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Values expressed are % susceptible R = intrinsic resistance "-" = data not available

Gram Negative Rods

2023 Isolates

	No. of Isolates (a)	Penicillins		Cephalosporins and Lactams					Carbapenems		Aminoglyc's			Others		Urines Only	
		Ampicillin (\$)	Piper/Tazobactam (\$\$)	Cefuroxime (IV) (\$)	Ceftriaxone (\$)	Ceftazidime (\$)	Cefepime (b) (\$)	Aztreonam (\$\$\$)	Ertapenem (\$\$\$)	Meropenem (\$\$)	Amikacin (\$\$\$)	Gentamicin (\$\$\$)	Tobramycin (\$\$\$)	Ciprofloxacin (\$)	Trimethoprim-sulfa (\$)	Cefazolin (f) (\$) Predicts 1st gen cepham	Nitrofurantoin (f) (\$\$\$)
Achromobacter xylosoxidans	21(c,d)	R	86	R	R	62	0	0	R	95	14	5	10	14	95	R	-
Acinetobacter baumannii complex	16(c,d)	R	-	R	R	94	88	R	R	94	94	88	88	88	94	R	-
Citrobacter freundii complex	21(c,d)	R	75	R	67	67	-	-	100	95	100	100	95	95	86	R	94
Enterobacter cloacae complex	61	R	59	R	49	54	71 / 21	68	74	98	100	96	96	93	91	R	48
Escherichia coli	293	43	94	82	82	90	82 / 0	82	99	99	99	88	88	76	70	75	97
Klebsiella aerogenes (Enterobacter aerogenes)	20(c)	R	87	R	87	87	86 / 0	100	100	100	100	100	100	95	100	R	14
Klebsiella oxytoca	36	R	77	57	78	100	86 / 10	71	100	100	100	100	97	94	92	29	92
Klebsiella pneumoniae	80	R	90	79	94	95	90 / 0	90	98	98	100	95	94	90	79	84	22
Morganella morganii	9(c,d)	R	-	R	89	78	100 / 0	-	100	100	100	78	100	56	100	R	R
Proteus mirabilis	33(c)	81	100	-	94	100	-	-	100	100	100	88	91	81	88	94	R
Pseudomonas aeruginosa	124	R	94	C/T	99	95	94	85	R	93	100(f)	-	100	85	R	R	R
Pseudomonas aeruginosa (CF-mucoid) (e)	13(c)	R	92	C/T	92	92	85	69	Imp	77	85	-	-	100	82	R	R
Pseudomonas aeruginosa (CF-non-mucoid) (e)	31	R	94	C/T	97	94	97	84	Imp	97	97	-	-	100	84	R	R
Salmonella spp.	22(c,d)	86	-	R	91	-	-	-	-	-	R	R	R	68	86	R	-
Serratia marcescens	30	R	100	R	97	97	100 / 0	100	100	100	100	100	100	93	97	R	R
Stenotrophomonas maltophilia	40	R	R	R	R	-	-	R	R	R	R	R	Levo	93	100	R	-

- (a) First isolate from each patient was included.
- (b) Shows susceptible / susceptible dose dependent. Not routinely tested on urine and blood Enterobacteriales isolates.
- (c) Data from isolate totals <30 may be statistically unreliable.
- (d) Includes isolates from 2022.
- (e) Cystic fibrosis patient isolates tested by disk diffusion.
- (f) Urine only.

A/S = Ampicillin/Sulbactam; C/T = Cefotazone/Tazobactam;  
Imp = Imipenem; Levo = Levofloxacin

# Antimicrobial Stewardship Program

2024

## Antimicrobial Susceptibility and Dosing Information

### Take an Antibiotic Time Out!

Discuss **BUG, DRUG, and DURATION**  
48—72 hours after starting an antibiotic

- What are the culture results?
- Can the antibiotic be stopped or narrowed?
- What is the planned duration for diagnosis?

