Streptococcus pneumoniae, Invasive (Pneumococcal Disease) rev Jan 2021

BASIC EPIDEMIOLOGY

Infectious Agent
Streptococcus pneumoniae (*S. pneumoniae*) are beta-hemolytic, Gram-positive cocci.

Transmission
Transmission of *S. pneumoniae* occurs as a result of direct person-to-person contact via respiratory droplets and by autoinoculation in persons carrying the bacteria in their upper respiratory tract.

Incubation Period
The incubation period varies by type of infection and can be as short as 1 to 3 days.

Communicability
The period of communicability is unknown. It may be as long as the organism is present in respiratory tract secretions but is probably less than 24 hours after effective antimicrobial therapy is begun.

Clinical Illness
The major clinical manifestations of invasive pneumococcal disease are bacteremia and meningitis. Pneumonia is the most common clinical presentation of pneumococcal disease among adults. Symptoms generally include an abrupt onset of fever and chills or rigors. Other common symptoms include:

- pleuritic chest pain,
- productive cough,
- shortness of breath,
- rapid breathing,
- hypoxia,
- rapid heart rate,
- malaise and weakness.

Bacteremia without a known site of infection is the most common invasive clinical presentation of pneumococcal infection among children 2 years of age and younger.

Severity
CDC estimates that 150,000 hospitalizations from pneumococcal pneumonia occur annually. Pneumococci account for up to 30% of adult community-acquired pneumonia. Bacteremia occurs in up to 25-30% of patients with pneumococcal pneumonia. The case fatality rate of pneumococcal pneumonia is 5%-7% and may be much higher among elderly persons. The case fatality rate of pneumococcal bacteremia is about 20%, but may be as high as 60% among elderly persons. The case fatality rate of pneumococcal meningitis is about 30% and may be as high as 80% among elderly persons. Patients with asplenia who develop bacteremia may experience a fulminant clinical course.

DEFINITIONS

Clinical Case Definition

Streptococcus pneumoniae cause many clinical syndromes depending on the site of infection (e.g., acute otitis media, pneumonia, bacteremia, or meningitis). Only invasive *Streptococcus pneumoniae* disease is reportable.

Laboratory Criteria for Diagnosis

- Isolation of *S. pneumoniae* from a normally sterile site.

Normally sterile sites do *not* include:

- Anatomical areas of the body that normally harbor either resident or transient flora (bacteria) including mucous membranes (throat, vagina), sputum and skin, or abscesses or localized soft tissue infections.

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

Case Classification

- **Confirmed**: A case that is laboratory confirmed
- **Probable**: A case with detection of *S. pneumoniae* from a normally sterile site using a culture independent diagnostic test (CIDT) (e.g., PCR, antigen based tests) without isolation of the bacteria

See the Streptococcal Infection: Case Status Classification Flowchart in Appendix A for assistance with case classification.

Note: Cases less than five years of age are required to have an isolate from sterile site submitted to the DSHS laboratory for serotyping.

SURVEILLANCE AND CASE INVESTIGATION

Case Investigation
Local and regional health departments should investigate all reports of suspected *Streptococcus pneumoniae.* In-depth investigation involving patient interviews is not required, but **it is necessary to confirm case status and vaccination status**.

Case Investigation Checklist

- ☐ Confirm that laboratory results meet the case definition. Only specimens from sterile sites are accepted as evidence of invasive disease.
  - See the Sterile Site and Invasive Disease Determination Flowchart for confirming that a specimen meets the criteria for sterile site.
- ☐ Review medical records or speak to an infection preventionist or physician to verify that the case meets case definition, identify underlying health conditions and describe the course of illness.
  - The Streptococcus pneumoniae, invasive Case Investigation Form is available at http://www.dshs.state.tx.us/idcu/investigation/ and can be used to record information. **Send this completed form to DSHS for all cases**.
- ☐ Determine vaccination status of the case. Sources of vaccination status that should be checked include:
  - Case (or parent), ImmTrac2, hospital medical records, school nurse records, primary care provider, etc.
- ☐ For children <5 years of age, the laboratory is required by the Texas Administrative Code to forward an isolate from sterile site to the DSHS laboratory for serotyping (see Laboratory Procedures below).
- ☐ If applicable, see the Managing Special Situations section.
- ☐ All confirmed *Streptococcus pneumoniae* case investigations must be entered and submitted for notification in the NEDSS Base System (NBS). Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.
- ☐ Fax, send secure email, or mail completed investigation form for all cases to EAIDU (see Reporting and Data Entry Requirements below).

