



Meningococcal Infections, Including Meningococcemias, Caused by *N. meningitidis* Investigation Guideline

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Revision History:

Date	Replaced	Comments
05/2018	11/2017	Updated Isolation, Work and Daycare Restrictions sections with updated 28-1-6 regulation.
11/2017	12/2014	Updated Contact Management with removal of “preferred” from description of recommended antibiotics. Addition of information on using MenB. Updated outbreak investigation guidance with new information from CDC released on November 9, 2017.
12/2014	11/2010	Reformatted Standard Case Investigation and Data Management section to assist with EpiTrax system data entry. Updated web links and references. Reformatted fact sheet.
07/2011	06/2010	Recommendations for when serotype not available. Edits to Laboratory Analysis and Case Investigation. Addition of Notification section. Removal of HiB type b Vaccine Worksheet.
02/2012	-	Removed references to KS-EDSS.
06/2010	03/2009	Format changes to Investigation Protocol. Edits to Case Definition that was inconsistent with CDC definition. Addition of VAERS statement under Contact Management.
04/2009	03/2009	Revised Bacterial Meningitis Supplemental Form.

Meningococcal Infections

Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 2015)

Clinical Criteria for Public Health Surveillance:

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

Laboratory Criteria for Case Classification:

- Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF)
- Detection of *N. meningitidis* antigen
 - In formalin-fixed tissue by immunohistochemistry (IHC); or
 - In CSF by latex agglutination
- Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g., blood or CSF), using a validated polymerase chain reaction (PCR) assay; or
- Isolation of *N. meningitidis*
 - From a normally sterile body site (e.g., blood or CSF, or less commonly, synovial, pleural, or pericardial fluid); or
 - From purpuric lesions

Case Classification:

Suspected:

- Clinical purpura fulminans in the absence of a positive blood culture; or
- Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF)

Probable:

- Detection of *N. meningitidis* antigen
- In formalin-fixed tissue by immunohistochemistry (IHC); or
 - In CSF by latex agglutination **Meningitis WITH** detection of *Haemophilus influenzae* type b antigen in cerebrospinal fluid [CSF].

Confirmed:

- Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g., blood or CSF), using a validated polymerase chain reaction (PCR) assay; or
- Isolation of *N. meningitidis*
 - From a normally sterile body site (e.g., blood or CSF, or less commonly, synovial, pleural, or pericardial fluid); or
 - From purpuric lesions.

LABORATORY ANALYSIS

By law, isolation of *N. meningitidis* isolate from a meningococcemia case should be submitted to the Kansas Health and Environmental Laboratories (KHEL).

- Shipping of isolates: Use a KHEL Miscellaneous Infectious Disease mailer
- For additional information: call (785) 296-1620.
- Specimens should be collected before the administration of antibiotics, but it is critical to treat the patient as soon as infection is suspected; do not to delay treatment to obtain culture or laboratory results.

- Gram stains, cultures, and PCR are performed by commercial laboratories.
- Gram stain can allow rapid identification and show organisms in CSF in 80% (range 60-90%) of patients with acute bacterial meningitis.
- Gram stain of cerebrospinal fluid showing gram-negative diplococci strongly suggests meningococcal meningitis.
- Cultures provide definitive diagnosis and are positive in 90% of patients but may be falsely negative in treated patients. Refer to additional resources to identify any antibiotics spectrum of activity.
- PCR detects DNA of meningococci in blood, CSF, or other clinical specimens and allows for detection of *N. meningitidis* from clinical samples who may have been treated. The specimen should always be forwarded to KHEL to attempt culture for an isolate for molecular typing.
 - During outbreak situations, whole genome sequencing (WGS) should be performed on all isolates, and isolates and/or sequences should be shared with CDC.
- CSF laboratory values may suggest a presumptive diagnosis of bacterial meningitis, but many cases are atypical.
 - Values can be affected by a number of factors (including age, gender, underlying medical conditions).
 - Use CSF values only in conjunction with the entire clinical presentation.

