Northwestern Medicine
Antimicrobial and Diagnostic
Stewardship Program

Palos Hospital Antibiograms - 2023

Palos 2023 Facility-Wide Antibiogram

Northwestern Medicine Antimicrobial and Diagnostic Stewardship Program
https://adsp.nm.org

	Isolates	Amikacin	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin [e]	Cefepime [j]	Ceftriaxone	Ciprofloxacin	Clindamycin	Daptomycin	Gentamicin	Linezolid	Meropenem [g]	Oxacillin	Piperacillin/Tazobactam [k]	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancomycin
GRAM POSITIVES																				
Enterococcus faecalis	316		99 [b]								71 [f]		100							96
Enterococcus faecium	100		14 [b]										100							35
Vancomycin-Resistant Enterococci	68		11 [b]										100							
Staphylococcus coagulase negative	155									67	100		100		46 [h]		61	83 [i]		100
Staphylococcus aureus	625									52	100		100		54 [h]		81	74 [i]		100
Methicillin-resistant Staphylococcus aureus	294									33	100		100				62	53 [i]		100
GRAM NEGATIVES																				
Acinetobacter species	36			50					28			53		28		19	58		61	
Citrobacter species	98	100			88		100	88	93			96		100		87	97		98	
Citrobacter freundii complex [d]	48	100			83		100	81	88			93		100		83	97		95	
Enterobacter species [d]	101	100			65		94	59	91			96		97		65	86		94	
Escherichia coli	1748	97	51 [c]	62	91	80	97	87	71			90		100		95	76		89	
Klebsiella species	617	99		70 [d]	85	72 [d]	94	84	84			94		99		82	86		91	
Klebsiella aerogenes [d]	56	100			73		94	71	91			98				68	95		98	
Klebsiella pneumoniae	465	98		72	85	81	93	83	81			94		99		83	83		98	
Proteus mirabilis	295	98	79 [c]	89	99	64	99	97	74			94		100		100	83		94	
Pseudomonas aeruginosa	377	98 [a]					90		82					86		93			95	
Serratia species	48	100			96		98	96	94			98		100			98		87	
Stenotrophomonas maltophilia	43																90 [m]			
MULTI-DRUG RESISTANT GRAM NEGATIVES																				
Extended-Spectrum β-Lactamase Enterobacterales (ESBL)	150	86							15			63		99			43		52	

Antibiogram data helps guide clinicians to choose appropriate empiric antibiotics for many infectious syndromes.
See protocol for multi-drug resistant gram-negative agents for guidance

% Susceptibility
≥ 80%
70-79%
≤ 69%

[a] %S using MIC breakpoint for urine sources only (≤ 16 mcg/ml). Not recommended for use outside of cystitis caused by *P. aeruginosa*.
[b] Results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin.
Ampicillin may be used to predict susceptibiltiy to amoxicillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam among non-β-lactamase-producing Enterococci in clinically stable/non-immunocompromised patients.
[c] Results of ampicillin can predict results for amoxicillin.
[d] Klebsiella (formerly Enterobacter) aerogenes, Citrobacter freundii, and Enterobacter cloacae complex are intrinsically resistant to ampicillin/sulbactam and cefazolin and are at high-risk for ampC resistance expression.
[e] For Enterobacterales, %S based on systemic MIC breakpoint of ≤ 2 (inferred via lowest Vitek automated dilution ≤ 4)
[f] %S based on MIC ≤ 2 with daptomycin dosage regimen of 6-8 mg/kg every 24 hours
[g] Should be reserved for patients who are intolerant to penicilins and cephalosporins or in patients who are suspected of having a drug-resistant bacteria.
[h] For agents with established clinical efficacy, condsidering site of infection and appropriate dosing, oxacillin-susceptble Staphylococci can be considered susceptible to the following beta-lactam agents:
1) β-lactam combination agents (amoxicillin-clavulante, ampicillin-sulbactam, piperacillin-tazobactam);
2) Oral cephalosporins (cefaclor, cefdinir, cephalexin, cefpodoxime, cefprozil, cefuroxime);
3) IV cephalosporins (cefazolin, cefepime, ceftriaxone); and 4) carbapenems (ertapenem, imipenem, meropenem)
[i] Organisms that are susceptible to tetracycline are also considered susceptible to doxycycline and minocycline. However, some organisms that are intermediate or resistant to tetracycline may be susceptible to doxycyline, minocycline, or both.
[j] %S based on susceptible MIC (≤ 2) & susceptible dose dependent MIC (up to 8) for Enterobacterales
[k] %S based on susceptible MIC (≤ 8) & susceptible dose dependent MIC (up to 16) for Enterobacterales
[m] For moderate to severe S. maltophilia infections consider using combination therapy until clinical improvement is observed.

