

# OUTPATIENT ANTIBIOGRAM 2018

EMPIRIC ANTIBIOTICS OF CHOICE FOR COMMON CLINICAL ENTITIES based on Community Hospital Antibiotic Formulary

Site of Infection	Common Causative Organism	Empiric Antibiotic Treatment	Alternative Antibiotic Choices – Comments
Skin or Soft Tissue	Uncomplicated, "Spontaneous" Cellulitis Strep – Group A, B or C Staph aureus (role of MRSA unknown)	IV: Cefazolin PO: Cephalexin	Vancomycin (if MRSA suspected) * Vanco trough level goal is 10-15mcg/ml
	Complicated Cellulitis 2° to diabetic vascular or pressure ulcer; trauma or surgery – polymicrobial	IV: Amp/Sulbactam +/- Vancomycin or Pip/Tazo +/- Vancomycin	Levofloxacin + Metronidazole +/- Vancomycin
	Necrotizing Fasciitis Staph Aureus, B-hemolytic strep, GNRs, anaerobes including Clostridia	Pip/Tazo plus Vancomycin plus Clindamycin	Vancomycin + Meropenem (ID or Intensivist only)
	Skin Abscess MRSA, MSSA	IV: Vancomycin, PO: Sulfamethoxazole/TMP or Doxycycline Consider Cephalexin if MSSA	PO: Linezolid <i>Drainage of abscess is the most important therapy</i>
Bone and Joint	Osteomyelitis, acute Staph aureus (hematogenous)	Vancomycin *	* Vancomycin Trough 15-20 mcg/ml for bone and joint infection
	Septic Arthritis Staph aureus, Strep species, GNR, Neisseria	Vancomycin * Add Ceftriaxone if GC is suspected	Consider addition of Rifampin if prosthetic joint
CNS	Bacterial Meningitis – Community Acquired S. pneumoniae, N. meningitis	Ceftriaxone High dose (2g q12h) plus Vancomycin* (add Ampicillin (if patient is >65 years old or immuno-compromised))	* Vancomycin trough goal 15-20 mcg/ml for CNS infections
	Post-Neurosurgical Pseudomonas, Staph aureus and Epidermidis, GNR	Vancomycin* plus Ceftazidime	Vancomycin + Meropenem (ID and intensivist only) if resistant GNR
Upper Respiratory	Sinusitis – Viruses, S. pneumoniae, H. influenzae, Moraxella	PO: Amox/Clavulanate or Levofloxacin	No antibiotics indicated for acute rhinosinusitis
	Pharyngitis – Group A strep	PO: Penicillin, or Amoxicillin, or Azithromycin	

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Pneumonia	Community Acquired (CAP) S.pneumoniae, Mycoplasma, H. influenzae, Legionella, Moraxella catarrhalis. Less common – Staph aureus, virus, GNRs	Outpatients: PO Azithromycin or Levofloxacin 750mg daily	Assess for and document risk for GNR pneumonia (esp pseudomonas): Alcoholism, bronchiectasis, structural lung disease, immune compromise, tracheostomy, etc.
	Hospitalized patients with CAP	Non-ICU patients Ceftriaxone (1g q24h) plus Azithromycin (500mg daily) Or Levofloxacin alone (750mg daily)	Assess risk for Staph aureus: post-influenza or necrotizing pneumonia
	ICU patients with CAP	Azithromycin plus Ceftriaxone or Pip-Tazo plus (Levofloxacin or ciprofloxacin) +/- (Vancomycin* or Linezolid (ID or intensivist only)	Desired Vancomycin trough level for pneumonia – 15-20mcg/ml
	Aspiration pneumonia Mixed oral flora, Anaerobes, S. aureus, GNR in hospital acquired aspiration	Ceftriaxone 1g q24h plus Metronidazole 500mg q12h Or Amp/Sulbactam alone	Pip/tazo plus Vancomycin for hospital acquired aspiration Levofloxacin plus metronidazole if beta-lactam allergy
	Hospital Associated (HAP) and Ventilator Associated (VAP) CAP organisms. + GNRs, MRSA	Pip/Tazo (+/-) Levofloxacin (750mg daily) or Aminoglycoside (+/-) Linezolid (ID, Intensivist only) or Vancomycin* (Trough goal 15-20mcg/ml)	Pip/tazo (3.375g or 4.5g q8h 4 hr infusion Assess for MDRO including ESBL, may need carbapenem (Meropenem - ID, Intensivist only))
Genito-urinary infection	Cystitis – E. coli, Staph saprophyticus	PO: Sulfamethox/trimethoprim (Septra-DS) (bid) or Cephalexin 500mg (Keflex) 500mg	Alternative Nitrofurantoin (Macrobid) 100mg BID <i>Check for resistance to Sulfa and quinolone</i>
	Uncomplicated Pyelonephritis – E coli, Proteus, other GNRs	PO: Ciprofloxacin 500mg bid IV/IM: Ceftriaxone 1g q24h	
	Complicated Pyelonephritis – Resistant GNR, Enterococci	Ceftriaxone 1g q24h or Pip/Tazo	Ertapenem or Meropenem (ID or intensivist only) if MDRO suspected
	Prostatitis: Acute- GNRs, GC Chronic: GNRs, Staph aureus	Ciprofloxacin* (+/-) Ceftriaxone if GC suspected	* GC commonly resistant to quinolones
Abdominal	Cholangitis, Diverticulitis, Bowel Perforation, etc Enteric GNR (Klebsiella, E. coli, Proteus) +/- Enterococci, anaerobes	Pip/Tazo alone or Ceftriaxone plus Metronidazole	Levofloxacin (750mg) plus Metronidazole Or Aztreonam plus Metronidazole +/- Vancomycin
	Hospitalized patient or prior antibiotic use: Above bacteria plus Pseudomonas and Candida.	Pip/Tazo +/- Fluconazole or Ceftazidime plus Metronidazole +/- Fluconazole	Aztreonam plus Metronidazole Consider carbapenem if MDRO suspected
	C. difficile colitis	Metronidazole PO 500mg TID or 500mg IV q8h	Vancomycin PO Liquid 125mg PO q6h

