Meningococcal Disease

Investigative Guidelines

June 2021

1. DISEASE REPORTING

1.1 Purpose of Reporting and Surveillance

1. To identify persons who have been significantly exposed to a person with meningococcal infection to recommend antibiotic prophylaxis and to inform them about signs and symptoms of illness.
2. Under very rare circumstances, to recommend prophylactic immunization in a defined population or community.

1.2 Laboratory and Physician Reporting Requirements

Physicians and others providing health care must report confirmed or suspected cases to the Local Health Department (LHD) by telephone within 24 hours. If LHD staff are unreachable, they must contact the Oregon Public Health Division (PHD).

Laboratories are required to report within 1 working day, and to submit all isolates from normally sterile sites to the Oregon State Public Health Laboratory (OSPHL). Confirmed primary specimens from sterile sites tested using Culture-Independent Diagnostic Tests (CIDTs) should be sent to OSPHL for serogrouping at the CDC, upon approval from the Public Health Division.

1.3 Local Health Department Reporting and Follow-Up Responsibilities

1. Report all confirmed and presumptive (but not suspect) cases (see definitions below) to PHD within 24 hours of initial physician/lab report.
2. Begin follow-up investigation within 24 hours.
3. Identify significant contacts and recommend prophylaxis within 24 hours of report.
4. If the case is lab-confirmed, make sure that the isolate/sample is forwarded to OSPHL.

2. THE DISEASE AND ITS EPIDEMIOLOGY

2.1 Etiologic Agent

Neisseria meningitidis — a Gram-negative diplococcal bacterium with nine serogroups that have been frequently associated with systemic disease: A, B, C, D, X, Y, Z, 29E, and W135. Four other serogroups (H, I, K, and L) rarely cause invasive disease. Between 2009 and 2018, serogroup B caused approximately

65% of cases among children less than 5 years old, while serogroups C, Y, or W caused approximately two in three cases of meningococcal disease among persons 11 years old or older during this time period. However, in 2018, serogroups C, Y, or W caused approximately 1 in 2 cases of meningococcal disease among persons 11 years old or older.[1]

2.2 Description of Illness

Disease is characterized by acute onset of fever, headache, weakness, hypotension, and rash. The rash may be initially urticarial, maculopapular, or petechial, and often appears in areas where elastic in underwear or socks applies pressure to the skin, or in the fingernail beds. Petechial hemorrhage is particularly common in the mucous membranes of the soft palate and conjunctiva. In addition to the more common presentations of bacteremia and meningitis, *N. meningitidis* can cause pneumonia or primary meningococcal conjunctivitis. Invasive disease may occur without signs of meningitis.

In infants and small children, fever and vomiting are often the only symptoms. The classic triad of fever, neck stiffness, and altered mental status occurred in only 27% of patients with invasive meningococcal in a Dutch cohort.[2] In the absence of associated invasive disease, finding *N. meningitidis* in sputum is not considered a remarkable event; such cases are not reportable and do not require post-exposure prophylaxis. Additionally, droplet precautions are not recommended for non-invasive disease.

The exact mechanism allowing the penetration of meningococci from the nasopharyngeal membranes is unknown, but a recent upper respiratory tract infection may facilitate invasion. Factors that increase carriage and disease risk include crowded living conditions (like army barracks and college dormitories) and either primary or secondary tobacco smoke exposure. Those with complement deficiencies and anatomic or functional asplenia are at especially high risk of meningococcal disease.

2.3 Reservoirs

Humans are the sole reservoir.

