

Section 4: Summary of Antimicrobial Resistance Surveillance

Background

Some scientists consider antibiotics to be the single most impressive medical achievement of the 20th Century. However, the continuing emergence and spread of antimicrobial resistance jeopardizes the utility of antibiotics and threatens public health globally. These pathogens are associated with increased morbidity and mortality, which not only impacts patients but also increases the burden on healthcare services as a result of additional diagnostic testing, prolonged hospital stays, and increased intensity and duration of treatment.

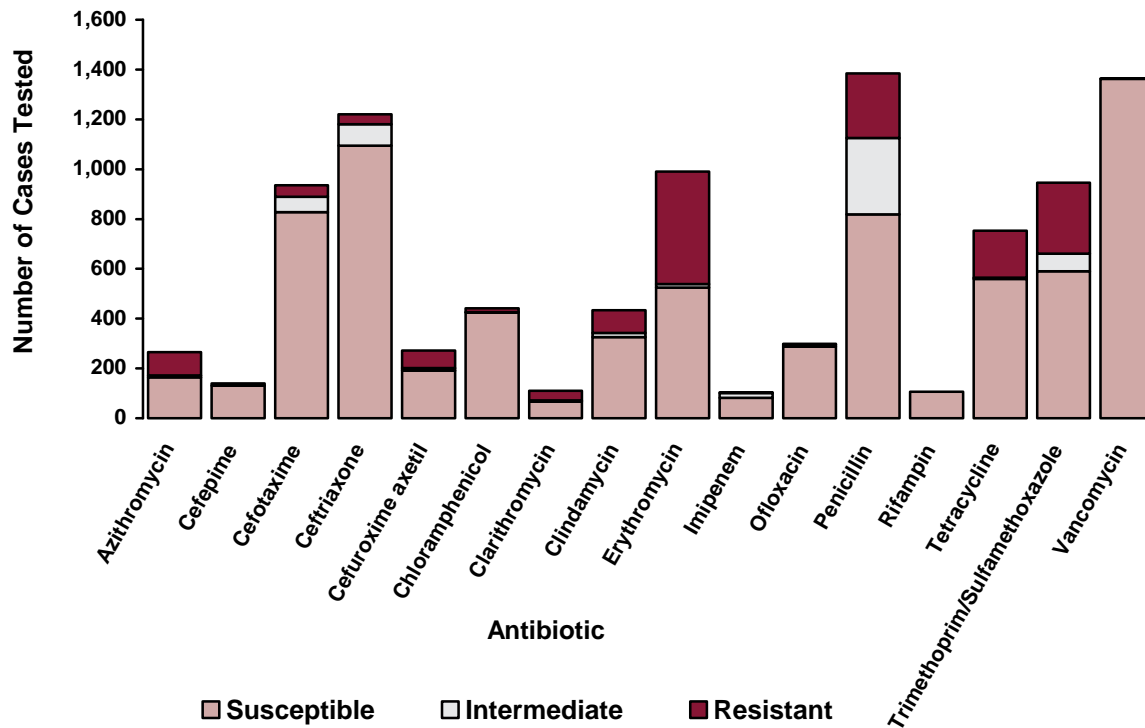
The purpose of the antimicrobial resistance surveillance in Florida is to maintain a statewide surveillance and information system that provides data on the incidence and spread of major invasive bacteria with clinically and epidemiologically relevant antimicrobial resistance. Describing the distribution of infection due to resistant organisms within populations, together with changes in patterns of those infections over time, provides the basic information for action both to control disease caused by resistant microorganisms and to contain the emergence of resistance. Strategies to protect the public's health can be developed and evaluated on the basis of this surveillance information.

Currently, *Streptococcus pneumoniae* is the only disease on Florida's list of notifiable diseases for which drug susceptibilities are required as part of case reporting. Drug-resistant *S. pneumoniae* (DRSP) invasive disease was added to Florida's list of notifiable diseases in mid-1996. Drug-susceptible *S. pneumoniae* (DSSP) invasive disease was added to the list of notifiable diseases mid-1999, to permit the assessment of the proportion of pneumococcal isolates that are drug-resistant. These data are currently captured and stored electronically in the Merlin database, though DSSP data wasn't captured electronically until 2003. The rise of antibiotic resistance among isolates of *S. pneumoniae* and the severity of disease it causes highlight the importance of monitoring trends to aid in developing effective treatment and intervention strategies.

Data Trends

There were a total of 704 DSSP cases and 792 DRSP cases in 2008. Of the 704 DSSP cases, 13 did not have antibiotic susceptibility data because the patient died and further testing was not done. Those 13 cases are excluded from this section. Additionally, it should be noted that not every antibiotic was tested for every case. When calculating percentages for each antibiotic, the denominator is the number of cases that were tested for that antibiotic. Resistant and intermediate susceptibilities were grouped together as "resistant" for this summary.

With the steady rise of antimicrobial resistance among strains of *S. pneumoniae* in the past decade, it is now more important than ever for physicians to prescribe proper antimicrobial therapy. Where penicillin was previously the drug of choice for all pneumococcal infections, 40.8% of the cases tested in Florida in 2008 were resistant to penicillin (see Figure 1 and Table 1). Resistance was most common for erythromycin, with 47.0% of isolates tested showing resistance or intermediate susceptibility. Seven of the antibiotics tracked (azithromycin, cefuroxime axetil, clarithromycin, erythromycin, penicillin, tetracycline, and trimethoprim/sulfamethoxazole) had greater than 25% resistance. Vancomycin and rifampin had the lowest resistance, at 0.1% and 0.9% respectively.

Figure 1. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, Florida, 2008Table 1. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, Florida 2008

