



# ***Streptococcus pneumoniae*, Invasive Disease**

## **Investigation Guideline**

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Fact Sheet (vs. 12/2014)	

### **Revision History:**

<b>Date</b>	<b>Replaced</b>	<b>Comments</b>
<b>12/2014</b>	<b>11/2010</b>	Reformatted Standard Case Investigation and Data Management section to assist with EpiTrax system data entry. Added a Notification section. Updated web links, including link to the most current CDC recommendation for the use of pneumococcal vaccine. Reformatted fact sheet.
<b>11/2010</b>	<b>01/2010</b>	Removal of clinically compatible from the listed case definition to bring it into agreement with CDC guidance. (In 02/2012, removed references to KS-EDSS.)

# ***Streptococcus pneumoniae*, Invasive Disease Disease Management and Investigative Guidelines**

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## **CASE DEFINITION (CDC 2010) – Invasive Pneumococcal Disease (IPD, *Streptococcus pneumoniae*, invasive disease)**

### **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).

### **Laboratory Criteria for Case Classification:**

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

### **Case Classification:**

- **Confirmed:** Isolation of *Streptococcus pneumoniae* from a normally sterile body site in a person of any age
- **Suspected:** Any reported case lacking confirmation of isolation of *Streptococcus pneumoniae* from a normally sterile body site.

**Note:** The above case definition is used for all cases of IPD. The licensure of a new 13-valent pneumococcal conjugate vaccine (PCV13) is expected in late 2009 or early 2010. Surveillance should be enhanced to provide baseline and ongoing data for the assessment of disease burden and immunization program effects.

In January 2008, the Clinical and Laboratory Standards Institute published new Minimum Inhibitory Concentration (MIC) breakpoints for defining susceptibility of *S. pneumoniae* isolates to penicillin. The new breakpoints are estimated to decrease the number of isolates classified as antibiotic-resistant by approximately 5%. The changes in breakpoints will likely result in a surveillance artifact in drug resistant *S. pneumoniae* reporting and further complicate interpretation of the reported data.

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

### **Clinical Description for Public Health Surveillance**

Same as above for invasive *Streptococcus pneumoniae*.

### **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*.

### **Case Classification:**

- **Confirmed:** Case that is laboratory-confirmed.
- **Probable:** 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.

## LABORATORY ANALYSIS

- Gram stains and cultures are performed routinely by commercial laboratories.
- Submission of **invasive** *S. pneumoniae* isolates to the Kansas Health and Environmental Laboratory (KHEL) is required by law. (K.A.R. 28-1-18)
- Shipping of isolates: Use Miscellaneous Infectious Disease (IDS) Shipper.
- For additional information and/or questions concerning isolate submission call (785) 296-1620 or refer to [www.kdheks.gov/labs/lab\\_ref\\_guide.htm](http://www.kdheks.gov/labs/lab_ref_guide.htm).

## EPIDEMIOLOGY

*S. 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 are 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:

*S. pneumoniae*, Gram positive diplococcus. Nearly all strains causing invasive disease are encapsulated; there are 90 known capsular serotypes

### B. Clinical Description:

Several invasive clinical syndromes, including pneumonia, bacteremia and meningitis. *S. pneumoniae* is also a cause of AOM and mastoiditis.

**C. Reservoirs:**

Humans.

**D. Mode(s) of Transmission:**

*S. 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). Invasive disease is not transmitted person-to-person as it only occurs after the bacteria get past the immune defenses of a person who is infected or colonized.

**E. Incubation Period:**

Unknown, probably short, 1-4 days.

**F. Period of Communicability:**

As long as organism is present in respiratory secretions; a person is regarded as noninfectious 24-48 hours after appropriate antibiotic treatment begins.

**G. Susceptibility and Resistance:**

Immunity associated with circulating bactericidal and /or anticapsular antibody, acquired transplacentally or from prior infection or immunization.

**H. Treatment:**

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.

