2006

Wisconsin Antibiotic Resistance Report
Invasive *Streptococcus pneumoniae*

Highlights

- The proportion of invasive *S. pneumoniae* isolates with high-level penicillin resistance decreased from 8.5% in 2005 to 4.8% in 2006. Wisconsin's penicillin resistance has remained below the national average since 1999.
- The proportion of isolates with reduced susceptibility to multiple drugs (penicillin ≥ non-betalactam antibiotics) increased from ~ 6.2% in 2005 to 8.3% in 2006.
- Fluoroquinolone resistance is rare. Only 1 isolate showed reduced susceptibility (intermediate resistance) to Levofloxacin.
- The percentage of total non-susceptible isolates decreased in the Western, Southern, and Northern regions, but increased in the Northern and Southeastern regions since 2005.

Surveillance

Enhanced passive surveillance is used to identify invasive isolates of *S. pneumoniae* in Wisconsin. This activity is coordinated by the Wisconsin Division of Public Health through the invasive bacterial disease surveillance program. Participating hospitals and laboratories voluntarily submit invasive bacterial isolates to the Wisconsin State Laboratory of Hygiene along with a report form that specifies the organism, source of specimen, and patient demographic characteristics. Duplicate isolates (e.g., from a hospital laboratory and a reference laboratory) and isolates obtained from non-Wisconsin residents are excluded.

Invasive isolates are defined as those obtained from blood, CSF, pleural fluid, or another normally sterile body site. In 2006 a total of 35 facilities submitted invasive pneumococcal isolates.

Laboratory Methods

Pneumococcal susceptibility testing was performed at the Wisconsin State Laboratory of Hygiene (WSLH). Susceptibilities to penicillin, cefotaxime, ceftriaxone, levofloxacin and meropenem were determined using the E-test. Susceptibilities to erythromycin, vancomycin, trimethoprim-sulfa-methoxazole, tetracycline and chloramphenicol were performed using disc diffusion. Minimum inhibitory concentrations (MICs) were interpreted as susceptible, intermediate or resistant according to the National Committee for Clinical Laboratory Standards Institute (CLSI) guidelines.

Results

TABLE 1.

Demographic characteristics of patients reported with invasive pneumococcal disease, Wisconsin 2005 and 2006

	2005		2006	
Age	**Number**	**(%)**	**Number**	**(%)**
<5 years	39	(11%)	33	(9%)
5-19 years	8	(2%)	12	(3%)
20-39 years	37	(10%)	39	(10%)
40-59 years	110	(31%)	111	(29%)
60-79 years	102	(29%)	104	(28%)
80+ years	59	(17%)	78	(21%)
Gender				
Male	194	(55%)	201	(53%)
Female	161	(45%)	176	(47%)
Region of residence				
Northeastern	35	(10%)	47	(12%)
Northern	36	(10%)	54	(14%)
Southeastern	188	(53%)	180	(48%)
Southern	61	(17%)	55	(15%)
Western	35	(10%)	41	(11%)
Source of isolate				
Blood	337	(95%)	356	(94%)
Cerebrospinal fluid	9	(2.5%)	14	(4%)
Other	9	(2.5%)	7	(2%)
Total	**355**	**(100%)**	**377**	**(100%)**

TABLE 2.

***S. pneumoniae* isolates with reduced susceptibility to penicillin and ≥ 2 non-beta-lactam antibiotics**

Year	Multi-drug Resistance	%
1999	43/410	10.5%
2000	32/289	11.1%
2001	29/255	11.4%
2002	43/352	12.2%
2003	35/418	8.4%
2004	19/320	5.9%
2005	22/355	6.2%
2006	31/377	8.3%