2.4 Modes of Transmission

Transmission is by direct exposure to droplets or direct contact with discharges from the nose or throat of a colonized person — symptomatic or otherwise. It is important to distinguish colonization from disease. Colonization is common, but invasive disease is very rare. Surveys of household or other contacts of cases reveal that 5%–25% of these persons may carry *N. meningitidis* in the nasopharynx. Most individuals are carriers at some point in their lives; that carriage can be chronic, intermittent, or transient. Disease incidence is highest in late winter to early spring. The burden of invasive meningococcal disease is typically highest in the very young (those 0–4 years of age), with a second, lower peak in incidence in young adults. Close contacts of cases (e.g., household members or day-care contacts) are at increased risk of becoming colonized and

then developing illness. The attack rate for household contacts of cases is 0.3–1% (some 300–1,000 times the rate for the general population). For persons exposed to a case during the case's period of communicability (see below), the risk of developing symptomatic illness is highest during the 10-day period following onset of illness of the first case. (An elevated risk may extend for up to 60 days.)

2.5 Incubation Period

Usually 3 to 4 days, but may range from 2 to 10 days

2.6 Period of Communicability

Persons are infectious as long as meningococci are present in discharges from the nose or pharynx. Cases are probably most infectious during the 3 days prior to onset of symptoms, and are considered no longer communicable 24 hours after initiation of treatment or chemoprophylaxis with appropriate antibiotics. Those exposed 7 or more days before onset of illness in the case are not at significantly increased risk. Depending on the antimicrobials used, therapy for invasive disease may not eradicate the organism from the nasopharynx, and chemoprophylaxis may also be required (see §5.3.4).

2.7 Treatment

Third-generation cephalosporins ceftriaxone or cefotaxime, or penicillin G administered intravenously at high doses are the drugs of choice for invasive disease. Alternatives include aztreonam, meropenem, or fluoroquinolones.[3,4]

Five to seven days of antimicrobial therapy are adequate.

3. CASE DEFINITIONS, DIAGNOSIS AND LABORATORY SERVICES

3.1 Confirmed Case Definition

- 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; or
- 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.

3.2 Presumptive Case Definitions

- Detection of *N. meningitidis* in formalin-fixed tissue by immunohistochemistry (IHC), or in CSF by latex agglutination; or
- Detection of Gram-negative diplococci, not yet identified, from CSF
- Consist signs and symptoms occurring within 2–10 days of contact with a confirmed case during the period of communicability.

3.3 Suspect Case

Any person with an undiagnosed compatible illness, with or without signs or symptoms of meningeal irritation (see §2.2).

3.4 Services Available at the Oregon State Public Health Laboratories

All isolates of *N. meningitidis* obtained from a normally sterile site must be sent to OSPHL.

OSPHL will confirm the identification of *N. meningitidis* and serogroup isolates. Pure isolates should be sent on appropriate media that support the growth of the organism (e.g., chocolate agar). Specimens that cannot be serogrouped by OSPHL will be forwarded to the CDC for serogrouping.

Complete specimen acceptance criteria for isolate submission are available on OSPHL's Lab Test Menu at www.healthoregon.org/labtests under "*Neisseria meningitidis* Serogroup."

Confirmed primary specimens from sterile sites tested using Culture-Independent Diagnostic Tests (CIDTs) should be sent to OSPHL for serogrouping at the CDC, upon approval from the Public Health Division.

Specimen submission criteria for primary specimens to be forwarded to and tested at the CDC should follow the specimen acceptance criteria available at the CDC Test Directory under "*Neisseria meningitidis* Identification and Serogrouping," available at www.cdc.gov/laboratory/specimen-submission/list.html.

All specimens must be properly submitted and be accompanied by a completed General Microbiology Test Request Form. Please indicate on the Test Request Form if the specimen was confirmed using CIDT methods to allow for proper forwarding of specimen to the CDC.

4. ROUTINE CASE INVESTIGATION

4.1 Case Interview

Interview the case (or parents) and others who may be able to provide pertinent information.

1. **Identify Source of Infection**

   Often not possible, because of the high percentage of people who carry the organism. However, it is useful to ask whether any household, daycare, or other close contacts have recently had an illness suggestive of meningococcal disease.