CSF ¹ laboratory values:

Agent	Virus	Bacteria	Subacute or chronic ⁴	Normal
CSF Appearance	Cloudy	Cloudy	Cloudy	Clear, colorless
CSF WBC Count ² (cell/mL)	< 1000 (usually 10-500)	100 - 10,000 (Usually >1000)	25-2000	< 8 (RBC and WBC)
CSF Differential (Predominate Cell)	Lymphocytes: 60-70%;	Mostly neutrophils ³ / PMNs; Few Lymphocytes & Monocytes	Lymphocytes	Lymphocytes
CSF Protein (mg/dL)	Normal / Slight increase	Elevated (50-100)	Increase / Greatly increased	< 40
CSF Glucose (mg/dL)	Normal	Below normal (< 50% of serum glucose)	Decreased	40-80
CSF Pressure (mm H2O)	Normal / Slight increase	Elevated > 300	Normal / Slight increase	100-200

¹ High WBC values in blood are also suggestive of infection. The blood (CBC) values will also give an impression of the patient's general health.

² If there are numerous RBCs in the CSF due to a traumatic tap; the WBC count will need to be corrected to account for the excess WBC's from the blood.

³ Neutrophils can predominate early in viral and TB meningitis infections (first 24-48 hours).

⁴ Subacute or chronic infections include meningitis due to: TB, cryptococci, other fungi, sarcoidosis, Lyme disease, syphilis, cytomegalovirus, or tumor.

EPIDEMIOLOGY

Neisseria meningitidis is a leading cause of bacterial meningitis and other serious infections worldwide with a rate for endemic disease of 0.5-5/100,000 persons. Devastating epidemics occur in countries throughout the meningitis belt of Africa. Six serogroups (A, B, C, W-135, X, and Y) are responsible for most cases of disease worldwide and the pattern of occurrence for each serogroup is unique.

In the United States, the greatest incidence of meningococcal disease occurs during the late winter and early spring; epidemics are irregular. Serogroups B, C, and Y are the major causes of disease. The rates of disease are highest in infants and toddlers aged <2 years with the highest attack rate observed at 3-5 months of age and 50% of the cases identified as serogroup B. With vaccination for serogroups A, C, W-135, and Y, meningococcal disease incidence has decreased since 2000, and incidence for serogroups C and Y are at historic lows. However, the persistence of a peak in disease among persons aged 18 years resulted in a recommendation for an adolescent booster dose in 2009.

Risk groups include infants and young children, refugees, household contacts of case patients, military recruits, college freshmen living in dormitories, laboratorians working with of *N. meningitidis* isolates, patients without spleens or with terminal complement component deficiencies, and people exposed to tobacco smoke. Between 5-15% of the general population's nasopharynx are colonized with *N. meningitidis* at any given time. While asymptomatic, these carriers may act as vectors, spreading the bacteria to others through saliva and respiratory secretions.

DISEASE OVERVIEW

A. Agent:

Neisseria meningitidis, a gram-negative diplococcal bacterium with 13 serogroups. Groups A, B, C, Y and W-135 are common to systemic disease.

B. Clinical Description:

An invasive infection with *N. meningitidis* may cause several clinical syndromes, including meningitis, bacteremia and sepsis. Symptoms of meningitis typically include the sudden onset of a stiff neck, high fever and an intense headache; a petechial rash may be present. Nausea, vomiting and mental confusion are often present. The case-fatality rate for meningococcal meningitis is between 5-15%.

Meningococemia (i.e., infection of the blood) typically presents with the abrupt onset of fever, chills, malaise, prostration and rash (e.g., urticarial, maculopapular, purpuric or petechial). Fulminant cases present with purpura, disseminated intravascular coagulation, shock, and/or coma and may lead to death within hours despite appropriate therapy. In fulminating disease, the death rate remains high despite prompt antibacterial treatment.

C. Reservoirs:

Humans.

D. Mode(s) of Transmission:

Direct contact with an infected person's oral and/or nasal secretions, including but not limited to: kissing, sharing a toothbrush or eating utensil and other markers of close social contact. An infected person(s) can be asymptomatic.

