

Meningococcal Infection, Invasive rev Jan 2018

BASIC EPIDEMIOLOGY

Infectious Agent

Neisseria meningitidis is a Gram-negative, aerobic diplococcus with at least 13 serogroups. Serogroups A, B, C, Y, W-135 and X are all capable of causing outbreaks. In the United States and in Texas, B, C and Y are the most common serogroups.

Transmission

N. meningitidis spreads from person to person either by direct contact with respiratory secretions (e.g., kissing), indirect contact (e.g., sharing of eating utensils), or by aerosol droplets (e.g., coughing and sneezing). Up to 10% - 20% of people can be asymptomatic nasopharyngeal carriers of *N. meningitidis*. Less than 1% of those will progress to invasive disease.

Incubation Period

The incubation period is usually 3–4 days, but it can range from 1–10 days.

Communicability

A person can pass the infection to others for as long as the bacteria are present in discharges from the nose and mouth. A person is no longer infectious after 24 hours of appropriate antimicrobial treatment. (Antimicrobial treatment should be continued for the full duration that it is prescribed.)

Clinical Illness

- **Meningitis** is the most common presentation of invasive meningococcal disease. Meningococcal infection is similar to other forms of meningitis, with sudden onset of fever, headache and stiff neck, often accompanied by nausea, vomiting, photophobia (sensitivity to light) or altered mental status.
- **Meningococcal sepsis (meningococcemia or bacteremia)** is the most severe form and can occur without meningitis in 5%-20% of invasive infections. Sepsis is characterized by abrupt onset of fever and a petechial or purpuric (red or purplish spots caused by bleeding under the skin) rash, and is often associated with hypotension, shock, acute adrenal hemorrhage and multiple organ failure.
- Less common presentations of meningococcal disease include pneumonia, arthritis, otitis media and epiglottitis.
- Texas invasive meningococcal disease cases from 2010-2014 reported the following clinical illness manifestations: meningococcal meningitis (48%), meningococcal sepsis (34%), pneumonia (3%), septic arthritis (2%), peritonitis (1%), multiple manifestations (5%), unknown manifestation (7%).

Severity

The case fatality rate is 8%-15% even with appropriate antibiotic treatment. Sequelae occur in 11%-19% of people and may include hearing loss, neurologic disability, amputation or loss of limb use.

DEFINITIONS

Clinical Case Definition

Invasive meningococcal disease manifests most commonly as meningitis and/or meningococcemia that may progress rapidly to purpura fulminans, shock and death. However, other manifestations might be observed.

Laboratory Criteria for Diagnosis

- **Confirmed:**
 - Isolation of *Neisseria meningitidis* from a normally sterile site
 - Isolation of *Neisseria meningitidis* from purpuric lesions
 - Detection of *Neisseria meningitidis*- specific nucleic acid in a specimen obtained from a normally sterile site, using a validated polymerase chain reaction (PCR) assay
- **Probable:**
 - *Neisseria meningitidis* antigen detection by immunohistochemistry (IHC) on formalin-fixed tissue
 - *Neisseria meningitidis* antigen detection by latex agglutination of CSF
- **Suspect:**
 - Gram negative diplococci, not yet identified, isolated from a normally sterile site (e.g., blood or CSF)

Case Classification

- **Confirmed:** A case that meets at least one of the confirmed laboratory criteria
- **Probable:** A case that meets at least one of the probable laboratory criteria
- **Suspect:** A case that meets the suspect laboratory criteria, or a case with clinical purpura fulminans in the absence of a positive blood culture

Note: All *Neisseria meningitidis* isolates from normally sterile sites and/or purpuric lesions must be submitted to the DSHS laboratory for typing and molecular analysis.

See the Sterile Site and Invasive Disease Determination Flowchart in Appendix A for confirming that a specimen meets the criteria for sterile site.

See the Meningococcal Infection: Case Status Classification Flowchart at the end of this section for assistance with case classification.