2. **Identify Potentially Exposed Persons**

   Obtain the name, address, and telephone number of all persons who have had significant exposure to the case during the communicable period. These include:

- all persons who have spent at least 4 hours (cumulatively, within 7 days of index patient's onset) in close, face-to-face association with the case, (e.g., household members, day-care contacts, cellmates); and
- anyone directly exposed to the patient's nasopharyngeal secretions (e.g., via kissing, mouth-to-mouth resuscitation, intubation, or nasotracheal suctioning). Health care workers who have not had direct contact with the case's nasopharyngeal secretions are not at increased risk, and prophylaxis is not indicated.

4.2 Culturing of Exposed Persons

While sometimes suggested by well-meaning persons to identify carriers, this is not a useful exercise.

4.3 Environmental Evaluation

Generally, none, although in outbreak settings an investigation may be warranted to identify environmental factors (disinfection practices, ventilation patterns, etc.) that may favor droplet transmission.

5. CONTROLLING FURTHER SPREAD

5.1 Education

Potentially exposed persons should be instructed to watch for fever, rash, lethargy, irritability, headache, loss of appetite, or vomiting. Should signs or symptoms develop within the next two weeks, they should seek medical care immediately. They should be advised that an elevated risk may persist for 60 days.

5.2 Isolation

In addition to standard precautions, hospitalized cases should be placed under droplet precautions until at least 24 hours after initiation of antibiotic treatment with ceftriaxone. If a different antibiotic was used for initial treatment, the case will require prophylaxis with rifampin or ciprofloxacin.

5.3 Protection of Contacts

1. Passive Immunization

None.

2. Active Immunization

ACIP recommends routine vaccination with quadrivalent (contains antigens from serogroups A, C, Y, and W-135) meningococcal conjugate vaccine for all adolescents aged 11 or 12 years with a booster at age 16 years.[5] Meningococcal vaccine is also recommended for persons ≥2 months of age who are at increased risk for the disease due to anatomic or functional asplenia, complement deficiency, or use of complement inhibitors such as eculizumab and ravulizumab; persons living with HIV; travel to or residence

in a country where meningococcal disease is hyperendemic or epidemic; microbiologists with routine exposure to *N. meningitidis* isolates; or inclusion in a defined risk group during a community or institutional outbreak.

Three quadrivalent vaccines are available: 1) MenACWY-D (Menactra®) licensed in 2005 for persons aged 9 months to 55 years; MenACWY-CRM (Menveo®) licensed in February 2010 for persons aged 2 months to 55 years; and 3) MenACWY-TT (MenQuadfi®), licensed in 2020 for persons ≥2 years of age.

Two additional licensed meningococcal vaccines are no longer available in the United States: 1) a quadrivalent (serogroups A, C, W, and Y) meningococcal polysaccharide vaccine (MPSV4) (Menomune – A/C/Y/W-135) and 2) a combined *Haemophilus influenzae* type b and meningococcal serogroups C and Y conjugate vaccine (Hib-MenCY-TT; MenHibrix).

See tables below for specific recommendations regarding quadrivalent vaccines and schedules for the general population (Table 1), quadrivalent vaccines for persons aged ≥2 months at increased risk (Table 2), and use of serogroup B vaccines for persons aged ≥2 years at increased risk (Table 3).[5] For up-to-date vaccination recommendations, visit: www.cdc.gov/mmwr/volumes/69/rr/rr6909a1.htm

Table 1. Routine meningococcal vaccination recommendations, non-group B meningococcus, ACIP (2020)

Age Group	Vaccine	Recommendation
11–21 years	MenACWY-D (Menactra®) or MenACWY-CRM (Menveo®) or MenACWY-TT (MenQuadfi®)	Primary vaccination†: 1 dose at age 11–12 years Booster: 1 dose at age 16 years if first dose administered before 16th birthday Catch-up vaccination: Although routine vaccination is only recommended for adolescents aged 11–18 years, MenACWY may be administered to persons aged 19–21 years who have not received a dose after their 16th birthday • Note: MenACWY vaccines are interchangeable

†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.

