination efforts. In situations where ongoing transmission is unlikely (e.g., cases are limited to household members, roommates, or boyfriend/girlfriend), a vaccination campaign is not necessarily indicated as long as antimicrobial chemoprophylaxis of close contacts is implemented to prevent further transmission. Because up to 5-10% of people carry *N. meningitidis* asymptomatically in their nasopharynx, screening with nasopharyngeal swabs of asymptomatic individuals is not recommended in routine case contact investigations or outbreak settings. Only a small percentage (<1%) of asymptomatic carriers will go on to develop invasive disease.

When an outbreak is suspected, healthcare providers and laboratories should be alerted and encouraged to remain vigilant for patients with symptoms suggestive of meningococcal disease. Clinical and commercial laboratories should be instructed to submit to the MDHHS BoL all *N. meningitidis* isolates recovered from normally sterile body sites, or clinical specimens in absence of isolate in order to rapidly confirm, serogroup, and refer the sample for molecular typing.

Expanded antimicrobial chemoprophylaxis can be administered to a wider circle of individuals than those identified as close contacts of a case. It is not usually recommended as a standalone measure to control outbreaks, however it may be considered in some organization-based outbreaks, such as within a limited population or where persons/groups at increased risk can be clearly defined (e.g., jail, childcare centers, residential facilities, smaller primary or secondary schools, or defined social networks in larger populations such as university fraternities, sororities, or sports teams). Expanded chemoprophylaxis can be used as an interim measure to temporarily reduce carriage and transmission prior to protection via vaccination. If used, expanded chemoprophylaxis should be initiated as soon as possible following outbreak determination.

16.) Investigation Roles and Responsibilities

16.1) Physicians and Infection Control:

- Report any suspect or confirmed meningococcal case as soon as possible, and within 24 hours, to the local health department jurisdiction where the case patient resides.
- Administer chemoprophylaxis to exposed on-site heath care workers and emergency personnel (e.g., EMTs or paramedics).
- Confirm your laboratory will submit the mandatory sterile site isolates, if available, to the Michigan Department of Health and Human Services Bureau of Laboratories (MDHHS BOL) for *N. meningitidis* serogroup typing. Instructions for sample submission can be found at: http://www.michigan.gov/documents/LSGNeisseria_Referred_Cultures_8258_7.doc
- Ensure terminal prophylaxis to eliminate nasopharyngeal carriage of *N. meningitidis* in case patient prior to discharge. Third generation cephalosporins (ceftriaxone or cefotaxime) or ciprofloxacin are effective.
- From 2019-2020, 11 meningococcal isolates with mutations associated with ciprofloxacin resistance were reported in the U.S. While widespread resistance does not appear to be a concern at this time, physicians should report any suspected chemoprophylaxis failures as soon as possible to the local health department.

16.2) Local Health Departments:

- Begin follow-up case investigation as soon as possible and within 24 hours of case notification.
- Enter the meningococcal disease case into MDSS as soon as possible and within 24 hours of first report from the physician or laboratory. Use the Meningococcal Disease case report form.
- Conduct case investigation and interview of case-patient, parents, or others able to provide close contact information. For adolescent and young adults, friends may be a good source of information as parents may not be aware of all direct contacts.
- Identify close contacts and recommend appropriate prophylaxis, the goal should be to identify all close contacts within 24 hours of case report.
- Advise close contacts to visit their health care provider to receive chemoprophylaxis. Help arrange chemoprophylaxis, as needed, for those without health care access.
- Communicate with providers to ensure appropriate prophylaxis of on-site health care contacts and any other emergency personnel (e.g., EMTs or paramedics) involved in the case was completed.
- Confirm that a sterile-site culture isolate from the hospital lab, if available, has been sent to the MDHHS laboratory for serogroup typing.
- Provide education on signs and symptoms of meningococcal disease to potentially exposed individuals. Symptoms generally develop within 14 days.
- As needed, provide templates of informational letters for parents of school or daycare contacts, or letters for college or workplace settings.
- Update the MDSS record at least daily with the investigation status and details.