Other Definitions

For a definition of “close contacts” see the Case Investigation section (subsection: Control Measures). For cluster and outbreak definitions see the Managing Special Situations section.

SURVEILLANCE AND CASE INVESTIGATION

Case Investigation

Local and regional health departments should investigate all reports of invasive meningococcal infections. Investigations should include an interview of the case or a surrogate to obtain a detailed exposure history. Please use the Meningococcal Infection Investigation Form available on the DSHS website: <http://www.dshs.state.tx.us/idcu/investigation/>.

Case Investigation Checklist

- An investigation should begin immediately for any person, living or deceased, who is suspected of having invasive meningococcal disease.
 - Immediately inform the Regional Health Department and DSHS EAIDB when an investigation is being done or considered.
- Confirm that laboratory results indicate invasive disease.
 - See the Sterile Site and Invasive Disease Determination Flowchart in Appendix A.
- Review medical records or speak to an infection preventionist or physician to obtain demographics and case-patient symptoms.
- Ensure that appropriate control measures are implemented (see Control Measures below).
- Interview the case (or surrogate) to identify close contacts (see “close contacts” definition in Control Measures section, below).
 - Obtain detailed information on close contacts including address, place of work, occupation, and daycare or school information.
 - If needed, the Respiratory Contact Tracking Form may be used to document contacts (available at <http://www.dshs.state.tx.us/idcu/investigation/>).
- Ensure that close contacts are offered and receive appropriate chemoprophylaxis.
- Ensure that all other appropriate control measures are implemented (see Control Measures).
- Within 24 hours of starting the investigation, contact the testing laboratory to ensure that the isolate has been forwarded to the DSHS laboratory (see Laboratory Procedures).
 - If an isolate (culture) is not available but invasive meningococcal disease is suspected, forward any specimen from a sterile site that is available.
 - If an isolate is available but no longer viable, please contact EAIDB at 512-776-7676 to discuss testing options.
- Complete the Meningococcal Infection Investigation Form using all of the following sources:
 - Medical records
 - Alternate or supplemental source: infection preventionist or physician responsible for the patient’s care during the meningococcal illness
 - Patient (or surrogate) interview
 - All possible sources of vaccination status including patient, parent/guardian, school, hospital records, primary care provider, and ImmTrac
- If applicable, complete steps in the Managing Special Situations section.
- Fax or securely email the completed investigation form and lab results to EAIDB.**
- Enter and submit for notification all suspect, probable, and confirmed invasive meningococcal cases in the NEDSS Base System (NBS).

Control Measures

Cases

- Investigate reports of suspected invasive meningococcal disease promptly to identify at-risk contacts.
- Start appropriate antibiotic treatment immediately upon diagnosis.
- Ensure that patients remain in respiratory isolation for 24 hours after the start of appropriate antibiotic therapy.
- Verify that school/daycare exclusion criteria are followed (see below).
- Disinfect any clothing or bedding that is soiled from nose or throat discharges. A patient's hospital room should be terminally cleaned upon discharge.

Contacts

- Advise contacts of signs and symptoms of illness, and refer them to their healthcare providers if they experience any symptoms compatible with invasive meningococcal disease.
- Recommend antibiotic postexposure prophylaxis for close contacts (regardless of meningococcal immunization status) who were exposed to the case in the 7 days before onset of disease in the case and until the case has had 24 hours of effective antibiotic therapy. Postexposure prophylaxis for close contacts should be initiated as soon as possible, ideally within 24 hours of identification of the index case and up to 14 days from the last exposure.
 - **Close Contacts Definition:** Close contacts of a patient who has meningococcal disease include household members (including dormitory room, barracks), child care center contacts, and persons directly exposed to the patient's oral/nasal secretions (e.g., by kissing, mouth-to-mouth resuscitation, unprotected endotracheal intubation, or unprotected endotracheal tube management).
 - The *Red Book: 2015 Report of the Committee on Infectious Diseases* lists the following categories of risk for contacts of people with meningococcal disease:

Managing Close Contacts

High risk: chemoprophylaxis recommended (close contacts)
<ul style="list-style-type: none"> • Household contacts, especially children younger than 2 years of age • Child care or preschool contact at any time during 7 days before onset of illness • Direct exposure to the index patient's secretions through kissing or through sharing toothbrushes or eating utensils—markers of close social contact—at any time during 7 days before onset of illness • Mouth-to-mouth resuscitation, unprotected contact during endotracheal intubation at any time 7 days before onset of illness • Frequently slept in same dwelling as index patient during 7 days before onset of illness • Passengers seated directly next to the index case during airline flights lasting more than 8 hours
Low risk: chemoprophylaxis not recommended
<ul style="list-style-type: none"> • 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 secretions <ul style="list-style-type: none"> ○ Note: Hospital personnel should receive prophylaxis only if they were directly exposed to the patient's nasal or throat secretions and failed to correctly use appropriate personal protective equipment (PPE).
In outbreak or cluster
<ul style="list-style-type: none"> • Chemoprophylaxis for people other than people at high risk should be administered only after consultation with local public health authorities.

- The Texas Medical Board recently changed its rules (Texas Administrative Code, Title 22, Part 9, Chapter 190, Subchapter B, §190.8) regarding the prescribing of prophylaxis for close contacts of patients with certain infectious diseases. Physicians can now prescribe antibiotics to contacts of invasive meningococcal disease cases without first medically evaluating the contact.
- Monitor close contacts for signs of illness, especially fever, for up to 10 days.
- Provide close contacts with meningococcal disease fact sheets and other information.
 - A fact sheet for meningococcal meningitis is available on the IDCU (Infectious Disease Control Unit) web site: http://www.dshs.state.tx.us/idcu/disease/meningococcal_invasive/faqs/
 - Information is also available on all types of meningococcal disease: <http://www.cdc.gov/meningococcal/about/>

Schools or Institutions

- When a case of invasive meningococcal disease is identified in a school or other institution, public health should immediately contact facility administrators to recommend that the institution rapidly communicate with its population, and to help guide messaging.
 - Information communicated should include:
 - Notification about the case (obtain consent if the name of the case is to be released)
 - Reassurance that the chance of another case is remote
 - Signs and symptoms of invasive meningococcal disease and instructions to seek care promptly if they occur
 - Chemoprophylaxis is not needed unless individuals have been contacted by public health authorities.
- Vaccination with available meningococcal vaccines offers longer-term protection and is routinely recommended for adolescents and others at increased risk.
 - Meningococcal conjugate vaccines (Menactra® and Menveo®) available in the US provide protection against 4 of the 5 most common serogroups of *N. meningitidis* (serogroups A, C, W, and Y).
 - Serogroup B vaccines (Trumenba® and Bexsero®) provides protection for the other most common serogroup, serogroup B.
 - Approximately 2 weeks are required following vaccination for the development of protective antibody levels.
 - For more information about these vaccines call the DSHS Immunization Division at 512-776-7284.

General Public

- Provide education, when needed:
 - There are 2 vaccines available in the US that provide protection against the 5 most common serogroups of *N. meningitidis* (serogroups A, B, C, W, and Y). These are meningococcal conjugate and serogroup B vaccines. For more information about these vaccines call the DSHS Immunization Division at 512-776-7284.
 - Routine hand washing and practicing respiratory etiquette (e.g., covering mouth and nose while sneezing or coughing) are essential to prevent the spread of bacteria.
 - Limit sharing food, eating utensils and other personal belongings.

Exclusion

Children with meningitis and bloodstream infections caused by *N. meningitidis* should be excluded from school and daycare until written permission is provided by their healthcare provider. According to the Texas Administrative Code (TAC), children in school and childcare settings shall be excluded until 24 hours after start of effective treatment and approval by health care provider.

Children with a fever from any infectious cause should be excluded from school and daycare for at least 24 hours after fever has subsided without the use of fever suppressing medications.

