

Streptococcal, Invasive Infections (Group A *Streptococcus* or *Streptococcus pneumoniae*) Investigation Guideline

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Streptococcal, Invasive Infections From Group A *Streptococcus* or *Streptococcus pneumoniae*

Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 1995) – Invasive, Group A *Streptococcus*

A. Clinical Description for Public Health Surveillance:

- Any of several clinical syndromes, including pneumonia, bacteremia in association with cutaneous infection (e.g., cellulitis, erysipelas, or infection of a surgical or nonsurgical wound), deep soft-tissue infection (e.g., myositis or necrotizing fasciitis), meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (i.e., puerperal fever), neonatal sepsis, and nonfocal bacteremia.

B. Laboratory Criteria for Case Classification:

- Isolation of group A *Streptococcus* (*Streptococcus pyogenes*) by culture from a normally sterile site (e.g., blood or cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid).

C. Case Classification:

- Confirmed: A case that is laboratory confirmed

Note: Cases with clinical manifestations of Toxic Shock Syndrome (i.e., signs of toxicity with rapid progression of disease) should be investigated and reported as “Toxic Shock Syndrome, *Streptococcus*.” All other invasive Group A *Streptococcus* are reported as “Streptococcal Disease, Invasive, Group A.”

CASE DEFINITION (CDC 2007) – *S. pneumoniae*, Invasive Disease

A. Clinical Description for Public Health Surveillance:

- *Streptococcus pneumoniae* causes many clinical syndromes, depending on the site of infection (e.g., acute otitis media, pneumonia, bacteremia, or meningitis). Starting in 2000, a conjugate pneumococcal vaccine is recommended for prevention of pneumococcal disease in the pediatric population.

B. Laboratory Criteria for Case Classification:

- Isolation of *Streptococcus pneumoniae* from a normally sterile site (e.g., blood or cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid).

C. Case Classification:

- Confirmed: A clinically compatible case caused by laboratory-confirmed culture of *S. pneumoniae* from a normally sterile site confirmed

Note: Only cases in children less than five years of age are reported to the CDC. Cases are reported as “*Streptococcus pneumoniae*, invasive”. If additional information indicates a drug resistant case, the case is then reclassified as “*Streptococcus pneumoniae*, invasive, drug-resistant”. (See next case definition.)

CASE DEFINITION (CDC 2007) – *Streptococcus pneumoniae*, Drug-Resistant Invasive Disease (DRSP)

A. Clinical Description for Public Health Surveillance

- Same as above for invasive *Streptococcus pneumoniae*.

B. Laboratory Criteria for Case Classification:

- Isolation of *S. pneumoniae* from a normally sterile site (e.g., blood, cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid) and
- "Nonsusceptible" isolate (i.e., intermediate- or high-level resistance* of the *S. pneumoniae* isolate to at least one antimicrobial agent currently approved for use in treating pneumococcal infection.)

* Resistance defined by National Committee for Clinical Laboratory Standards (NCCLS)-approved methods and NCCLS-approved interpretive minimum inhibitory concentration (MIC) standards ($\mu\text{g/ml}$) for *S. pneumoniae*. NCCLS recommends that all invasive *S. pneumoniae* isolates found to be "possibly resistant" to beta-lactams by oxacillin screening should undergo further susceptibility testing by using a quantitative MIC method acceptable for penicillin, extended-spectrum cephalosporins, and other drugs as clinically indicated.

C. Case Classification:

- Confirmed: A clinically compatible case caused by laboratory-confirmed culture of *S. pneumoniae* from a normally sterile site confirmed
- Probable: A clinically compatible case caused by laboratory-confirmed culture of *S. pneumoniae* identified as "nonsusceptible" (i.e., an oxacillin zone size of less than 20 mm) when oxacillin screening is the only method of antimicrobial susceptibility testing performed

D. Laboratory Testing:

- Gram stains and cultures performed routinely by commercial laboratories.
- Remarks: Submission of invasive Group A *Streptococcus* and *S. pneumoniae* isolates to the Kansas Health and Environmental Laboratories (KHEL) is required by law.
- Shipping of isolates: Use Miscellaneous Infectious Disease (IDS) Shipper.
- For additional information and/or questions concerning isolate submission, and laboratory kits call (785) 296-1620 or refer to online guidance at www.kdheks.gov/labs/packaging_and_shipping.html.

