



## Palos Hospital Antibigrams - 2023

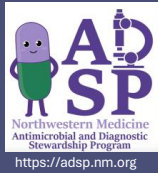
[1. Facility-wide Antibigram](#)

[2. Blood specimen-specific Antibigram](#)

[3. Emergency Department \(ED\)-specific Antibigram](#)

[4. Urine specimen-specific Antibigram](#)

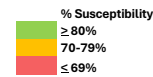
# Palos 2023 Facility-Wide Antibiogram



Isolates	Amikacin	Ampicillin	Ampicillin/Subactam	Aztreonam	Cefazolin <sup>a</sup>	Cefepime <sup>j</sup>	Ceftriaxone	Ciprofloxacin	Clindamycin	Daptomycin	Gentamicin	Linezolid	Meropenem <sup>k</sup>	Oxacillin	Piperacillin/Tazobactam <sup>k</sup>	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancocycin
<b>GRAM POSITIVES</b>																			
Enterococcus faecalis	316	99 <sup>b</sup>							71 <sup>i</sup>			100							96
Enterococcus faecium	100	14 <sup>b</sup>										100							35
Vancomycin-Resistant Enterococci	68	11 <sup>b</sup>										100							
Staphylococcus coagulase negative	155								67	100		100		46 <sup>h</sup>		61	83 <sup>l</sup>		100
Staphylococcus aureus	625								52	100		100		54 <sup>h</sup>		81	74 <sup>l</sup>		100
Methicillin-resistant Staphylococcus aureus	294								33	100		100				62	53 <sup>l</sup>		100
<b>GRAM NEGATIVES</b>																			
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 <sup>d</sup>	48	100		83		100	81	88				93	100		83	97			95
Enterobacter species <sup>d</sup>	101	100		65		94	59	91				96	97		65	86			94
Escherichia coli	1748	97	51 <sup>c</sup>	62	91	80	97	87	71			90	100		95	76			89
Klebsiella species	617	99		70 <sup>d</sup>	85	72 <sup>d</sup>	94	84	84			94	99		82	86			91
Klebsiella aerogenes <sup>d</sup>	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 <sup>e</sup>	89	99	64	99	97	74			94	100		100	83			94
Pseudomonas aeruginosa	377	98 <sup>f</sup>				90		82				86			93				95
Serratia species	48	100		96		98	96	94				98	100						87
Stenotrophomonas maltophilia	43															90 <sup>m</sup>			
<b>MULTI-DRUG RESISTANT GRAM NEGATIVES</b>																			
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](#)



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

<sup>b</sup> Results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin.

Ampicillin may be used to predict susceptibility to amoxicillin-clavulanate, ampicillin-subactam, and piperacillin-tazobactam among non-β-lactamase-producing Enterococci in clinically stable/non-immunocompromised patients.

<sup>c</sup> Results of ampicillin can predict results for amoxicillin.

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

<sup>e</sup> For Enterobacterales, %S based on systemic MIC breakpoint of ≤ 2 (inferred via lowest Vitek automated dilution ≤ 4)

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

<sup>g</sup> Should be reserved for patients who are intolerant to penicillins and cephalosporins or in patients who are suspected of having a drug-resistant bacteria.

<sup>h</sup> For agents with established clinical efficacy, considering site of infection and appropriate dosing, oxacillin-susceptible Staphylococci can be considered susceptible to the following beta-lactam agents:

- β-lactam combination agents (amoxicillin-clavulanate, ampicillin-subactam, piperacillin-tazobactam);
- Oral cephalosporins (cefactor, cefdinir, cephalexin, cefpodoxime, cefprozil, cefuroxime);
- IV cephalosporins (cefazolin, cefepime, ceftriaxone); and 4) carbapenems (ertapenem, imipenem, meropenem)

<sup>i</sup> 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 doxycycline, minocycline, or both.

<sup>j</sup> %S based on susceptible MIC (≤ 2) & susceptible dose dependent MIC (up to 8) for Enterobacterales

<sup>k</sup> %S based on susceptible MIC (≤ 8) & susceptible dose dependent MIC (up to 16) for Enterobacterales

<sup>m</sup> 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

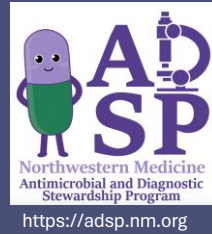
When risk for mortality or significant morbidity is high (eg. meningitis, septic shock/critical illness) agents with %S at least 90% should be selected.

