

Invasive *Streptococcus pneumoniae* Surveillance Report

ICDCODE 4823

Report all invasive drug-resistant disease using this form and attach the lab antibiogram. Report susceptible isolates by sending the lab antibiogram only. Report meningitis due to *S. pneumoniae* on this form.

PATIENT INFORMATION

Name of Patient (Last, First) _____ Address (Number, Street) _____ City State Zip _____	Tel. Phone No: _____ Date of Birth Age ___/___/___ Outcome: survived <input type="checkbox"/> ___/___/___ died <input type="checkbox"/>	Race 1 <input type="checkbox"/> Am.Indian/Alaskan 5 <input type="checkbox"/> White 3 <input type="checkbox"/> Black 2 <input type="checkbox"/> Asian/Pacific Is. 9 <input type="checkbox"/> Not Specified	Sex 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female Ethnic Origin 1 <input type="checkbox"/> Hispanic 2 <input type="checkbox"/> Non-Hispanic
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CLINICAL AND LABORATORY DATA

Specimen Date: ___/___/___ Specimen <input type="checkbox"/> blood <input type="checkbox"/> csf Source: <input type="checkbox"/> other sterile site: _____ Type <input type="checkbox"/> Primary bacteremia <input type="checkbox"/> Meningitis Of <input type="checkbox"/> Pneumonia Infection: <input type="checkbox"/> Otitis media <input type="checkbox"/> Other _____	Hospital: _____ I.C. Contact: _____ Lab: _____ Lab Tel. No.: _____ Lab Address: _____ Oxacillin Susceptibility: _____ Oxacillin R < 19mm (possibly resistant) Zone Size: _____ S >= 20mm (susceptible) (range 0-30) Not Tested: _____
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Antimicrobial Agent	Susceptibility Method	Sign	Numeric Result <small>(e.g. 19mm or 0.06 ug/ml)</small>	S, I, R Result
Azithromycin	_____	_____	_____	_____
Cefepime	_____	_____	_____	_____
Cefotaxime**	_____	_____	_____	_____
Ceftriaxone**	_____	_____	_____	_____
Cefuroxime axetil	_____	_____	_____	_____
Chloramphenicol*	_____	_____	_____	_____
Clarithromycin	_____	_____	_____	_____
Clindamycin	_____	_____	_____	_____
Erythromycin	_____	_____	_____	_____
Imipenem	_____	_____	_____	_____
Ofloxacin	_____	_____	_____	_____
Penicillin*	_____	_____	_____	_____
Ripampin	_____	_____	_____	_____
Tetracycline	_____	_____	_____	_____
Trimethoprim/ sulfamethoxazole	_____	_____	_____	_____
Vancomycin	_____	_____	_____	_____

PLEASE ATTACH A COPY OF ALL LABORATORY REPORTS WITH SUSCEPTIBILITY INFORMATION

Susceptibility Method: 1. Agar: Agar Dilution 2. Broth: Bacterial Broth Dilution 3. Disk: Bacterial Disk Diffusion (Kirby Bauer) 4. Strip: Antimicrobial Gradient Strip (E-Test)	(<, >, =)	Valid Range for data value 0.000-999.999 *Antimicrobial agents that should be considered for routine testing. **Either antibiotic may be tested, both are not required.	See Reverse Side
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Submitted By: _____ Tel. No. _____ Date: _____

Questions and Answers about the Invasive *Streptococcus pneumoniae* Surveillance Report Form

About the Form in General

Why should invasive *Streptococcus pneumoniae* be reported?

S. pneumoniae is a leading cause of morbidity and mortality in the United States, resulting each year in an estimated 3,000 cases of meningitis, 50,000 cases of bacteremia, 500,000 cases of pneumonia, and 7,000,000 cases of otitis media. As with most respiratory pathogens, rapid, sensitive and specific diagnostic tests are not available, thus early in the course of illness, diagnosis of *S. pneumoniae* infection is usually presumptive, and the choice of antimicrobial therapy is nearly always empiric. The choice of antimicrobial agents for empiric therapy should be guided by the regional prevalence of drug-resistant *Streptococcus pneumoniae* (DRSP). However, the prevalence of resistance to penicillin is unknown for most areas of the United States because DRSP has not been a reportable condition and the incidence of invasive pneumococcal disease is unknown. CDC has recommended reporting all invasive cases of pneumococcal infections along with the antibiograms in order to calculate the prevalence of DRSP.

Why should an antibiogram be reported?

Antibiograms can provide information about the existence of resistant strains in communities. Clinicians need DRSP prevalence data specific to their community to select appropriate antimicrobial agents when empirically treating persons who have pneumococcal infections.