E. Bioterrorism Potential: None.

F. Outbreak Definition:

Settings and/or locations that require prompt public health action includes:

- Outbreaks of rheumatic fever;
- Clusters in military institutions; and
- Clusters in hospitals or long-term care facilities;
- Outbreaks of invasive disease in childcare and/or school settings

INVESTIGATOR RESPONSIBILITIES

A. Investigation Related Tasks and Activities:

- 1) Confirm diagnosis with appropriate medical provider.
 - Obtain information that supports clinical findings in the case definition and information on the onset date of the symptoms.
 - Obtain information on any laboratory tests performed and results.
 - Gram stain results should be available within 1 hour of any CSF collection. Culture results may take more than 48 hours.
 - If *Streptococcus pneumoniae* or group A *Streptococcus* was isolated from clinical specimen, ensure bacterial isolate was sent to state lab.
 - If susceptibility testing was done, obtain results (including oxacillin screen results).
 - For hospitalization, obtain medical records, including admission notes, progress notes, lab report(s), and discharge summary.
- 2) Further case investigation will be needed only in situations involving CSF isolates (i.e., meningitis case), a case of invasive *S. pneumoniae* in a child <5 years of age, an outbreak or as determined by the state health department.
- 3) Contact investigations are not usually warranted, except in outbreaks or as determined by the state health department.
- 4) Report all cases to the KDHE Office of Surveillance and Epidemiology, using established methods. Meningitis cases require immediate notification within 4 hours of the initial report.

B. Notifications:

- 1) Report all meningitis cases by telephone to the Local Health Officer, the local on-call epidemiologist and KDHE (1-877-427-7317) within 4 hours of initial report.
- 2) As appropriate, use the notification letter(s) and the disease fact sheet to notify the case, contacts and other individuals or groups.

EPIDEMIOLOGY

In the United States, the estimated rate of Group A Streptococcal (GAS) disease is 3.3 cases per 100,000. It occurs year-round with peak incidence from December through March. Individuals with chronic cardiac or pulmonary disease, diabetes, HIV and those that inject drugs or abuse alcohol may be at a higher risk. Varicella infection is also a significant risk factor. GAS may be followed by complications of rheumatic fever and glomerulonephritis.

Streptococcus pneumoniae is a leading cause worldwide of illness and death for young children, persons with underlying medical conditions, and the elderly. It is the most commonly identified cause of bacterial pneumonia; and, since the widespread use of vaccines against *Haemophilus influenzae* type b, it has become the most common cause of bacterial meningitis in the United States. Rates of invasive disease are highest among persons younger than 2 years of age and those 65 years of age or older. Pneumococci can be found in the upper respiratory tract of 15% of well adults; in child care settings, up to 65% of

children are colonized. Although pneumococcal carriage can lead to invasive disease, acute otitis media (AOM) is the most common clinical manifestation among children and the most common outpatient diagnosis resulting in antibiotic prescriptions in that group. Approximately 12% of all patients with invasive pneumococcal disease die of their illness, but case-fatality rates are higher for the elderly and patients with certain underlying illnesses.

Before 1990, *S. pneumoniae* was almost uniformly susceptible to penicillin, allowing most physicians to treat persons with severe infections with penicillin alone. However, during the 1990s, resistance to penicillin and to multiple classes of antimicrobial agents spread rapidly in the United States, with an increasing trend of invasive pneumococci resistant to three or more drug classes. In 1998, 24% of invasive pneumococcal isolates were non-susceptible to penicillin, and 78% of these strains belonged to five of the seven serotypes included in PCV7, a 7-valent pneumococcal polysaccharide–protein conjugate vaccine. Following the introduction of PCV7 into the routine childhood immunization program in 2000, the incidence of antibiotic-resistant invasive disease declined substantially. In 2004, the rate of penicillin- non-susceptible invasive disease caused by serotypes included in PCV7 had declined by 98% among children younger than 2 years of age and by 79% among adults 65 years or older. In contrast, there was an increase in penicillin-resistant disease caused by serotypes not included in PCV7, but the magnitude of this effect remains small.

DISEASE OVERVIEW

A. Agent:

Group A streptococci disease is caused by the bacterium, *Streptococcus pyogenes*. There are > 100 serological types identified within group A.

Streptococcus pneumoniae, Gram positive diplococcus. Nearly all strains causing invasive disease are encapsulated; there are 90 known capsular serotypes with distribution varied by region and with age.

B. Clinical Description:

Any of several clinical syndromes, including pneumonia, bacteremia and meningitis.

Group A streptococci can also cause bacteremia in association with cutaneous infection (e.g., cellulitis, erysipelas, or infection of a surgical or nonsurgical wound), deep soft-tissue infection (e.g., myositis or necrotizing fasciitis), , peritonitis, osteomyelitis, septic arthritis, postpartum sepsis, and neonatal sepsis. Potential complications of GAS infection include acute rheumatic fever and glomerulonephritis.