Table 2. Meningococcal vaccination recommendations for persons at increased risk of meningococcal disease, non-group B meningococcus, ACIP (2020)

Risk Group	Schedule
Aged > 2 months	
Complement component deficiency* (e.g., C5–C9, properdin, factor H, or factor D), including patients using a complement inhibitor** Functional or anatomic asplenia, including sickle cell disease*** HIV infection*** Exposure to an outbreak of meningococcal disease due to serogroup A, C, W, or Y Travel to or residence in countries where meningococcus is hyperendemic	**Primary vaccination at age 2–23 months** MenACWY-D (aged ≥9 months): 2 doses ≥12 weeks apart or 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)
	Primary vaccination at age 2–9 years++ with MenACWY-D¶ or 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
	Primary vaccination at age ≥ 10 years ††: 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
Age-appropriate Vaccination (aged ≥10 years)	
Microbiologists routinely exposed to *N. meningitidis* College freshmen living in residence halls Military recruits	Primary vaccination: MenACWY-D or 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

* 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.
*** Because of the high risk for invasive pneumococcal disease, children with functional or anatomic asplenia or human immunodeficiency virus infection should not be vaccinated with MenACWY-D (Menactra®) before age 2 years to avoid interference with the immune response to PCV. If MenACWY-D is used in a person (of any age) with functional or anatomic asplenia or HIV infection, it should not be administered until at least 4 weeks after completion of all PCV doses.
+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.
¶ MenACWY-D should be given either before or at the same time as DTaP to avoid interference with the immune response to meningococcal vaccine in children. MenACWY-D may be given at any time in relation to Tdap or Td.

¶¶ 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.

3. Serogroup B Vaccination

Over the last decade there have been multiple college campus outbreaks of meningococcus serogroup B, for which the above-mentioned vaccinations are not effective. In2014, the Food and Drug Administration (FDA) licensed the first serogroup B meningococcal vaccine (MenB-FHbp, Trumenba®) for use in people 10–25 years of age as a 3-dose series. FDA licensed a second serogroup B meningococcal vaccine (MenB-4C, Bexsero®) in 2015 for use in people 10–25 years of age as a 2-dose series.

MenB vaccination is now recommended for those ≥10 years with complement deficiencies, anatomic or functional asplenia, microbiologists who have contact with *N. meningitidis*, and others at increased risk during a serogroup B outbreak.[5]

Cost-effectiveness of MenB vaccines among U.S. adolescents was most recently evaluated in 2018. Vaccination strategies included a MenB primary series at age 11 years with a booster at age 16 years, a series at age 16 years, a series at age 18 years, and a series among college students. Cost per QALY saved for these four strategies ranged from $9.6 million to $12.7 million, with the number needed to vaccinate to prevent a case ranging from 152,000 to 305,000 and the number needed to vaccinate to prevent a death ranging from 1.6 million to 2.8 million.[5]

Due to the lack of cost-effectiveness, MenB vaccines are not routinely recommended for college students. However, the ACIP recommends a MenB series for persons aged 16–23 years (preferred age 16–18 years) on the basis of shared clinical decision-making. Shared clinical decision-making refers to an individually based vaccine recommendation informed by a decision-making process between the health care provider and the patient or parent/guardian. Considerations for shared clinical decision-making for vaccine administration and timing of administration should include the serious nature of the disease, the increased risk among college students, and the level of protection afforded by vaccine. However, the low risk of infection with serogroup B among persons aged 16–23 years in the U.S., the short duration of projection provided by MenB vaccines, and the evidence that the vaccine does not reduce carriage should also be taken into consideration.

See Section 6.2 for criteria for use of MenB vaccines in outbreak settings.