Is DRSP reporting mandatory?

The Council of State and Territorial Epidemiologists (CSTE) approved a proposal in 1995 to recommend that all states require reporting of invasive infections caused by DRSP. Although regulatory authority for reporting nationally notifiable diseases resides at the state level, approval by CSTE provides a basis for state health officials to encourage their state legislators to adopt the measure.

How was the report form developed?

The Invasive *S. pneumoniae* Surveillance Report Form is based on the DRSP collection screens used in the Public Health Laboratory Information System (PHLIS).

What is PHLIS?

PHLIS is a PC-based software application, initially designed for use in public health laboratories. This menu-driven, electronic reporting system provides a mechanism for local, county or state organizations to enter, edit and analyze data at their own site and then to transmit that information electronically to other state offices or to other federal agencies to ensure availability of timely data useful to disease prevention and control programs. Because DRSP is a laboratory-defined condition, it is reported to CDC through the PHLIS system. NETSS does not accommodate DRSP reporting.

About Specific Items on the Form

What specimen sources should be reported ?

All normally sterile sites such as cerebrospinal fluid (CSF), blood, joint fluid, pericardial fluid, middle ear, etc., should be reported

What is the specimen date?

This is the date the specimen was collected.

What is an oxacillin disk ?

This 1 μ g disk is used to screen pneumococcal isolates for β -lactams. This method of screening is recommended by NCCLS. Decreased susceptibility to β -lactams (penicillin and cephalosporins) is considered probable with oxacillin zone size \leq 19 mm.

How were the antimicrobials selected?

The National Committee for Clinical Laboratory Standards (NCCLS) recommends that oxacillin screening for *S. pneumoniae* isolates (from normally sterile sites such as blood or CSF) for penicillin be used. This screening approach is highly sensitive (99%) and specific (80%-90%) and should detect all isolates nonsusceptible to penicillin and extended-spectrum cephalosporins (e.g., ceftriaxone or cefotaxime). Isolates found to be nonsusceptible by oxacillin disk should then be subjected to quantitative MIC testing against penicillin, an extended-spectrum cephalosporin, chloramphenicol, vancomycin, and other drugs clinically indicated to treat the patient. The antimicrobials selected have, during in vitro tests, demonstrated acceptable efficacy. Alternatively, some laboratories may choose to test all invasive isolates for MIC for a variety of antimicrobials without first screening with an oxacillin disk. This more expensive approach would provide clinically useful data more rapidly.

How should a laboratory select which antimicrobials to test?

Selection of the most appropriate antimicrobial agents to test and report is a decision best made by each clinical laboratory in consultation with infectious disease practitioners, the pharmacy, and the pharmacy and infection-control committees of the medical staff. The NCCLS recommends that penicillin, either cefotaxime or ceftriaxone, chloramphenicol, and vancomycin be considered for routine testing and reporting on *S. pneumoniae* by clinical microbiology labs.

Who recommended the four susceptibility methods: agar dilution, broth dilution, disk diffusion (Kirby Bauer, and antimicrobial gradient strip dilution (e.g., E-test[®])?

These methods were determined by NCCLS to be valid and reliable methods for MIC testing of *S. pneumoniae*.

What does S, I, R result mean?

The S (susceptible), I (intermediate), R (resistant) result indicates whether the microorganism is susceptible or not susceptible (intermediate or resistant) to the antimicrobial being tested.

About the Interpretive Standards

What is the Zone Diameter Interpretive Standard?

The zone diameter is an area that appears on the disk diffusion (Kirby-Bauer) method of determining antimicrobial sensitivity which indicates where the antimicrobial agents have inhibited growth of an organism.

What is Minimum Inhibitory Concentration (MIC)?

The least amount of an antimicrobial agent that prevents growth in the dilution method of determining antimicrobial sensitivity. This is a quantitative measurement of antimicrobial susceptibility.

Why are there no zone diameters nor MICs for some antibiotics?

NCCLS has not yet defined breakpoints for all bacterial- antimicrobial combinations. There are no NCCLS defined *S. pneumoniae* breakpoints for most of the oral cephalosporins.

REFERENCES

American Public Health Association. Policy Statements Adopted by the Governing Council of the American Public Health Association: Prevention of Illness and Complications due to Drug-Resistant *Streptococcus pneumoniae*. Am J Pub Health 1996; 86: 430, 445.

Breiman, RF, Butler, JC, Tenover, FC, Elliott, JA, Facklam, RR. Emergence of drug-resistant pneumococcal infections in the United States. JAMA 1994; 271: 1831-5.

