

BACTERIAL SUSCEPTIBILITY REPORT: 2016

(January 2016 – December 2016)

VA Palo Alto Health Care System
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This report includes bacterial susceptibility information for the following:

Division/Units	Comments
Palo Alto: Emergency Department Acute Care (2A, 2C, 3C) Critical Care (2F, 3F) Spinal Cord (7SCI)	Units and buildings with similar patient populations and bacterial susceptibility patterns were combined in this report to increase the number of isolates, thus improving the interpretation of the data and our ability to detect trends. Spinal Cord (7SCI) was not combined with other units due to its unique population.
Nursing Home (4C) Menlo Park and Livermore CLC	Buildings 331, 360, and 90

Summary:

Methodology/Findings	Comments
<ul style="list-style-type: none"> All susceptibility data were obtained from Praedico, and reports were generated using first isolate methodology as recommended by Clinical Laboratory Standards Institute (CLSI). 	<ul style="list-style-type: none"> New breakpoints for cephalosporins vs. enteric gram-negative bacilli issued by the Clinical Laboratory Standards Institute were implemented July 2013 (lowered MIC value associated with resistance). Therefore, ESBL is no longer reported since reduced susceptibilities are identified using these breakpoints. Amoxicillin/clavulanate, ceftazidime (for urine only), and daptomycin susceptibilities were added, and quinupristin/dalfopristin susceptibilities were removed for the 2016 antibiogram.
<ul style="list-style-type: none"> Susceptibility of <i>Pseudomonas aeruginosa</i> to cefepime, piperacillin/tazobactam, and ceftazidime were relatively similar: cefepime 79-95%, piperacillin/tazobactam 85-96%, and ceftazidime 82-95%. For the medical/surgical acute care units, 2A/2C/3C and 2F/3F, % susceptibility of <i>Pseudomonas aeruginosa</i> isolates was the following: cefepime 79% and 85%, respectively; piperacillin/tazobactam 85% and 88%, respectively; ceftazidime 84% and 82%, respectively. 	<ul style="list-style-type: none"> <i>Pseudomonas aeruginosa</i> susceptibility rates to cefepime, piperacillin/tazobactam, and ceftazidime have remained relatively stable compared to 2015 overall, but have slightly decreased for 2F/3F (cefepime 95% to 85%, piperacillin/tazobactam 90% to 88% and ceftazidime 90% to 82%). Susceptibility rates to cefepime also decreased for 2A/2C/3C: 89% to 79% and 7SCI: 90% to 79%. <i>Pseudomonas aeruginosa</i> susceptibility to meropenem has remained relatively stable from 2015 to 2016 (overall unchanged at 91%; slightly improved for 2F/3F: 85% to 91%).
<ul style="list-style-type: none"> For <i>Escherichia coli</i>, resistance to ciprofloxacin (and levofloxacin) and trimethoprim-sulfamethoxazole remains high at 26% and 25%, respectively; resistance rates varied from unit to unit (20-45% and 24-41%, respectively). 	<ul style="list-style-type: none"> From 2015 to 2016, <i>E.coli</i> resistance to ciprofloxacin (and levofloxacin) and trimethoprim-sulfamethoxazole has remained relatively stable overall: 24% to 26% and 24% to 25%, respectively.
<ul style="list-style-type: none"> 94% of <i>Enterococcus</i> isolates were <i>Enterococcus faecalis</i>. Susceptibility of <i>E.faecalis</i> isolates to ampicillin and vancomycin were 99-100% and 90-100%, respectively. The overall vancomycin-resistant <i>Enterococcus</i> (VRE) rate is estimated to be 5%. 	<ul style="list-style-type: none"> The overall estimated VRE rate has slightly decreased from 2014 to 2016: 10% to 7% to 5%.
<ul style="list-style-type: none"> The overall rate of methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) is estimated to be 39% (range: 40-67% on unit specific antibiograms). Susceptibility of MRSA isolates to trimethoprim-sulfamethoxazole and tetracycline remains high (94-100% and 86-100%, respectively). MRSA susceptibility to clindamycin is limited (27-69%). 	<ul style="list-style-type: none"> Overall, MRSA rates have slightly increased from 2015 to 2016: 35% to 39%.