Abbreviations: %S, percent susceptible; SDD, susceptible-dose-dependent
30 isolate threshold
Blank boxes indicate organism has intrinsic resistance to corresponding antimicrobial or resistance testing is not applicable
When risk for mortality or significant morbidity is high (eg. meningitis, septic shock/critical illness) agents with %S at least 90% should be selected.
Less significant concerns for mortality within the next 24 to 48 hours (eg. uncomplicated UTIs or community-acquired infections), %S of 80% may be appropriate.
Antibiogram Guidance (CLSI M100-Ed34)

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Palos 2023 Blood Antibiogram

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	Isolates	Amikacin	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin [e]	Cefepime [j]	Ceftriaxone	Ciprofloxacin	Clindamycin	Daptomycin	Doxycycline	Gentamicin	Linezolid	Meropenem [g]	Oxacillin	Piperacillin/Tazobactam [k]	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancomycin
GRAM POSITIVES																					
Enterococcus faecalis	33		100 [b]								70 [f]			100							100
Staphylococcus coagulase negative	63									60	100			100		41 [h]		75	83 [i]		100
Staphylococcus aureus	100									62	100			100		65 [h]		85	82 [i]		100
Methicillin-resistant Staphylococcus aureus	35									37	100			100				63	57 [i]		100
GRAM NEGATIVES																					
Escherichia coli	130	98	48 [c]	58	90	82	97	85	76				90		100		98	72		87	
Klebsiella species [d]	62	98		69 [d]	84	73 [d]	90	82	89				97		98		82	91		95	
Proteus species	36	97	75 [c]	89	100	57	97	97	72				92		100		100	83		92	

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% Susceptibility
- ≥ 80%
- 70-79%
- ≤ 69%

[b] Results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin.
Ampicillin may be used to predict susceptibiltiy to amoxicillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam among non-β-lactamase-producing Enterococci in clinically stable/non-immunocompromised patients.

[c] Results of ampicillin can predict results for amoxicillin.

[d] Klebsiella (formerly Enterobacter) aerogenes, Citrobacter freundii, and Enterobacter cloacae complex are intrinsically resistant to ampicillin/sulbactam and cefazolin and are at high-risk for ampC resistance expression.

[e] For Enterobacterales, %S based on systemic MIC breakpoint of ≤ 2 (inferred via lowest Vitek automated dilution ≤ 4)

[f] %S based on MIC ≤ 2 with daptomycin dosage regimen of 6-8 mg/kg every 24 hours

[g] Should be reserved for patients who are intolerant to penicilins and cephalosporins or in patients who are suspected of having a drug-resistant bacteria.

[h] For agents with established clinical efficacy, condsidering site of infection and appropriate dosing, oxacillin-susceptble Staphylococci can be considered susceptible to the following beta-lactam agents:
1) β-lactam combination agents (amoxicillin-clavulante, ampicillin-sulbactam, piperacillin-tazobactam);
2) Oral cephalosporins (cefaclor, cefdinir, cephalexin, cefpodoxime, cefprozil, cefuroxime);
3) IV cephalosporins (cefazolin, cefepime, ceftriaxone); and 4) carbapenems (ertapenem, imipenem, meropenem)

[i] Organisms that are susceptible to tetracycline are also considered susceptible to doxycycline and minocycline. However, some organisms that are intermediate or resistant to tetracycline may be susceptible to doxycyline, minocycline, or both.