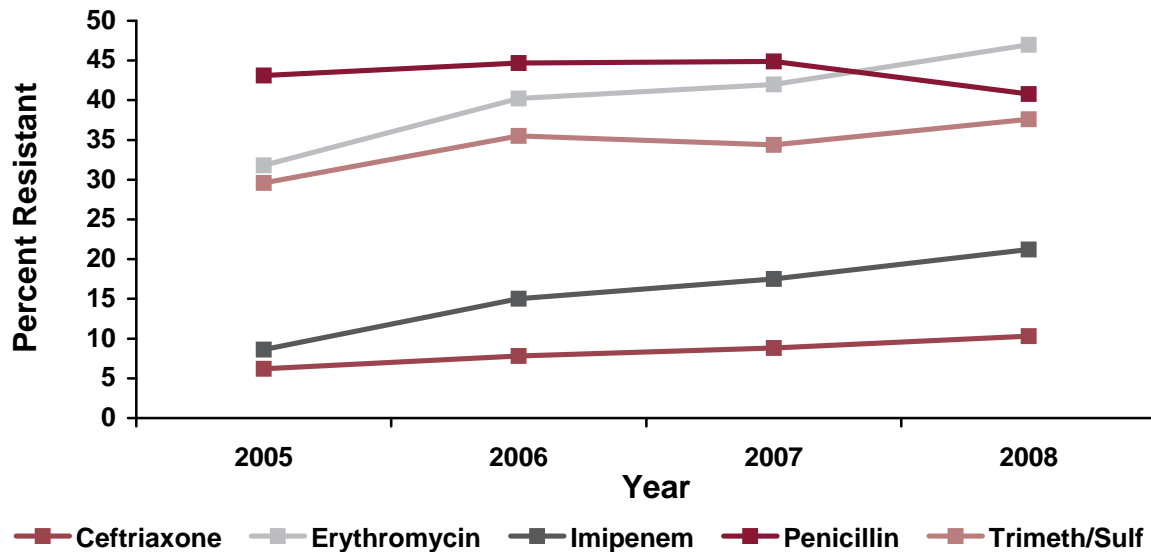
Antibiotic name	Number of Cases Tested	Susceptible	Intermediate	Resistant
Azithromycin	265	61.9%	3.0%	35.1%
Cefepime	140	93.6%	6.4%	0.0%
Cefotaxime	935	88.6%	6.5%	4.9%
Ceftriaxone	1,220	89.7%	7.0%	3.3%
Cefuroxime axetil	272	70.2%	4.0%	25.7%
Chloramphenicol	441	96.4%	0.2%	3.4%
Clarithromycin	110	60.9%	4.5%	34.5%
Clindamycin	434	75.1%	3.9%	21.0%
Erythromycin	991	53.0%	1.4%	45.6%
Imipenem	104	78.8%	18.3%	2.9%
Ofloxacin	299	96.3%	2.7%	1.0%
Penicillin	1,384	59.2%	22.1%	18.7%
Rifampin	107	99.1%	0.0%	0.9%
Tetracycline	753	74.4%	0.7%	25.0%
Trimethoprim/Sulfamethoxazole	947	62.3%	7.5%	30.1%
Vancomycin	1,364	99.9%	0.0%	0.1%

The prevalence of resistance increased for most antibiotics overall from 2005 to 2008, though decreased for a few antibiotics (see Table 2 and Figure 2). Antibiotics with steady increases in resistance include ceftriaxone, clindamycin, erythromycin, imipenem, and tetracycline. Resistance to the remaining antibiotics fluctuated over the years. Overall increases were seen for azithromycin, cefotaxime, cefuroxime axetil, clarithromycin, rifampin, and trimethoprim/sulfamethoxazole. Overall decreases

were seen for cefepime, chloramphenicol, ofloxacin, and penicillin. Note that ceftriaxone, erythromycin, imipenem, penicillin, and trimethoprim/sulfamethoxazole are highlighted in Table 2 and are presented in Figure 2. These antibiotics were chosen because they represent most of the major antibiotic classes.

Table 2. <i>Streptococcus pneumoniae</i>, Invasive Disease, Percent Resistant to Antibiotics, Florida 2005-2008				
Antibiotic name	2005	2006	2007	2008
Azithromycin	30.6%	45.4%	44.3%	38.1%
Cefepime	9.2%	14.1%	10.2%	6.4%
Cefotaxime	8.6%	8.0%	11.3%	11.4%
Ceftriaxone	6.2%	7.8%	8.8%	10.3%
Cefuroxime axetil	22.1%	29.3%	30.8%	29.7%
Chloramphenicol	4.4%	2.8%	4.7%	3.6%
Clarithromycin	30.9%	36.9%	51.1%	39.0%
Clindamycin	16.2%	20.2%	23.4%	24.9%
Erythromycin	31.8%	40.2%	42.0%	47.0%
Imipenem	8.6%	15.0%	17.5%	21.2%
Ofloxacin	4.4%	5.2%	2.9%	3.7%
Penicillin	43.1%	44.7%	44.9%	40.8%
Rifampin	0.0%	0.6%	0.0%	0.9%
Tetracycline	16.1%	16.6%	21.2%	25.7%
Trimethoprim/Sulfamethoxazole	29.6%	35.5%	34.4%	37.6%
Vancomycin	0.1%	0.8%	0.3%	0.1%

Figure 2. *Streptococcus pneumoniae*, Invasive Disease, Percent Resistant to Select Antibiotics, Florida 2005-2008



In general, the prevalence of resistance to antibiotics is highest in the very young, followed by the elderly, and lowest in the middle aged (see Table 3). For example, 66.7% of the cases tested for imipenem in those less than one year old were resistant, compared to 6.4% in those 25 to 64 years old, and 8.7% in those 65 and older. Overall, the highest rate of resistance was seen in erythromycin; 62.3% of cases one to four years old were resistant while only 46.7% of cases 65 and older were resistant.

Table 3. *Streptococcus pneumoniae*, Invasive Disease, Percent Resistant to Antibiotics by Age Category, Florida 2008

Age	Number of Cases	Azithromycin	Cefepime	Cefotaxime	Ceftriaxone	Cefuroxime axetil	Chloramphenicol	Clarithromycin	Clindamycin	Erythromycin	Imipenem	Ofloxacin	Penicillin	Rifampin	Tetracycline	Trimethoprim/ Sulfamethoxazole	Vancomycin
<1	67	50.0%	14.3%	23.9%	19.6%	64.7%	0.0%	33.3%	34.8%	50.0%	66.7%	0.0%	64.6%	0.0%	34.5%	64.1%	0.0%
1-4	163	63.0%	20.0%	23.2%	22.7%	51.5%	4.0%	53.8%	39.0%	62.3%	53.0%	3.2%	58.8%	4.2%	46.0%	60.6%	0.0%
5-14	53	50.0%	0.0%	10.2%	6.8%	6.2%	0.0%	66.7%	21.4%	44.8%	0.0%	0.0%	44.0%	0.0%	23.8%	52.0%	0.0%
15-24	32	50.0%	-	6.7%	3.6%	-	10.0%	0.0%	28.6%	36.0%	-	0.0%	38.8%	0.0%	22.2%	25.0%	0.0%
25-64	716	28.5%	5.3%	11.1%	8.2%	25.4%	2.9%	25.4%	23.7%	44.4%	6.4%	2.2%	37.2%	0.0%	22.3%	35.3%	0.2%
65+	452	43.8%	2.8%	5.7%	8.9%	24.4%	5.0%	54.3%	17.7%	46.7%	8.7%	7.4%	36.1%	0.0%	23.8%	30.1%	0.0%
Total	1483	38.1%	6.4%	11.4%	10.3%	29.8%	3.6%	39.1%	24.9%	47.0%	21.2%	3.7%	40.8%	0.9%	25.6%	37.6%	0.1%

Resistance patterns were also summarized by region and county. The Regional Domestic Security Task Force regions were used, as depicted in Figure 3.