Streptococcus pneumoniae is a cause of acute otitis media (AOM) and mastoiditis.

C. Reservoirs: Humans.

D. Mode(s) of Transmission:

The bacteria that cause GAS and *Streptococcus pneumoniae* are transmitted

person-to-person by large droplet spread and/or by contact with respiratory secretions. Casual contact can result in nasopharyngeal carriage of the organism without illness developing. Individuals with acute respiratory tract infections (particularly nasal) can transmit noninvasive infection (i.e. upper respiratory infections or pharyngitis). Invasive disease is not transmitted person to person as it only occurs after the bacteria that have colonized or infected a person get past the defenses of the person who is infected or colonized.

Nasal, throat, skin, anal and vaginal carriers of Group A *streptococcus* have been responsible for nosocomial outbreaks of surgical wound infections. Streptococcal pharyngitis has been associated with contaminated food ingestion.

E. Incubation Period:

Group A *Streptococcus*: Short, usually 1-3 days.

Streptococcus pneumoniae: Unknown, probably short, 1-4 days.

F. Period of Communicability:

As long as the organism is present in respiratory secretions. If treated with appropriate antibiotics, cases are considered noninfectious 24 hours after treatment begins.

G. Susceptibility and Resistance:

Group A *Streptococcus*: Immunity develops only against specific strains and/or exotoxins.

Streptococcus pneumoniae: Immunity associated with the presence of circulating bactericidal and /or anticapsular antibody, acquired transplacentally, from prior infection or from immunization

H. Treatment:

Group A *Streptococcus*: Penicillin with dosing to assure adequate therapeutic level for 10 days. Clindamycin and cephalosporins are acceptable alternatives.

Streptococcus pneumoniae: Penicillin, ceftriaxone, or cefotaxime are drugs of choice. When resistance is widespread, treatment will usually include a broad-spectrum cephalosporin, and often vancomycin, until results of antibiotic sensitivity testing are available.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Standard investigation activities include the following:

- 1) Confirmation of diagnosis using case definition.
- 2) Collection of demographic data (birth date, county, sex, race/ethnicity)
 - If less <6 years of age, is patient in daycare?
- 3) Collection of clinical and vaccine status data:
 - Date of illness onset
 - Type of infection or clinical syndrome (i.e. Primary Bacteremia, meningitis)
 - Specimen collection date, date first positive culture obtained; specimen from which organism isolated
 - Hospitalizations
 - Antibiotic susceptibility

- Underlying medical conditions
 - Outcomes: survived or date of death
 - Details of pneumococcal vaccination history (for *S. pneumoniae* cases).
- 4) Determination of risk factors.
- 5) Investigation of epi-links among cases (cluster, household, co-workers, etc).

Standard investigation **includes** completion of the General Investigation Form(s) and/or Bacterial Meningitis Supplemental Form for isolates from CSF. Further activity should include:

A. Isolation, Work and Daycare Restrictions

- K.A.R 28-1-6 for Streptococcal disease, hemolytic; including erysipelas, scarlet fever, streptococcal sore throat:
 - Each infected person shall remain in isolation for 10 days if untreated or for 24 hours following initiation of antibiotic therapy.
- Universal, droplet and contact precautions are recommended for all medical care personal taking care of patients with invasive disease.
- Foodhandlers diagnosed with streptococcal sore throat or with infected wounds or cuts on their hands should not handle food. They may return to food handling duties when they are afebrile.

B. Environmental Measures:

- In day care setting, the regularly cleaning of toys with an approved disinfectant is recommended.

C. Education:

- Practice basic hygiene with an emphasis on proper hand washing technique.
- Avoid sharing food, beverages, cigarettes or eating utensils.
- Contacts should be instructed that
 - Invasive disease is not spread person-to-person;
 - Antibiotic treatment is not considered an effective way of protect contacts exposed to a meningitis case caused by bacteria other than *N. meningitidis* or *H. influenzae*; and
 - Medical attention should be sought immediately if they begin to exhibit signs and symptoms of severe illness.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- Notify KDHE immediately, 1-877-427-7317.
- Active case finding will be an important part of any investigation.

B. School or Child Care Settings for Group A *Streptococcus*:

- Coordinate activities with school nurse and/or administration.
- Cases are excluded from school for 10 days if untreated or for 24 hours following initiation of antibiotic therapy.
- Advise daycare centers to clean toys daily using an approved disinfectant

and discourage the use of play food that may facilitate the transmission of this and other illnesses.

- Parents of children who are in the same classroom as the case should be notified (preferably in writing) of the occurrence of GAS disease in the facility. The notice should advise parents to:
 - Watch their children carefully for a 5-day period for signs of illness, especially fever, and seek medical care if illness should occur.
 - Children exhibiting signs of GAS disease are to be excluded from school for 10 days if untreated or for 24 hours following initiation of antibiotic therapy.