**NOTIFICATION TO PUBLIC HEALTH AUTHORITIES**

Streptococcal invasive disease from *Streptococcus pneumoniae* (invasive pneumococcal disease (IPD)) shall be reported within seven days\*\*:

\*\* Meningitis cases require immediate notification by phone within 4 hours of the initial report.

1. Health care providers and hospitals: report to local health jurisdiction
2. Laboratories: report to KDHE - BEPHI
3. Local health jurisdiction: report to KDHE - BEPHI

**Kansas Department of Health and Environment (KDHE)  
Bureau of Epidemiology and Public Health Response (BEPHI)  
Phone: 1-877-427-7317 Fax: 1-877-427-7318**

**Further responsibilities of state and local health departments to the CDC:**

*As a nationally notifiable condition, Streptococcus pneumoniae, invasive disease (IPD) cases require a STANDARD report to the Center of Disease Control and Prevention (CDC).*

1. STANDARD reporting requires KDHE-BEPHI to file an electronic report for within the next reporting cycle.
  - KDHE-BEPHI will file electronic reports weekly with CDC.
2. **Local public health jurisdiction** will report information requested in the Kansas electronic surveillance system, as soon as possible, ensuring that the electronic form is completed within 7 days of receiving a notification of a report.

## INVESTIGATOR RESPONSIBILITIES

- 1) [Report](#) all confirmed, probable and suspect cases to the KDHE.
  - Meningitis cases require immediate notification within 4 hours of the initial report by calling the epidemiologist-on-call at 1-877-427-7317.
- 2) Contact the medical provider to collect additional information and confirm diagnosis using the current case definition.
  - Collect all information requested in [Step 1](#) of case investigation.
- 3) Conduct [case investigation](#) to collect epidemiological data as required by current surveillance objectives. (Most data can be collected from the medical provider, and the patient will not need to be contacted.)
- 4) Ensure invasive [S. pneumoniae isolates](#) were sent to the state laboratory.
- 5) [Record](#) data, collected during the investigation, in the KS EpiTrax system under the data's associated [\[tab\]](#) in the case morbidity report (CMR).
- 6) As appropriate, use the disease [fact sheet](#) to notify individuals or groups.

**Note:** Routine contact investigation and/or an investigation for a source is of no practical value for *S. pneumoniae* cases.

## STANDARD CASE INVESTIGATION AND CONTROL METHODS

### Case Investigation

- 1) If there is no indication that the isolate has been sent to KHEL, call or send a reminder to the laboratory that performed the testing that they are required by law to submit all [invasive S. pneumoniae isolates to the state laboratory](#).
- 2) Contact the medical provider who reported or ordered testing of the case to obtain the following from the patient's medical records.

**For all cases, the following data is ESSENTIAL:**

- **Demographic data (birth date, county, sex, race/ethnicity)** [\[Demographic\]](#)
- **Anatomic site from which organism is isolated** [\[Laboratory\]](#)
- **Type of infection** [\[Investigation-Symptoms\]](#)
- **Antibiotic susceptibility** – scanned and attach to CMR [\[Notes-Add Attachment\]](#)

Additional information to collect for cases includes:

- Onset date of illness [\[Clinical\]](#);
  - Attendance at a daycare facility: include name of facility [\[Epidemiological\]](#);
  - Hospitalizations: location and duration of stay [\[Clinical\]](#);
  - Outcomes: survived and date of recovery or date of death [\[Clinical\]](#);
  - Underlying medical conditions prior to illness [\[Investigation-Complications\]](#);
  - Date first positive culture obtained [\[Laboratory\]](#); and
  - Through a credible immunization registry or medical record information on pneumococcal vaccination(s), including date(s) of vaccination, vaccine name, manufacturer, lot number [\[Investigation-Vaccination History\]](#)
- 3) Investigate any epi-links among cases (cluster, household, co-workers, etc) if identified. For suspected [outbreaks](#) refer to [Managing Special Situations](#).

### Contact Investigation

Contact investigation is of no practical value for routine situations.

### Isolation, Work and Daycare Restrictions

Hospitalized patients: Standard precautions are recommended, including patients with infections caused by drug-resistant *S. pneumoniae*.