Figure 3. Regional Domestic Security Task Force Regions



The East Central Region of Florida had 254 (17.1%) of the 1,483 cases included in this summary (Figure 4 and Table 4). Only one case was tested for imipenem resistance, and this case was resistant. Two cases were tested for clarithromycin, and one of these cases was resistant. The small denominators for these antibiotics make the resistance percentages misleading. Excluding these antibiotics, the highest rate of resistance was seen in erythromycin (50.8%). Tetracycline, penicillin, trimethoprim/sulfamethoxazole, cefuroxime axetil, azithromycin, and erythromycin all had resistance rates greater than 25.0%.

The North Central Region of Florida had 37 (2.5%) of the 1,483 cases included in this summary (Figure 5 and Table 4). One case was tested for imipenem resistance; two cases were tested for azithromycin, cefepime, chloramphenicol, and ofloxacin resistance; and six cases were tested for cefuroxime axetil resistance. The small denominators for these antibiotics make the resistance percentages misleading. Excluding these antibiotics, the highest rate of resistance was seen in penicillin (40.0%), followed by erythromycin (35.5%). Tetracycline, trimethoprim/sulfamethoxazole, erythromycin, and penicillin all had resistance rates greater than 25.0%.

The North East Region of Florida had 198 (13.4%) of the 1,483 cases included in this summary (Figure 6 and Table 4). Only three cases were tested for imipenem, making the resistance percentage misleading due to the small denominator. Penicillin had the highest resistance rate (42.2%) followed by erythromycin (41.1%) and azithromycin (40.0%). Clindamycin, trimethoprim/sulfamethoxazole, azithromycin, erythromycin, and penicillin all had resistance rates greater than 25.0%.

The North West Region of Florida had 137 (9.2%) of the 1,483 cases included in this summary (Figure 7 and Table 4). Only one case was tested for rifampin resistance, making the resistance percentage misleading due to the small denominator. Penicillin had the greatest resistance rate (30.0%) followed by trimethoprim/sulfamethoxazole (26.3%). These were the only two antibiotics with resistance rates greater than 25.0%.

The South East Region of Florida had 445 (30.0%) of the 1,483 cases included in this summary (Figure 8 and Table 4). Clarithromycin had the greatest resistance rate (52.6%), though only 19 cases reported clarithromycin susceptibility results. Erythromycin had the next highest resistance rate (48.8%) and also had a large denominator. Clindamycin, trimethoprim/sulfamethoxazole, penicillin, cefuroxime axetil, imipenem, azithromycin, erythromycin, and clarithromycin all had resistance rates greater than 25.0%.

The South West Region of Florida had 127 (8.6%) of the 1,483 cases included in this summary (Figure 9 and Table 4). Susceptibility data for several antibiotics in this region were rarely reported: rifampin (1 case), imipenem (4 cases), cefepime (5 cases), cefuroxime axetil (7 cases), clarithromycin (8 cases), and azithromycin (10 cases). The small denominators for these antibiotics make the resistance percentages misleading. Excluding these antibiotics, the highest rate of resistance was seen in erythromycin (56.1%), followed by penicillin (44.8%). Clindamycin, trimethoprim/sulfamethoxazole, penicillin, and erythromycin all had resistance rates greater than 25.0%.

The West Central Region of Florida had 285 (19.2%) of the 1,483 cases included in this summary (Figure 10 and Table 4). Erythromycin had the greatest resistance rate (51.0%), followed by clarithromycin (50.0%). Clindamycin, tetracycline, cefuroxime axetil, trimethoprim/sulfamethoxazole, penicillin, azithromycin, clarithromycin, and erythromycin all had resistance rates greater than 25.0%.

Resistance rates by county are presented in Table 5.

Figure 4. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, East Central Region of Florida, 2008

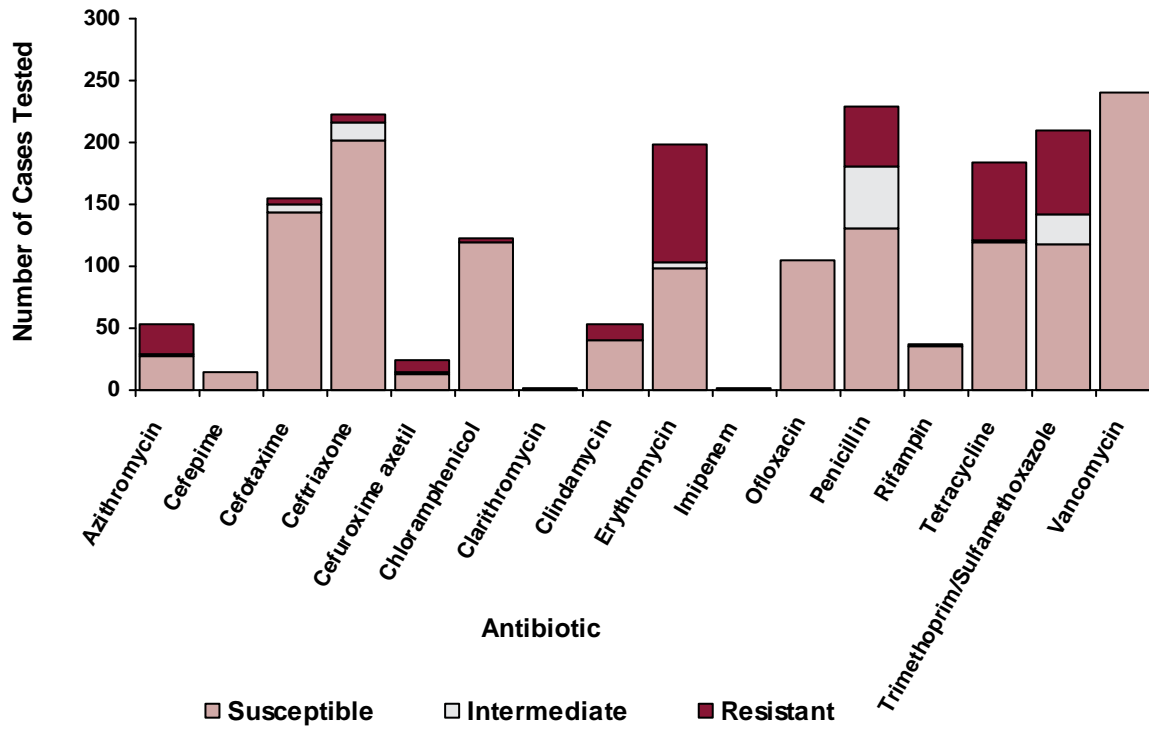


Figure 5. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, North Central Region of Florida, 2008