Centers for Disease Control and Prevention. Defining the public health impact of drug-resistant *Streptococcus pneumoniae*: report of a working group. 1996,45 (No. RR-1).

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Hofmann, J, Cetron, MS, Farley, MM, Baughman, WS, Facklam, RR, Elliott, JA, Deaver, KA, Breiman, RF. The prevalence of drug-resistant *Streptococcus pneumoniae* in Atlanta. N Engl J Med 1995; 333:481-486.

Jernigan, DB, Cetron, MS., Breiman, RF. Minimizing the Impact of Drug-Resistant *Streptococcus pneumoniae*. JAMA 1996, 275: 206-209.

National Committee for Clinical Laboratory Standards. Performance standards for antimicrobial susceptibility testing (9th informational supplement). Villanova, PA: National Committee for Clinical Laboratory Standards, 1999; NCCLS document no. M100-S9.

Zone Diameter Interpretive Standards for *Streptococcus pneumoniae*

Antimicrobial Agent	Disk Content	Zone Diameter, Nearest Whole mm			Equivalent MIC Breakpoints (ug/mL)		Comments
		R	I	S	R	S	
PENICILLINS							Isolates of pneumococci with oxacillin zone sizes of ≥ 20 mm are susceptible (MIC ≤ 0.06 mg/mL) to penicillin and can be considered susceptible to ampicillin, amoxicillin, amoxicillin/ clavulanic acid, ampicillin/ sulbactam, cefaclor, cefdinir, cefepime, cefetamet, cefixime, cefotaxime, cefprozil, ceftibuten, ceftriaxone, cefuroxime, cefpodoxime, ceftizoxime, imipenem, loracarbef and meropenem for approved indications, and these agents need not be tested.
Penicillin	1 ug oxacillin			≥ 20		≤ 0.06	Penicillin and cefotaxime or ceftriaxone MICs should be determined for those isolates with oxacillin zone sizes ≤ 19 mm because zones of ≤ 19 mm occur with penicillin-resistant, intermediate, or certain susceptible strains. Isolates should not be reported as penicillin resistant or intermediate based solely on an oxacillin zone ≤ 19 mm.
GLYCOPEPTIDES							
Vancomycin	30ug			≥ 17		≤ 1	No <i>S. pneumoniae</i> strain with a vancomycin zone diameter < 17 mm has been observed; submit such strains to the State Central Laboratory.
MACROLIDES							Susceptibility and resistance to azithromycin, clarithromycin, and dirithromycin can be predicted by using erythromycin. Not routinely reported on isolates from the urinary tract.
Erythromycin	15 ug	≤ 15	16-20	≥ 21	≥ 1	≤ 0.25	
Azithromycin	15 ug	≤ 13	14-17	≥ 18	≥ 2	≤ 0.5	
Clarithromycin	15 ug	≤ 16	17-20	≥ 21	≥ 1	≤ 0.25	
Dirithromycin	15 ug	≤ 13	14-17	≥ 18	≥ 2	≤ 0.5	
TETRACYCLINES							
Tetracycline	30 ug	≤ 18	19-22	≥ 23	≥ 8	≤ 2	
QUINOLONES							
Levofloxacin	5 ug	≤ 13	14-16	≥ 17	≥ 8	≤ 2	Ofloxacin susceptible <i>S. pneumoniae</i> will also be susceptible to levofloxacin.
Ofloxacin	5 ug	≤ 12	13-15	≥ 16	≥ 8	≤ 2	
Sparfloxacin	5 ug	≤ 15	16-18	≥ 19	≥ 2	≤ 0.5	
Grepafloxacin	5 ug	≤ 15	16-18	≥ 19	≥ 2	≤ 0.5	
Trovafloxacin	10 ug	≤ 15	16-18	≥ 19	≥ 4	≤ 1	
OTHER							
Trimethoprim/ sulfamethoxazole	1.25/ 23.75 ug	≤ 15	16-18	≥ 19	$\geq 4/76$	$\leq 0.5/9.5$	
Chloramphenicol	30 ug	≤ 20	--	≥ 21	≥ 8	≤ 4	Not routinely reported on isolates from the urinary tract.
Rifampin	5 ug	≤ 16	17-18	≥ 19	≥ 4	≤ 1	Rx: Rifampin should not be used alone for chemotherapy.
Clindamycin	2 ug	≤ 15	16-18	≥ 19	≥ 1	≤ 0.25	Not routinely reported on isolates from the urinary tract.
Quinupristin/ dalfopristin	15 ug	≤ 15	16-18	≥ 19	≥ 4	≤ 1	Investigational; not approved by FDA.