### Case Management

Report on any changes in patient status (i.e. date of death). [Clinical]

### Contact Management

None required.

### Environmental Measures

In day care settings, the regularly cleaning of toys with an approved disinfectant is recommended. For more information on *S. pneumoniae* in daycares, refer to [Managing Special Situations](#).

### Education

If contacts or household members inquire about their risk of acquiring the disease:

- Use the *S. pneumoniae* fact sheet to answer inquiries.
- Stress the following:
  - Invasive disease is not spread person-to-person;
  - Antibiotic treatment is not an effective way of protect contacts exposed to a meningitis caused by bacteria, other than *N. meningitidis* or *H. influenzae* type B; but
  - Medical attention should be sought immediately if they do begin to exhibit signs and symptoms of severe illness.
- Instruct household members or close contacts to:
  - Practice basic hygiene emphasizing proper hand washing technique.
  - Avoid sharing food, beverages, cigarettes or eating utensils.
- Those at high risk or presumed high risk of acquiring invasive pneumococcal infection (i.e., immunocompromised, sickle cell disease, or functional or anatomic asplenia) should be directed to discuss current health status (including immunization history) with their primary care physician and/or routine immunization provider.
  - The local health department should strive to make sure those in the groups recommended for immunization have access the vaccine.
  - Current recommendations for pneumococcal vaccine usage can be found at [www.cdc.gov/vaccines/vpd-vac/pneumo/default.htm](http://www.cdc.gov/vaccines/vpd-vac/pneumo/default.htm)

## MANAGING SPECIAL SITUATIONS

### A. Outbreak Investigation:

1. Consider further investigation of any invasive cases clustered in time and place among groups that share common space (i.e. daycare, institutions)
2. Notify KDHE immediately, 1-877-427-7317.
3. Case finding and additional case investigation will be an important part of any investigation.

## B. Daycares and *Streptococcus pneumoniae*

- Out-of-home day care increases the risk for invasive pneumococcal disease and AOM among children. Day care attendance is also a risk factor for other acute upper respiratory tract infections among children aged <5 years. (Source: [www.cdc.gov/mmwr/preview/mmwrhtml/rr4909a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4909a1.htm))
- 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: [www.kdheks.gov/immunize/schoolinfo.htm](http://www.kdheks.gov/immunize/schoolinfo.htm)

## DATA MANAGEMENT AND REPORTING TO THE KDHE

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

## ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. Red Book: Report of the Committee on Infectious Disease, 29th Edition. Illinois, Academy of Pediatrics, 2014.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, Washington, DC, American Public Health Association, 2010.
- C. **Case Definitions:** [wwwn.cdc.gov/nndss/](http://wwwn.cdc.gov/nndss/)
- D. **Kansas Regulations/Statutes Related to Infectious Disease:** [www.kdheks.gov/epi/regulations.htm](http://www.kdheks.gov/epi/regulations.htm)
- E. **Pink Book:** Epidemiology and Prevention of Vaccine-Preventable Diseases. Available at: [www.cdc.gov/vaccines/pubs/pinkbook/index.html](http://www.cdc.gov/vaccines/pubs/pinkbook/index.html)
- F. **Manual for the Surveillance of Vaccine-Preventable Diseases:** Available at: [www.cdc.gov/vaccines/pubs/surv-manual/index.html](http://www.cdc.gov/vaccines/pubs/surv-manual/index.html) .
- G. **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: [www.cdc.gov/mmwr/preview/mmwrhtml/rr4909a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4909a1.htm)
- H. **Additional Information (CDC):** [www.cdc.gov/vaccines/pubs/surv-manual/index.html](http://www.cdc.gov/vaccines/pubs/surv-manual/index.html)

## ATTACHMENTS

To view attachments in the electronic version:

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

**Streptococcus pneumoniae Surveillance Worksheet**

NAME (Last, First)		Hospital Record No.		
Address (Street and No.)	City	County	Zip	Phone
Reporting Physician/Nurse/Hospital/Clinic/Lab/Phone	Address		Phone	

.....DETACH HERE and transmit only lower portion if sent to CDC.....