ALL UNITS (Inpatient & Outpatient) ANTIBIOGRAM: January 2016 – December 2016

GRAM-POSITIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams				Fluoroquinolones / Aminoglycosides (synergy)			Miscellaneous								
		Penicillins / Cephalosporins				Levofloxacin (R)	Gentamicin (a)	Streptomycin (a)(R)	Clindamycin	Daptomycin (R)	Erythromycin	Linezolid (d)(R)	Nitrofurantoin for urine only	Rifampin (b) not for monotherapy	Tetracycline	Trimethoprim/ sulfamethoxazole	Vancomycin
		Penicillin	Oxacillin	Ampicillin	Ceftriaxone												
Enterococcus faecalis	489	-	-	99	-	-	73	92	-	100	-	-	99	-	19	-	99
Enterococcus faecium	31	-	-	19	-	-	100*	29*	-	100*	-	100*	9*	-	26*	-	32
Staphylococcus aureus (MRSA)	224	-	-	-	-	-	-	-	57	100	13	100	-	100	94	97	100
Staphylococcus aureus (MSSA)	346	30	100	-	-	-	-	-	82	100*	69	-	-	-	-	99	100
Staphylococcus, coag negative	378	18	55	-	-	-	-	-	57	-	38	100	-	99	87	68	100
Staphylococcus lugdunensis	31	48	94	-	-	-	-	-	77	-	69	100	-	100	100	100	100
Streptococcus agalactiae (group B)	21*	100*	-	-	100*	95*	-	-	57*	-	48*	-	-	-	-	-	100*
Streptococcus pneumoniae (c)	19*	100*(c)	-	-	100*(c)	95*	-	-	95*	-	68*	100*	-	-	74*	89*	100*

GRAM-NEGATIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams										Aminoglycosides			Fluoroquinolones / Miscellaneous						
		Penicillins				Cephalosporins					Carbapenems		Gentamicin	Tobramycin	Amikacin (CR)	Ciprofloxacin	Levofloxacin (R)	Aztreonam (R)	Nitrofurantoin for urine only	Trimethoprim/ sulfamethoxazole	
		Ampicillin	Amoxicillin/ Clavulanate	Ampicillin/ subactam (R)	Piperacillin/ tazobactam	Cefazolin for urine only	Cefoxitin	Cefepodoxime	Ceftriaxone	Ceftazidime (R)	Cefepime (CR)	Ertapenem									Meropenem (R)
Acinetobacter baumannii	11*	-	-	91*	60*	-	-	-	-	36*	40*	-	80*	91*	91*	-	73*	73*	-	-	73*
Citrobacter freundii	36	-	-	-	89	-	-	#	#	#	100	100	100	94	94	100	97	92	89	100*	83
Citrobacter koseri	50	-	98	-	100	100^A	90	100	100	100	100	100	100	100	100	100	98	96	100	84	100
Enterobacter aerogenes	41	-	-	-	78	-	-	#	#	#	100	100	100	100	100	100	93	90	90	36*	93
Enterobacter cloacae	117	-	-	-	86	-	-	#	#	#	96	92	97	96	96	100	93	95	85	59	89
Escherichia coli	770	52	79	61	95	80^A	88	89	91	93	93	100	100	89	90	100	74	74	93	97	75
Klebsiella oxytoca	78	-	-	68	95	62^A	96	97	96	97	97	99	100	99	99	100	96	96	96	92	90
Klebsiella pneumoniae	329	-	92	82	94	89^A	95	93	93	94	94	99	100	97	91	99	93	94	94	46	86
Morganella morganii	48	-	-	-	98	-	37	-	83	88	96	100	98	87	89	96	67	71	93	-	63
Proteus mirabilis	197	73	91	86	99	70^A	92	93	94	96	95	99	99	87	88	99	69	70	96	-	66
Providencia rettgeri	20*	-	-	-	100*	-	95*	100*	100*	100*	100*	90*	100*	85*	85*	100*	95*	95*	100*	-	95*
Providencia stuartii	21*	-	-	-	100*	-	95*	100*	100*	100*	100*	95*	100*	-	-	100*	38*	38*	100*	-	76*
Pseudomonas aeruginosa	275	-	-	-	94	-	-	-	-	93	93	-	91	88	97	96	83	77	80*	-	-
Serratia marcescens	50	-	-	-	98	100^A	-	-	#	#	100	96	100	100	92	100	94	96	100	-	100
Stenotrophomonas maltophilia	17*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76*	-	-	88*

FOOTNOTES * Fewer than 30 isolates were tested. Due to the small number of isolates tested, results may be statistically unreliable (i.e. interpret with caution).