E. Incubation Period:

Range 2-10 days; usually 3-4 days.

F. Period of Communicability:

As long as *N. meningitidis* are present in the nasopharynx; 7 days prior to illness onset to 24 hours after initiation of an appropriate antibiotic treatment.

G. Susceptibility and Resistance:

Immunity is life-long and develops after clinical or inapparent infections. Adults born before 1957 are likely to have been infected and are considered immune.

H. Treatment:

Empiric therapy with cefotaxime or ceftriaxone is recommended. Agent specific treatment: parenteral Penicillin G in high doses every 4-6 hours. Chloramphenicol, cefotaxime, ceftriaxone and ampicillin are acceptable alternatives.

Rifampin, ciprofloxacin, and ceftriaxone reduce nasopharyngeal carriage of *N. meningitidis*. If other agents were used for treatment, the index patient should receive antibiotics for nasopharyngeal carriage eradication before discharge.

I. Vaccine:

Tetravalent vaccines against serogroups A, C, Y, W-135: MCV4 (conjugate) and MPSV4 (polysaccharide for those above 55 years of age). Serogroup B meningococcal vaccine is now available in a monovalent vaccine.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

N. meningitidis infections shall be designated as infectious or contagious, and all cases or **suspected** cases shall be reported within **4 hours by phone**:

1. Health care providers and hospitals: report to the local public health jurisdiction or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)
4. KDHE-BEPHI contacts the local public health jurisdiction by phone within one hour of receiving a bacterial meningitis report

**Kansas Department of Health and Environment (KDHE)
Bureau of Epidemiology and Public Health Informatics (BEPHI)
24/7 Phone: 1-877-427-7317**

As a nationally notifiable condition, [confirmed](#) and [probable](#) *N. meningitidis* cases require a STANDARD report to the Center of Disease Control and Prevention (CDC).

1. STANDARD reporting requires KDHE-BEPHI to file an electronic report for a case meeting the [confirmed](#) or [probable](#) criteria within the next reporting cycle.
 - KDHE-BEPHI will file electronic reports weekly with CDC.
2. **Local public health jurisdiction** will report information requested as soon as possible, ensuring that the electronic form is completed within 3 days of receiving a notification of a *N. meningitidis* report.

INVESTIGATOR RESPONSIBILITIES

Note: Investigation should begin as soon as possible. Ideally, prophylactic measures for close contacts should be assured within 24 hours of initial report.

- 1) [Report](#) all confirmed, probable and suspected cases to the KDHE-BEPHI at 1-877-427-7317 within 4 hours of the initial report
- 2) Contact medical provider to collect additional information and confirm diagnosis using the current case definition within 1 day of the report.
 - Collect all information requested in [Step 1](#)) of case investigation.
 - Ensure that the patient is aware of his/her diagnosis.
- 3) Conduct [case investigation](#) to identify potential source of infection.
- 4) Conduct [contact investigation](#) to locate additional cases and/or contacts.
- 5) Identify whether the source of infection is major public health concern,
 - Case is associated to a college, residential living facility, or daycare.
- 6) Initiate [control and prevention measures](#) to prevent spread of disease.
 - Culturing of contacts, prophylaxis, vaccinations, and restrictions.
- 7) [Record](#) data, collected during the investigation, in the KS EpiTrax system under the data's associated [\[tab\]](#) in the case morbidity report (CMR) within 3 days of the initial report.
- 8) As appropriate, use the disease [fact sheet](#) to notify individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