**Streptococcus pneumoniae Surveillance Worksheet**  
**(Invasive pneumococcal disease and drug-resistant *S. pneumoniae*)**

**THROUGHOUT: Y=YES N=NO U=UNKNOWN**

1. Are you reporting:  
 Drug Resistant *S. pneumoniae* Y  N  U   
 Invasive Disease Y  N  U

2. Date of Birth --  
MONTH DAY YEAR

3a. Age

3b. Is age in years / months / weeks / days?  
 years  months  weeks  days

4. Sex  Male  Female  Unknown

5. Race: (check all that apply)  
 American Indian / Alaska native  
 Asian  
 Black or African American  
 Native Hawaiian or Pacific Islander  
 White  
 Other race (specify) \_\_\_\_\_

6. Ethnicity: is patient Hispanic or Latino? Y  N  U

7. State in which patient resided at time of diagnosis:

8. Zip code at which patient resided at time of diagnosis:

9a. Hospitalized? Y  N  U

9b. If hospitalized for this condition, how many days total was the patient hospitalized? (Include days from multiple hospitals if relevant)  
 NUMBER OF DAYS: 0-999; 999=UNKNOWN

10. Does this patient: (check all that apply)  
 Attend a day care\* facility? Y  N  U   
Facility Name \_\_\_\_\_  
 \*DAY CARE IS DEFINED AS AS SUPERVISED GROUP OF 2 OR MORE UNRELATED CHILDREN FOR >4 HOURS PER WEEK.  
 Reside in a long term care facility? Y  N  U   
Facility Name \_\_\_\_\_

11. Did patient die from this illness? Y  N  U

12. Onset Date --  
MONTH DAY YEAR

13. Type of infection caused by organism (check all that apply)

Bacteremia without focus	<input type="checkbox"/>
Cellulitis	<input type="checkbox"/>
Epiglottitis	<input type="checkbox"/>
Hemolytic uremic syndrome	<input type="checkbox"/>
Meningitis	<input type="checkbox"/>

Osteomyelitis	<input type="checkbox"/>
Otitis media	<input type="checkbox"/>
Peritonitis	<input type="checkbox"/>
Pericarditis	<input type="checkbox"/>
Pneumonia	<input type="checkbox"/>
Septic arthritis	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>

14. Sterile site from which organism isolated: (check all that apply)

Blood	<input type="checkbox"/>	Joint	<input type="checkbox"/>
CSF	<input type="checkbox"/>	Bone	<input type="checkbox"/>
Pleural fluid	<input type="checkbox"/>	Internal body site	<input type="checkbox"/>
Peritoneal fluid	<input type="checkbox"/>	Muscle	<input type="checkbox"/>
Pericardial fluid	<input type="checkbox"/>	Other normally sterile site	<input type="checkbox"/>
<small>(specify) _____</small>			

15. Date first positive culture obtained  
 DATE SPECIMIN TAKEN --  
MONTH DAY YEAR

16. Nonsterile sites from which organism isolated, if any:  
 Middle ear  Sinus  Other (specify) \_\_\_\_\_

17a. Does the patient have any underlying medical conditions or prior illness?  
 Y  Yes. If yes fill out 17b.  
 N  No. If no skip to 18.  
 U  Unknown. Skip to 18.

17b. What underlying medical conditions does the patient have? (check all that apply)

Current smoker	<input type="checkbox"/>
Multiple myeloma	<input type="checkbox"/>
Sickle cell anemia	<input type="checkbox"/>
Splenectomy / asplenia	<input type="checkbox"/>
Immunoglobulin deficiency	<input type="checkbox"/>
Immunosuppressive therapy (steroids, chemotherapy, radiation)	<input type="checkbox"/>
Leukemia	<input type="checkbox"/>
Hodgkin's disease	<input type="checkbox"/>
Asthma	<input type="checkbox"/>
Emphysema / COPD	<input type="checkbox"/>
Systemic lupus erythematosus	<input type="checkbox"/>
Diabetes mellitus	<input type="checkbox"/>
Nephrotic syndrome	<input type="checkbox"/>
Renal failure / dialysis	<input type="checkbox"/>
HIV infection	<input type="checkbox"/>