(a) Test for Enterococcal high-level resistance to gentamicin (MIC 500 mcg/mL) and streptomycin (MIC 2000 mcg/mL). S: synergy with beta-lactams likely, R: synergy with beta-lactams is unlikely.

(b) Rifampin should NOT be used as monotherapy for the treatment of Staphylococcal infections

(c) % susceptibility for penicillin and ceftriaxone for Streptococcus pneumoniae- non-meningitis: penicillin 95% (18/19), ceftriaxone 100% (19/19); meningitis: penicillin 63% (12/19), ceftriaxone 95% (18/19).

(d) Linezolid and daptomycin were only tested against 18 and 4 vancomycin-resistant Enterococcus isolates, respectively.

(CR) Criteria restricted. Cefepime for neutropenic fever, amikacin for gram-negative organisms resistant to gentamicin/tobramycin, streptomycin for gentamicin-resistant Enterococcal endocarditis. Use for other indications requires Infectious Diseases approval.

(R) Restricted. Use of these agents requires Infectious Diseases approval.

^ Actual cefazolin urine susceptibilities are likely better than what is listed in this column (due to MIC interpretation differences).

Enterobacter, Citrobacter, and Serratia may develop resistance during prolonged therapy (approx 5 days) with 3rd generation cephalosporins as a result of derepression of AmpC beta-lactamase. Therefore, isolates that are initially susceptible may become resistant after initiation of therapy. Repeat testing may be warranted. For blood culture/sterile sites, ID consult is recommended.

EMERGENCY ROOM ANTIBIOGRAM: January 2016 – December 2016

GRAM-POSITIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams				Fluoroquinolones / Aminoglycosides (synergy)			Miscellaneous								
		Penicillins / Cephalosporins				Levofloxacin (R)	Gentamicin (a)	Streptomycin (a)(R)	Clindamycin	Daptomycin (R)	Erythromycin	Linezolid (d)(R)	Nitrofurantoin for urine only	Rifampin (b) not for monotherapy	Tetracycline	Trimethoprim/sulfamethoxazole	Vancomycin
		Penicillin	Oxacillin	Ampicillin	Ceftriaxone												
Enterococcus faecalis	116	-	-	99	-	-	78	100	-	100*	-	-	97	-	21	-	100
Enterococcus faecium	7*	-	-	0*	-	-	100*	0*	-	100*	-	100*	17*	-	33*	-	29*
Staphylococcus aureus (MRSA)	64	-	-	-	-	-	-	-	69	100*	11	100	-	100	90	94	100
Staphylococcus aureus (MSSA)	96	32	100	-	-	-	-	-	82	100*	71	-	-	-	-	99	100
Staphylococcus, coag negative	84	18	58	-	-	-	-	-	69	-	50	100	-	99	88	75	100
Staphylococcus lugdunensis	11*	36*	91*	-	-	-	-	-	78*	-	78*	100*	-	100*	100*	91*	100*
Streptococcus agalactiae (group B)	8*	100*	-	-	100*	88*	-	-	75*	-	63*	-	-	-	-	-	100*
Streptococcus pneumoniae (c)	10*	100*(c)	-	-	100*(c)	95*	-	-	100*	-	70*	100*	-	-	80*	90*	100*