C. Daycares and *Streptococcus pneumoniae*

- Information from MMWR 49(RR09); 1-16 “Preventing Pneumococcal Disease Among Infants and Young Children - Recommendations of the Advisory Committee on Immunization Practices (ACIP)”:
 - Out-of-home day care increases the risk for invasive pneumococcal disease and AOM among children.
 - In studies of otitis media resulting from all causes, risk for AOM was higher among children who attended day care outside the home compared with family day care, and risk for middle ear effusions increased with exposure to larger numbers of children in day care settings. The younger the age when starting day care also increases risk for experiencing recurrent AOM.
 - Day care attendance is also a risk factor for other acute upper respiratory tract infections among children aged <5 years.
 - Children aged 24--59 months who attend group daycares (defined by any setting outside a home where a child regularly spends >4 hours/week with >2 unrelated children under adult supervision) were considered part of a priority group that the ACIP recommends receive PCV7 vaccination.
- Reference K.A.R. 28-1-20 for current immunization requirements for daycares; on-line at: <http://www.kdheks.gov/immunize/schoolInfo.htm>

D. Postpartum or post-surgical group A streptococcal (GAS) infection:

- A single case of postpartum or post-surgical group A streptococcal (GAS) infection calls for a timely investigation to assure that an asymptomatic carrier is not causing nosocomial infection(s).
- Coordinate with infection control personnel.

DATA MANAGEMENT AND REPORTING TO THE KDHE

- A.** Organize, collect and report data with the “General Investigation Form(s)”,
- For all CSF isolates: Also use the “Bacterial Meningitis Supplemental Form”
 - Note: Currently the CDC *Streptococcus pneumoniae* Surveillance Worksheet for cases in children <5 years of age is being revised. This investigation guideline will be updated upon its release by the CDC. The collection of pneumococcal vaccine history and reporting of vaccine failure is important for all cases <5 years of age.
- B.** Report data electronically via KS-EDSS or by fax, include:
- At a minimum all essential data collected during the investigation that helps to confirm or classify a case (i.e., drug susceptibilities).
 - All information collected on the General Investigation and supplemental forms.

Notes on KS-EDSS:

Invasive Group A cases are initially entered as “Streptococcal Disease, Invasive, Group A”. Clinical manifestations of Toxic Shock Syndrome (i.e., signs of toxicity with rapid progression of disease) that are identified and reported during the local investigation will result in the case event being changed to “Toxic Shock Syndrome, Streptococcus.”

Invasive *S. pneumoniae* laboratory reports are initially entered as “Streptococcus pneumoniae, invasive”. If additional information indicates a drug resistant case, the case event is changed to “Streptococcus pneumoniae, invasive, drug-resistant”.

ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. 2006 Red Book: Report of the Committee on Infectious Disease, 27th Edition. Illinois, Academy of Pediatrics, 2006.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 18th Edition. Washington, DC, American Public Health Association, 2004.
- C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: http://www.cdc.gov/ncphi/diss/nndss/casedef/case_definitions.htm
- D. **Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders <http://www.waldcenter.org/Quarantine%20and%20Isolation%20Information%20for%20Health%20Officers.pdf>
- E. **Kansas Regulations/Statutes Related to Infectious Disease:** <http://www.kdheks.gov/epi/regulations.htm>
- F. **Pink Book:** Epidemiology and Prevention of Vaccine-Preventable Diseases. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/default.htm>
- G. **Manual for the Surveillance of Vaccine-Preventable Diseases:** Available at: <http://www.cdc.gov/vaccines/pubs/surv-manual/default.htm> .
- H. **Drug-Resistant *Streptococcus pneumoniae* Surveillance Manual:** Available at: <http://www.cdc.gov/drsp/surveillancetoolkit/resources-manual.htm> .
- I. **Preventing Pneumococcal Disease Among Infants and Young Children; Recommendations of the Advisory Committee on Immunization Practices (ACIP).** MMWR December 9, 2005 / 54(RR14); 1-16. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4909a1.htm>
- J. **Additional Information (CDC):** <http://www.cdc.gov/health/default.htm>