Table 3. Meningococcus serogroup B vaccination recommendations, ACIP (2020)

Age	Vaccine and schedule+	Risk groups
Persons with elevated risk		
≥10 years	MenB-FHbp (Trumenba®)[§] Three dose series at 0,1- 2, and 6 months Or MenB-4C (Bexsero®)[†] Two dose series with doses given at least 1 month apart Boosters (if person remains at increased risk or due to exposure during an outbreak)††: Single dose at 1 year after completion of primary vaccination	• Persons with persistent complement component deficiencies* or use of complement inhibitors.** • Persons with anatomic or functional asplenia.** • Microbiologists routinely exposed to isolates of *Neisseria meningitidis*. • Persons identified as at increased risk because of a serogroup B meningococcal disease outbreak.
Vaccination on the basis of shared decision-making		
16–23 years	MenB-FHbp (Trumenba®)[§] Two dose series at 0 and 6 months Or MenB-4C (Bexsero®)[†] Two dose series with doses given at least 1 month apart Booster: Not routinely recommended unless the person becomes at increased risk for meningococcal disease	• A serogroup B meningococcal (MenB) series may be administered to young adults 16 through 23 years of age, who are not at increased risk for disease, to provide short term protection against most strains of serogroup meningococcal disease. The preferred age for MenB vaccination is 16 through 18 years of age.

+Based on available data and expert opinion, either MenB vaccine may be administered concomitantly with other vaccines indicated for this age, but at a different anatomic site, if feasible. The same vaccine product should be used for all doses
[§] Wyeth Pharmaceuticals, Inc.
[†] Novartis Vaccines
†† Booster doses administered outside of these ages or administration of >1 booster dose are considered off-label in the U.S.
*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.

4. Antibiotic Prophylaxis

Chemoprophylaxis should be recommended for all household members of confirmed or presumptive cases and other exposed persons, as defined in §4.1.2. Chemoprophylaxis should be initiated as soon as possible, ideally <24

hours after index patient identification.[6] If >14 days have passed since the last contact with the index patient, chemoprophylaxis is likely to be of little benefit. Chemoprophylaxis should also be recommended to daycare contacts under certain circumstances (see §6). It should not be recommended to persons who have had only brief or casual contact with the case. If such persons are anxious about their exposure, they should be advised that their risk of disease is extremely low. They should be further advised to be alert to signs and symptoms of illness, especially fever, and to seek medical care immediately should illness develop.

Prophylaxis of close contacts of culture positive patients with pneumonia or primary meningococcal conjunctivitis without accompanying bacteremia is not recommended in the U.S. due to a lack of evidence of transmission.

Acceptable chemoprophylaxis includes ciprofloxacin, rifampin, or ceftriaxone, each of which are 90–95% effective in reducing nasopharyngeal carriage of *N. meningitidis*.[6] Azithromycin is less well-studied, and *not* routinely recommended, but has also been shown to eradicate nasopharyngeal carriage. It may be considered as *second-line* chemoprophylaxis and may be useful in the uncommon instance of ciprofloxacin resistance.

Ciprofloxacin was not previously recommended in children due to induced arthropathy in juvenile animals, but multiple studies have failed to replicate that finding in human juveniles. In one randomized clinical trial on carriage eradication, ciprofloxacin when compared to rifampicin did not lead to a higher rate of side effects. Multiple controlled prospective and retrospective studies, using higher doses of ciprofloxacin, showed that the rate of adverse events of ciprofloxacin in children was similar to that seen with other antibiotics, and that long-term cartilage damage was not seen in humans.[7,8] The dosage for persons ≥1 month of age is 20 mg/kg up to a maximum of 500 mg, orally.[6] Ciprofloxacin is not recommended for pregnant women.