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)

[Back to top](#)

# Palos 2023 Blood Antibigram



## GRAM POSITIVES

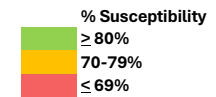
Organism	Isolates	Amikacin	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin <sup>e</sup>	Cefepime <sup>j</sup>	Ceftriaxone	Ciprofloxacin	Clindamycin	Daptomycin	Doxycycline	Gentamicin	Linezolid	Meropenem <sup>g</sup>	Oxacillin	Piperacillin/Tazobactam <sup>k</sup>	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancomycin	
Enterococcus faecalis	33		100 <sup>b</sup>							70 <sup>f</sup>			100									100
Staphylococcus coagulase negative	63								60	100			100		41 <sup>h</sup>		75	83 <sup>i</sup>				100
Staphylococcus aureus	100								62	100			100		65 <sup>h</sup>		85	82 <sup>i</sup>				100
Methicillin-resistant Staphylococcus aureus	35								37	100			100				63	57 <sup>i</sup>				100

## GRAM NEGATIVES

Escherichia coli	130	98	48 <sup>c</sup>	58	90	82	97	85	76				90	100			98	72				87
Klebsiella species <sup>d</sup>	62	98		69 <sup>d</sup>	84	73 <sup>d</sup>	90	82	89				97	98			82	91				95
Proteus species	36	97	75 <sup>c</sup>	89	100	57	97	97	72				92	100			100	83				92

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](#)



<sup>b</sup> Results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin.

Ampicillin may be used to predict susceptibility to amoxicillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam among non-β-lactamase-producing Enterococci in clinically stable/non-immunocompromised patients.

<sup>c</sup> Results of ampicillin can predict results for amoxicillin.

<sup>d</sup> 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.

<sup>e</sup> For Enterobacteriales, %S based on systemic MIC breakpoint of ≤ 2 (inferred via lowest Vitek automated dilution ≤ 4)

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

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

<sup>h</sup> For agents with established clinical efficacy, considering site of infection and appropriate dosing, oxacillin-susceptible Staphylococci can be considered susceptible to the following beta-lactam agents:

- 1) β-lactam combination agents (amoxicillin-clavulanate, ampicillin-sulbactam, piperacillin-tazobactam);
- 2) Oral cephalosporins (cefactor, cefdinir, cephalexin, cefpodoxime, cefprozil, cefuroxime);
- 3) IV cephalosporins (cefazolin, cefepime, ceftriaxone); and 4) carbapenems (ertapenem, imipenem, meropenem)

<sup>i</sup> 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 doxycycline, minocycline, or both.

<sup>j</sup> %S based on susceptible MIC (≤ 2) & susceptible dose dependent MIC (up to 8) for Enterobacteriales

<sup>k</sup> %S based on susceptible MIC (≤ 8) & susceptible dose dependent MIC (up to 16) for Enterobacteriales

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)

[Back to top](#)

# Palos 2023 ED Antibiogram



## GRAM POSITIVES

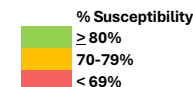
Isolates	Amikacin	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin	Cefepime <sup>j</sup>	Ceftriaxone	Ciprofloxacin	Clindamycin	Daptomycin	Gentamicin	Linezolid	Meropenem <sup>g</sup>	Oxacillin	Piperacillin/Tazobactam <sup>k</sup>	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancomycin
Enterococcus faecalis	183	100 <sup>b</sup>								69 <sup>f</sup>		100							97
Enterococcus faecium	43	9 <sup>b</sup>										100							37
Staphylococcus coagulase negative	104								67	100		100		48 <sup>h</sup>		77	82 <sup>i</sup>		100
Staphylococcus aureus	241								57	100		100		51 <sup>h</sup>		85	78 <sup>i</sup>		100
Methicillin-resistant Staphylococcus aureus	115								36	100		100				70	61 <sup>i</sup>		100

## GRAM NEGATIVES

Citrobacter species <sup>d</sup>	61	100		87	41	100	87	90				97	100		92	98			97
Enterobacter species <sup>d</sup>	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 <sup>d</sup>	381	98		68 <sup>d</sup>	83	70	93	82	80			94	99		91	83			89
Proteus species	192	97	76 <sup>c</sup>	87	99	63	99	97	73			92	100		100	83			92
Pseudomonas aeruginosa	140	99 <sup>a</sup>			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](#)



<sup>a</sup> %S using MIC breakpoint for urine sources only ( $\leq 16$  mcg/ml). Not recommended for use outside of cystitis caused by *P. aeruginosa*.

<sup>b</sup> Results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin.

Ampicillin may be used to predict susceptibility to amoxicillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam among non- $\beta$ -lactamase-producing enterococci in clinically stable/non-immunocompromised patients.

<sup>c</sup> Results of ampicillin can predict results for amoxicillin.