MANAGING SPECIAL SITUATIONS

If there are ≥ 2 suspected cases in the same institution or social group, an area or organization has met the outbreak threshold, and for guidance about other unusual situations, immediately notify EAIDB at **(800) 252-8239** or **(512) 776-7676**.

Attack Rate Calculations

Attack rates are calculated to determine the risk for disease among the general population and to determine whether overall rates have increased.

1. Determine if any cases are secondary or co-primary cases. If the two cases are determined not to be co-primary or secondary, evaluation should continue to see if the cases represent an organizational outbreak.
 - a. Primary case: A primary a case of invasive meningococcal disease is one that occurs in the absence of previous known close contact with another patient with invasive meningococcal disease.
 - b. Secondary case: A secondary case of invasive meningococcal disease is one that occurs among close contacts of a primary case-patient 24 hours or more after onset of illness in the primary patient. (Note: Occurrence of secondary cases will be rare if chemoprophylaxis is administered as recommended.)
 - c. Co-primary case: Co-primary cases are two or more cases that occur among a group of close contacts with onset of illness separated by less than 24 hours.
 - d. Close contacts: Close contacts of a patient who has invasive meningococcal disease include household members (including dormitory room, barracks), child care center contacts, and persons directly exposed to the patient's oral/nasal secretions (e.g., by kissing, mouth-to-mouth resuscitation, unprotected endotracheal intubation, or unprotected endotracheal tube management).
2. To calculate a primary attack rate all confirmed cases of the same serogroup should be summed, secondary cases should be excluded, and each set of co-primary cases should be counted as one case.

$$\text{Attack rate}/100,000 = \frac{\text{Number of primary confirmed or probable cases occurring during a 3-month period}}{\text{Number of population at risk during the same time period}} \times 100,000$$

Population at risk: Persons who are considered to be at increased risk for invasive meningococcal disease compared with historical rates of disease in the same group of the general US population. Population at risk is usually defined on the basis of community of residence or organizational affiliation. In organization-based outbreaks, the population at risk can be defined as the group of persons that best represent the affiliation. In community-based outbreaks, patients do not share any common affiliation besides an area of residence.

Two or More Cases with the Same or Similar PFGE Patterns

DSHS EAIDB monitors molecular laboratory data for invasive meningococcal disease cases whose isolates have indistinguishable (matching) or similar pulsed-field gel electrophoresis (PFGE) patterns. EAIDB defines a PFGE cluster as one of the following:

- At least 2 cases with matching pulsed-field gel electrophoresis (PFGE) patterns in a county in a 1-year period
- At least 2 cases with matching PFGE patterns anywhere in Texas in a 3-month period

When a PFGE cluster is identified:

- EAIDB will inform the Health Service Region (HSR); the HSR should inform the local health department(s) (LHDs) with jurisdiction over the cases (if applicable).
- If not already submitted, completed case investigation forms will be requested on cases that are part of the cluster.
- Case investigation forms for the clustered cases should be reviewed for common exposures.
- The investigating jurisdiction(s) may be asked to re-interview the cases or complete a supplemental case form.
- Threshold calculations may be conducted.
- Enhanced surveillance may be considered if cases are sufficiently temporally and/or geographically clustered or if they occur in a defined population and outbreak thresholds are not met.

Two or More Cases Associated with a School, Daycare, Nursing Home, Correctional Facility or Closed Setting

When ≥ 2 invasive meningococcal disease cases are associated with an organization, the local/regional health department:

- Should thoroughly investigate links between the cases
 - LHDs should work closely with HSRs and EAIDB to coordinate information on invasive meningococcal disease cases from different jurisdictions.
- Should recommend basic control measures including hand hygiene, and respiratory etiquette education for residents/patients and staff
- Should conduct active surveillance for new cases of disease for a minimum of 2 weeks after the onset of the last case
- Should take steps to reduce overcrowding (if applicable)
- Should determine the population of the organization or affiliation and calculate attack rates for the organization by classroom, grade, unit or other grouping.
 - Organization-based outbreak: The occurrence of ≥ 3 confirmed or probable cases of invasive meningococcal disease of the same serogroup in a period of ≤ 3 months among persons who have a common affiliation but no close contact with each other, resulting in a primary disease attack rate of >10 cases per 100,000 persons.
 - Organization-based outbreaks may occur among children, students, residents and/or staff at a university, school, daycare, nursing home, correctional facility, church, employer, club, sports team or other organizational or closed setting.
- May consider mass antibiotic chemoprophylaxis for limited or closed populations (e.g., a single school or residential facility)
 - If mass chemoprophylaxis is undertaken, it should be administered to all targeted persons at the same time.
 - It is possible that even in a vaccine-preventable, organization-based outbreak, antibiotic distribution may be a more timely intervention, since preventive antibodies take 7-10 days to develop after vaccination.

- Should vaccinate the population at risk if the attack rate is >10 cases per 100,000 population
 - In some instances, the attack rate will be >10 cases per 100,000 populations with only 2-3 cases. In these situations, vaccination may be considered after only 2 primary cases are identified.
 - The actual attack rate at which the decision to vaccinate is made may vary and the following factors should be considered:
 - Completeness of case reporting and number of possible cases of invasive meningococcal disease for which bacteriologic confirmation or serogroup data are not available
 - Occurrence of additional cases of invasive meningococcal disease after recognition of a suspected outbreak
 - Logistic and financial considerations
 - Consult with EAIDB and the DSHS Immunization Branch to determine the need for and availability of vaccine.

Note: In the United States, measures that have not been recommended for control of invasive meningococcal disease outbreaks include restricting travel to areas with an outbreak, closing schools or universities, or canceling sporting or social events.

Multiple Cases Located within a Community

When multiple cases occur in a community, the local/regional health department should:

- Thoroughly investigate links between the cases
 - LHDs should work closely with HSRs and EAIDB to coordinate information on meningococcal disease cases from different jurisdictions.
- Consider enhanced surveillance to detect additional cases in the community
- Determine the population of the community and calculate attack rates with the outbreak strain among the population at risk, as described in the *Control of Communicable Diseases Manual, Epidemiology and Prevention of Vaccine-Preventable Diseases* (“Pink book”) and *Manual for the Surveillance of Vaccine-Preventable Diseases*.
 - **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. Cases have no common affiliations to an organization but are instead linked by a shared, geographically defined community with a primary attack rate of >10 cases per 100,000 population.
 - Examples of settings for a community-based outbreak include neighborhood, zip code, school district, city or county, and may include populations with shared characteristics, such as men who have sex with men, as long as no affiliation to a specific organization is identified.
 - Note: For outbreak threshold calculations, population-based rates are used, and not age-specific attack rates, as have been calculated for college students.

When a community-based outbreak (based on calculations) is occurring:

- Conduct active surveillance to detect other cases in the population.
- Conduct a public education campaign.
- Immunize unvaccinated members of the at-risk population.
 - The actual attack rate at which the decision to vaccinate is made may vary and the following factors should be considered:
 - Completeness of case reporting and number of possible cases of invasive meningococcal disease for which bacteriologic confirmation or serogroup data are not available
 - Occurrence of additional cases of invasive meningococcal disease after recognition of a suspected outbreak
 - Logistic and financial considerations
 - Consult with EAIDB and the DSHS Immunization Branch to determine the need for and availability of vaccine.

Note: Mass chemoprophylaxis (with antibiotics) is not usually effective for widespread communities but may be considered for small sub-populations (e.g., schools) that are directly experiencing cases. If mass chemoprophylaxis is undertaken, it should be administered to all targeted persons at the same time.

Outbreaks

If an outbreak of meningococcal disease is suspected, notify the regional DSHS office or EAIDB at **(800) 252-8239** or **(512) 776-7676**.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School & Child-Care Facilities, and General Public Reporting Requirements

Laboratory confirmed and clinically suspected cases are required to be reported **immediately** to the local or regional health department or to DSHS EAIDB at **(800) 252-8239** or **(512) 776-7676**.