Kansas Disease Investigation Guidelines

General Investigation Form

Investigation Information		
Case Type: <input type="checkbox"/> Human Case <input type="checkbox"/> Non-human Case	Disease Name: _____	
Classification: <input type="checkbox"/> Suspect <input type="checkbox"/> Probable <input type="checkbox"/> Confirmed	KS-EDSS Investigation ID: _____	
Outbreak: <input type="checkbox"/> Yes <input type="checkbox"/> No	Outbreak Name: _____	Outbreak #: _____
Onset Date: _____	Diagnosis Date: _____	Report Date: _____
Assigned to (Investigator): _____	Patient Died: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Patient Information		
Name Type: <input type="checkbox"/> Default/Common <input type="checkbox"/> Legal <input type="checkbox"/> Maiden <input type="checkbox"/> Nickname		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Sex: <input type="checkbox"/> Failure to Report <input type="checkbox"/> Female <input type="checkbox"/> Male <input type="checkbox"/> Other <input type="checkbox"/> Transexual <input type="checkbox"/> Unknown		
Race: <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black or African American <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> White <input type="checkbox"/> Unknown		
Hispanic / Latino Ethnicity: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Date of Birth: _____	Age: _____	Age Unit: <input type="checkbox"/> Days <input type="checkbox"/> Weeks <input type="checkbox"/> Months <input type="checkbox"/> Years
Parent Information (if under 18)		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Work / Occupation or School / Grade		
Worksites / School: _____		
Occupations / Grade: _____		
Travel History		
1st	Destination: _____	Depart Date: _____ Return Date: _____
2nd	Destination: _____	Depart Date: _____ Return Date: _____
3rd	Destination: _____	Depart Date: _____ Return Date: _____
4th	Destination: _____	Depart Date: _____ Return Date: _____

Supplemental Laboratory Report Form

Lab Reports

Laboratory Name: _____

Lab Report Date: _____

Ordering Provider Name: _____

Phone: _____

Facility: _____

Specimen Accession Number: _____

Specimen Collection Date: _____

Organism Name: _____

Organism Species: _____

Organism Serogroup: _____

Organism Serotype: _____

PFGE Results

Pattern 1 KS: _____

Other State: _____

CDC: _____

Pattern 2 KS: _____

Other State: _____

CDC: _____

Pattern 3 KS: _____

Other State: _____

CDC: _____

Additional Results Information

Reported Test Name:

Coded Result:

Text Result:

Numeric Result:

Comments:

Supplemental Contact Form

Contacts

Last: _____ **First:** _____ **Middle:** _____

Street: _____ **City/State:** _____ **Zip:** _____

Evening Phone #: _____ **Daytime Phone #:** _____ **E-mail:** _____

Sex: Failure to Report Female Male Other Transexual Unknown

Race: American Indian or Alaska Native Asian Black or African American Native Hawaiian or Other Pacific Islander White Unknown

Hispanic / Latino Ethnicity: Yes No

Date of Birth: _____ **Age:** _____ **Age Unit:** Days Weeks Months Years

Worksites / School: _____

Occupations / Grade: _____

Exposure Information

Contact Type: Household Sexual Other: _____ **Partner / Cluster Code:** _____

Date of First Exposure: _____ **Date of Last Exposure:** _____ **Frequency:** _____

Nature of Exposure: _____ **Comments:** _____

Testing and Treatment Information

Clinic Code: _____ **Examination Date:** _____

Examination Test: _____ **Examination Result:** _____

Prophylaxis/empiric treatment date: _____ **Drug / Dosage:** _____

Provider (Name / Facility): _____

Disposition and Diagnosis Information

Initiation Date: _____ **Disposition Date:** _____ **Disposition:** _____

Diagnosis: _____ **Referral Type:** Patient Provider **Post-test Counseled :** Yes No

Currently Assigned To: _____ **Follow-up Date:** _____

Risk Factors

Pregnant: Yes No **If Yes, # of Weeks:** _____

Risk factors for complications in contact: None Pregnant Woman HIV Seropositive Unimmunized Index case is a super-spreader

Child younger than 5 Age > 65 Otherwise immunosuppressed (s/p transplant, high dose steroids, etc)

National Bacterial Meningitis and Bacteremia Supplemental Form

Kansas Department of Health

Epidemiologic Case History

* indicates required fields

Case Type* <i>Human Case Non Human Case</i>	Classification* <i>Confirmed Not a Case Probable Suspect Deleted Unknown</i>
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Supplemental Form Status
Not Done Form Complete Form in Progress Form Approved Form Sent to CDC

Report Date*
mm/dd/yyyy

Patient Demographic Information

* indicates required fields

Last Name*	First Name*	Middle Name	Name Type*	Age
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Age Unit <i>Days Weeks Months Years</i>	Date of Birth <small>mm/dd/yyyy</small>
--	---

Race*
(Check all that apply)

*American Indian or Alaska Native Asian Black or African American
Native Hawaiian or Other Pacific Islander White Unknown*

Ethnicity*
Hispanic or Latino Not Hispanic or Latino Unknown

Sex*
Failure to Report Female Male Other Transsexual Unknown

Street Address

City	County	State	Zip
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Evening Phone <small>###-###-####</small>	Daytime Phone <small>###-###-####</small>
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Occupation

Person Providing Report

Name of Reporting Facility*

National Bacterial Meningitis and Bacteremia Case Report

If <6 years of age, is the patient in daycare?