- 1) Contact the medical provider who reported or ordered testing of the case to obtain the following from the patient's medical records.
 - Record onset date [\[Clinical\]](#)
 - Record date diagnosed - presumptive and final diagnosis date [\[Clinical\]](#)
 - Record hospitalizations: location and duration of stay [\[Clinical\]](#)
 - Record outcomes: survived or date of death [\[Clinical\]](#)
 - Obtain clinical information on symptoms, including: fever, headache, rash, nausea, vomiting, muscle weakness/pain, joint pains, gait/balance difficulty, stiff neck, confusion, hallucinations, disorientations, seizures, or any other symptoms [\[Investigation – Symptoms\]](#)
 - Type of infection (i.e. primary bacteremia, meningitis) [\[Investigation-Complications\]](#)
 - Examine the laboratory testing that was done [\[Laboratory\]](#):
 - Gram stain results (should be available within 1 hour of collection).
 - Culture results (may take more than 48 hours).
 - o If *N. meningitidis* is isolated; ensure the isolate is sent to KHEL.
 - Collect additional information on culture results, including:
 - o Specimen from which organism isolated
 - o Date first positive culture obtained
 - o Organism's resistance to sulfa or rifampin
 - o Serogroup
 - Collect case's demographics and contacting information (address, birth date, gender, race/ethnicity, primary language, and phone number(s)) [\[Demographic\]](#)
 - Through a credible immunization registry or medical record obtain information

- on history of meningococcal vaccine:
- Dates of vaccination, manufacturer, number of doses, and lot numbers;
 - Or why the case was not vaccinated.
- 2) Interview the case to determine source, risk factors and transmission settings:
Note: Due to the high number of asymptomatic carriers it may not be possible to identify the source of infection.
- For source, focus on incubation period 10 days prior to symptom onset.
 - Determine if the case had contact with one or more persons who either have/had the disease or have been exposed to a point source of infection
 - Obtain dates of exposure,
 - Name, address / telephone, and date of birth of possible sources,
 - Possible source’s occupation or school and grade or residence
 - Possible source’s relationship to case,
 - Transmission setting, if applicable (i.e., household, school, daycare)
 - Identify social or athletic contacts (e.g., nightclubs, parties or sports). [Notes]
 - Research for earlier reported cases at these activities or events.
 - Record occupations, group living, daycare associations, and any Place Exposure(s) (where illness could have been transmitted). [Epidemiological]
 - Collect information from case for the Contact Investigation. (See below).
 - See Case Management for additional instructions on isolation.
- 3) Investigate epi-links among cases (clusters, household, co-workers, etc).
- If the patient had contact with person(s) who have/had an invasive type infection, especially meningitis, determine if the other “cases” were seen by a medical provider and if they were reported to the state:
 - Search the state electronic surveillance for the possible case.
 - If found, record the previously reported record number in the record of the case you are investigating [Notes].
 - Meningococcal infections in persons that have not previously been reported should be investigated as a potential case and reported to KDHE-BEPHI if evidence is collected that supports the case definition.
 - Enter the patient’s contact who exhibited meningococcal illness on the [Contact] Tab of the CMR and save.
 - After the CMR has updated, click ‘Show’ beside the contact.
 - With the **View Contact** open in show mode, select ‘Promote to CMR’; update, as needed.
 - For suspected outbreaks refer to Managing Special Situations section.

Contact Investigation

- 1) Review the patient’s occupation and activities collected during the Case Investigation and recorded on [Epidemiological] and [Notes] tabs.
- 2) Continue to interview patient / family to identify at risk activities 7 days prior to symptom onset till 24 hours of appropriate treatment, consider the following:
 - Patient’s occupation and living and/or sleeping accommodations; high-risk situations include those living in institutional or residential facilities, involved in direct patient care, and/or social or athletic activities.
- 3) Identify the following contacts based on activities 7 days prior to illness onset until 24 hours after appropriate antibiotic treatment (AAP Red Book, 2014):