GRAM-NEGATIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams										Aminoglycosides			Fluoroquinolones / Miscellaneous									
		Penicillins				Cephalosporins					Carbapenems		Gentamicin	Tobramycin	Amikacin (CR)	Ciprofloxacin	Levofloxacin (R)	Aztreonam (R)	Nitrofurantoin for urine only	Trimethoprim/sulfamethoxazole				
		Ampicillin	Amoxicillin/Clavulanate	Ampicillin/sulbactam (R)	Piperacillin/tazobactam	Cefazolin for urine only	Cefoxitin	Cefpodoxime	Ceftriaxone	Ceftazidime (R)	Cefepime (CR)	Ertapenem									Meropenem (R)			
Acinetobacter baumannii	2*	-	-	50*	100*	-	-	-	-	50*	-	-	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*
Citrobacter freundii	13*	-	-	-	92*	-	-	#	#	#	100*	100*	100*	100*	92*	100*	100*	100*	100*	92*	100*	69*	100*	
Citrobacter koseri	10*	-	98*	-	100*	100*^	90*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	71*	100*	100*	
Enterobacter aerogenes	9*	-	-	-	78*	-	-	#	#	#	100*	100*	100*	100*	100*	100*	93*	90*	90*	36*	93*	93*		
Enterobacter cloacae	26*	-	-	-	86*	-	-	#	#	#	96*	92*	97*	96*	96*	100*	93*	95*	85*	59*	89*	89*		
Escherichia coli	210	49	76	57	95	82^	89	89	90	92	92	100	100	89	88	100	75	75	93	98	76	76		
Klebsiella oxytoca	17*	-	-	76*	100*	75*^	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	
Klebsiella pneumoniae	60	-	93	86	97	91^	98	95	95	95	98	98	97	95	98	95	95	95	95	49	86	86		
Morganella morganii	17*	-	-	-	100*	-	31*	-	88*	94*	100*	100*	100*	76*	88*	100*	82*	94*	94*	-	65*	-		
Proteus mirabilis	44	73	93	89	100	77^	93	95	98	100	100	100	100	82	82	100	66	70	100	-	70	70		
Providencia rettgeri	6*	-	-	-	100*	-	83*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	-	100*	100*		
Providencia stuartii	5*	-	-	-	100*	-	100*	100*	100*	100*	100*	100*	100*	-	-	100*	20*	20*	100*	-	60*	-		
Pseudomonas aeruginosa	56	-	-	-	96	-	-	-	-	95	95	-	89	86	100	96	84	78	-	-	-	-		
Serratia marcescens	8*	-	-	-	100*	-	-	-	#	#	100*	88*	100*	100*	88*	100*	100*	100*	100*	-	100*	100*		
Stenotrophomonas maltophilia	4*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50*	-	-	-	100*		

FOOTNOTES * Fewer than 30 isolates were tested. Due to the small number of isolates tested, results may be statistically unreliable (i.e. interpret with caution).

(a) Test for Enterococcal high-level resistance to gentamicin (MIC 500 mcg/mL) and streptomycin (MIC 2000 mcg/mL). S: synergy with beta-lactams likely, R: synergy with beta-lactams is unlikely.

(b) Rifampin should NOT be used as monotherapy for the treatment of Staphylococcal infections

(c) There were 10 Streptococcus pneumoniae isolates from the ER in 2016. For all units (inpatient and outpatient) combined, the % susceptibility for penicillin and ceftriaxone for Streptococcus pneumoniae-non-meningitis: penicillin 95% (18/19), ceftriaxone 100% (19/19); meningitis: penicillin 63% (12/19), ceftriaxone 95% (18/19).

(d) Linezolid and daptomycin were only tested against 5 and 1 vancomycin-resistant Enterococcus isolates, respectively.

(CR) Criteria restricted. Cefepime for neutropenic fever, amikacin for gram-negative organisms resistant to gentamicin/tobramycin, streptomycin for gentamicin-resistant Enterococcal endocarditis. Use for other indications requires Infectious Diseases approval.

(R) Restricted. Use of these agents requires Infectious Diseases approval.

^ Actual cefazolin urine susceptibilities are likely better than what is listed in this column (due to MIC interpretation differences).

Enterobacter, Citrobacter, and Serratia may develop resistance during prolonged therapy (approx 5 days) with 3rd generation cephalosporins as a result of derepression of AmpC beta-lactamase. Therefore, isolates that are initially susceptible may become resistant after initiation of therapy. Repeat testing may be warranted. For blood culture/sterile sites, ID consult is recommended.

