

# *Streptococcus pneumoniae*, Invasive (Pneumococcal Disease) rev Jan 2016

## 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

The case fatality rate of pneumococcal pneumonia is 5%-7% and may be much higher among elderly persons. Bacteremia occurs in about 25%-30% of patients with pneumococcal pneumonia. 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. *S. pneumoniae* disease is estimated to cause 175,000 hospitalizations annually.

## 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 Confirmation

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

**Normally sterile site:** Invasive diseases typically cause significant morbidity and mortality.

Sterile sites include:

- blood (excluding cord blood)
- cerebrospinal fluid (CSF)
- pericardial fluid
- pleural fluid
- peritoneal fluid
- bone or bone marrow

The following are also considered sterile sites when certain other criteria are met:

- Joint fluid when the joint surface is intact (no abscess or significant break in the skin).
- Internal body sites (brain, heart, liver, spleen, vitreous fluid, kidney, pancreas, lymph node or ovary) when the specimen is collected aseptically during a surgical procedure.

### 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 Classifications

- **Confirmed:** A case that is laboratory confirmed
- **Probable:** No probable case definition

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

## SURVEILLANCE AND 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 Invasive Streptococcal Case Report Form is available at <http://www.dshs.state.tx.us/idcu/investigation/> and can be used to record information. This form does not need to be sent to DSHS.

- Determine vaccination status of the case. Sources of vaccination status that should be checked include:
  - Case (or parent), ImmTrac, school nurse records, primary care provider, etc.
- For children <5 years of age, ask the laboratory to forward the specimen to DSHS for serotyping (voluntary activity, 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.

### 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.

### 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 the IRID team lead in EAIDB at **(800) 252-8239 or (512) 776-7676**. The DSHS EAIDB 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 is suspected, notify EAIDB 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 Facility, 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 EAIDB 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.
- If the investigator filled out an investigation form, fax (or mail) it when the NBS notification is submitted.
  - Investigation forms may be faxed to **512-776-7616** 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 **512-776-7676**.
- Submit a completed **Respiratory Disease Outbreak Summary Form** at the conclusion of the outbreak investigation.
  - Fax a copy to the DSHS regional office and/or to EAIDB at 512-776-7676
  - 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.

### 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. Under Section 4, Bacteriology, write in “S. pneumo” next to Serotyping.

Section 4. BACTERIOLOGY	
<u>Clinical specimen:</u>	<u>Pure culture:</u>
<input type="checkbox"/> Aerobic isolation	<input type="checkbox"/> Anaerobic identification
<input type="checkbox"/> Anaerobic isolation	<input type="checkbox"/> Organism suspected: _____
<input type="checkbox"/> Culture, stool	<u>Definitive Identification:</u>
<input type="checkbox"/> Diphtheria Screen	<input type="checkbox"/> Bacillus
<input type="checkbox"/> EHEC, shiga-like toxin assay	<input type="checkbox"/> Campylobacter
<input type="checkbox"/> GC/CT, amplified RNA probe	<input type="checkbox"/> Enteric Bacteria
<input type="checkbox"/> GC Screen	<input type="checkbox"/> Gram Negative Rod
<input type="checkbox"/> Group B Strep Screen	<input type="checkbox"/> Gram Positive Rod
<input type="checkbox"/> Haemophilus, isolation	<input type="checkbox"/> Group B Streptococcus (Beta Strep)
<input type="checkbox"/> Toxic shock syndrome toxin I assay (TSST 1)	<input type="checkbox"/> Haemophilus
<u>Serotyping:</u> <i>S. pneumo</i>	<input type="checkbox"/> Legionella
<input type="checkbox"/> E.coli	<input type="checkbox"/> Neisseria
<input type="checkbox"/> Haemophilus influenzae	<input type="checkbox"/> Pertussis / Bordetella
<input type="checkbox"/> Neisseria meningitidis	<input type="checkbox"/> Staphylococcus
<input type="checkbox"/> Salmonella	<input type="checkbox"/> Streptococcus
<input type="checkbox"/> Shigella	<input type="checkbox"/> Vibrio
<input type="checkbox"/> Vibrio cholera	<input type="checkbox"/> Other:

### 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
- Expired media used

## UPDATES

- Definitions: minor change to Clinical Case Definition to bring this document in line with Epi Case Criteria Guide (ECCG) changes
- Surveillance and Case Investigation: minor changes to Case Investigation Checklist including that submitting isolates on children <5 years old is a voluntary activity