16.3) Michigan Department of Health and Human Services:

- Provide consultation and recommendations on case investigation and prophylaxis, as needed, to healthcare providers and the local health departments.
- Review cases of meningococcal disease submitted to the MDSS.
- Verify cases meet appropriate case definition guidelines.
- Maintain and enhance statewide surveillance data.
- Maintain serogroup surveillance data from specimens tested at the MDHHS Lab.
- Assist in multi-county investigations as requested by the local health departments.
- Route out-of-state cases to appropriate jurisdictions.
- Assist in the determination of sporadic vs. outbreak situations.
- Consult with the MDHHS laboratory and request WGS, when appropriate, for suspected outbreaks.
- Consult on the role of vaccination for control measures in an outbreak.
- Report statewide serotyping information to CDC, as requested.

17.) Table Index

Table 1: Recommended chemoprophylaxis regimens for high-risk contacts of person with invasive meningococcal disease

Drug	Age	Dose	Duration	Efficacy (%)	Cautions
Rifampin	<1 month	5 mg/kg, orally, every 12 hours	2 days		Discussion with an expert for infants <1 month
	≥1 month	10 mg/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 ≥15 years	125 mg, intramuscularly 250 mg, intramuscularly	Single dose Single dose	90-95 90-95	To decrease pain at injection site, dilute with 1% lidocaine
Ciprofloxacin*	≥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 one study

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

Table adapted from: 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.

Table 2: Summary of ACIP Meningococcal Routine Vaccine Recommendations				
Vaccine Type	**Age Group**	**Risk Group**	**Primary Vaccination**	**Booster Dose**
MenACWY	11 – 21 years old	**Normal health**	Menveo®, or MenQuadfi®: At age 11-12 years: 1 dose At age 13-18 years: 1 dose, if not vaccinated previously At age 19-21 years: not routinely recommended, but 1 dose may be administered as a catch-up vaccination for those who have not received a dose after their 16th birthday **Note**: MenACWY vaccines are interchangeable	One booster dose recommended if first dose administered before 16th birthday No booster if primary dose given on or after age 16 years, unless the person becomes at increased risk for meningococcal disease
MenB	16 – 23 years old	**Normal health**	Trumenba® or Bexsero® At age 16-23 years on basis of shared clinical decision-making (preferred age 16–18 years): • 2 doses at 0 and 6 months **Note**: MenB vaccines are <u>not</u> interchangeable	Not routinely recommended unless the person becomes at increased risk for meningococcal disease
Note: For those aged 2 months-10 years or ≥ 24 years; vaccination is not routinely recommended. See Tables 3-12 below for recommendations regarding individuals with an increased risk of disease.				
Table adapted from: Meningococcal Vaccination: Recommendations of the Advisory Committee on Immunization Practices, United States, 2020. MMWR Recomm Rep 2020;69(No. RR-9):1-41				

Table 3: Recommended meningococcal vaccines for person at increased risk for meningococcal disease			
Risk Group	**MenACWY**	**MenB Vaccine**	**Table**
Persons with complement component deficiency (e.g., C5–C9, properdin, factor H, or factor D), including patients using a complement inhibitor	Aged ≥2 months	Aged ≥10 years	4
Persons with functional or anatomic asplenia (including sickle cell disease)	Aged ≥2 months	Aged ≥10 years	5
Persons with HIV infection	Aged ≥2 months	No recommendation	6
Microbiologists routinely exposed to *Neisseria meningitidis*	Age appropriate*	Age appropriate†	7
Persons exposed during an outbreak of meningococcal disease due to a vaccine-preventable serogroup	Aged ≥2 months	Aged ≥10 years	8
Persons who travel to or live in countries where meningococcal disease is hyperendemic or epidemic	Aged ≥2 months	No recommendation	9
College freshmen living in residence halls	Age appropriate*	No recommendation	10
Military recruits	Age appropriate*	No recommendation	10

* Persons aged ≥2 months in these risk groups are recommended to receive MenACWY vaccination.
† Persons aged ≥10 years in this risk group are recommended to receive MenB vaccination.