Detach Here

AIDS (CD4 <200)

Cirrhosis / liver failure

Alcohol abuse

Cardiovascular disease (ASCVD) / CAD

Heart failure / CHF

CSF leak

Intravenous drug use

Other malignancy (specify) \_\_\_\_\_

Organ / bone marrow transplant

Other prior illness (specify) \_\_\_\_\_

**VACCINATION HISTORY**

18. Did patient receive **POLYSACCHARIDE** pneumococcal vaccine? Y  N  U  If **YES**, please complete the list below.

DOSE	DATE GIVEN (MONTH/DAY/YEAR)	VACCINE NAME	LOT NUMBER
1	<input type="text"/> - <input type="text"/> - <input type="text"/>	<input type="checkbox"/> Pneumovax 23 (Merck) <input type="checkbox"/> Pnu-Imune23 (Wyeth) Other _____	
2	<input type="text"/> - <input type="text"/> - <input type="text"/>	<input type="checkbox"/> Pneumovax 23 (Merck) <input type="checkbox"/> Pnu-Imune23 (Wyeth) Other _____	
3	<input type="text"/> - <input type="text"/> - <input type="text"/>	<input type="checkbox"/> Pneumovax 23 (Merck) <input type="checkbox"/> Pnu-Imune23 (Wyeth) Other _____	

19. Did patient receive **CONJUGATE** pneumococcal vaccine? Y  N  U  If **YES**, please complete the list below.

DOSE	DATE GIVEN (MONTH/DAY/YEAR)	VACCINE NAME	MANUFACTURER	LOT NUMBER
1	<input type="text"/> - <input type="text"/> - <input type="text"/>			
2	<input type="text"/> - <input type="text"/> - <input type="text"/>			
3	<input type="text"/> - <input type="text"/> - <input type="text"/>			
4	<input type="text"/> - <input type="text"/> - <input type="text"/>			

20. Resistance Testing Results

**Oxacillin zone size:**  mm **Oxacillin interpretation:**  R < 20mm (possibly resistant)  S ≥20mm (susceptible)  Unknown/not tested (valid 00-30)

SUSCEPTIBILITY METHOD CODES	S/I/R RESULT CODES	SIGN CODES	MIC VALUE
A- AGAR: Agar dilution method B- BROTH: Broth dilution C- DISK: Disk diffusion (Kirby Bauer) S- STRIP: Antimicrobial gradient strip (E-test)	S- SUSCEPTIBLE B- INTERMEDIATE C- RESISTANT S- UNK. / NOT TESTED  Result indicates whether the microorganism is susceptible or not susceptible (intermediate or resistant) to the antimicrobial being tested	Indicate whether the MIC is <, >, ≤, ≥, = to the numerical MIC value in the last column  MIC = minimum inhibitory concentration	Valid range for data value 0.000 - 999.999

ANTIMICROBIAL AGENT	SUSCEPTIBILITY METHOD A/B/D/S	S/I/R/U RESULT	SIGN < / > / ≤ / ≥ / =	MIC VALUE (e.g., 0.06 µg/ml)
Penicillin				
Amoxicillin				
Amoxicillin/clavulanic acid				
Cefotaxime				
Ceftriaxone				
Cefuroxime				
Vancomycin				
Erythromycin				
Azithromycin				
Tetracycline				
Levofloxacin				
Sparfloxacin				
Gatifloxacin				
Moxifloxacin				
Trimethoprim/sulfamethoxazole				
Clindamycin				
Quinupristin/dalfopristin				
Linazolid				
Other: (list)				

Submitted by: \_\_\_\_\_ Phone ( \_\_\_\_\_ ) \_\_\_\_\_ Date: -----

MONTH DAY YEAR

**Streptococcus pneumoniae Surveillance Worksheet** – inserted here