Results

TABLE 3.
Antimicrobial susceptibility of 377 *S. pneumoniae* isolates in 2006

	Susceptible	Intermediate	Resistant	Total Non-susceptible
β-lactam drugs				
penicillin	80.0%	15.2%	4.8%	20.0%
ceftriaxone (n=363 non-*CSF isolates)	358/363 98.6%	5/363 1.4%	0/363 0%	5/363 1.4%
ceftriaxone (n=14 *CSF isolates)	11/14 78.7%	2/14 14.2%	1/14 7.1%	3/14 21.3%
cefotaxime (n=363 non-*CSF isolates)	358/363 98.6%	5/363 1.4%	0/363 0%	5/363 1.4%
cefotaxime (n=14 *CSF isolates)	12/14 85.8%	1/14 7.1%	2/14 7.1%	2/14 14.2%
meropenem	94.1%	4.3%	1.6%	5.9%
Other drugs				
chloramphenicol	99.2%	0%	0.8%	0.8%
erythromycin	86.6%	0.6%	12.8%	13.4%
tetracycline	93.9%	0%	6.1%	6.1%
trimethoprim-sulfamethoxazole	87.9%	2.2%	9.9%	12.1%
levofloxacin	1-isolate with intermediate resistance			
vancomycin	All isolates were suseptible			

*CSF = Cerebrospinal fluid

FIGURE 1.
Temporal trends in *S. pneumoniae* penicillin resistance (MIC ≥2.0 µg/mL)

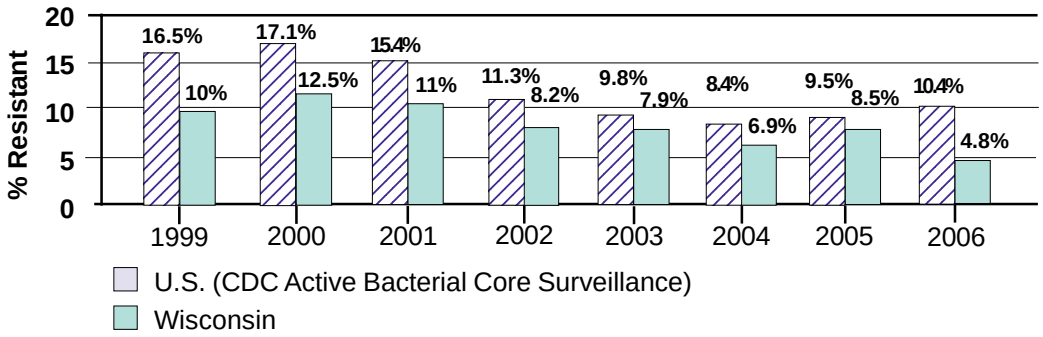
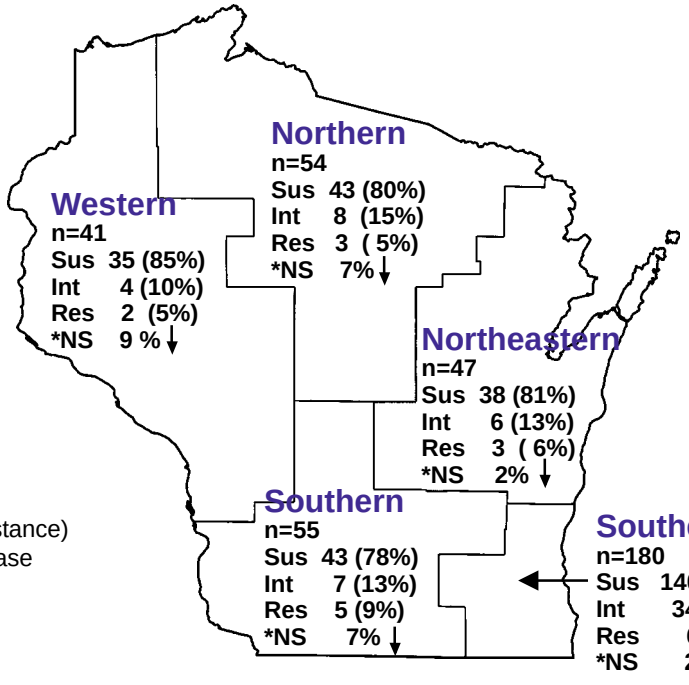


FIGURE 2.
***S. pneumoniae* penicillin susceptibility by region for the year 2006**



***NS=non-susceptible**
(intermediate or full resistance)
(↑↓) increase or decrease compared to 2005

About WARN

Wisconsin **A**ntibiotic **R**esistance **N**etwork (**WARN**) is a coalition of Wisconsin health care providers, professional organizations, and public health agencies concerned about antibiotic resistance and inappropriate antibiotic use.

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WISCONSIN ANTIBIOTIC RESISTANCE NETWORK