Table adapted from: Recommended meningococcal vaccines for persons at increased risk for meningococcal disease — Advisory Committee on Immunization Practices, United States, 2020. MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 4: Recommended vaccination schedule for persons with complement component deficiencies*(includes patients using a complement inhibitor)†

Age group	Serogroups A, C, W, and Y meningococcal conjugate vaccines MenACWY-CRM (Menveo, GlaxoSmithKline)¶ *or* MenACWY-TT (MenQuadfi, Sanofi Pasteur)**	Serogroup B meningococcal vaccines MenB-FHbp (Trumenba, Pfizer) *or* MenB-4C (Bexsero, GlaxoSmithKline)
2-23 months	Primary vaccination: MenACWY-CRM if first dose at age • 2 months: 4 doses at 2, 4, 6, and 12 months • 3–6 months: See catch-up schedule§§ • 7–23 months: 2 doses (second dose ≥12 weeks after the first dose and after the 1st birthday)	No recommendations for use of MenB vaccines in this population††
2-9 years	**Primary vaccination¶¶:** MenACWY-CRM ***or*** MenACWY-TT: 2 doses ≥8 weeks apart **Boosters (if person remains at increased risk)†††:** • Aged <7 years: Single dose at 3 years after primary vaccination and every 5 years thereafter • Aged ≥7 years: Single dose at 5 years after primary vaccination and every 5 years thereafter	No recommendations for use of MenB vaccines in this population††
≥10 years	**Primary vaccination††:** MenACWY-D ***or*** MenACWY-CRM ***or*** MenACWY-TT: 2 doses ≥8 weeks apart **Boosters (if person remains at increased risk)†††:** Single dose at 5 years after primary vaccination and every 5 years thereafter	**Primary vaccination††:** 3 doses at 0, 1–2, and 6 months **Boosters (if person remains at increased risk)§§§:** Single dose at 1 year after completion of primary vaccination and every 2–3 years thereafter **Note:** MenB-FHbp and MenB-4C are not interchangeable

* Persistent complement deficiencies include C3, C5–C9, properdin, factor H, or factor D.
† Includes eculizumab (Soliris) and ravulizumab (Ultomiris). Meningococcal vaccines should be administered at least 2 weeks before the first dose of complement inhibitor, unless the risk for delaying complement therapy outweighs the risk for developing meningococcal disease.
¶ Licensed in the United States only for persons aged 2 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.
** Licensed in the United States only for persons aged ≥2 years.
†† Licensed in the United States only for persons aged 10–25 years. Vaccination of persons aged ≥26 years is considered off-label.
§§ If MenACWY-CRM is initiated at ages 3–6 months, catch-up vaccination includes doses at intervals of 8 weeks until the infant is aged ≥7 months, at which time an additional dose is administered at age ≥7 months, followed by a dose at least 12 weeks later and after the 1st birthday.
¶¶ Primary vaccination licensed as a single dose in persons aged 2–55 years for MenACWY-D and MenACWY-CRM or ≥2 years for MenACWY-TT. Two-dose primary series is considered off-label.
††† Licensed in the United States only for a single booster dose for persons aged 15–55 years for MenACWY-CRM or aged ≥15 years for MenACWY-TT. Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label.
§§§ Licensed in the United States only for a primary series. Administration of booster doses is considered off-label.

Table adapted from: **Recommended vaccination schedule and intervals for persons with persistent complement deficiencies* (including patients using a complement inhibitor)† — Advisory Committee on Immunization Practices, United States, 2020.** MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 5: Recommended vaccination schedule and intervals for persons with anatomic or functional asplenia, including those with sickle cell disease

Age group	Serogroups A, C, W, and Y meningococcal conjugate vaccines MenACWY-CRM (Menveo, GlaxoSmithKline)† *or* MenACWY-TT (MenQuadfi, Sanofi Pasteur)§	Serogroup B meningococcal vaccines MenB-FHbp (Trumenba, Pfizer) *or* MenB-4C (Bexsero, GlaxoSmithKline)
2-23 months	**Primary vaccination:** MenACWY-CRM: If first dose at age • 2 months: 4 doses at 2, 4, 6, and 12 months • 3–6 months: See catch-up schedule¶ • 7–23 months: 2 doses (second dose ≥12 weeks after the first dose and after the 1st birthday)	No recommendations for use of MenB vaccines in this population**
2-9 years	**Primary vaccination††:** MenACWY-CRM ***or*** MenACWY-TT: 2 doses ≥8 weeks apart **Boosters (if person remains at increased risk)***:** • Aged <7 years: Single dose at 3 years after vaccination and every 5 years thereafter • Aged ≥7 years: Single dose at 5 years and every 5 years thereafter	No recommendations for use of MenB vaccines in this population**
≥10 years	**Primary vaccination††:** MenACWY-D¶¶: 2 doses ≥8 weeks apart and ≥4 weeks after completion of PCV13 series ***or*** MenACWY-CRM ***or*** MenACWY-TT: 2 doses ≥8 weeks apart **Boosters (if person remains at increased risk)***:** Single dose at 5 years after primary vaccination and every 5 years thereafter	**Primary vaccination**:** 3 doses at 0, 1–2, and 6 months doses ≥1 month apart **Boosters (if person remains at increased risk)†††:** Single dose at 1 year after completion of primary vaccination and every 2–3 years thereafter **Note:** MenB-FHbp and MenB-4C are not interchangeable