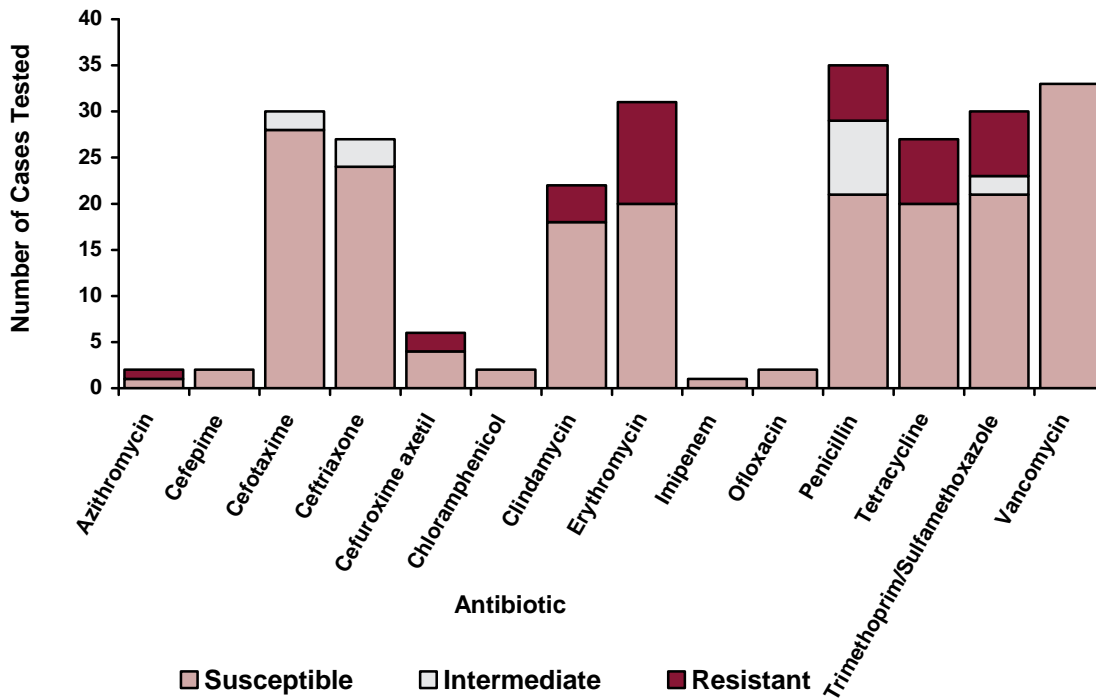


Figure 6. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, North East Region of Florida, 2008

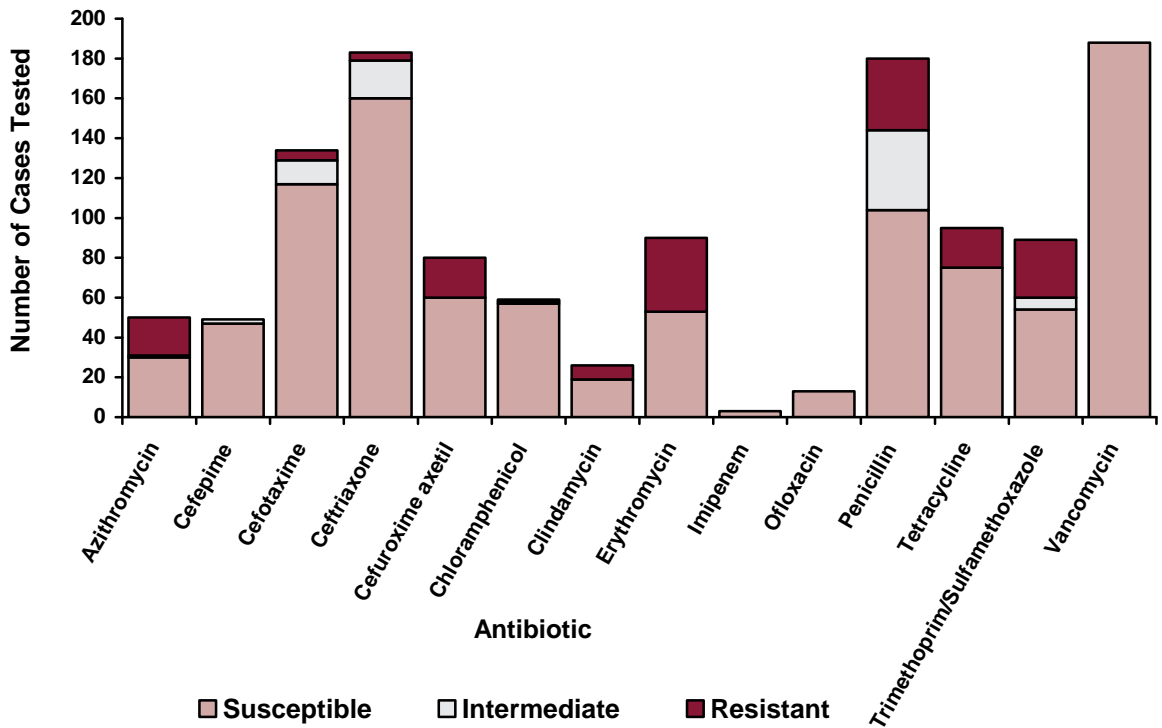


Figure 7. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, North West Region of Florida, 2008