[j] %S based on susceptible MIC (≤ 2) & susceptible dose dependent MIC (up to 8) for Enterobacterales

[k] %S based on susceptible MIC (≤ 8) & susceptible dose dependent MIC (up to 16) for Enterobacterales

Abbreviations: %S, percent susceptible; SDD, susceptible-dose-dependent
30 isolate threshold
Blank boxes indicate organism has intrinsic resistance to corresponding antimicrobial or resistance testing is not applicable
When risk for mortality or significant morbidity is high (eg. meningitis, septic shock/critical illness) agents with %S at least 90% should be selected.
Less significant concerns for mortality within the next 24 to 48 hours (eg. uncomplicated UTIs or community-acquired infections), %S of 80% may be appropriate.
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Palos 2023
ED Antibiogram

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	Isolates	Amikacin	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin	Cefepime [j]	Ceftriaxone	Ciprofloxacin	Clindamycin	Daptomycin	Gentamicin	Linezolid	Meropenem [g]	Oxacillin	Piperacillin/Tazobactam [k]	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancomycin
GRAM POSITIVES																				
Enterococcus faecalis	183		100 [b]								69 [f]		100							97
Enterococcus faecium	43		9 [b]										100							37
Staphylococcus coagulase negative	104									67	100		100		48 [h]		77	82 [i]		100
Staphylococcus aureus	241									57	100		100		51 [h]		85	78 [i]		100
Methicillin-resistant Staphylococcus aureus	115									36	100		100				70	61 [i]		100
GRAM NEGATIVES																				
Citrobacter species [d]	61	100			87	41	100	87	90			97		100		92	98		97	
Enterobacter species [d]	48	100			60		90	50	89			94		100		69	75		88	
Escherichia coli	1175	97	50	61	90	80	97	86	71			91		100		96	77		90	
Klebsiella species [d]	381	98		68 [d]	83	70	93	82	80			94		99		91	83		89	
Proteus species	192	97	76 [c]	87	99	63	99	97	73			92		100		100	83		92	
Pseudomonas aeruginosa	140	99 [a]			75		94		85					88		94			98	

Antibiogram data helps guide clinicians to choose appropriate empiric antibiotics for many infectious syndromes.
See protocol for multi-drug resistant gram-negative agents for guidance

% Susceptibility
- ≥ 80%
- 70-79%
- ≤ 69%

[a] %S using MIC breakpoint for urine sources only (≤ 16 mcg/ml). Not recommended for use outside of cystitis caused by *P. aeruginosa*.

[b] Results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin.
Ampicillin may be used to predict susceptibiltiy to amoxicillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam among non-β-lactamase-producing enterococci in clinically stable/non-immunocompromised patients.

[c] Results of ampicillin can predict results for amoxicillin.

[d] Klebsiella (formerly Enterobacter) aerogenes, Citrobacter freundii, and Enterobacter cloacae complex are intrinsically resistant to ampicillin/sulbactam and cefazolin and are at high-risk for ampC resistance expression.

[f] %S based on MIC ≤ 2 with daptomycin dosage regimen of 6-8 mg/kg every 24 hours

[g] Should be reserved for patients who are intolerant to penicilins and cephalosporins or in patients who are suspected of having a drug-resistant bacteria.

[h] For agents with established clinical efficacy, condsidering site of infection and appropriate dosing, oxacillin-susceptble Staphylococci can be considered susceptible to the following beta-lactam agents:
1) β-lactam combination agents (amoxicillin-clavulante, ampicillin-sulbactam, piperacillin-tazobactam);
2) Oral cephalosporins (cefaclor, cefdinir, cephalexin, cefpodoxime, cefprozil, cefuroxime);
3) IV cephalosporins (cefazolin, cefepime, ceftriaxone); and 4) carbapenems (ertapenem, imipenem, meropenem)

[i] Organisms that are susceptible to tetracycline are also considered susceptible to doxycycline and minocycline. However, some organisms that are intermediate or resistant to tetracycline may be susceptible to doxycyline, minocycline, or both.