* Licensed in the United States only for persons aged 9 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.
† Licensed in the United States only for persons aged 2 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.
§ Licensed in the United States only for persons aged ≥2 years.
¶ If MenACWY-CRM is initiated at ages 3–6 months, catch-up vaccination includes doses at intervals of 8 weeks until the infant is aged ≥7 months, at which time an additional dose is administered at age ≥7 months, followed by a dose at least 12 weeks later and after the 1st birthday.
** Licensed in the United States only for persons aged 10–25 years. Vaccination of persons aged ≥26 years is considered off-label.
†† Primary vaccination licensed as a single dose in persons aged 2–55 years for MenACWY-D and MenACWY-CRM or ≥2 years for MenACWY-TT. Two-dose primary series is considered off-label.
*** Licensed in the United States only for a single booster dose for persons aged 15–55 years for MenACWY-CRM or aged ≥15 years for MenACWY-TT. Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label.
††† Licensed in the United States only for a primary series. Administration of booster doses is considered off-label.

Table adapted from: **Recommended vaccination schedule and intervals for persons with anatomic and functional asplenia (including sickle cell disease) — Advisory Committee on Immunization Practices, United States, 2020.** MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 6: Recommended vaccination schedule and intervals for persons with human immunodeficiency virus		
Age group	**Serogroups A, C, W, and Y meningococcal conjugate vaccines MenACWY-CRM (Menveo, GlaxoSmithKline)† *or* MenACWY-TT (MenQuadfi, Sanofi Pasteur)§**	**Serogroup B meningococcal vaccines MenB-FHbp (Trumenba, Pfizer) *or* MenB-4C (Bexsero, GlaxoSmithKline)**
2-23 months	**Primary vaccination:** MenACWY-CRM: If first dose at age • 2 months: 4 doses at 2, 4, 6, and 12 months • 3–6 months: See catch-up schedule¶ • 7–23 months: 2 doses (second dose ≥12 weeks after the first dose and after the 1st birthday)	No recommendations for use of MenB vaccines in these populations unless otherwise indicated (in persons aged ≥10 years)
≥2 years	**Primary vaccination**:** MenACWY-CRM ***or*** MenACWY-TT: 2 doses ≥8 weeks apart **Boosters (if person remains at increased risk)¶¶:** • Aged <7 years: Single dose at 3 years after primary vaccination and every 5 years thereafter • Aged ≥7 years: Single dose at 5 years after primary vaccination and every 5 years thereafter	See Table 2 for recommendations in persons aged 16–23 years