Rifampin dosage for those <1 month of age is 5 mg/kg twice daily for two days; for persons ≥1 month of age, 10 mg/kg twice daily for two days (maximum 600mg). Rifampin chemoprophylaxis is not recommended for pregnant women. Those taking rifampin should be informed that gastrointestinal upset, orange discoloration of urine, discoloration of soft contact lenses, and decreased effectiveness of oral contraceptives can occur. Complete medication list should be obtained and checked for interactions prior to providing rifampin (N.b.: that the rifampin schedule for eradication of *Haemophilus influenzae* carriage is effective against *N. meningitidis* carriage as well, but not vice versa.)

Ceftriaxone can be used for children and adults (including pregnant women) to eradicate nasopharyngeal carriage if ciprofloxacin and rifampin are contraindicated. It is given as a single IM dose of 125 mg for children <15 years of age and 250 mg for older persons.

Azithromycin may be given as a single oral dose of 10 mg/kg (maximum of 500 mg).

The drug of choice for children is rifampin or ciprofloxacin.[6] Keep in mind that liquid suspension for ciprofloxacin may not be readily available.

Table 4. Recommended chemoprophylaxis regimens for protection against meningococcal disease

Drug	Age	Dose	Duration	Cautions
Ciprofloxacin	≥1 month	20 mg/kg up to a max of 500 mg	Single dose	Not recommended for pregnant women
Rifampin	<1 month ≥1 month	5 mg/kg, orally, twice daily 10 mg/kg (maximum 600 mg), orally, twice daily	2 days	Can interfere with the efficacy or oral contraceptives, some anticonvulsants, and warfarin among many other drug interactions; may stain soft contact lenses orange Not recommended in pregnant women
Ceftriaxone	<15 years ≥15 years	125 mg, intramuscularly 250 mg, intramuscularly	Single dose	To decrease pain at injection site, dilute with 1% lidocaine
Azithromycin		10 mg/kg (maximum 500 mg), orally	Single dose	Not routinely recommended Use when fluoroquinolone-resistant *N. meningitidis* has been identified in the community

6. MANAGING SPECIAL SITUATIONS 4

6.1 Case Attends a Daycare Facility

If the child has attended any such facility for at least 4 hours (cumulatively) during the week before onset, then within 24 hours of the initial report:

1. The operator of the day-care facility should be interviewed to determine whether other cases of meningococcal disease occurred among attending children during the past 60 days.
2. The parents of children who are in the same classroom as the case should be notified (preferably in writing) of the occurrence of meningococcal disease in the facility. The notice should advise parents to:
    - seek chemoprophylaxis for their attending children without delay.
    - watch their children carefully for a two-week period for signs of illness, especially fever, and seek medical care immediately if illness should

occur. Advise parents that an elevated risk may persist for up to two months following the occurrence of a case.

3. Instruct the day-care operator to notify the LHD immediately if another person becomes ill with signs and symptoms of meningococcal disease over the next two months.
4. Chemoprophylaxis should also be given to all staff in the ill child's classroom.
5. Children and staff in other rooms are usually not at elevated risk, and do not need chemoprophylaxis

6.2 Determination of a meningococcal disease outbreak

Decisions about initiating mass chemoprophylaxis or vaccination campaigns for recognized outbreaks of meningococcal disease have always been a public health challenge. CDC formerly defined outbreaks as $\geq$ 3 cases of the same serogroup and an attack rate of > 10 cases per 100,000 population during a 3-month period. Recent guidelines, however, have dropped the use of a standard threshold in favor of a more flexible approach.[9]

Table 5 summarizes the key steps in the investigation of a cluster of meningococcal cases and the criteria for offering mass vaccination or prophylaxis. Please notify OHA when you have identified two or more linked cases of meningococcus and we will be happy to advise you on next steps (likely after consulting our colleagues at CDC).