Daycare is defined as a supervised group of 2 or more unrelated children for greater than 4 hours per week

Yes No Unknown

Type of Infection Caused by Organism

(Check all that apply)

Primary Bacteremia *Meningitis* *Otitis media* *Pneumonia* *Cellulitis* *Epiglottitis*
Peritonitis *Pericarditis* *Septic arthritis* *Conjunctivitis* *Other (specify)* _____

Bacterial Species Isolated From Any Normally Sterile Site

Neisseria meningitidis *Haemophilus influenzae*
Group A Streptococcus *Group B Streptococcus*
Lysteria monocytogenes *Streptococcus pneumoniae (pneumococcus)*
Other Bacterial Species (Specify: include mycobacteria, fungi) _____

Has Patient Received Cochlear Implants?

Yes No Unknown

If yes, date

mm/dd/yyyy

Physician

-Important- Please Complete For The Following Organisms:

Haemophilus Influenzae
Did the Patient Receive Haemophilus b Vaccine

If YES, please complete the list below.

Yes No Unknown

Dose	Date Given	Vaccine Name	Vaccine Manufacturer	Lot Number
	mm/dd/yyyy			
1				
2				
3				
4				

If H. Influenzae was isolated from blood or CSF, was it resistant to:

Ampicillin

Yes No Not Tested or Unknown

Chloramphenicol

Yes No Not Tested or Unknown

Rifampin

Yes No Not Tested or Unknown

Meningococcal vaccine

Did the patient receive meningococcal vaccine

Yes No Unknown

Dose	Date Given	Vaccine Name	Vaccine Manufacturer	Lot Number
	mm/dd/yyyy			
1				
2				
3				
4				

Did the patient receive the Streptococcus pneumoniae (pneumococcus) vaccine

Yes No Unknown

Dose	Date Given	Vaccine Name	Vaccine Manufacturer	Lot Number
	mm/dd/yyyy			
1				
2				
3				

If N. meningitidis was isolated from blood or CSF, was it resistant to:

Sulfa <i>Yes No Not Tested or Unknown</i>	Rifampin <i>Yes No Not Tested or Unknown</i>
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Public Health Fact Sheet

Group A Streptococcal (GAS) Disease (strep throat, necrotizing fasciitis, impetigo)

What is group A streptococcus (GAS)?

Group A Streptococcus is a bacterium often found in the throat and on the skin. People may carry group A streptococci in the throat or on the skin and have no symptoms of illness. Most GAS infections are relatively mild illnesses such as "strep throat," or impetigo. Occasionally these bacteria can cause severe and even life-threatening diseases.

Severe, sometimes life-threatening, GAS disease may occur when bacteria get into parts of the body where bacteria usually are not found, such as the blood, muscle, or the lungs. These infections are termed "invasive GAS disease." Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis and streptococcal toxic shock syndrome. Necrotizing fasciitis (occasionally described by the media as "the flesh-eating bacteria") is a rapidly progressive disease which destroys muscles, fat, and skin tissue. Streptococcal toxic shock syndrome (STSS) results in a rapid drop in blood pressure and causes organs (e.g., kidney, liver, lungs) to fail. STSS is not the same as the "toxic shock syndrome" due to the bacteria *Staphylococcus aureus* which has been associated with tampon usage. While 10%-15% of patients with invasive group A streptococcal disease die from their infection, approximately 25% of patients with necrotizing fasciitis and more than 35% with STSS die.

How are group A streptococci spread?

These bacteria are spread through direct contact with mucus from the nose or throat of persons who are infected or through contact with infected wounds or sores on the skin. Ill persons, such as those who have strep throat or skin infections, are most likely to spread the infection. Persons who carry the bacteria but have no symptoms are much less contagious. Treating an infected person with an antibiotic for 24 hours or longer generally eliminates their ability to spread the bacteria. However, it is important to complete the entire course of antibiotics as prescribed. It is not likely that household items like plates, cups, or toys spread these bacteria.

What kind of illnesses are caused by group A streptococcal infection?

Infection with GAS can result in a range of symptoms:

- No illness
- Mild illness (strep throat or a skin infection such as impetigo)
- Severe illness (necrotizing fasciitis, streptococcal toxic shock syndrome)

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation. If you have any questions about the disease described above or think that you may have an infection, consult with your healthcare provider. This fact sheet is based on the Centers for Disease Control and Prevention's Health and Safety topic fact sheets.