ACUTE MED/SURG (2A/2C/3C) ANTIBIOGRAM: January 2016 – December 2016

GRAM-POSITIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams				Fluoroquinolones / Aminoglycosides (synergy)			Miscellaneous								
		Penicillins / Cephalosporins				Levofloxacin (R)	Gentamicin (a)	Streptomycin (a)(R)	Clindamycin	Daptomycin (R)	Erythromycin	Linezolid (d)(R)	Nitrofurantoin <i>for urine only</i>	Rifampin (b) <i>not for monotherapy</i>	Tetracycline	Trimethoprim/ sulfamethoxazole	Vancomycin
		Penicillin	Oxacillin	Ampicillin	Ceftriaxone												
Enterococcus faecalis	32	-	-	100	-	-	78	100	-	100*	-	-	100*	-	16	-	94
Enterococcus faecium	5*	-	-	0*	-	-	-	-	-	-	-	100*	0*	-	20*	-	20*
Staphylococcus aureus (MRSA)	19*	-	-	-	-	-	-	-	50*	100*	17*	100*	-	100*	89*	95*	100*
Staphylococcus aureus (MSSA)	20*	20*	100*	-	-	-	-	-	94*	-	65*	-	-	-	-	100*	100*
Staphylococcus, coag negative	17*	-	18*	-	-	-	-	-	27*	-	-	100*	-	94*	100*	41*	100*

GRAM-NEGATIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams										Aminoglycosides			Fluoroquinolones / Miscellaneous						
		Penicillins					Cephalosporins					Carbapenems		Gentamicin	Tobramycin	Amikacin (CR)	Ciprofloxacin	Levofloxacin (R)	Aztreonam (R)	Nitrofurantoin <i>for urine only</i>	Trimethoprim/ sulfamethoxazole
		Ampicillin	Amoxicillin/ Clavulanate	Ampicillin/ sulbactam (R)	Piperacillin/ tazobactam	Cefazolin <i>for urine only</i>	Cefoxitin	Cefpodoxime	Ceftriaxone	Ceftazidime (R)	Cefepime (CR)	Ertapenem	Meropenem (R)								
Escherichia coli	43	44	79	53	95	67 [^]	88	77	79	79	79	100	100	88	88	100	60	60	77	93*	63
Klebsiella pneumoniae	18*	-	94*	78*	89*	100* [^]	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	58	72*
Proteus mirabilis	16*	69*	86*	81*	100*	69* [^]	94*	88*	88*	88*	88*	100*	100*	87*	88*	100*	75*	75*	88*	-	56*
Pseudomonas aeruginosa	19*	-	-	-	89*	-	-	-	-	84*	79*	-	95*	89*	100*	94*	79*	84*	-	-	-

FOOTNOTES * Fewer than 30 isolates were tested. Due to the small number of isolates tested, results may be statistically unreliable (i.e. interpret with caution).

(a) Test for Enterococcal high-level resistance to gentamicin (MIC 500 mcg/mL) and streptomycin (MIC 2000 mcg/mL). S: synergy with beta-lactams likely, R: synergy with beta-lactams is unlikely.

(b) Rifampin should NOT be used as monotherapy for the treatment of Staphylococcal infections

(c) There were 2 Streptococcus pneumoniae isolates from 2A/2C/3C in 2016. For all units (inpatient and outpatient) combined, the % susceptibility for penicillin and ceftriaxone for Streptococcus pneumoniae-non-meningitis: penicillin 95% (18/19), ceftriaxone 100% (19/19); meningitis: penicillin 63% (12/19), ceftriaxone 95% (18/19).

(d) Linezolid and daptomycin were only tested against 4 and 0 vancomycin-resistant Enterococcus isolates, respectively.

(CR) Criteria restricted. Cefepime for neutropenic fever, amikacin for gram-negative organisms resistant to gentamicin/tobramycin, streptomycin for gentamicin-resistant Enterococcal endocarditis. Use for other indications requires Infectious Diseases approval.

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[^] Actual cefazolin urine susceptibilities are likely better than what is listed in this column (due to MIC interpretation differences).

Enterobacter, Citrobacter, and Serratia may develop resistance during prolonged therapy (approx 5 days) with 3rd generation cephalosporins as a result of derepression of AmpC beta-lactamase. Therefore, isolates that are initially susceptible may become resistant after initiation of therapy. Repeat testing may be warranted. For blood culture/sterile sites, ID consult is recommended.