Gram Positive Cocci

2023 Isolates

	Number of Isolates (a)	Beta-Lactams							Others									
		Oxacillin/Nafcillin (\$\$)		Penicillin or Ampicillin (\$)		1st Generation cephem (\$)	Cefuroxime (\$)	Ceftriaxone (\$)	Meropenem (\$\$\$)	Levofloxacin (\$\$)	Ciprofloxacin (h) (\$)	Clindamycin (b) (\$)	Erythromycin (\$\$\$)	Nitrofurantoin (h) (\$\$\$)	Trimethoprim-sulfa (\$)	Vancocycin (\$\$\$)	Tetracycline (\$\$)	Linezolid (\$\$\$\$)
		%S	%I	%R														
Staphylococcus aureus	435	89	(c)	-	-	89	-	-	-	-	-	82	70	-	100	100	-	-
MRSA only	49	0	0	-	-	0	-	-	-	-	-	69	35	-	100	100	94	100
Staphylococcus lugdunensis	6(d,e)	100	(c)	-	-	100	-	-	-	-	-	67	67	-	100	100	-	-
Staphylococcus spp., Coagulase-negative	54	33	(c)	-	-	33	-	-	-	-	-	61	37	-	67	100	-	-
Enterococcus faecium	14(d)	-	43	-	57	R	R	R	-	-	71	R	-	43	R	93	-	93
Enterococcus faecalis	24(d)	-	100	-	0	R	R	R	-	-	R	-	-	R	100	-	-	
Streptococcus group B	30	-	100	0	0	-	-	-	-	-	43	-	-	-	-	-	-	-
Viridans group Streptococci	30	-	63	30	7	-	-	93	-	97	-	89	43	-	100	-	-	
Streptococcus pneumoniae	23(d)	-	74(f)	-	26	-	81	96(g)	83	-	-	93	65	-	83	100	Doxycycline	67

- (a) First isolate from each patient was included.
- (b) Testing for inducible clindamycin resistance performed on all Staphylococci, group B Strep, and S. pneumoniae.
- (c) Penicillin sensitivity confirmed by request.
- (d) Data from isolate totals <30 may be statistically unreliable.
- (e) Includes isolates from 2022.
- (f) Based on meningitis interpretive criteria (more conservative). Nonmeningitis interpretation is 100%.
- (g) Ceftriaxone uses the meningitis interpretive criteria (more conservative).
- (h) Urine only.

\$ = \$0-20  
\$\$ = \$20-50  
\$\$\$ = \$50-100  
\$\$\$\$ = >\$100

Candida

Percent Susceptible By Broth Microdilution (YeastOne, Trek Diagnostics)	No. Tested	Amphotericin B (a) (\$\$\$\$)	Fluconazole (b) (\$)	Voriconazole (\$\$\$\$)	Caspofungin (c) (\$\$\$)
Candida albicans	16(d,e)	100	100/0	100	94
Candida glabrata	7(d,e)	100	0/86	-	100
Candida parapsilosis	13(d,e)	100	100/0	100	100
Other Candida species	6(d,e)	100	(f)	67	100

Haemophilus influenzae

For infections with beta-lactamase producing H. influenzae: cefuroxime, ceftriaxone, trimethoprim/sulfamethoxazole, amoxicillin/clavulanate, or azithromycin is recommended.  
Ceftriaxone is drug of choice for CNS infections.  
At LPCH, 65% (n=52) of H. influenzae are ampicillin susceptible.

- (a) Suggested Ampho Resistant breakpoint MIC > or = 2 mcg/ml.
- (b) Shows susceptible / susceptible dose dependent.
- (c) Consult Peds ID if Caspofungin being considered for treatment.
- (d) Data from isolate totals <30 may be statistically unreliable.
- (e) Includes isolates from 2022.
- (f) Species other than C. krusei are 100% susceptible; C. krusei is intrinsically resistant to fluconazole.

**Questions?**

Focused questions about antimicrobial choice, dose, route, and duration

Antimicrobial Stewardship Program (ASP)

Pediatric Infectious Disease Consult Service

Voalte 650-724-8835 (M-F, 8-4) or E-mail (below)

Page Peds ID On Call

E-mail: [pediatricasp@stanford.edu](mailto:pediatricasp@stanford.edu)

Antibiogram and dosing compiled by the Antimicrobial Stewardship Program, P&T Committee, Stanford Health Care Clinical Microbiology Laboratory, and Department of Pharmacy. Released 3/2024.

## LPCHS Formulary Antimicrobials

### GENERAL INFORMATION

- The doses provided are general recommendations and do **NOT** include *neonatal dosing, cystic fibrosis dosing, or renal dose adjustment*.
- Please refer to the **Housestaff Manual (HSM)** or **Neofax** for additional recommendations and **indication-specific dosing**.
- Maximum individual doses in parentheses.
- Renal dose adjustment** parameters indicated by **superscript** (see HSM for renal dosing):  
<sup>1</sup> Adjustment needed if CrCl < 70 mL/min  
<sup>2</sup> Adjustment needed if CrCl < 50 mL/min  
<sup>3</sup> Adjustment needed if CrCl < 30 mL/min
- All inpatient restricted antimicrobial use, including continuation of home medications, requires Pediatric Infectious Disease (ID) approval. Contact the Pediatric ID fellow on-call for approval.
- For assistance, consult ASP or ID.