- **High risk:** chemoprophylaxis **recommended** (close contacts):
 - Household contact, especially children younger than 2 years of age.
 - Child care or preschool contact.
 - Direct exposure to index patient's oral or respiratory secretions through kissing or sharing toothbrushes or eating utensils, or other markers of close social contact.
 - Mouth-to-mouth resuscitation, unprotected contact during endotracheal intubation, suctioning, or managing patient's airway.
 - Frequently slept or ate in same dwelling as index patient.
 - Passengers seated directly next to the infectious index case during prolonged airline flights (The [Pink Book](#) references lasting >8 hours.)
 - **Low risk:** chemoprophylaxis **not** recommended:
 - Casual contact: no history of direct exposure to index patient's oral secretions (e.g., school or work).
 - Indirect contact: only contact is with a high-risk contact, no direct contact with the index patient
 - Health care personnel without direct exposure to patient's oral or respiratory secretions and were not managing an airway
- 4) Create a line listing of close contacts. **[Contact]** Collect information on:
- Type of exposure and date(s) of exposure.
 - Any symptoms of meningitis or fever in contacts.
 - Information on immunization status
 - Information on the contact's occupation.
 - Note any school or daycare attendance. (Include facility name and location.)
- 5) Perform risk assessment of all contacts based on type and date of exposure
- 6) Refer symptomatic contacts for medical evaluation.
- 7) Follow-up with contacts as recommended under [Contact Management](#).

Isolation, Work and Daycare Restrictions

K.A.R 28-1-6 for Meningococcal Disease (Control of Cases):

- For each person hospitalized with a case, droplet precautions shall be followed for 24 hours following initiation of appropriate antimicrobial therapy.
- 1) Hospital Settings: Use droplet precautions in addition to universal precautions until 24 hours after the start of an appropriate antibiotic regime.
- 2) Reference K.A.R. 28-1-20 for immunization requirements for the current school year; on-line at: www.kdheks.gov/immunize/schoolInfo.htm
- 3) Routine vaccination also is recommended for certain persons who have increased risk for meningococcal disease, including:
- College freshmen living in dormitories;
 - Microbiologists who are routinely exposed to isolates of *N. meningitidis*;
 - Military recruits;
 - Those who travel to or reside in countries in which *N. meningitidis* is hyperendemic or epidemic, particularly with prolonged local contact;
 - Persons who have terminal complement component deficiencies; and
 - Persons who have anatomic or functional asplenia.

Case Management

- 1) Assure proper isolation measures are started as soon as meningococcal disease is suspected or even considered as a possibility.
- 2) Conduct a follow-up as needed to assure compliance with control measures, including work, school or daycare restrictions.
- 3) Follow up with cases, as indicated, to assure proper chemoprophylaxis was given to assure elimination of the organism in the nasopharynx (i.e., rifampin or ciprofloxacin).
- 4) Conduct a follow-up to determine outcome of illness, as needed.

Contact Management

Protection of contacts involves many public health prevention strategies including: education, prophylaxis, active surveillance and the possible use of vaccine.

- 1) Contacts should be identified as soon as possible and informed about their risk of disease and the need to seek immediate medical attention if febrile illness or other symptoms consistent with a meningococcal infection develop.
- 2) All contacts or potential contacts in the at-risk population should be educated on how the disease is transmitted and on actions to take to prevent transmission.
- 3) Chemoprophylaxis is recommended up until 14 days after the case's onset.
 - Decisions about chemoprophylaxis should be made after consulting with a KDHE epidemiologist and/or the contact's physician.
 - Chemoprophylaxis is indicated for all close (high risk) contacts, regardless of immunization status, when an exposure date was within the last 10 days
 - Those with the most recent exposure (<4 days) should receive first priority.
 - Oropharyngeal or nasopharyngeal cultures are not useful in determining the need for chemoprophylaxis and may delay effective preventive measures.
- 4) Chemoprophylaxis recommendations:
 - Rifampin, unless the contact is pregnant.
 - Adults and children ≥ 1 month of age: 10 mg/kg twice daily, orally, every 12 hours, for 2 days to a maximum of 600 mg/dose.
 - <1 month of age: 5 mg/kg twice daily, orally every 12 hours for 2 days.
 - Ceftriaxone is safe for use during pregnancy.
 - <15 years of age: 125 mg in a single IM injection.
 - ≥ 15 years of age: 250 mg in a single IM injection.
 - Ciprofloxacin is an alternative antimicrobial for prophylaxis therapy, but it is not recommended for pregnant women. It is considered for use in a mass chemoprophylaxis setting and in those less than 18 years of age if the benefits outweigh the risks to the patient. Some cases of ciprofloxacin resistance have been noted. Use only if fluoroquinolone-resistant strains of *N. meningitidis* have not been identified in the community.
- 5) Vaccination is not recommended to protect contacts of sporadic cases, but should be recommended to protect susceptible individuals from future exposures to the *N. meningitidis* serogroups A, C, Y, W-135 or B
 - Mass vaccination may be useful when a significant outbreak of disease due to serogroup A, C, Y, W-135 or B is continuing in a defined population. (Refer to [Managing Special Situations](#) for Outbreak Investigations.)