Table 5. Summary of Guidance for Clusters of Meningococcal Cases

Investigation of cases • *N meningitidis* should be confirmed through culture or PCR of fluid collected from normally sterile site. Culture should be attempted to obtain an isolate for molecular typing • Perform serogrouping on all confirmed cases and whole genome sequencing (WGS) on all isolates
Determination of a meningococcal disease outbreak • All cases of meningococcal disease of the same serogroup should be included in the outbreak case count unless molecular typing indicates that the strain from a case is genetically different than the predominant outbreak strain. In outbreaks with well-defined risk groups, probable cases may be included as outbreak-associated even if they are unable to be confirmed or serogrouped. • The outbreak threshold for vaccine decision-making should be determined on a case-by-case basis, using the following general guidance: ▪ Organization-based outbreak: 2–3 outbreak-associated cases within an organization during a 3-month period. ▪ Community-based outbreak: Multiple outbreak-associated cases with an incidence of meningococcal disease that is above the expected incidence in a community during a 3-month period.

Vaccination

- If vaccination is undertaken, vaccine should be selected based on outbreak serogroup:
  - A, C, W, or Y: quadrivalent meningococcal conjugate (MenACWY) vaccine in persons aged ≥2 months.
  - B: serogroup B meningococcal (MenB) vaccine in persons aged ≥10 years.
- For serogroup B outbreaks, the identification of MenB vaccine antigens through WGS of outbreak isolates cannot be used to reliably infer strain coverage at this time; therefore these data should not drive the selection of MenB vaccine product (MenB-FHbp vs. MenB-4C).

Expanded antimicrobial prophylaxis

- Expanded antimicrobial chemoprophylaxis (administration of antibiotics to a wider circle of individuals than those identified as close contacts of the case-patient) is typically not recommended as a standalone measure, but in some organization-based outbreaks, may be used in conjunction with vaccination or when vaccination is not possible.

6.3 Troubleshooting Prophylaxis Availability

What if the contact's insurance refuses to cover the cost of prophylaxis?
Prophylaxis should be covered by all insurance policies in Oregon (e.g., Oregon Health Plan, etc.), though a copayment may be required. If the pharmacist cannot obtain authorization, the insurance company should be contacted directly for pre-approval.

Also, as prophylaxis requires only 1 to 4 doses and generics for the recommended antibiotics are available, inquire with the pharmacist what the out-of-pocket cost would be: the total cost of the medication might be less than a copayment.

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UPDATE LOG

June 2021. Updated available vaccines and vaccination schedules; updated guidance for cluster/outbreak investigations. (Thomas, Martin)

September 2018. Clarified PEP recommendations (or lack thereof) for non-invasive cases. (Poissant)

September 2017. Updated laboratory submission instructions. (Poissant)

May 2017. Updated ACIP Men B vaccination recommendations for healthy adolescents and adults aged 16-23 years. Two doses of MenB-FHbp (Trumenba) is now available for healthy adolescents and adults who are not at risk for meningococcal disease (Tasha Poissant).

November 2016. Clarified drugs of choice for children (Tasha Poissant).

December 2015. Updated Ciprofloxacin dosing recommendations to be consistent with the 2015 Red Book recommendations. (Tasha Poissant)

July 2015. DRAFT Reformatted into new IG template. (Kathleen Vidoloff)

June 2015. Updated epidemiologic data, risk groups, treatment, vaccination recommendations, chemoprophylaxis recommendations, and serogroup B vaccination information. (David Serota, Tasha Poissant)

February 2015. Updated case definitions to be in line with CSTE case definitions. Added latex agglutination as acceptable test results in CSF for a confirmed case. (Tasha Poissant)

July 2012. Added information about how to troubleshoot prophylaxis availability to Managing Special Situations Section. Clarified prophylaxis recommendations. (Jamie Thompson)

December 2011. Updated vaccination recommendations and clarified time frame for chemoprophylaxis administration. (Jamie Thompson)

May 2007. This is the corrected version of what was meant to be the July release. The confirmed case definition was modified to incorporate PCR results. Recommendations for the new conjugate vaccine MCV4 were incorporated into the active immunization section. Primary meningococcal conjunctivitis and pneumonia were added as uncommon but possible presentations of meningococcal disease. (June Bancroft)