<sup>d</sup> 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.

<sup>e</sup> %S based on MIC  $\leq 2$  with daptomycin dosage regimen of 6-8 mg/kg every 24 hours

<sup>f</sup> Should be reserved for patients who are intolerant to penicillins and cephalosporins or in patients who are suspected of having a drug-resistant bacteria.

<sup>h</sup> For agents with established clinical efficacy, considering site of infection and appropriate dosing, oxacillin-susceptible Staphylococci can be considered susceptible to the following beta-lactam agents:

- 1)  $\beta$ -lactam combination agents (amoxicillin-clavulanate, 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)

<sup>i</sup> 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 doxycycline, minocycline, or both.

<sup>j</sup> %S based on susceptible MIC ( $\leq 2$ ) & susceptible dose dependent MIC (up to 8) for Enterobacterales

<sup>k</sup> %S based on susceptible MIC ( $\leq 8$ ) & 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

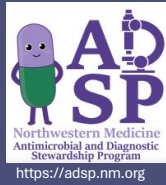
When risk for mortality or significant morbidity is high (eg. meningitis, septic shock/critical illness) agents with %S at least 90% should be selected.

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.

Antibiogram Guidance (CLSI M100-Ed34)

[Back to top](#)

# Palos 2023 Urine Antibigram

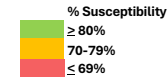


Isolates	Amikacin	Ampicillin	Ampicillin/Subactam	Aztreonam	Cefazolin	Cefepime <sup>j</sup>	Ceftriaxone	Ciprofloxacin	Gentamicin	Linezolid	Meropenem <sup>f</sup>	Nitrofurantoin	Oxacillin	Piperacillin/Tazobactam <sup>k</sup>	Sulfamethoxazole/Trimethoprim	Tetracycline	Tobramycin	Vancomycin
<b>GRAM POSITIVES</b>																		
Enterococcus faecalis	234	100 <sup>b</sup>							100		99							97
Enterococcus faecium	63	8 <sup>bi</sup>							100		37							37
Vancomycin-Resistant Enterococci	44	14 <sup>bi</sup>							100		32							
Staphylococcus coagulase negative	56								100				54 <sup>r</sup>	75	86 <sup>h</sup>			100
Staphylococcus aureus <sup>n</sup>	69								100				43 <sup>r</sup>	78	68 <sup>h</sup>			100
Methicillin-resistant Staphylococcus aureus	38								100					63	53 <sup>h</sup>			100
<b>GRAM NEGATIVES</b>																		
Citrobacter species <sup>d</sup>	77	100		90		100	88	92	97		100	84		93	97			99
Enterobacter species <sup>d</sup>	55	100		51			89	43	87	95		96	51	58	78			89
Escherichia coli	1506	96	51 <sup>e</sup>	62	91	83 <sup>p</sup>	97	87	70	91		100	96		96	76		90
Klebsiella species <sup>d</sup>	478	99		70 <sup>d</sup>	84	76 <sup>d</sup>	94	83	82	95		99	40		90	85		90
Proteus species	213	98	77 <sup>e</sup>	89	99	90	98	97	73	92		100		100	82			93
Pseudomonas aeruginosa	174	99 <sup>a</sup>					96		81			85		92				98
<b>MULTI-DRUG RESISTANT GRAM NEGATIVES</b>																		
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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[See protocol for multi-drug resistant gram-negative agents for guidance](#)



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

<sup>b</sup> Results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin.

Ampicillin may be used to predict susceptibility to amoxicillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam among non-β-lactamase-producing enterococci in clinically stable/non-immunocompromised patients.

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<sup>e</sup> Should be reserved for patients who are intolerant to penicillins and cephalosporins or in patients who are suspected of having a drug-resistant bacteria.

<sup>f</sup> For agents with established clinical efficacy, considering site of infection and appropriate dosing, oxacillin-susceptible Staphylococci can be considered susceptible to the following beta-lactam agents:

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- 3) IV cephalosporins (cefazolin, cefepime, ceftriaxone); and 4) carbapenems (ertapenem, imipenem, meropenem)

<sup>g</sup> 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 doxycycline, minocycline, or both.

<sup>h</sup> 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.

<sup>i</sup> %S based on susceptible MIC (≤ 2) & susceptible dose dependent MIC (up to 8) for Enterobacterales

<sup>k</sup> %S based on susceptible MIC (≤ 8) & susceptible dose dependent MIC (up to 16) for Enterobacterales

<sup>n</sup> Staph aureus is not an expected urinary organism, outside of rare occasions 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.

<sup>p</sup> %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

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.

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Antibiogram Guidance (CLSI M100-Ed34)

[Back to top](#)