Control Measures

- Provide education on *Streptococcus pneumoniae* as needed.
- Recommend that anyone experiencing symptoms be evaluated by a healthcare provider.
- Promote respiratory etiquette and hand hygiene.
- Encourage vaccination per ACIP guidance.
  - Pneumococcal conjugate vaccine (PCV13) is recommended for all children younger than 5 years old, all adults 65 years or older, and people 6 years or older with certain risk factors.
  - Pneumococcal polysaccharide vaccine (PPSV23) is recommended for all adults 65 years or older. People 2 years through 64 years of age who are at high risk of pneumococcal disease should also receive PPSV23.

Managing Close Contacts
Special management of close contacts has no significant value for routine situations.

Treatment
Certain antibiotics are effective at treating *S. pneumoniae* infection.

Exclusion
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

Case is a Suspected Healthcare-Associated (Nosocomial) Infection
If one or more nosocomial (healthcare-associated) cases occur in patients of the same hospital, residential care facility, or other long-term care facility; and the cases have no other identified plausible source of infection; or if other circumstances suggest the possibility of nosocomial infection, notify EAIDU VPD team at **(800) 252-8239 or (512) 776-7676**. The DSHS EAIDU Healthcare-Associated Infections (HAI) Team or the regional HAI epidemiologist should also be notified and should work with the local health department to investigate the possibility of transmission within the healthcare setting.

Outbreaks
If an outbreak of *S. pneumoniae* is suspected, notify the regional DSHS office or EAIDU at **(800) 252-8239 or (512) 776-7676**.

The local/regional health department should work with the facility to:

- Review infection prevention practices currently in place.
- Ensure everyone gets hand hygiene and respiratory etiquette education.
- Ensure that symptomatic staff members are excluded from work.
- Ensure an adequate supply of personal protective equipment (PPE) (e.g., gowns, masks).
- Ensure that staff members wear PPE for all respiratory illnesses without an identified etiology.
- Cohort ill patients/residents together.
- Encourage anyone with symptoms to be evaluated by a healthcare provider.
- Review vaccination status of exposed persons and recommend vaccination per ACIP guidance.

Note: Treatment of asymptomatic carriers is considered ineffective.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School & Child-Care Facilities, and General Public Reporting Requirements
Confirmed cases are required to be reported **within 1 week** to the local or regional health department or to DSHS EAIDU at **(800) 252-8239 or (512) 776-7676.**

Local and Regional Reporting and Follow-up Responsibilities
Local and regional health departments should:

- Enter the case into NBS and submit an NBS notification on all **confirmed** cases to DSHS within 30 days of receiving a report of a confirmed case.
    - Please refer to the *NBS Data Entry Guidelines* for disease-specific entry rules.
    - 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 within 30 days of completing the investigation for all cases.
    - Investigation forms may be faxed to **512-776-7616**, securely emailed to VPDTexas@dshs.texas.gov or mailed to:

      Emerging and Acute Infectious Disease 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 EAIDU at **(800) 252-8239 or 512-776-7676**. Submit a completed **Respiratory Disease Outbreak Summary Form** at the conclusion of the outbreak investigation.
    - The Respiratory Disease Outbreak Summary Form is available at http://www.dshs.state.tx.us/idcu/investigation/.