- If vaccine is administered as part of the investigation, report any adverse event that occurs after the administration of a vaccine to Vaccine Adverse Events Reporting System at <https://vaers.hhs.gov/index.html>.
- 6) All contacts should be placed under active surveillance for at least 10 days after their last contact with the infectious case.
 - All contacts should be monitored for fever and other early signs of infection.
 - Symptomatic contact: refer for medical evaluation, investigate and report to the state as a case; initiate any work, school, or daycare restrictions.
 - Routine culturing of nasopharynx of contacts is not indicated.
 - 7) For cases in daycare and institutions, initiate active surveillance of the daycare or institution for 2 incubation periods (i.e., 20 days).
 - 8) Discuss additional control strategies with an epidemiologist from the BEPHI.

Environmental

- 1) Apply disinfection measures (including proper disposal) as soon as possible after the discharge of infectious secretions from the nose or throat, or after the soiling of articles with nose or throat discharges.
- 2) All personal contact with such discharges or articles should be minimized prior to disinfection or disposal.
- 3) Terminal (thorough) cleaning should occur after the death or transfer of the patient or after the patient has ceased to be a source of infection.
- 4) In outbreak settings an investigation may be warranted to identify environmental factors (e.g., disinfection practices, ventilation patterns, etc.) that may favor droplet transmission.

Education

- 1) Provide education that includes basic information about the disease including means of transmission, and symptoms.
- 2) Instruct cases and contacts on the necessary isolation or any other restrictions.
- 3) Counsel contacts to watch for signs or symptoms of meningitis occurring within 10 days after exposure and to seek medical care promptly.
- 4) If necessary, prepare and distribute a press release in conjunction with senior health department staff and/or Office of Surveillance and Epidemiology.
- 5) Special attention may be needed for those not considered high risk contacts or whose exposure was greater than 10 days prior to alleviate their concerns and anxiety.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- Determine if there is an outbreak.
 - Outbreak definition:
 - Organization-based outbreak: 2-3 outbreak-associated cases within an organization during a 3-month period.
 - Community 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.
- Notify KDHE-BEPHI immediately, 1-877-427-7317.
- Organize and maintain all data related to outbreak:
 - Case counts: include 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.
 - Construct and maintain case listing which includes:
 - Record number, name, DOB (or age) and other demographics,
 - Symptoms; onset date and time; recovery date and time
 - Source of exposure (i.e., record number, setting, classroom),
 - Specimen collection date and lab results,
 - Case status (i.e., confirmed, probable, suspect)
 - Construct listing(s) of contacts as instructed in [Contact Management](#)
 - Organized by group setting and
 - Associated case (include record number of case exposing contact)
 - Use tracking tools (logbooks, chalkboards or databases) to record actions needed for each suspected case (i.e., deliver stool kit, call)
 - All epidemiologic data will be reported and managed with EpiTrax.
- Identify population(s) at risk of infection based on the scope and spread of the outbreak; use the information collected in case investigations to define:
 - Person: who is becoming ill (i.e., age, gender, occupations)
 - Place: where are the cases; settings or activities associations
 - Time: when did it start and is it still going on
- Laboratory testing: Determine the serogroup involved in the outbreak.
- Enhance surveillance and perform active case finding:
 - Maintain active surveillance with medical providers serving the affected communities for two incubation periods from last confirmed case.
- Outbreak control:

- Basic control measures may include:
 - Vaccinating people identified as being at increased risk
 - Making sure close contacts of a patient receive prophylaxis
- Based on all the information collected, control measures (including the decision to vaccinate) will be determined in consultation with KDHE-BEPHI using guidance from [CDC's Guidance for the Evaluation and Public Health Management of Suspected Outbreaks of Meningococcal Disease](#)
- 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.
 - ✓ MenB-FHbp: 3-dose series (0, 1-2, 6 months)
 - ✓ MenB-4C: 2-dose series (0, ≥ 1 month)
- 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.
- Objectives include:
 - Target efforts on those population(s) identified as at risk.
 - Evaluate the effectiveness of and consider amendments to the restrictions discussed in [Isolation, Work and Daycare Restrictions](#).
 - Establish protocols for control measures necessary to slow or prevent the transmission of disease in affected settings.

B. Case Attends College/University or Boarding School:

If a suspected or diagnosed case of meningococcal disease is reported on campus, the following intervention measures should be considered:

- Notify college administration and health care personnel.
- Intensify surveillance and increase awareness among college health services, community physicians, and hospitals.
- Educate on the campus and in surrounding areas about transmission.
- Pursue early diagnosis and treatment of cases and contacts.
- Contacts of meningococcal patients should receive antibiotic chemoprophylaxis even if they are vaccinated for meningococcal disease.
 - Use the definition of high risk contacts under [Contact Investigation](#) when evaluating living situations and the need for prophylaxis.
- Consider immunization of students to prevent additional cases (Refer to the [Outbreak Investigation](#) section.)

C. School or Child Care Settings:

- Coordinate activities with school nurse and/or administration.
- While the risk of transmission in a school is relatively low; the age of the case will determine the extent of chemoprophylaxis.
 - Daycare and preschool attendees are generally considered at higher risk for transmission due to the younger age of the children.
 - All children attending or visiting the facilities should be evaluated for at risk activities and interactions to determine the need for prophylaxis.
- Identify potential contacts to observe for symptoms and chemoprophylaxis, based on the following situations:
 - Child care centers: With extensive contact between children, consider entire class (or entire center if the child care center is not divided into classes). With minimum interaction between children, consider only individual(s) or groups with significant exposure.
 - Home child care setting: Consider all children, the child-care provider and members of his/her family who have had contact with case.
 - Schools: Consider patterns of interaction that increase the potential for sharing oral secretions among group members. Chemoprophylaxis groups with significant risk of exposure to the case's oral secretions.
 - Elementary school or middle school where students do not change classes frequently or high-risk settings such as residential schools for ill or developmentally delayed children: Consider entire classroom, staff, aides and volunteers. Investigate after school activities and core groups of close friends for exposure.
 - High school and other higher-level education facilities: Consider contacts based on risk of direct contact with case's oral secretions and the presence of activities that would allow for the exchange of oral secretions. Consider those who work closely with or sit next to the case (school or transport), those sharing living arrangements, and the case's core group of close friends and social or work contacts.
 - Extra-curricular activity: Other extra-curricular groups, including teams, are examined based on the risk of group activities allowing for the direct exchange of oral secretions. Direct exchange of oral secretions is allowed by sharing drinking cups or bottles, sharing eating utensils at a single setting, kissing or other markers of close social contact. Those inanimate objects that are not directly shared with contacts after being used by a case do not usually allow for this direct exchange of oral secretions. Exceptions are made for younger children who are more likely to have significant oral contact with toys and other inanimate objects.
 - For classrooms, teams and other groups in which there are > 2 confirmed cases, it may be appropriate to expand the definition of a close contact (i.e. entire class, team or group who would not have been considered with only one confirmed case).
 - Providing chemoprophylaxis to an entire school or large child care center is not recommended under normal circumstances.

- Create listing(s) of contacts organized by group setting. Evaluate extent of exposure for each group. For at-risk close contacts (those at risk for sharing oral secretions) perform the following:
 - Evaluate for symptoms of meningitis and refer symptomatic contacts for medical treatment.
 - Refer asymptomatic contacts for chemoprophylaxis.
 - Notify parents of close contacts of the case (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 2-week period for signs of illness, especially fever, and seek medical care immediately if illness should occur.
- As a case of invasive meningococcal illness in a school often causes panic in parents and in the community, discuss with the facility's administration if there is a need for and the best way to provide additional information about meningococcal disease and its transmission.
- Initiate active surveillance among close contacts and for at least 2 incubation periods (i.e., 20 days) after last case has been identified.
- Consider immunization of students to prevent additional cases if an outbreak occurs and the serogroup is covered by the vaccine. (Refer to the [Outbreak Investigation](#) section.)

