

Antimicrobial Susceptibility Summary



2016—Pierce County, Washington

From Jan. 1 to Dec. 31, 2016, Pierce County MultiCare and military hospital labs reported antibiotic susceptibility test results to Tacoma-Pierce County Health Department.

Antibiotic susceptibility test results include inpatient and outpatient data. Data includes only bacterial isolates collected for diagnostic purposes. Surveillance cultures were not included. Results reflect combinations of different patient populations with different syndromes, infection sites and risk factors for drug-resistant organisms (e.g., adult vs. pediatric, inpatient vs. outpatient, ICU vs. non-ICU).

Based on this data and established treatment guidelines, Pierce County Antibiotic Resistance Task Force recommends the following.

Urinary Tract Infection

- Short courses, selecting recommended agents and avoiding fluoroquinolones are important stewardship strategies.
- Cephalosporins (i.e., cephalexin, cefpodoxime, cefdinir) and nitrofurantoin (if creatinine clearance (CrCl) > 60 ml/min) are the best options for empiric urinary tract infection (UTI) treatment.
- Avoid sulfamethoxazole-trimethoprim (TMP-SMX, Bactrim) unless susceptibilities are available. Resistance rates for common gram-negative pathogens causing UTI are rising. Avoid empiric treatment with TMP-SMX where resistance rates are 20% or greater. *E. coli* resistance to TMP-SMX in Pierce County was 20% in 2016 and, therefore, should not be used for empiric treatment.
- Patients without urinary symptoms generally do **not** need treatment for positive urine dipstick or urinalysis testing (unless pregnant or undergoing an invasive urological procedure).
- Use nitrofurantoin for afebrile cystitis only (not pyelonephritis). Patient must have CrCl >60 for drug to be excreted into the urinary tract.
- Due to the possibility of side effects and rising resistance levels in some parts of the world, reserve fluoroquinolone use when possible. When prescribing fluoroquinolones, ciprofloxacin is preferred for gram-negative coverage in UTI. Avoid moxifloxacin, as it is not renally excreted.

Methicillin-resistant *Staphylococcus aureus*

- Pierce County's overall Methicillin-resistant *Staphylococcus aureus* (MRSA) rate remained at 43%, unchanged from 2015.

- MRSA coverage should be considered for purulent skin and soft tissue infections (SSTI). Non-purulent SSTIs are rarely caused by *Staphylococcus aureus* and MRSA coverage is usually not necessary.
- The best agents for empiric MRSA coverage include TMP-SMX and tetracycline analogs (i.e., minocycline or doxycycline).
- Due to the risk of renal failure and severe side effects, TMP-SMX should be used with caution in the elderly and those with pre-existing renal dysfunction.

Acute Otitis Media in Pediatric Patients

- Consider treating uncomplicated acute otitis media (AOM) without antibiotics to reduce antibiotic resistance. Most cases of AOM resolve without antibiotics.
- When otitis media with effusion (OME) is diagnosed, antibiotics are not the answer. Effusions may take many weeks to resolve.
- First line therapy for AOM, when needed, should be amoxicillin 90 mg/kg/day divided BID (maximum 2g/day) for 5 to 10 days, depending on child's age and severity of illness.

Limitations

- CHI Franciscan Health System was unable to report. Due to the small number of participating hospitals, data from larger hospitals may disproportionately impact aggregate results.
- Data are the result of single organism-antimicrobial combinations. They do not show trends in cross-resistance between an organism and multiple drugs. Nor do they reveal synergistic properties of using different antimicrobials in combination with each other.
- Organisms can have multiple strains and are not always homogenous for clinical pathology or drug resistance. For example, this report combines all isolates of *Staphylococcus aureus*, regardless of methicillin-resistance.
- We were unable to determine how many *Streptococcus pneumoniae* isolates were invasive, meaning they were obtained from a sterile site within the body.
- Not all labs use the same methods to test for microbial resistance or create antibiograms. Inconsistency in methods can mask important differences and trends.
- Data may not be generalized to specific patient populations or community locations.