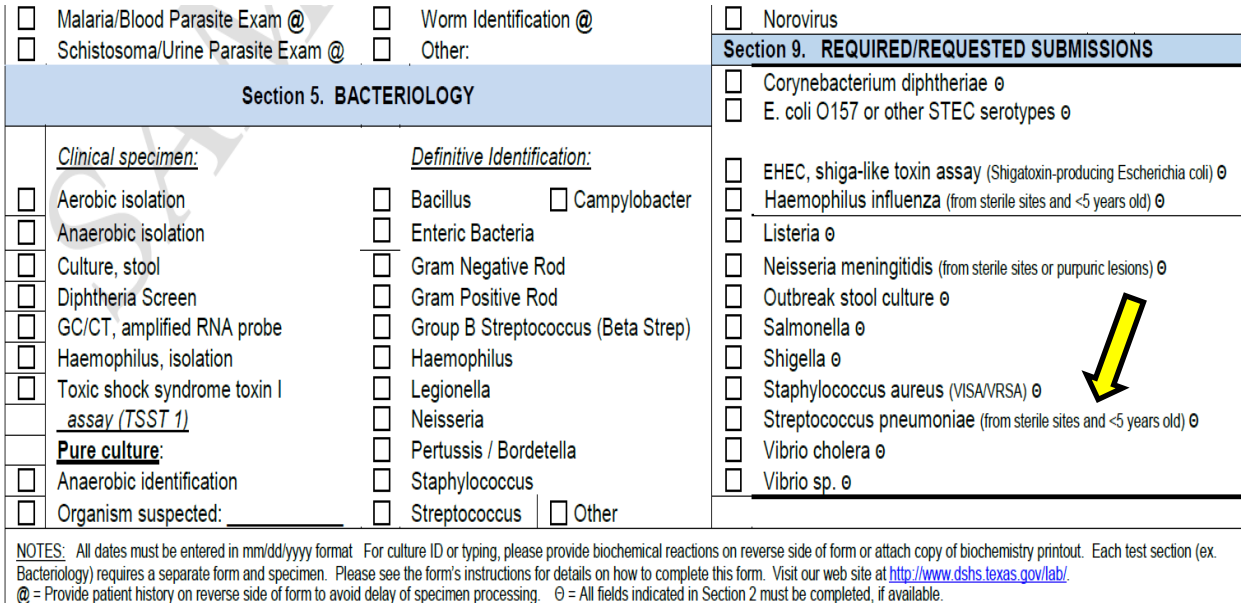
LABORATORY PROCEDURES

Testing for pneumococcal disease is widely available from most hospital or private laboratories.

The only exception is serotyping of isolates to determine if the strain was vaccine-preventable or not. Currently, serotyping of isolates is only available through the DSHS Laboratory and only offered for cases less than five years of age. Isolates must be from a sterile site. Serotyping for cases less than five years of age is required by the TAC.

Isolate Submission

- Submit isolates of *S. pneumoniae* on appropriate media such as blood or chocolate agar slants (or media that has the necessary growth requirements for *S. pneumoniae)* at ambient temperature.
- Ship isolates to the DSHS laboratory via overnight delivery.
- Use Specimen Submission form G-2B.
- For cases <5 years old with isolate from a sterile site, Under Section 49, Required/Requested Submissions select the *Streptococcus pneumoniae* for cases under five years old and from a sterile site.



☐ Malaria/Blood Parasite Exam @ ☐ Worm Identification @
☐ Schistosoma/Urine Parasite Exam @ ☐ Other:

Section 5. BACTERIOLOGY

Clinical specimen:	*Definitive Identification:*
☐ Aerobic isolation	☐ Bacillus ☐ Campylobacter
☐ Anaerobic isolation	☐ Enteric Bacteria
☐ Culture, stool	☐ Gram Negative Rod
☐ Diphtheria Screen	☐ Gram Positive Rod
☐ GC/CT, amplified RNA probe	☐ Group B Streptococcus (Beta Strep)
☐ Haemophilus, isolation	☐ Haemophilus
☐ Toxic shock syndrome toxin I assay (TSST 1)	☐ Legionella
	☐ Neisseria
Pure culture:	☐ Pertussis / Bordetella
☐ Anaerobic identification	☐ Staphylococcus
☐ Organism suspected: _____	☐ Streptococcus ☐ Other

☐ Norovirus

Section 9. REQUIRED/REQUESTED SUBMISSIONS

☐ Corynebacterium diphtheriae ϴ
☐ E. coli O157 or other STEC serotypes ϴ
☐ EHEC, shiga-like toxin assay (Shigatoxin-producing Escherichia coli) ϴ
☐ Haemophilus influenza (from sterile sites and <5 years old) ϴ
☐ Listeria ϴ
☐ Neisseria meningitidis (from sterile sites or purpuric lesions) ϴ
☐ Outbreak stool culture ϴ
☐ Salmonella ϴ
☐ Shigella ϴ
☐ Staphylococcus aureus (VISA/VRSA) ϴ
☐ Streptococcus pneumoniae (from sterile sites and <5 years old) ϴ
☐ Vibrio cholera ϴ
☐ Vibrio sp. ϴ

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. ϴ = All fields indicated in Section 2 must be completed, if available.

Specimen Shipping

- DO NOT mail on a Friday or the day before a state holiday unless special arrangements have been made in advance with the DSHS Laboratory.
- 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

Causes for Rejection

- Discrepant or missing information between isolate and paperwork
  - Two identifiers not listed on the isolate such as patient first and last name AND date of birth
- Expired media used

UPDATES

January 2021

- Requirement to submit completed case investigation form for all cases.
- New investigation form and hyperlink to investigation forms updated.
- Updated G-2B Guidance.
- Added flow chart.

FLOW CHART rev March 2021