DATA MANAGEMENT AND REPORTING TO THE KDHE

- A. Accept the case assigned to the LHD and record the date the LHD investigation was started on the [\[Administrative\]](#) tab.
- B. Organize and collect data.
- The [Meningococcal Disease Surveillance Worksheet \(Abbreviated Option\)](#) is provided to assist the investigator but does not have to be submitted to CDC or KDHE.
 - Investigators can collect and enter all required information directly into EpiTrax [\[Investigation\]](#), [\[Clinical\]](#), [\[Demographics\]](#), and [\[Epidemiological\]](#) tabs without using the paper forms.
 - During outbreak investigations, refer to guidance from a KDHE epidemiologist for appropriate collection tools.
- C. Report data collected during the investigation via EpiTrax.
- Verify that all data requested in [Step 1](#)) has been recorded on an appropriate EpiTrax [\[tab\]](#), or that actions are completed for a case lost to follow-up as outlined below.
 - Some data that cannot be reported on an EpiTrax [\[tab\]](#) may need to be recorded in [\[Notes\]](#) or scanned and attached to the record.
 - Paper report forms do not need to be sent to KDHE after the information is recorded in EpiTrax. The forms should be handled as directed by local administrative practices.
- D. If a case is lost to follow-up, after the appropriate attempts:
- Indicate 'lost to follow-up' on the [\[Administration\]](#) tab with the number of attempts to contact the case recorded.
 - Record at least the information that was collected from the medical records.
 - Record a reason for 'lost to follow-up' in [\[Notes\]](#).
- E. After the requirements listed under [Case Investigation](#) have been completed, record the "Date LHD investigation completed" field located on the [\[Administrative\]](#) tab.
- Record the date even if the local investigator's [Case](#) or [Contact Management](#) for the contact is not "Complete".
- F. Once the entire investigation is completed, the LHD investigator will click the "Complete" button on the [\[Administrative\]](#) tab. This will trigger an alert to the LHD Administrator so they can review the case before sending to the state.
- The LHD Administrator will then "Approve" or "Reject" the CMR.
 - Once a case is "Approved" by the LHD Administrator, BEPHI staff will review the case to ensure completion before closing the case.

Review the [EpiTrax User Guide, Case Routing](#) for further guidance.


Note: Events are entered into the Kansas surveillance system as "Meningococcal disease (Neisseria meningitidis)".

ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. Red Book: Report of the Committee on Infectious Disease, 30th Edition. Illinois, Academy of Pediatrics, 2015.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, Washington, DC, American Public Health Association, 2015.
- C. **Case Definitions:** wwwn.cdc.gov/nndss/
- D. **Kansas Regulations/Statutes Related to Infectious Disease:** www.kdheks.gov/epi/regulations.htm
- E. **CDC Guidance for the Evaluation and Public Health Management of Suspected Outbreaks of Meningococcal Disease, November 9, 2017:** www.cdc.gov/meningococcal/downloads/meningococcal-outbreak-guidance.pdf
- F. **Pink Book:** Epidemiology and Prevention of Vaccine-Preventable Diseases. Available at: www.cdc.gov/vaccines/pubs/pinkbook/index.html
- G. **Manual for the Surveillance of Vaccine-Preventable Diseases:** Available at: www.cdc.gov/vaccines/pubs/surv-manual/index.html .
- H. **Additional Information (CDC):** www.cdc.gov/vaccines/pubs/surv-manual/index.html

ATTACHMENTS

To view attachments in the electronic version:

1. Go to <View>; <Navigation Pane>; <Attachments> – OR – Click on the “Paper Clip”  icon at the left.
2. Double click on the document to open.