Local and Regional Reporting and Follow-up Responsibilities

Local and regional health departments should:

- Call DSHS EAIDB immediately when an investigation is being done or considered.
- Enter the case into NBS and submit an NBS notification on all **confirmed, probable, and suspect** cases to DSHS within 30 days of receiving a report of a confirmed, probable, or suspect case.
 - Please refer to the *NBS Data Entry Guidelines* for disease-specific entry rules (for link to NBS guidelines see Appendix D).
 - A notification can be sent as soon as the case criteria have been met. Additional information from the investigation may be entered upon completion of the investigation.
- Fax, send a secure email, or mail a completed investigation form when the NBS notification is submitted.
 - **In the event of a death, copies of the hospital discharge summary, death certificate and autopsy report should also be sent to DSHS EAIDB.**
 - Investigation forms may be faxed to **512-776-7616**, securely emailed to VPDTexas@dshs.texas.gov or mailed to:
 - Infectious Disease Control Unit
 - Texas Department of State Health Services
 - Mail Code: 1960
 - PO Box 149347
 - Austin, TX 78714-9347

When an outbreak is investigated, local and regional health departments should:

- Report outbreaks within 24 hours of identification to the regional DSHS office or to EAIDB at **(800) 252-8239** or **512-776-7676**.
- Submit a completed **Respiratory Disease Outbreak Summary Form** at the conclusion of the outbreak investigation.
 - Send a copy to the DSHS regional office and/or to EAIDB see above methods for sending.
 - The Respiratory Disease Outbreak Summary Form is available at <http://www.dshs.state.tx.us/idcu/investigation/>.

LABORATORY PROCEDURES

Neisseria meningitidis isolates from normally sterile sites and/or purpuric lesions are required to be submitted to the DSHS Laboratory for typing and molecular analysis. Before shipping specimens, be sure to notify DSHS EAIDB staff at **(512) 776-7676**.

Specimen Collection

- Submit isolates of *N. meningitidis* (preferred specimen) on blood or chocolate agar at ambient temperature.
 - Note: Isolates that are no longer viable can still be tested. Please contact EAIDB to discuss testing options. If an isolate/culture is not available, EAIDB recommends sending blood, CSF, or any other available specimen from a sterile site or purpuric lesions (for PCR testing at CDC).
- Submit blood in a red or tiger-top vacutainer. Transport at ambient temperature.
- Submit spinal fluid. Transport at room temperature. **DO NOT REFRIGERATE.**

Laboratory Submission Form

- Use the DSHS Laboratory G-2B Specimen Submission Form.
- For isolates of *N. meningitidis*:
 - On the G-2B Form in “Section 9. Required/Requested Submissions” check “*Neisseria meningitidis*”. Also select the appropriate box in “Section. 5 Bacteriology.”