Severe, sometimes life-threatening, GAS disease may occur when bacteria get into parts of the body where bacteria usually are not found, such as the blood, muscle, or the lungs. These infections are termed "invasive GAS disease." Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis and Streptococcal Toxic Shock Syndrome. Necrotizing fasciitis (occasionally described by the media as "the flesh-eating bacteria") destroys muscles, fat, and skin tissue. Streptococcal toxic shock syndrome (STSS), causes blood pressure to drop rapidly and organs (e.g., kidney, liver, lungs) to fail. STSS is not the same as the "toxic shock syndrome" frequently associated with tampon usage. About 20% of patients with necrotizing fasciitis and more than half with STSS die. About 10%-15% of patients with other forms of invasive group A streptococcal disease die.

How common is invasive group A streptococcal disease?

About 9,000-11,500 cases of invasive GAS disease occur each year in the United States, resulting in 1,000-1,800 deaths annually. STSS and necrotizing fasciitis each comprise an average of about 6%-7% of these invasive cases. In contrast, there are several million cases of strep throat and impetigo each year.

Why does invasive group A streptococcal disease occur?

Invasive GAS infections occur when the bacteria get past the defenses of the person who is infected. This may occur when a person has sores or other breaks in the skin that allow the bacteria to get into the tissue, or when the person's ability to fight off the infection is decreased because of chronic illness or an illness that affects the immune system. Also, some virulent strains of GAS are more likely to cause severe disease than others.

Who is most at risk of getting invasive group A streptococcal disease?

Few people who come in contact with GAS will develop invasive GAS disease. Most people will have a throat or skin infection, and some may have no symptoms at all. Although healthy people can get invasive GAS disease, people with chronic illnesses like cancer, diabetes, and chronic heart or lung disease, and those who use medications such as steroids have a higher risk. Persons with skin lesions (such as cuts, chicken pox, surgical wounds), the elderly, and adults with a history of alcohol abuse or injection drug use also have a higher risk for disease.

What are the early signs and symptoms of necrotizing fasciitis and streptococcal toxic shock syndrome?

Early signs and symptoms of necrotizing fasciitis;

- Severe pain and swelling, often rapidly increasing
- Fever
- Redness at a wound site

Early signs and symptoms of STSS;

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- Fever
- Abrupt onset of generalized or localized severe pain, often in an arm or leg
- Dizziness
- Influenza-like syndrome
- Confusion
- A flat red rash over large areas of the body (only occurs in 10% of cases)

How is invasive group A streptococcal disease treated?

GAS infections can be treated with many different antibiotics. For STSS and necrotizing fasciitis, high dose penicillin and clindamycin are recommended. For those with very severe illness, supportive care in an intensive care unit may also be needed. For persons with necrotizing fasciitis, early and aggressive surgery is often needed to remove damaged tissue and stop disease spread. Early treatment may reduce the risk of death from invasive group A streptococcal disease. However, even the best medical care does not prevent death in every case.

What can be done to help prevent group A streptococcal infections?

The spread of all types of GAS infection can be reduced by good hand washing, especially after coughing and sneezing and before preparing foods or eating. Persons with sore throats should be seen by a doctor who can perform tests to find out whether the illness is strep throat. If the test result shows strep throat, the person should stay home from work, school, or day care until 24 hours after taking an antibiotic. All wounds should be kept clean and watched for possible signs of infection such as redness, swelling, drainage, and pain at the wound site. A person with signs of an infected wound, especially if fever occurs, should immediately seek medical care. It is not necessary for all persons exposed to someone with an invasive group A strep infection (i.e. necrotizing fasciitis or strep toxic shock syndrome) to receive antibiotic therapy to prevent infection. However, in certain circumstances, antibiotic therapy may be appropriate. That decision should be made after consulting with your doctor.

Where can you get more information?

- Your Local Health Department
- Kansas Department of Health and Environment, Epidemiologic Services Section at (877) 427-7317
- <http://www.cdc.gov/health/default.htm>
- Your doctor, nurse, or local health center

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Public Health Fact Sheet

Pneumococcal Disease

What is pneumococcal disease?

Pneumococcal disease is defined as infections that are caused by the bacteria *Streptococcus pneumoniae*, also known as pneumococcus. The most common types of infections caused by this bacterium include middle ear infections, pneumonia, blood stream infections (bacteremia), sinus infections, and meningitis.

Who is more likely to get pneumococcal disease?