ICU/IICU (2F/3F) ANTIBIOGRAM: January 2016 – December 2016

GRAM-POSITIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams				Fluoroquinolones / Aminoglycosides (synergy)			Miscellaneous								
		Penicillins / Cephalosporins				Levofloxacin (R)	Gentamicin (a)	Streptomycin (a)(R)	Clindamycin	Daptomycin (R)	Erythromycin	Linezolid (d)(R)	Nitrofurantoin for urine only	Rifampin (b) not for monotherapy	Tetracycline	Trimethoprim/ sulfamethoxazole	Vancomycin
		Penicillin	Oxacillin	Ampicillin	Ceftriaxone												
Enterococcus faecalis	21*	-	-	100*	-	-	100*	75*	-	100*	-	100*	100*	-	29*	-	90*
Enterococcus faecium	4*	-	-	25*	-	-	100*	100*	-	-	-	100*	50*	-	50*	-	25*
Staphylococcus aureus (MRSA)	32	-	-	-	-	-	-	-	52	100*	23	100	-	100	97	97	100
Staphylococcus aureus (MSSA)	23*	35*	100*	-	-	-	-	-	86*	-	86*	-	-	-	-	100*	100*
Staphylococcus, coag negative	17*	6*	25*	-	-	-	-	-	45*	-	36*	100*	-	88*	88*	88*	100*

GRAM-NEGATIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams										Aminoglycosides			Fluoroquinolones / Miscellaneous							
		Penicillins					Cephalosporins					Carbapenems		Gentamicin	Tobramycin	Amikacin (CR)	Ciprofloxacin	Levofloxacin (R)	Aztreonam (R)	Nitrofurantoin for urine only	Trimethoprim/ sulfamethoxazole	
		Ampicillin	Amoxicillin/ Clavulanate	Ampicillin/ sulbactam (R)	Piperacillin/ tazobactam	Cefazolin for urine only	Cefoxitin	Cefpodoxime	Ceftriaxone	Ceftazidime (R)	Cefepime (CR)	Ertapenem	Meropenem (R)									
Enterobacter cloacae	13*	-	-	-	69*	-	-	#	#	#	92*	85*	100*	100*	100*	100*	100*	92*	92*	69*	67*	92*
Escherichia coli	20*	45*	70*	55*	85*	75*^	85*	95*	95*	95*	95*	100*	100*	90*	90*	100*	80*	80*	95*	80*	70*	
Klebsiella pneumoniae	16*	-	94*	69*	88*	71*^	88*	94*	94*	94*	93*	94*	100*	100*	94*	94*	88*	81*	94*	20*	75*	
Proteus mirabilis	12*	75*	75*	83*	100*	100*^	100*	83*	83*	83*	83*	92*	100*	83*	83*	100*	58*	58*	83*	-	58*	
Pseudomonas aeruginosa	33	-	-	-	88	-	-	-	-	82	85	-	88	88	97	94	85	85	-	-	-	
Serratia marcescens	9*	-	-	-	100*	0*^	-	-	#	#	100*	100*	100*	100*	89*	100*	100*	100*	100*	100*	100*	
Stenotrophomonas maltophilia	5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100*	-	-	-	80*

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(b) Rifampin should NOT be used as monotherapy for the treatment of Staphylococcal infections

(c) There was 1 Streptococcus pneumoniae isolate from 2F/3F in 2016. For all units (inpatient and outpatient) combined, the % susceptibility for penicillin and ceftriaxone for Streptococcus pneumoniae-non-meningitis: penicillin 95% (18/19), ceftriaxone 100% (19/19); meningitis: penicillin 63% (12/19), ceftriaxone 95% (18/19).

(d) Linezolid and daptomycin were only tested against 3 and 0 vancomycin-resistant Enterococcus isolates, respectively.

(CR) Criteria restricted. Cefepime for neutropenic fever, amikacin for gram-negative organisms resistant to gentamicin/tobramycin, streptomycin for gentamicin-resistant Enterococcal endocarditis. Use for other indications requires Infectious Diseases approval.

(R) Restricted. Use of these agents requires Infectious Diseases approval.

^ Actual cefazolin urine susceptibilities are likely better than what is listed in this column (due to MIC interpretation differences).

Enterobacter, Citrobacter, and Serratia may develop resistance during prolonged therapy (approx 5 days) with 3rd generation cephalosporins as a result of derepression of AmpC beta-lactamase. Therefore, isolates that are initially susceptible may become resistant after initiation of therapy. Repeat testing may be warranted. For blood culture/sterile sites, ID consult is recommended.