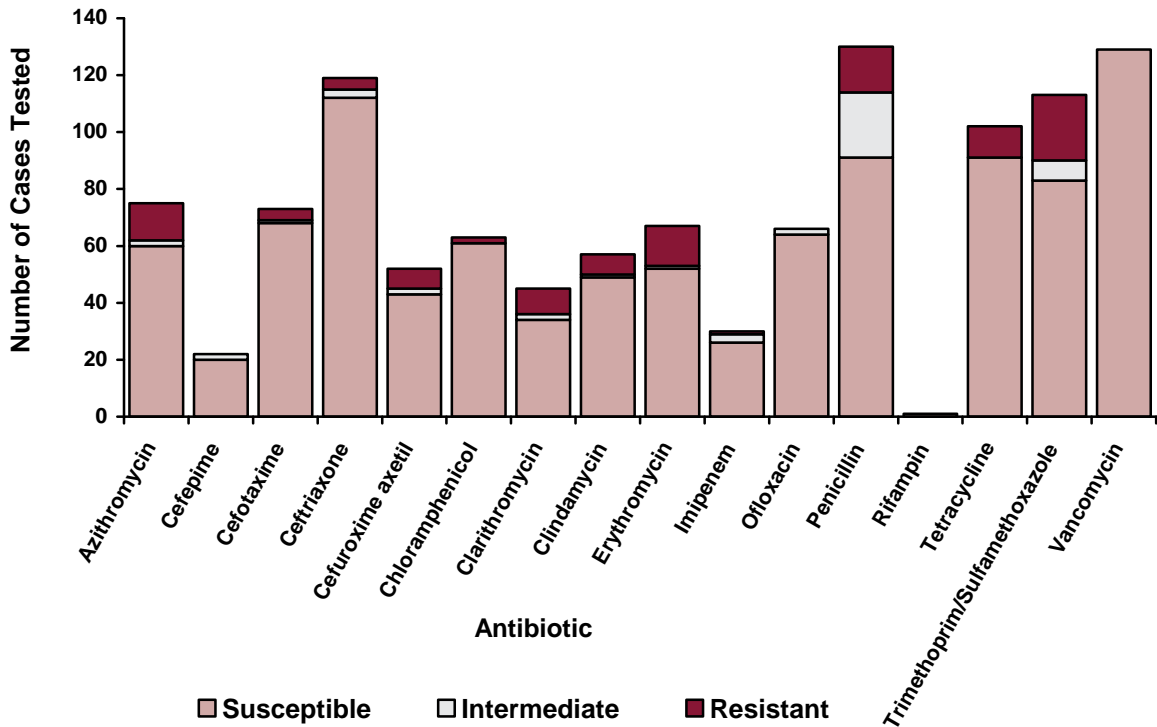


Figure 8. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, South East Region of Florida, 2008

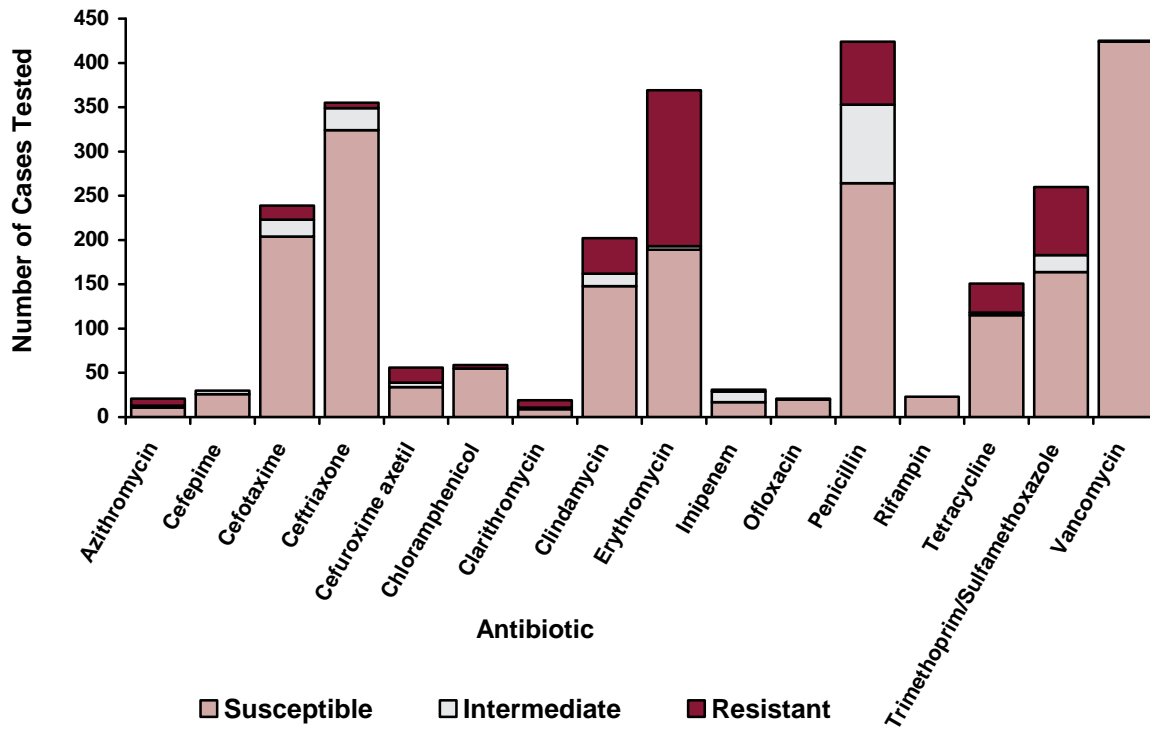


Figure 9. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, South West Region of Florida, 2008

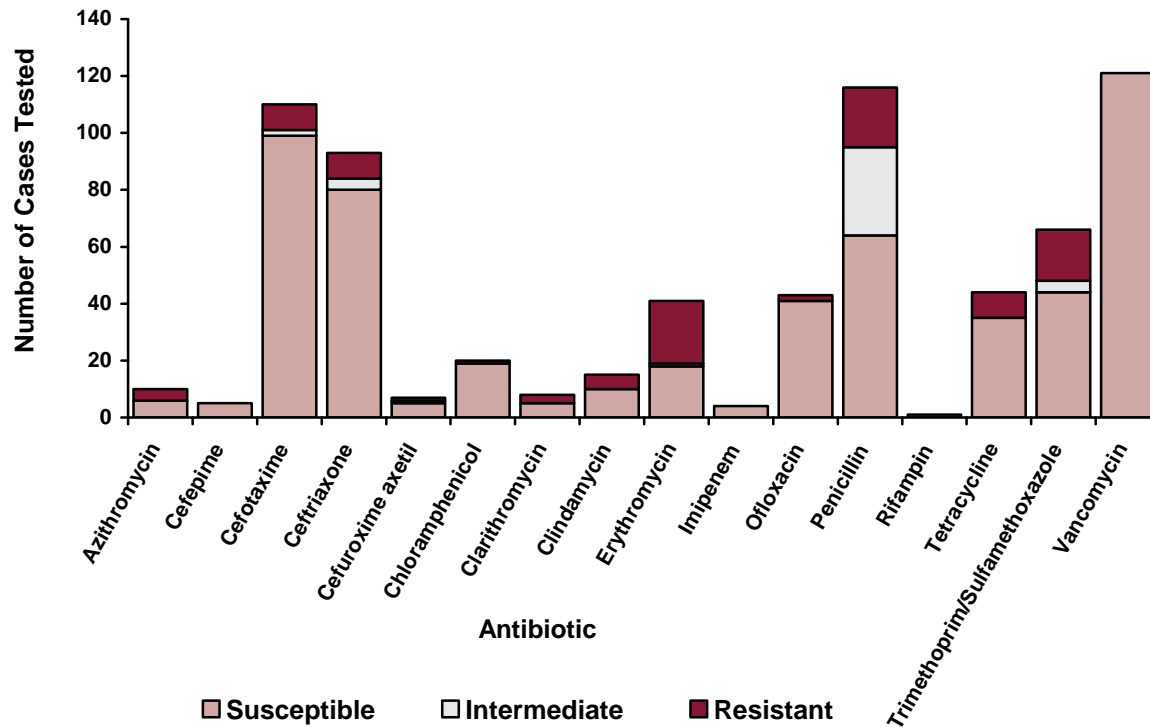


Figure 10. *Streptococcus pneumoniae*, Invasive Disease, Antibiotic Resistance, West Central Region of Florida, 2008