† Licensed in the United States only for persons aged 2 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.
§ Licensed in the United States only for persons aged ≥2 years.
¶ If MenACWY-CRM is initiated at ages 3–6 months, catch-up vaccination includes doses at intervals of 8 weeks until the infant is aged ≥7 months, at which time an additional dose is administered at age ≥7 months, followed by a dose at least 12 weeks later and after the 1st birthday.
** Primary vaccination licensed as a single dose in persons aged 2–55 years for MenACWY-D and MenACWY-CRM or ≥2 years for MenACWY-TT. Two-dose primary series is considered off-label.
¶¶ Licensed in the United States only for a single booster dose for persons aged 15–55 years for MenACWY-D and MenACWY-CRM or aged ≥15 years for MenACWY-TT. Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label.
Table adapted from: **Recommended vaccination schedule and intervals for persons with human immunodeficiency virus infection — Advisory Committee on Immunization Practices, United States, 2020**
MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 7: Recommended vaccination schedule and intervals for microbiologists routinely exposed to isolates of *Neisseria meningitidis*		
Age group	**Serogroups A, C, W, and Y meningococcal conjugate vaccines MenACWY-CRM (Menveo, GlaxoSmithKline)† *or* MenACWY-TT (MenQuadfi, Sanofi Pasteur)§**	**Serogroup B meningococcal vaccines MenB-FHbp (Trumenba, Pfizer) *or* MenB-4C (Bexsero, GlaxoSmithKline)**
≥10 years	**Primary vaccination:** MenACWY-CRM ***or*** MenACWY-TT: 1 dose **Boosters (if person remains at increased risk)**:** Single dose at 5 years after primary vaccination and every 5 years thereafter	**Primary vaccination¶:** 3 doses at 0, 1–2, and 6 months **Boosters (if person remains at increased risk)††:** Single dose at 1 year after completion of primary vaccination and every 2–3 years thereafter **Note:** MenB-FHbp and MenB-4C are not interchangeable

† Licensed in the United States only for persons aged 2 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.
§ Licensed in the United States only for persons aged ≥2 years.
¶ Licensed in the United States only for persons aged 10–25 years. Vaccination of persons aged ≥26 years is considered off-label.
** Licensed in the United States only for a single booster dose for persons aged 15–55 years for MenACWY-CRM or aged ≥15 years for MenACWY-TT. Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label.
†† Licensed in the United States only for a primary series. Administration of booster doses is considered off-label.
Table adapted from: **Recommended vaccination schedule and intervals for microbiologists routinely exposed to isolates of *Neisseria meningitidis* — Advisory Committee on Immunization Practices, United States, 2020**
MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 8: Recommended vaccination schedule and intervals for persons who are at risk during an outbreak* attributable to a vaccine serogroup

Age group	Serogroups A, C, W, and Y meningococcal conjugate vaccines MenACWY-CRM (Menveo, GlaxoSmithKline)§ *or* MenACWY-TT (MenQuadfi, Sanofi Pasteur)¶	Serogroup B meningococcal vaccines MenB-FHbp (Trumenba, Pfizer) *or* MenB-4C (Bexsero, GlaxoSmithKline)
2-23 months	**Primary vaccination:** MenACWY-CRM: If first dose at age • 2 months: 4 doses at 2, 4, 6, and 12 months • 3–6 months: See catch-up schedule†† • 7–23 months: 2 doses (second dose ≥12 weeks after the first dose and after the 1st birthday)	No recommendations for use of MenB vaccines in this population**
2-9 years	**Primary vaccination:** MenACWY-CRM ***or*** MenACWY-TT: 1 dose **Boosters (if previously vaccinated and identified as being at increased risk)¶¶:** • Aged <7 years: Single dose if ≥3 years since vaccination • Aged ≥7 years: single dose if ≥5 years since vaccination	No recommendations for use of MenB vaccines in this population**
≥10 years	**Primary vaccination:** MenACWY-CRM ***or*** MenACWY-TT: 1 dose **Boosters (if person previously vaccinated and identified as being at increased risk during an outbreak)¶¶:** • Aged <7 years: Single dose if ≥3 years since vaccination • Aged ≥7 years: Single dose if ≥5 years since vaccination	**Primary vaccination:** 3 doses at 0, 1–2, and 6 months **Boosters (if person previously vaccinated and identified as being at increased risk during an outbreak)***:** Single dose if ≥1 year after MenB primary series completion (≥6 months interval might also be considered by public health professionals) **Note:** MenB-FHbp and MenB-4C are not interchangeable