<input type="checkbox"/> Malaria/Blood Parasite Exam @ <input type="checkbox"/> Schistosoma/Urine Parasite Exam @	<input type="checkbox"/> Worm Identification @ <input type="checkbox"/> Other:	<input type="checkbox"/> Norovirus		
Section 5. BACTERIOLOGY				
<p><u>Clinical specimen:</u></p> <input type="checkbox"/> Aerobic isolation <input type="checkbox"/> Anaerobic isolation <input type="checkbox"/> Culture, stool <input type="checkbox"/> Diphtheria Screen <input type="checkbox"/> GC/CT, amplified RNA probe <input type="checkbox"/> Haemophilus, isolation <input type="checkbox"/> Toxic shock syndrome toxin I assay (TSST 1) <p><u>Pure culture:</u></p> <input type="checkbox"/> Anaerobic identification <input type="checkbox"/> Organism suspected: _____	<p><u>Definitive Identification:</u></p> <input type="checkbox"/> Bacillus <input type="checkbox"/> Campylobacter <input type="checkbox"/> Enteric Bacteria <input type="checkbox"/> Gram Negative Rod <input type="checkbox"/> Gram Positive Rod <input type="checkbox"/> Group B Streptococcus (Beta Strep) <input type="checkbox"/> Haemophilus <input type="checkbox"/> Legionella <input type="checkbox"/> Neisseria <input type="checkbox"/> Pertussis / Bordetella <input type="checkbox"/> Staphylococcus <input type="checkbox"/> Streptococcus <input type="checkbox"/> Other	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #e1eef6;"> <th style="text-align: left; padding: 2px;">Section 9. REQUIRED/REQUESTED SUBMISSIONS</th> </tr> <tr> <td style="padding: 2px;"> <input type="checkbox"/> <i>Corynebacterium diphtheriae</i> ◊ <input type="checkbox"/> <i>E. coli</i> O157 or other STEC serotypes ◊ <input type="checkbox"/> EHEC, shiga-like toxin assay (Shigatoxin-producing <i>Escherichia coli</i>) ◊ <input type="checkbox"/> <i>Haemophilus influenzae</i> (from sterile sites and <5 years old) ◊ <input type="checkbox"/> <i>Listeria</i> ◊ <input type="checkbox"/> <i>Neisseria meningitidis</i> (from sterile sites or purpuric lesions) ◊ <input type="checkbox"/> Outbreak stool culture ◊ <input type="checkbox"/> <i>Salmonella</i> ◊ <input type="checkbox"/> <i>Shigella</i> ◊ <input type="checkbox"/> <i>Staphylococcus aureus</i> (VISA/VRSA) ◊ <input type="checkbox"/> <i>Streptococcus pneumoniae</i> (from sterile sites and <5 years old) ◊ <input type="checkbox"/> <i>Vibrio cholera</i> ◊ <input type="checkbox"/> <i>Vibrio sp.</i> ◊ </td> </tr> </table>	Section 9. REQUIRED/REQUESTED SUBMISSIONS	<input type="checkbox"/> <i>Corynebacterium diphtheriae</i> ◊ <input type="checkbox"/> <i>E. coli</i> O157 or other STEC serotypes ◊ <input type="checkbox"/> EHEC, shiga-like toxin assay (Shigatoxin-producing <i>Escherichia coli</i>) ◊ <input type="checkbox"/> <i>Haemophilus influenzae</i> (from sterile sites and <5 years old) ◊ <input type="checkbox"/> <i>Listeria</i> ◊ <input type="checkbox"/> <i>Neisseria meningitidis</i> (from sterile sites or purpuric lesions) ◊ <input type="checkbox"/> Outbreak stool culture ◊ <input type="checkbox"/> <i>Salmonella</i> ◊ <input type="checkbox"/> <i>Shigella</i> ◊ <input type="checkbox"/> <i>Staphylococcus aureus</i> (VISA/VRSA) ◊ <input type="checkbox"/> <i>Streptococcus pneumoniae</i> (from sterile sites and <5 years old) ◊ <input type="checkbox"/> <i>Vibrio cholera</i> ◊ <input type="checkbox"/> <i>Vibrio sp.</i> ◊
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<p>NOTES: All dates must be entered in mm/dd/yyyy format. For culture ID or typing, please provide biochemical reactions on reverse side of form or attach copy of biochemistry printout. Each test section (ex. Bacteriology) requires a separate form and specimen. Please see the form's instructions for details on how to complete this form. Visit our web site at http://www.dshs.texas.gov/lab/. @ = Provide patient history on reverse side of form to avoid delay of specimen processing. ◊ = All fields indicated in Section 2 must be completed, if available.</p>				

- For blood or spinal fluid specimens:
 - On the G-2B Form in “Section 5. BACTERIOLOGY,” check “Aerobic isolation” under “*Clinical specimen*”. Please write “*N. meningitidis*” in the white space next to “Aerobic isolation” (see below). Also, please check the box for *Neisseria meningitidis* in the required/ requested submission.