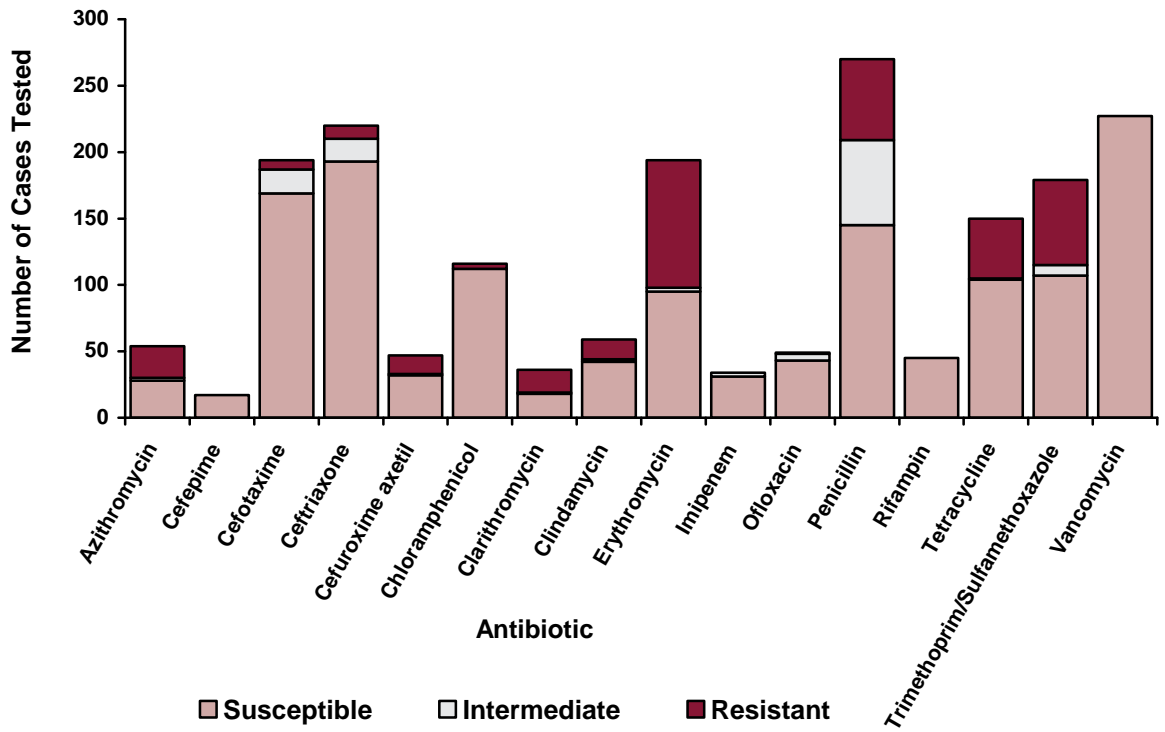


Table 4. Streptococcus pneumoniae, Invasive Disease, Percent Resistant to Antibiotics by Region, Florida 2008

Region	Number of Cases	Azithromycin	Cefepime	Cefotaxime	Ceftriaxone	Cefuroxime axetil	Chloramphenicol	Clarithromycin	Clindamycin	Erythromycin	Imipenem	Ofloxacin	Penicillin	Ritampin	Tetracycline	Trimethoprim/Sulfamethoxazole	Vancomycin
East Central	254	47.2%	6.7%	7.7%	9.8%	45.8%	2.5%	50.0%	24.5%	50.7%	100.0%	0.0%	43.3%	2.7%	34.7%	44.1%	0.0%
North Central	37	50.0%	0.0%	6.7%	11.1%	33.3%	0.0%	-	18.2%	35.5%	0.0%	0.0%	40.0%	-	25.9%	30.0%	0.0%
North East	198	40.0%	4.1%	12.7%	12.6%	25.0%	3.4%	-	26.9%	41.1%	0.0%	0.0%	42.2%	-	21.1%	39.3%	0.0%
North West	137	20.0%	9.1%	6.9%	5.9%	17.3%	3.2%	24.4%	14.1%	22.4%	13.3%	3.0%	30.0%	0.0%	10.8%	26.3%	0.0%
South East	445	47.6%	13.3%	14.6%	8.7%	39.3%	6.8%	52.6%	26.7%	48.8%	45.2%	4.8%	37.7%	0.0%	23.9%	36.9%	0.2%
South West	127	40.0%	0.0%	10.0%	14.0%	28.6%	5.0%	37.5%	33.3%	56.1%	0.0%	4.7%	44.8%	0.0%	20.5%	33.4%	0.0%
West Central	285	48.1%	0.0%	12.9%	12.2%	31.9%	3.4%	50.0%	28.8%	51.0%	8.8%	12.2%	46.3%	0.0%	30.7%	40.3%	0.0%
Total	1483	38.1%	6.4%	11.4%	10.3%	29.8%	3.6%	39.1%	24.9%	47.0%	21.2%	3.7%	40.8%	0.9%	25.6%	37.6%	0.1%

Table 5. Streptococcus pneumoniae, Invasive Disease, Percent Resistant to Antibiotics by County, Florida 2008

County	Number of Cases	Azithromycin	Cefepime	Cefotaxime	Ceftriaxone	Cefuroxime axetil	Chloramphenicol	Clarithromycin	Clindamycin	Erythromycin	Imipenem	Ofloxacin	Penicillin	Ritampin	Tetracycline	Trimethoprim/Sulfamethoxazole	Vancomycin
Alachua	23	14.3%	0.0%	12.5%	14.3%	19.0%	14.3%	-	-	12.5%	-	0.0%	28.6%	-	25.0%	12.5%	0.0%
Baker	2	0.0%	0.0%	0.0%	0.0%	-	0.0%	-	0.0%	0.0%	-	-	0.0%	-	0.0%	0.0%	0.0%
Bay	21	-	-	33.3%	18.2%	37.5%	0.0%	100.0%	100.0%	-	-	0.0%	52.4%	-	30.0%	45.0%	0.0%
Bradford	3	-	-	-	0.0%	50.0%	-	-	-	-	-	-	0.0%	-	-	-	0.0%
Brevard	55	41.2%	0.0%	0.0%	5.8%	0.0%	3.2%	0.0%	20.0%	46.6%	-	-	50.0%	0.0%	33.3%	41.8%	0.0%
Broward	140	0.0%	20.0%	10.7%	7.7%	50.0%	0.0%	0.0%	18.9%	48.9%	0.0%	0.0%	27.8%	-	13.2%	34.3%	0.0%
Charlotte	3	-	-	0.0%	0.0%	-	0.0%	-	100.0%	100.0%	-	33.3%	50.0%	0.0%	50.0%	50.0%	0.0%
Citrus	11	-	0.0%	33.3%	27.3%	75.0%	-	-	14.3%	55.6%	-	0.0%	81.9%	-	28.6%	42.9%	0.0%
Clay	22	33.3%	0.0%	33.3%	28.6%	0.0%	0.0%	-	0.0%	33.3%	-	-	52.4%	-	33.3%	25.0%	0.0%
Collier	17	-	0.0%	0.0%	17.6%	0.0%	-	-	-	75.0%	-	7.7%	47.0%	-	13.3%	40.0%	0.0%