* Detailed recommendations on outbreak management are available at https://www.cdc.gov/meningococcal/downloads/meningococcal-outbreak-guidance.pdfpdf icon.
§ Licensed in the United States only for persons aged 2 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.
¶ Licensed in the United States only for persons aged ≥2 years.
** Licensed in the United States only for persons aged 10–25 years. Vaccination of persons aged ≥26 years is considered off-label.
†† If MenACWY-CRM is initiated at ages 3–6 months, catch-up vaccination includes doses at intervals of 8 weeks until the infant is aged ≥7 months, at which time an additional dose is administered at age ≥7 months, followed by a dose at least 12 weeks later and after the 1st birthday.
¶¶ Licensed in the United States only for a single booster dose for persons aged 15–55 years for MenACWY-D and MenACWY-CRM or aged ≥15 years for MenACWY-TT. Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label.
*** Licensed in the United States only for a primary series. Administration of booster doses is considered off-label.
Table adapted from: **Recommended vaccination schedule and intervals for persons who are at risk during an outbreak* attributable to a vaccine serogroup — Advisory Committee on Immunization Practices, United States, 2020**
MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 9: Recommended vaccination schedule and intervals for persons who travel or reside in countries where meningococcal disease is hyperendemic or epidemic*		
Age group	**Serogroups A, C, W, and Y meningococcal conjugate vaccines MenACWY-CRM (Menveo, GlaxoSmithKline)§ *or* MenACWY-TT (MenQuadfi, Sanofi Pasteur)¶**	**Serogroup B meningococcal vaccines MenB-FHbp (Trumenba, Pfizer) *or* MenB-4C (Bexsero, GlaxoSmithKline)**
2-23 months	**Primary vaccination:** MenACWY-CRM: If first dose at age • 2 months: 4 doses at 2, 4, 6, and 12 months • 3–6 months: See catch-up schedule§§ • 7–23 months: 2 doses (second dose ≥12 weeks after the first dose and after the 1st birthday)	No recommendations for use of MenB vaccines in this population unless otherwise indicated††
≥2 years	**Primary vaccination:** MenACWY-CRM ***or*** MenACWY-TT: 1 dose **Boosters (if person remains at increased risk)¶¶,***** • Aged <7 years: Single dose at 3 years after primary vaccination and every 5 years thereafter • Aged ≥7 years: Single dose at 5 years after primary vaccination and every 5 years thereafter	See Table 2 for recommendations in persons aged 16–23 years

* For international travelers, vaccination is recommended for those visiting the parts of sub-Saharan Africa known as the meningitis belt during the dry season (December–June). Vaccination may also be considered for travelers to countries that contain areas included in the meningitis belt but who travel to areas outside of the meningitis belt zone. Advisories for travelers to other countries are issued by CDC when epidemics of meningococcal disease caused by vaccine-preventable serogroups are detected. Traveler's health information is available from CDC toll free by calling 1-877-394-8747 (1-877-FYI-TRIP) or at https://wwwnc.cdc.gov/travel. Additional information about geographic areas for which vaccination is recommended can be obtained from international health clinics for travelers and state health departments.

§ Licensed in the United States only for persons aged 2 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.

¶ Licensed in the United States only for persons aged ≥2 years.

†† Some countries recommend routine use of MenB vaccines for infants; persons living in these countries might follow the vaccination recommendations of these countries.

§§ If MenACWY-CRM is initiated at ages 3–6 months, catch-up vaccination includes doses at intervals of 8 weeks until the infant is aged ≥7 months, at which time an additional dose is administered at age ≥7 months, followed by a dose at least 12 weeks later and after the 1st birthday.

¶¶ Licensed in the United States only for a single booster dose for persons aged 15–55 years for MenACWY-D and MenACWY-CRM or aged ≥15 years for MenACWY-TT. Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label.

*** International travelers should receive a booster dose of MenACWY if the last dose was administered 3–5 or more years previously (depending on the age at most recent dose received). Vaccination is required by the Kingdom of Saudi Arabia (KSA) for all travelers to Mecca during the Hajj and Umrah pilgrimages. Travelers should confirm current vaccination requirements with the KSA embassy.

Table adapted from: **Recommended vaccination schedule and intervals for persons who travel to or are residents of countries where meningococcal disease is hyperendemic or epidemic* — Advisory Committee on Immunization Practices, United States, 2020.** MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 10: Recommended vaccination schedule and intervals for college freshmen living in residence halls* and military recruits