### ABBREVIATIONS

(ID) = Requires ID approval for use (please note process in HSM for details and exclusions):

**Amphotericin B products, Ceftazidime-avibactam, Cidofovir, Fosfarnet, Isavuconazonium, Linezolid, Posaconazole, Remdesivir**

**All non-formulary antimicrobials, e.g., daptomycin**

(PI) = Prolonged infusion (i.e., extended infusion, continuous infusion) may be considered; use Epic order panel

(Px) = Prophylaxis; (Tx) = Treatment

(TDM) = Therapeutic drug monitoring recommended

(TMP/SMX) = Trimethoprim/sulfamethoxazole

### THERAPEUTIC DRUG MONITORING\*

DRUG	DOSING	TROUGH
Amikacin	Q8h	< 8
	Q24h	
Gentamicin or Tobramycin	Q8h	< 1
	Q24h	
Isavuconazonium (ID)	Q24h	1—7
Posaconazole (ID)	Variable	Px >0.7
		Tx >1 (salvage >1.25)
Vancomycin	Per Pharmacy	AUC 400—600
Voriconazole	Q12h	1—5.5

\*See the HSM for the "Azole Antifungal Monitoring Guidance" and "Aminoglycoside Guideline" for additional information and targets.

PARENTERAL (IV) ANTIBIOTICS	
Amikacin <sup>2</sup> (TDM)	7.5 mg/kg/dose q8h (500mg) 15—20 mg/kg/dose q24h (1.5g)
Ampicillin <sup>3</sup>	50—100 mg/kg/dose q6h (2g)
Ampicillin-sulbactam <sup>3</sup>	50 mg/kg/dose q6h (2g) (dose based on ampicillin)
Aztreonam <sup>3</sup>	30 mg/kg/dose q6h (2g)
Cefazolin <sup>3</sup>	16.5—50 mg/kg/dose q8h (2g)
Cefepime <sup>2</sup> (PI)	50 mg/kg/dose q8h (2g)
Cefoxitin	40 mg/kg/dose q6-8h (2g)
Ceftazidime <sup>2</sup> (PI)	50 mg/kg/dose q8h (2g)
Ceftazidime-avibactam <sup>2</sup> (ID)	≥ 3 months: 50 mg/kg/dose q8h (2g)
Ceftriaxone	50—75 mg/kg/dose q24h (2g) Meningitis: 50 mg/kg/dose q12h (2g)
Ciprofloxacin <sup>3</sup>	15 mg/kg/dose q12h (400mg)
Clindamycin	7—13 mg/kg/dose q8h (900mg)
Doxycycline	2 mg/kg/dose q12h (100mg)
Gentamicin <sup>2</sup> (TDM)	2—2.5 mg/kg/dose q8h 5—7.5 mg/kg/dose q24h Synergy: 1 mg/kg/dose q8h or 3 mg/kg/dose q24h
Levofloxacin <sup>2</sup>	<5yr: 8—10 mg/kg/dose q12h ≥5yr: 10 mg/kg/dose q24h (750mg)
Linezolid (ID)	<12yr: 10 mg/kg/dose q8h (600mg) ≥12 yr: 10 mg/kg/dose q12h (600mg)
Meropenem <sup>2</sup> (PI)	20 mg/kg/dose q8h (1g) Meningitis/CF: 40 mg/kg/dose q8h (2g)
Metronidazole <sup>3</sup>	10 mg/kg/dose q8h (500mg) Appendicitis: 30 mg/kg/dose q24h (1g, unless >80kg, then 1.5g)
Nafcillin <sup>3</sup> (PI)	33-50 mg/kg/dose q4-6h (2g)
Penicillin G <sup>3</sup>	25,000—100,000 units/kg/dose q4-6h (4million units)
Piperacillin-tazobactam <sup>2</sup> (PI)	<i>See age-specific HSM recommendations</i> 80—130 mg/kg/dose q6-8h (4g)
Tobramycin <sup>2</sup>	1—2.5 mg/kg/dose q8h 5—7.5 mg/kg/dose q24h