Table 5. Streptococcus pneumoniae, Invasive Disease, Percent Resistant to Antibiotics by County, Florida 2008

County	Number of Cases	Azithromycin	Cefepime	Cefotaxime	Ceftriaxone	Cefuroxime axetil	Chloramphenicol	Clarithromycin	Clindamycin	Erythromycin	Imipenem	Ofloxacin	Penicillin	Ritampin	Tetracycline	Trimethoprim/Sulfamethoxazole	Vancomycin
Columbia	7	-	-	25.0%	0.0%	0.0%	-	-	-	50.0%	-	-	28.6%	-	50.0%	25.0%	0.0%
Dade	205	37.5%	25.0%	20.2%	12.2%	61.5%	10.3%	42.9%	39.8%	47.2%	48.1%	20.0%	46.7%	0.0%	40.5%	36.6%	0.5%
Dixie	2	50.0%	0.0%	0.0%	50.0%	100.0%	0.0%	-	-	50.0%	-	-	100.0%	-	50.0%	50.0%	0.0%
Duval	87	57.1%	6.2%	11.6%	11.7%	31.8%	0.0%	-	42.9%	45.7%	0.0%	0.0%	45.7%	-	25.0%	42.5%	0.0%
Escambia	63	23.3%	25.0%	5.4%	3.4%	16.7%	4.0%	23.1%	8.8%	33.3%	20.0%	8.7%	27.6%	-	10.0%	28.3%	0.0%
Flagler	6	-	-	20.0%	16.7%	-	-	-	-	100.0%	-	-	100.0%	-	0.0%	60.0%	0.0%
Gadsden	2	-	-	0.0%	0.0%	0.0%	-	-	0.0%	0.0%	-	-	0.0%	-	0.0%	0.0%	0.0%
Gilchrist	3	50.0%	0.0%	0.0%	0.0%	33.3%	0.0%	-	-	100.0%	-	-	33.3%	-	0.0%	100.0%	0.0%
Glades	1	-	-	0.0%	0.0%	-	-	-	-	-	-	0.0%	-	-	-	-	0.0%
Gulf	3	-	-	-	0.0%	0.0%	-	-	-	-	-	-	33.3%	-	-	0.0%	0.0%
Hamilton	3	-	-	0.0%	0.0%	-	-	-	-	100.0%	0.0%	-	50.0%	-	-	0.0%	0.0%
Hardee	2	100.0%	-	0.0%	0.0%	-	0.0%	-	-	100.0%	-	0.0%	100.0%	-	50.0%	100.0%	0.0%
Hendry	1	-	-	0.0%	0.0%	-	-	-	-	-	-	0.0%	0.0%	-	100.0%	0.0%	0.0%
Hernando	23	54.6%	0.0%	30.8%	16.7%	33.3%	-	-	0.0%	40.0%	-	-	42.1%	-	29.4%	15.4%	0.0%
Highlands	10	37.5%	0.0%	20.0%	20.0%	100.0%	0.0%	37.5%	100.0%	50.0%	0.0%	0.0%	66.6%	-	11.1%	22.2%	0.0%
Hillsborough	82	52.7%	-	10.2%	11.5%	22.2%	4.3%	52.7%	29.3%	66.1%	10.7%	19.1%	51.8%	0.0%	34.8%	45.2%	0.0%
Holmes	1	-	-	0.0%	0.0%	-	-	-	-	0.0%	-	-	0.0%	-	0.0%	0.0%	0.0%
Indian River	2	-	-	-	0.0%	-	-	-	0.0%	0.0%	-	-	0.0%	-	-	-	0.0%
Jackson	10	22.2%	11.1%	11.1%	10.0%	20.0%	-	-	33.3%	20.0%	50.0%	0.0%	30.0%	-	11.1%	22.2%	0.0%
Jefferson	3	-	-	0.0%	0.0%	-	-	-	33.3%	33.3%	-	-	100.0%	-	33.3%	0.0%	0.0%
Lafayette	1	-	-	0.0%	-	-	-	-	0.0%	0.0%	-	-	0.0%	-	0.0%	0.0%	0.0%
Lake	29	100.0%	0.0%	4.0%	7.4%	100.0%	0.0%	100.0%	0.0%	54.6%	-	0.0%	46.4%	-	41.4%	51.7%	0.0%
Lee	47	-	0.0%	13.1%	15.5%	0.0%	-	-	0.0%	50.0%	0.0%	0.0%	45.5%	-	20.0%	20.0%	0.0%
Leon	15	-	-	0.0%	12.5%	-	-	-	14.3%	33.3%	-	-	40.0%	-	14.3%	40.0%	0.0%
Manatee	26	-	0.0%	4.2%	0.0%	50.0%	12.5%	-	25.0%	60.0%	-	0.0%	36.0%	-	25.0%	28.5%	0.0%
Marion	32	40.9%	5.3%	10.7%	12.9%	29.2%	4.3%	-	14.3%	48.0%	-	0.0%	40.0%	-	20.7%	40.7%	0.0%
Martin	6	-	-	0.0%	0.0%	0.0%	-	-	-	33.3%	-	0.0%	16.7%	-	0.0%	0.0%	0.0%

Table 5. Streptococcus pneumoniae, Invasive Disease, Percent Resistant to Antibiotics by County, Florida 2008