Age group	Serogroups A, C, W, and Y meningococcal conjugate vaccines MenACWY-CRM (Menveo, GlaxoSmithKline)§ *or* MenACWY-TT (MenQuadfi, Sanofi Pasteur)¶	Serogroup B meningococcal vaccines MenB-FHbp (Trumenba, Pfizer) *or* MenB-4C (Bexsero, GlaxoSmithKline)
≥10 years	**Primary vaccination:** MenACWY-CRM ***or*** MenACWY-TT: 1 dose **Boosters**:** • College freshmen living in residence halls: Not routinely recommended unless person becomes at increased risk due to another indication • Military recruits: Every 5 years on basis of assignment††	No recommendations for use of MenB vaccines in this population unless otherwise indicated See Table 2 for recommendations in persons aged 16–23 years

* College freshmen living in residence halls should receive at least 1 dose of MenACWY within 5 years before college entry. The preferred timing of the most recent dose is on or after their 16th birthday. If only 1 dose of vaccine was administered before the 16th birthday, a booster dose should be administered before enrollment. Adolescents who received a first dose after their 16th birthday do not need another dose before college entry unless it has been more than 5 years since the dose. Some schools, colleges, and universities have policies requiring vaccination against meningococcal disease as a condition of enrollment.
§ Licensed in the United States only for persons aged 2 months–55 years. Vaccination of persons aged ≥56 years is considered off-label.
¶ Licensed in the United States only for persons aged ≥2 years.
** Licensed in the United States only for a single booster dose for persons aged 15–55 years for MenACWY-D and MenACWY-CRM or aged ≥15 years for MenACWY-TT. Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label.
†† Vaccination recommendations for military personnel are made by the U.S. Department of Defense on the basis of high-risk travel requirements.
Table adapted from: **Recommended vaccination schedule and intervals for college freshmen living in residence halls* and military recruits — Advisory Committee on Immunization Practices, United States, 2020.** MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 11. Off-label meningococcal vaccination recommendations for persons at increased risk for meningococcal disease, by age group and indication

Age group	Indication
≥2 years	Administration of a 2-dose MenACWY primary series in persons at increased risk for serogroups A, C, W, or Y meningococcal disease Repeated booster doses of MenACWY for certain persons who remain at increased risk for serogroups A, C, W, or Y meningococcal disease (MenACWY-CRM is licensed for a single booster dose for persons aged 15–55 years if at least 4 years have elapsed since the last dose. MenACWY-TT is licensed for a single booster dose for persons aged ≥15 years if at least 4 years have elapsed since the last dose of MenACWY)
≥10 years	MenB booster doses in certain persons who remain at increased risk for serogroup B meningococcal disease
≥26 years	MenB primary series administration in persons at increased risk for serogroup B meningococcal disease
≥56 years	Administration of MenACWY-CRM in persons at increased risk for serogroups A, C, W, or Y meningococcal disease

Table adapted from: **Off-label meningococcal vaccination recommendations for persons at increased risk for meningococcal disease, by age group and indication — Advisory Committee on Immunization Practices, United States, 2020.** MMWR Recomm Rep 2020;69(No. RR-9):1-41

Table 12. Recommended timing of meningococcal vaccine doses*† within the routine schedule based on shared clinical decision-making for meningococcal B vaccine

Age group	MenB not favored	MenB favored at 16 yrs	MenB favored at >16 yrs
11-12 years	MenACWY dose #1	MenACWY dose #1	MenACWY dose #1
16 years	MenACWY dose #2	MenACWY dose #2 + MenB-4C¶ Or MenACWY dose #2 + MenB-FHbp** Or MenACWY-TT/MenB-FHbp followed by Men B-FHbp 6 months later	MenACWY dose #2
17-23 years	NA	NA	MenB-4C¶ Or MenB-FHbp**

* Assumes that a person has not previously been vaccinated with MenACWY or MenB.
†MenACWY vaccines are interchangeable; the same vaccine product is recommended, but not required, for all doses. Different manufacturers' MenB vaccines are not interchangeable.
¶Two-dose series with doses administered ≥1 month apart
**Two-dose series with doses administered 6 months apart
Table adapted from: **Collins JP, Crowe SJ, Ortega-Sanchez IR, et al. Use of the Pfizer Pentavalent Meningococcal Vaccine Among Persons Aged ≥10 Years: Recommendations of the Advisory Committee on Immunization Practices — United States, 2023. MMWR Morb Mortal Wkly Rep 2024;73:345–350. DOI: http://dx.doi.org/10.15585/mmwr.mm7315a4**

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