TMP-SMX <sup>3</sup> (dose based on trimethoprim)	Treatment: 3-6 mg/kg/dose q12h (160mg) <i>Stenotrophomonas/PJP</i> : 5 mg/kg/dose q8h (320mg)
Vancomycin <sup>3</sup> (TDM)	15—20 mg/kg/dose q6-8h (per Pharmacy)
ENTERAL (PO) ANTIBIOTICS	
Amoxicillin <sup>3</sup>	12.5—30 mg/kg/dose TID (1g) <i>S. pneumoniae</i> : 40—45 mg/kg/dose BID (2g)
Amoxicillin-clavulanate <sup>3</sup> [dose based on amoxicillin; note ratio of amoxicillin to clavulanate (e.g., 7:1)]	<i>See age-specific HSM recommendations</i> General dosing (7:1): 22.5 mg/kg/dose BID (875 mg) <i>S. pneumoniae</i> coverage (14:1 or 16:1): 40—45 mg/kg/dose BID (2g) Urinary tract infection (4:1): 13 mg/kg/dose TID (500 mg)
Azithromycin	10 mg/kg on day 1 (500mg), then 5 mg/kg (250mg) q24h on days 2-5
Cefdinir <sup>3</sup>	7 mg/kg/dose BID or 14 mg/kg/dose daily (600mg)
Cephalexin <sup>3</sup>	12.5—50 mg/kg/dose TID-QID (1g)
Ciprofloxacin <sup>3</sup>	10—20 mg/kg/dose BID (750mg)
Clindamycin <sup>3</sup>	7—10 mg/kg/dose TID (600mg)
Doxycycline	2 mg/kg/dose q12h (100mg)
Levofloxacin <sup>2</sup>	<5yr: 8—10 mg/kg/dose q12h ≥5yr: 10 mg/kg/dose q24h (750mg)
Linezolid (ID)	<12yr: 10 mg/kg/dose q8h (600mg) ≥12yr: 10 mg/kg/dose q12h (600mg)
Metronidazole	10 mg/kg/dose q8h (500mg)
Nitro-furantoin <sup>1</sup> (MacroBID®) Oral capsule	Treatment: 3.5 mg/kg/dose (50-mg increments) BID (100mg) Prophylaxis: 1—2 mg/kg/dose daily—BID (100mg)
Nitro-furantoin <sup>1</sup> (Macro-dantin®) Oral suspension	Treatment: 1.25—2.5 mg/kg/dose QID (100mg) Prophylaxis: 1—2 mg/kg/dose daily—BID (100mg)
Penicillin <sup>3</sup>	12.5 mg/kg/dose QID (500mg)
Rifampin	5-10 mg/kg/dose daily-TID (600mg)
TMP-SMX <sup>3</sup> (dose based on trimethoprim)	Tx: 3-6 mg/kg/dose q12h (320mg) Px: 2-5mg/kg/dose daily (160mg)
Vancomycin	10 mg/kg/dose PO QID (125 mg; unless severe <i>C. difficile</i> , 500 mg)

ANTIFUNGALS	
Liposomal amphotericin (ID)	IV: 3—5 mg/kg/dose q24h
Caspofungin	Tx/Px: IV: Load 70 mg/m <sup>2</sup> once (70mg), then 50 mg/m <sup>2</sup> daily (50mg)
Fluconazole <sup>2</sup>	IV/PO: Loading dose 6—12 mg/kg/dose once, followed by 3—12 mg/kg/dose daily (800mg)
Isavuconazonium (ID) (TDM)	IV/PO: 10 mg/kg q8h x 6 doses, then 10 mg/kg daily (372 mg)
Posaconazole (ID) (TDM)	<i>See age-specific HSM recommendation</i> Tx/Px (tablet): 5-7 mg/kg/dose PO BID x 1 day, then 5-7 mg/kg/dose (50-mg increments) PO once daily (300 mg)
Voriconazole (TDM)	<i>See age-specific HSM recommendation</i> Tx/Px: IV/PO: 6—9 mg/kg/dose q12h x 2 doses, then by 3—9 mg/kg/dose q12h
ANTIVIRALS	
Acyclovir <sup>2</sup>	>70kg: <i>Use ideal body weight</i> Tx: IV: 10—15 mg/kg/dose q8h (800mg); PO: 15—20 mg/kg/dose 3-5x/day (800mg); hydration required Px: IV: 5 mg/kg/dose or 250 mg/m <sup>2</sup> q8h (300mg); PO: 10—15 mg/kg/dose TID (300mg)
Cidofovir (ID) <sup>2</sup>	1 mg/kg/dose IV 3 x/week or 5 mg/kg/dose once weekly (hydration required; +/- probenecid)
Foscarnet <sup>1</sup> (ID)	<i>Induction</i> Tx: 60—90 mg/kg/dose IV q12h
Ganciclovir <sup>1</sup>	<i>Induction</i> Tx: 5 mg/kg/dose IV q12h Px: 5 mg/kg/dose IV q24h
Oseltamivir <sup>3</sup>	Tx: 3—3.5 mg/kg/dose PO BID (75mg) Px: 3 mg/kg/dose daily (75mg)
Remdesivir <sup>3</sup> (ID)	5 mg/kg IV (200 mg) x 1, then 2.5 mg/kg (100 mg) IV q24h
Valacyclovir <sup>2</sup>	Tx: 20 mg/kg/dose PO BID (1g) Px: 250—500 mg PO BID
Valganciclovir <sup>1</sup>	Tx: 12—20 mg/kg/dose PO q12h (900mg) Px: 10—15 mg/kg/dose PO daily (900mg)