SPINAL CORD INJURY UNIT (7SCI) ANTIBIOGRAM: January 2016 – December 2016

GRAM-POSITIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams				Fluoroquinolones / Aminoglycosides (synergy)			Miscellaneous								
		Penicillins / Cephalosporins				Levofloxacin (R)	Gentamicin (a)	Streptomycin (a)(R)	Clindamycin	Daptomycin (R)	Erythromycin	Linezolid (d)(R)	Nitrofurantoin for urine only	Rifampin (b) not for monotherapy	Tetracycline	Trimethoprim/sulfamethoxazole	Vancomycin
		Penicillin	Oxacillin	Ampicillin	Ceftriaxone												
Enterococcus faecalis	32	-	-	100	-	-	50*	-	-	-	100*	100	-	13	-	94	
Staphylococcus aureus (MRSA)	20*	-	-	-	-	-	-	44*	100*	33*	94*	-	100*	100*	100*	100*	
Staphylococcus aureus (MSSA)	10*	50*	100*	-	-	-	-	100*	-	100*	-	-	-	-	90*	100*	
Staphylococcus, coag negative	9*	33*	33*	-	-	-	-	100*	-	67*	100*	-	100*	67*	56*	100*	

GRAM-NEGATIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams										Aminoglycosides			Fluoroquinolones / Miscellaneous						
		Penicillins					Cephalosporins					Carbapenems		Gentamicin	Tobramycin	Amikacin (CR)	Ciprofloxacin	Levofloxacin (R)	Aztreonam (R)	Nitrofurantoin for urine only	Trimethoprim/sulfamethoxazole
		Ampicillin	Amoxicillin/Clavulanate	Ampicillin/sulbactam (R)	Piperacillin/tazobactam	Cefazolin for urine only	Cefoxitin	Cefpodoxime	Ceftriaxone	Ceftazidime (R)	Cefepime (CR)	Ertapenem	Meropenem (R)								
Escherichia coli	51	35	80	53	98	85^	80	94	94	94	96	100	100	90	90	100	55	55	94	94*	59
Klebsiella pneumoniae	45	-	93	79	93	83^	89	89	87	89	89	100	100	98	91	100	89	91	89	36	84
Proteus mirabilis	22*	68*	91*	86*	100*	56*^	86*	91*	91*	100*	100*	95*	95*	91*	91*	95*	45*	45*	100*	-	41*
Pseudomonas aeruginosa	47	-	-	-	85	-	-	-	-	87	79	-	79	77	91	93	66	59	-	-	-

FOOTNOTES * Fewer than 30 isolates were tested. Due to the small number of isolates tested, results may be statistically unreliable (i.e. interpret with caution).

(a) Test for Enterococcal high-level resistance to gentamicin (MIC 500 mcg/mL) and streptomycin (MIC 2000 mcg/mL). S: synergy with beta-lactams likely, R: synergy with beta-lactams is unlikely.

(b) Rifampin should NOT be used as monotherapy for the treatment of Staphylococcal infections

(c) There were no Streptococcus pneumoniae isolates from 7SCI in 2016. For all units (inpatient and outpatient) combined, the % susceptibility for penicillin and ceftriaxone for Streptococcus pneumoniae-non-meningitis: penicillin 95% (18/19), ceftriaxone 100% (19/19); meningitis: penicillin 63% (12/19), ceftriaxone 95% (18/19).

(d) Linezolid and daptomycin were tested against 1 and 0 vancomycin-resistant Enterococcus isolates, respectively.

(CR) Criteria restricted. Cefepime for neutropenic fever, amikacin for gram-negative organisms resistant to gentamicin/tobramycin, streptomycin for gentamicin-resistant Enterococcal endocarditis. Use for other indications requires Infectious Diseases approval.

(R) Restricted. Use of these agents requires Infectious Diseases approval.

^ Actual cefazolin urine susceptibilities are likely better than what is listed in this column (due to MIC interpretation differences).

Enterobacter, Citrobacter, and Serratia may develop resistance during prolonged therapy (approx 5 days) with 3rd generation cephalosporins as a result of derepression of AmpC beta-lactamase. Therefore, isolates that are initially susceptible may become resistant after initiation of therapy. Repeat testing may be warranted. For blood culture/sterile sites, ID consult is recommended.