<input type="checkbox"/> Malaria/Blood Parasite Exam @	<input type="checkbox"/> Worm Identification @	<input type="checkbox"/> Norovirus
<input type="checkbox"/> Schistosoma/Urine Parasite Exam @	<input type="checkbox"/> Other:	Section 9. REQUIRED/REQUESTED SUBMISSIONS
Section 5. BACTERIOLOGY		
<u>Clinical specimen:</u>	<u>Definitive Identification:</u>	<input type="checkbox"/> Corynebacterium diphtheriae ø
<input checked="" type="checkbox"/> Aerobic isolation	<input type="checkbox"/> Bacillus	<input type="checkbox"/> E. coli O157 or other STEC serotypes ø
<input type="checkbox"/> Anaerobic isolation	<input type="checkbox"/> Campylobacter	<input type="checkbox"/> EHEC, shiga-like toxin assay (Shigatoxin-producing Escherichia coli) ø
<input type="checkbox"/> Culture, stool	<input type="checkbox"/> Enteric Bacteria	<input type="checkbox"/> Haemophilus influenza (from sterile sites and <5 years old) ø
<input type="checkbox"/> Diphtheria Screen	<input type="checkbox"/> Gram Negative Rod	<input type="checkbox"/> Listeria ø
<input checked="" type="checkbox"/> GC/CT, amplified RNA probe	<input type="checkbox"/> Gram Positive Rod	<input type="checkbox"/> Neisseria meningitidis (from sterile sites or purpuric lesions) ø
<input type="checkbox"/> Haemophilus, isolation	<input type="checkbox"/> Streptococcus (Beta Strep)	<input type="checkbox"/> Outbreak stool culture ø
<input type="checkbox"/> Toxic shock syndrome toxin I assay (TSST 1)	<input type="checkbox"/> Haemophilus	<input type="checkbox"/> Salmonella ø
Pure culture:	<input type="checkbox"/> Legionella	<input type="checkbox"/> Shigella ø
<input type="checkbox"/> Anaerobic identification	<input type="checkbox"/> Neisseria	<input type="checkbox"/> Staphylococcus aureus (VISA/VRSA) ø
<input type="checkbox"/> Organism suspected:	<input type="checkbox"/> Pertussis / Bordetella	<input type="checkbox"/> Streptococcus pneumoniae (from sterile sites and <5 years old) ø
	<input type="checkbox"/> Staphylococcus	<input type="checkbox"/> Vibrio cholera ø
	<input type="checkbox"/> Streptococcus	<input type="checkbox"/> Vibrio sp. ø
	<input type="checkbox"/> Other	

NOTES: All dates must be entered in mm/dd/yyyy format. For culture ID or typing, please provide biochemical reactions on reverse side of form or attach copy of biochemistry printout. Each test section (ex. Bacteriology) requires a separate form and specimen. Please see the form's instructions for details on how to complete this form. Visit our web site at <http://www.dshs.texas.gov/lab/>. @ = Provide patient history on reverse side of form to avoid delay of specimen processing. ø = All fields indicated in Section 2 must be completed, if available.

Specimen Shipping

- Provide a shipment tracking number to DSHS if possible.
- DO NOT ship specimens on a Friday or the day before a state holiday unless special arrangements have been made with the DSHS Laboratory.
- *N. meningitidis* is considered an infectious agent, biosafety level 2. The isolate should be triple-contained in accordance with federal regulations.
- Ship specimens to:

Laboratory Services Section, MC-1947
 Texas Department of State Health Services
 Attn. Walter Douglass (512) 776-7569
 1100 West 49th Street
 Austin, TX 78756-3199

Frequent Causes for Rejection:

- Discrepancy between patient name on tube and name on submission form
 - Include two patient identifiers on the specimen media such as patient first and last name AND date of birth.
- Expired media used

UPDATES

January 2018

- Available vaccines offered for meningococcal disease
- Community- based outbreak definition and settings
- VPD team email address added as method of securely sending case investigation form
- Updated G-2B guidance

FLOW CHART rev Apr 2017

**Invasive Meningococcal Infection:
Case Status Classification**