2016—Antimicrobial Susceptibility of Common Organisms, Pierce County

Gram Negative Organism	Tested No.	Ampicillin	Pip./Taz.	Cefazolin	Ceftriaxone	Ceftazidime	Imipenem	Gentamicin	Tobramycin	Nitrofuratoin	Ciprofloxacin	Levofloxacin	Trimeth/sulfa
		%	%	%	%	%	%	%	%	%	%	%	%
<i>Acinetobacter baumannii</i>	51	nt	nt	n/a	nt	82	nt	86	100	nt	90	nt	100
<i>Citrobacter freundii</i>	287	<30	87	nt	79	nt	99	96	96	92	89	87	85
<i>Enterobacter aerogenes</i>	313	nt	85	nt	85	nt	63	100	100	<30	96	100	98
<i>Enterobacter cloacae</i>	464	nt	82	nt	74	nt	97	98	99	<30	94	89	90
<i>Escherichia coli</i>	18,747	60	98	89	95	96	100	95	95	98	84	90	80
<i>Klebsiella pneumoniae</i>	2,426	nt	96	93	96	96	96	97	95	40	95	94	92
<i>Morganella morganii</i>	38	nt	100	nt	nt	nt	nt	95	nt	nt	84	nt	92
<i>Proteus mirabilis</i>	1,033	78	99	80	96	97	nt	90	97	nt	77	88	78
<i>Pseudomonas aeruginosa</i>	1,465	nt	89	nt	nt	91	90	90	96	nt	76	80	nt
<i>Serratia marcescens</i>	204	nt	97	nt	95	nt	72	100	89	nt	94	100	nt

nt = Not tested.

Gram Positive Organism	Tested No.	Penicillin	Oxacillin	Clindamycin	Erythromycin	Gentamicin	Nitrofuratoin	Levofloxacin	Tetracycline	Rifampin	Trimeth./Sulfa.	Vancomycin
		%	%	%	%	%	%	%	%	%	%	%
<i>Enterococcus species</i>	968	98	nt	nt	nt	71	92	84	<30	nt	nt	90
<i>Staphylococcus aureus</i>	6,634	<30	57	77	42	99	99	nt	92	nt	95	100

<i>Strep pneumoniae</i> 250 isolates	Tested No.	Susceptible %
Ceftazidime	18	100
Ceftriaxone	192	98
Erythromycin	40	63
Levofloxacin	250	100
Penicillin	210	90
Tetracycline	40	78
Trimeth./Sulfa.	40	75
Vancomycin	40	100

2014-2016—Three-Year Trends in Antimicrobial Susceptibility, Pierce County

Organism	Drug	% Susceptibility by Year			% Total Change 2014 vs. 2016
		2014	2015	2016	
<i>Citrobacter freundii</i>	Ceftriaxone	85	84	80	-6
<i>Citrobacter freundii</i>	Nitrofuratoin	86	88	92	6
<i>Enterobacter aerogenes</i>	Imipenem	88	74	64	-24
<i>Enterobacter cloacae</i>	Ceftriaxone	81	79	74	-8
<i>Enterobacter cloacae</i>	Ciprofloxacin	88	92	94	5
<i>Enterococcus</i>	Levofloxacin	80	81	94	14
<i>Enterococcus</i>	Nitrofuratoin	88	94	100	12
<i>Enterococcus</i>	Vancomycin	92	94	100	8
<i>Escherichia coli</i>	Ampicillin	60	58	95	35
<i>Escherichia coli</i>	Levofloxacin	82	81	90	7
<i>Escherichia coli</i>	Tobramycin	90	90	95	6
<i>Klebsiella pneumoniae</i>	Nitrofuratoin	32	35	40	9
<i>Proteus mirabilis</i>	Ampicillin	71	72	78	7
<i>Proteus mirabilis</i>	Cefazolin	88	82	81	-7
<i>Proteus mirabilis</i>	Levofloxacin	72	73	88	17
<i>Proteus mirabilis</i>	Tobramycin	86	88	97	11
<i>Proteus mirabilis</i>	Trimeth./Sulfa.	71	71	78	7
<i>Pseudomonas aeruginosa</i>	Ciprofloxacin	69	70	76	7
<i>Pseudomonas aeruginosa</i>	Imipenem	85	84	90	5
<i>Pseudomonas aeruginosa</i>	Levofloxacin	64	67	80	16
<i>Pseudomonas aeruginosa</i>	Piperacillin-Tazobactam	100	100	89	-11
<i>Staphylococcus epidermi</i>	Clindamycin	57	49	40	-17
<i>Staphylococcus epidermi</i>	Gentamicin	87	97	97	10

Results limited to statistically significant trends.

**ANTIBIOTIC
RESISTANCE**
Task Force