LONG TERM CARE (4C/331/360/90) ANTIBIOGRAM: January 2016 – December 2016

GRAM-POSITIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams				Fluoroquinolones / Aminoglycosides (synergy)			Miscellaneous								
		Penicillins / Cephalosporins				Levofloxacin (R)	Gentamicin (a)	Streptomycin (a)(R)	Clindamycin	Daptomycin (R)	Erythromycin	Linezolid (d)(R)	Nitrofurantoin for urine only	Rifampin (b) not for monotherapy	Tetracycline	Trimethoprim/sulfamethoxazole	Vancomycin
		Penicillin	Oxacillin	Ampicillin	Ceftriaxone												
Enterococcus faecalis	11*	-	-	100*	-	-	-	-	-	-	-	-	100*	-	20*	-	100*
Enterococcus faecium	2*	-	-	0*	-	-	100*	-	-	100*	-	100*	0*	-	0*	-	0*
Staphylococcus aureus (MRSA)	15*	-	-	-	-	-	-	-	27*	100*	9*	100*	-	100*	86*	100*	100*
Staphylococcus aureus (MSSA)	10*	60*	100*	-	-	-	-	-	83*	-	67*	-	-	-	-	100*	100*

GRAM-NEGATIVE ORGANISM (% Susceptibility)	# isolates tested	Beta lactams										Aminoglycosides			Fluoroquinolones / Miscellaneous						
		Penicillins					Cephalosporins					Carbapenems		Gentamicin	Tobramycin	Amikacin (CR)	Ciprofloxacin	Levofloxacin (R)	Aztreonam (R)	Nitrofurantoin for urine only	Trimethoprim/sulfamethoxazole
		Ampicillin	Amoxicillin/Clavulanate	Ampicillin/sulbactam (R)	Piperacillin/tazobactam	Cefazolin for urine only	Cefoxitin	Cefpodoxime	Ceftriaxone	Ceftazidime (R)	Cefepime (CR)	Ertapenem	Meropenem (R)								
Escherichia coli	37	54	81	65	89	78^	92	86	86	86	89	100	100	86	92	100	65	65	89	97	73
Klebsiella pneumoniae	28*	-	93*	86*	93*	90*^	93*	96*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	40*	100*
Proteus mirabilis	35	80	91	83	97	80^	94	100	100	100	100	100	100	86	89	100	54	54	100	-	60
Pseudomonas aeruginosa	20*	-	-	-	85*	-	-	-	-	90*	95*	-	90*	75*	95*	95*	65*	65*	-	-	-

FOOTNOTES * Fewer than 30 isolates were tested. Due to the small number of isolates tested, results may be statistically unreliable (i.e. interpret with caution).

- (a) Test for Enterococcal high-level resistance to gentamicin (MIC 500 mcg/mL) and streptomycin (MIC 2000 mcg/mL). S: synergy with beta-lactams likely, R: synergy with beta-lactams is unlikely.
- (b) Rifampin should NOT be used as monotherapy for the treatment of Staphylococcal infections
- (c) There was one S pneumoniae isolate from 4C/331/360/90 in 2016. For all units (inpatient and outpatient) combined, the % susceptibility for penicillin and ceftriaxone for Streptococcus pneumoniae-non-meningitis: penicillin 95% (18/19), ceftriaxone 100% (19/19); meningitis: penicillin 63% (12/19), ceftriaxone 95% (18/19).
- (d) Linezolid and daptomycin were only tested against 2 and 1 vancomycin-resistant Enterococcus isolates, respectively.
- (CR) Criteria restricted. Cefepime for neutropenic fever, amikacin for gram-negative organisms resistant to gentamicin/tobramycin, streptomycin for gentamicin-resistant Enterococcal endocarditis. Use for other indications requires Infectious Diseases approval.
- (R) Restricted. Use of these agents requires Infectious Diseases approval.
- ^ Actual cefazolin urine susceptibilities are likely better than what is listed in this column (due to MIC interpretation differences).
- # Enterobacter, Citrobacter, and Serratia may develop resistance during prolonged therapy (approx 5 days) with 3rd generation cephalosporins as a result of derepression of AmpC beta-lactamase. Therefore, isolates that are initially susceptible may become resistant after initiation of therapy. Repeat testing may be warranted. For blood culture/sterile sites, ID consult is recommended.