[j] %S based on susceptible MIC (≤ 2) & susceptible dose dependent MIC (up to 8) for Enterobacterales

[k] %S based on susceptible MIC (≤ 8) & susceptible dose dependent MIC (up to 16) for Enterobacterales

Abbreviations: %S, percent susceptible; SDD, susceptible-dose-dependent
30 isolate threshold
Blank boxes indicate organism has intrinsic resistance to corresponding antimicrobial or resistance testing is not applicable
When risk for mortality or significant morbidity is high (eg. meningitis, septic shock/critical illness) agents with %S at least 90% should be selected.
Less significant concerns for mortality within the next 24 to 48 hours (eg. uncomplicated UTIs or community-acquired infections), %S of 80% may be appropriate.
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Palos 2023
Urine Antibiogram

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	Isolates	Amikacin	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin	Cefepime [j]	Ceftriaxone	Ciprofloxacin	Gentamicin	Linezolid	Meropenem [f]	Nitrofurantoin	Oxacillin	Piperacillin/Tazobactam [k]	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancomycin
GRAM POSITIVES																			
Enterococcus faecalis	234		100 [b]								100		99						97
Enterococcus faecium	63		8 [b,i]								100		37						37
Vancomycin-Resistant Enterococci	44		14 [b,i]								100		32						
Staphylococcus coagulase negative	56										100			54 [g]		75	86 [h]		100
Staphylococcus aureus [n]	69										100			43 [g]		78	68 [h]		100
Methicillin-resistant Staphylococcus aureus	38										100					63	53 [h]		100
GRAM NEGATIVES																			
Citrobacter species [d]	77	100			90		100	88	92	97		100	84		93	97		99	
Enterobacter species [d]	55	100			51		89	43	87	95		96	51		58	78		89	
Escherichia coli	1506	96	51 [c]	62	91	83 [p]	97	87	70	91		100	96		96	76		90	
Klebsiella species [d]	478	99		70 [d]	84	76 [d]	94	83	82	95		99	40		90	85		90	
Proteus species	213	98	77 [c]	89	99	90	98	97	73	92		100			100	82		93	
Pseudomonas aeruginosa	174	99 [a]					96		81			85			92			98	
MULTI-DRUG RESISTANT GRAM NEGATIVES																			
Extended-Spectrum β-Lactamase Enterobacterales (ESBL-E)	131	85							20	63		100	66		85	44		51	

Several agents have the potential to concentrate in the urine with an intermediate MIC. Contact ADSP for appropriate indication and recommended dosing.

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% Susceptibility
- **≥ 80%**
- **70-79%**
- **≤ 69%**

[a] %S using MIC breakpoint for urine sources only (≤ 16 mcg/ml). Not recommended for use outside of cystitis caused by *P. aeruginosa.*
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3) IV cephalosporins (cefazolin, cefepime, ceftriaxone); and 4) carbapenems (ertapenem, imipenem, meropenem)
[h] Organisms that are susceptible to tetracycline are also considered susceptible to doxycycline and minocycline. However, some organisms that are intermediate or resistant to tetracycline may be susceptible to doxycyline, minocycline, or both.
[i] For cases of cystitis, ampicillin is expected to achieve adequate urinary concentrations to overcome resistance up to MIC 256 mcg/dl and should be considered as first-line treatment.
[j] %S based on susceptible MIC (≤ 2) & susceptible dose dependent MIC (up to 8) for Enterobacterales
[k] %S based on susceptible MIC (≤ 8) & susceptible dose dependent MIC (up to 16) for Enterobacterales
[n] Staph aureus is not an expected urinary organism, outside of rare occassions of contamination from skin flora, which may be increased in patients with urinary catheters. Recommend ordering blood cultures when isolated from urine as clinically indicated.
[p] %S based on urinary MIC breakpoint of ≤ 16 for cystitis. For pyelonephritis & complicated infections outside of the bladder, refer to facility-wide antibiogram, Enterobacterales are 65-80% susceptible at MIC ≤ 4.
Enterobacterales included for the urinary (cystitis only) MIC breakpoint include E. coli, K. pneumoniae, and P. mirabilis only.

Abbreviations: %S, percent susceptible; SDD, susceptible-dose-dependent
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Blank boxes indicate organism has intrinsic resistance to corresponding antimicrobial or resistance testing is not applicable
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