Young children are much more likely than older children and adults to get pneumococcal disease. Children under 2, children in group child care, and children who have certain illnesses (for example sickle cell disease, HIV infection, chronic heart or lung conditions) are at higher risk than other children to get pneumococcal disease. In addition, pneumococcal disease is more common among children of certain racial or ethnic groups, such as Alaska Natives, Native Americans, and African-Americans, than among other groups.

Who is at most serious risk?

Children at increased risk of pneumococcal infections include those with anatomic or functional asplenia (including sickle cell disease), patients taking immunosuppressive chemotherapy, those with congenital and acquired immune deficiency (including HIV infections), those with chronic renal disease and healthy Native American, Alaskan Native, and African American children. Children less than 60 months of age in out-of-home day care are at 2-3 fold higher risk of experiencing invasive pneumococcal infections than children in home care.

What are the symptoms of pneumococcal disease?

- **Meningitis:** High fever, headache, and stiff neck are common symptoms of meningitis in anyone over the age of 2 years. These symptoms can develop over several hours, or they may take 1 to 2 days. Other symptoms may include nausea, vomiting, discomfort looking into bright lights, confusion, and sleepiness. In newborns and small infants, the classic symptoms of fever, headache, and neck stiffness may be absent or difficult to detect, and the infant may only appear slow or inactive, or be irritable, have vomiting, or be feeding poorly.
- **Pneumonia:** In adults, pneumococcal pneumonia is often characterized by sudden onset of illness with symptoms including shaking chills, fever, shortness of breath or rapid breathing, pain in the chest that is worsened by breathing deeply, and a productive cough. In infants and young children, signs and symptoms may not be specific, and may include fever,

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- cough, rapid breathing or grunting.
- **Otitis media:** Children who have otitis media (middle ear infection) typically have a painful ear, and the eardrum is often red and swollen. Other symptoms that may accompany otitis media include sleeplessness, fever and irritability.
 - **Blood stream infections:** Infants and young children with blood stream infections-also known as bacteremia-typically have non-specific symptoms including fevers and irritability.

How serious is pneumococcal disease?

Pneumococcal disease is a very serious illness in young children. Pneumococcal infections are now the most common cause of invasive bacterial infection in U. S. children. In the United States it is estimated that pneumococcal infections cause 100 deaths, 450 cases of meningitis, 4,000 cases of bacteremia or other invasive disease, and 3.1 million cases of otitis media (ear infections) annually in children under 5 years of age.

Meningitis is the most severe type of pneumococcal disease. Of children less than 5 years of age with pneumococcal meningitis, about 5% will die of their infection and others may have long-term problems such as hearing loss. Many children with pneumococcal pneumonia or blood stream infections will be ill enough to be hospitalized; about 1% of children with blood stream infections or pneumonia with a blood stream infection will die of their illness. Nearly all children with ear infections recover, although children with recurrent infections can suffer hearing loss.

How is pneumococcal disease spread?

The bacteria are spread through contact between persons who are ill or who carry the bacteria in their throat. Transmission is mostly through the spread of respiratory droplets from the nose or mouth of a person with a pneumococcal infection. It is common for people, especially children, to carry the bacteria in their throats without being ill from it.

How is pneumococcal disease treated/cured?

Pneumococcal disease is treated with antibiotics. Over the last decade, many pneumococci have become resistant to some of the antibiotics used to treat pneumococcal infections; high levels of resistance to penicillin are common.

Can pneumococcal disease in children be prevented?

Prevnar® has been in use since 2000 and is highly effective in preventing invasive pneumococcal disease. It is the first pneumococcal vaccine that can be used in children under the age of 2 years. Pneumovax® and Pnu-Immune® are pneumococcal vaccines for the prevention of disease among children and adults who are 2 years and older and has been in use since 1977.

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Who should receive the vaccine?

Prevnar® is indicated for use in infants and toddlers. The vaccine should be given to all infants younger than 24 months of age at 2, 4, and 6 months of age, followed by a booster dose at 12-15 months of age. Children who are unvaccinated and are 7 to 11 months of age should be given a total of 3 doses (2 months apart) and children age 12 to 23 months should be given a total of 2 doses at least two months apart.

Usually, children who are 24 months of age or older will only need one dose of the vaccine. Vaccine should be considered for all children aged 24-35 months and other children through 59 months of age with a priority for those at higher risk of disease, including Alaska Natives, American Indians, or African Americans and those children who attend out-of-home day care for more than 4 hours per week and/ or children with certain illness (sickle cell anemia, HIV infection, chronic lung or heart disease).

Pneumovax® and Pnu-Immune® is currently recommended for use in all adults who are older than 65 years of age.

Where can you get more information?

- Your Local Health Department
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