County	Number of Cases	Azithromycin	Cefepime	Cefotaxime	Ceftriaxone	Cefuroxime axetil	Chloramphenicol	Clarithromycin	Clindamycin	Erythromycin	Imipenem	Ofloxacin	Penicillin	Rifampin	Tetracycline	Trimethoprim/ Sulfamethoxazole	Vancomycin
Monroe	5	-	-	50.0%	0.0%	-	0.0%	-	-	60.0%	-	-	20.0%	-	40.0%	20.0%	0.0%
Nassau	11	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.0%	40.0%	-	0.0%	0.0%	0.0%
Okaloosa	16	40.0%	0.0%	0.0%	7.7%	0.0%	8.3%	60.0%	33.3%	23.1%	0.0%	0.0%	37.5%	-	10.0%	22.2%	0.0%
Okeechobee	2	-	-	0.0%	0.0%	-	-	-	-	0.0%	-	-	0.0%	-	-	-	0.0%
Orange	73	40.0%	0.0%	9.8%	10.1%	-	2.9%	-	50.0%	43.9%	-	0.0%	37.2%	0.0%	33.3%	46.5%	0.0%
Osceola	7	-	0.0%	0.0%	0.0%	-	0.0%	-	0.0%	71.4%	-	0.0%	14.3%	-	33.3%	33.4%	0.0%
Palm Beach	95	63.6%	9.5%	7.1%	4.9%	17.8%	0.0%	63.6%	0.0%	51.5%	50.0%	0.0%	34.1%	-	17.4%	50.0%	0.0%
Pasco	32	40.0%	0.0%	12.5%	7.7%	50.0%	11.1%	50.0%	50.0%	42.9%	0.0%	0.0%	37.9%	0.0%	35.7%	37.4%	0.0%
Pinellas	55	37.5%	0.0%	13.6%	6.7%	9.1%	0.0%	46.2%	42.9%	50.0%	0.0%	22.2%	39.2%	0.0%	16.1%	38.9%	0.0%
Polk	73	0.0%	0.0%	8.0%	18.4%	100.0%	0.0%	-	0.0%	40.6%	-	0.0%	43.1%	0.0%	16.7%	34.6%	0.0%
Putnam	3	-	-	-	0.0%	0.0%	-	-	-	-	0.0%	0.0%	33.3%	-	-	-	0.0%
Santa Rosa	6	6.2%	0.0%	7.7%	5.6%	10.0%	0.0%	9.1%	9.1%	8.3%	9.1%	0.0%	5.9%	-	5.6%	6.2%	0.0%
Sarasota	18	50.0%	-	17.6%	25.0%	0.0%	0.0%	-	-	25.0%	-	0.0%	50.0%	-	25.0%	40.0%	0.0%
Seminole	18	75.0%	14.3%	23.1%	25.0%	57.1%	7.1%	-	25.0%	61.1%	-	0.0%	57.9%	-	44.4%	60.0%	0.0%
St. Johns	20	-	-	0.0%	0.0%	0.0%	0.0%	-	-	0.0%	-	-	33.3%	-	-	100.0%	0.0%
St. Lucie	20	-	-	6.7%	12.4%	75.0%	-	-	100.0%	93.3%	100.0%	0.0%	70.5%	0.0%	-	-	0.0%
Sumter	7	-	-	0.0%	0.0%	0.0%	0.0%	-	-	50.0%	-	-	50.0%	-	57.1%	50.0%	0.0%
Taylor	2	-	-	0.0%	0.0%	-	-	-	0.0%	0.0%	-	0.0%	0.0%	-	0.0%	0.0%	0.0%
Volusia	44	25.0%	0.0%	0.0%	9.8%	66.6%	0.0%	-	29.4%	43.3%	-	0.0%	38.7%	5.9%	29.4%	30.8%	0.0%
Wakulla	2	-	-	50.0%	50.0%	-	-	-	100.0%	50.0%	-	-	50.0%	-	100.0%	100.0%	0.0%
Walton	3	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	-	0.0%	50.0%	0.0%
Washington	2	0.0%	-	0.0%	0.0%	-	-	0.0%	0.0%	0.0%	-	-	0.0%	0.0%	0.0%	0.0%	0.0%
Total	1483	38.1%	6.4%	11.4%	10.3%	29.8%	3.6%	39.1%	24.9%	47.0%	21.2%	3.7%	40.8%	0.9%	25.6%	37.6%	0.1%

Other Activities

Methicillin-resistant *Staphylococcus aureus* (MRSA), a major cause of both healthcare-associated and community-associated infections, is not included on Florida's list of notifiable diseases in 2008. However, the Florida Department of Health began collecting antibiotic susceptibility data in 2005 for all *S. aureus* isolates processed by Quest Diagnostics, a commercial laboratory that primarily serves outpatient providers operating throughout Florida. Data for all *S. aureus* isolates from 2003 and 2004 were retrospectively collected and, as of 2008, six years of data are available. These data are not presented here, but please check the Bureau of Epidemiology website (http://www.doh.state.fl.us/Disease_ctrl/epi/htopics/anti_res/MRSA.html) periodically for updates.

In the November 2008 revision to F.A.C. Rule 64D-3, Florida made community-associated *S. aureus* mortality a reportable condition. Additionally, antibiotic susceptibilities for all *S. aureus* isolates from sterile sites became reportable via electronic laboratory reporting. This applies only to laboratories participating in electronic laboratory reporting with the Florida Department of Health, and individual case investigations are not required. The goal of this surveillance is to monitor trends of antimicrobial resistance.

The emergence of quinolone-resistant *Neisseria meningitidis* in the U.S. has raised important questions regarding current chemoprophylaxis guidelines and highlights the expanding threat of antimicrobial resistance in bacterial pathogens. The Centers for Disease Control and Prevention (CDC) responded to this threat by forming MeningNet, an enhanced meningococcal surveillance system that will be used to monitor antimicrobial susceptibility. As part of MeningNet, Florida began forwarding all *N. meningitidis* isolates to the CDC for antibiotic susceptibility testing in late 2008. A total of four isolates were tested, all of which were susceptible to penicillin, ceftriaxone, ciprofloxacin, rifampin, and azithromycin.

Nocardia species are weakly acid-fast, gram positive bacteria that can cause severe opportunistic infections including: respiratory infections; brain abscesses; cutaneous and lymphocutaneous disease; and actinomycotic mycetomas. Because *Nocardia* species are partially acid-fast, hospitals often seek confirmation from the Bureau of Laboratories to be sure they rule out a *Mycobacterium* species isolate. Sulfonamides have been the traditional treatment of choice for *Nocardia* species since the 1940's, but emerging sulfonamide resistance has been reported in Europe, Japan, and there have been a few cases and small case series reported in the U.S. In response to this emerging threat, the CDC started a three year surveillance project in 2007 to assess the burden of disease due to antimicrobial resistant *Nocardia*. In 2008, the Bureau of Laboratories began forwarding all presumptive *Nocardia* isolates to the CDC for antibiotic susceptibility testing as part of this surveillance project. Additionally, epidemiologic data will be collected to determine antimicrobial treatments and medical procedures for these cases.