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SEPSIS Syndrome	GNR, Staph aureus	Pip/Tazo plus Vancomycin (may add Aminoglycoside or Levofloxacin 750mg)	Ceftazidime plus Vancomycin Aztreonam plus Vancomycin (may add Aminoglycoside or Levofloxacin) Add metronidazole if bowel source
Acute Native Valve Endocarditis	Strep viridans (30-40%), Enterococcus (5-15%), Staph aureus (20-35%)	Vancomycin* (+/-) Gentamicin (1mg/kg q8h) (+/-) Ceftriaxone (2g q24h)	Begin antibiotics after cultures unless patient is acutely ill or in heart failure
Prosthetic Valve Endocarditis	Staph aureus or Staph epidermidis	Vancomycin plus Gentamicin plus Rifampin	ID Consult strongly advised
Febrile Neutropenia	GNRs, Pseudomonas, Staph aureus, Strep viridans	Pip/Tazo (+/-) Aminoglycoside Or Ceftazidime (2g q8h) (+/-) Aminoglycoside Add Vancomycin if line associated infection suspected	Meropenem (ID or intensivist) (+/-) Vancomycin  Low risk patients PO Cipro plus Amox/Clav (Augmentin)

SUGGESTED DURATION OF ANTIMICROBIAL THERAPY FOR COMMON INFECTIONS	
Infection	Duration
Pneumonia CAP HCAP VAP or infections due to pseudomonas or other NFGNR	~ 5 days 7 days 10-14 days
Complicated intra-abdominal infection	4-7 days (with source control)
Urinary tract infection Uncomplicated cystitis in female UTI in males Pyelonephritis	— 3-5 days 10-14 days 10-14 days
Cellulitis – Skin, soft tissue infection Diabetic foot infection	5-10 days 7-21 days depending on severity of infection

### CLINICAL PEARLS

1. IV and PO formulations are equally bioavailable for Fluconazole, Levofloxacin, Ciprofloxacin, Metronidazole, Azithromycin. Use PO formulations when possible.
2. Avoid redundant anaerobic coverage, no need for Metronidazole for patients on Piperacillin/Tazobactam or Ampicillin/Sulbactam unless you are also treating C. difficile.
3. Generally there is no need to “double cover” pseudomonas infection while awaiting complete susceptibility information except in neutropenic patients or in patients with suspected resistance

### CONTRIBUTORS

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## Gram Negative Rods

	Beta lactams			Cephalosporins			Quinolones			Carbapenems			Aminoglycosides			Folate		Other
	Ampicillin	Amox/Clavulanate	Amp/Subactam	Piperacillin/Tazobactam	Cefazolin	Cefazolin (Urine)*	Ceftaxone	Ceftazidime	Ciprofloxacin	Levofloxacin	Ertapenem	Meropenem	Amikacin	Gentamicin	Tobramycin	Trimethoprim/sulfa	Nitrofurantoin (urine only)	
Citrobacter Freundii complex	32 0%	32 0%	32 81%	32 0%	32 84%	32 84%	32 84%	32 91%	32 94%	32 100%	32 100%	32 94%	32 97%	32 88%	32 94%	32 94%		
Citrobacter koseri	29 97%	29 93%	29 97%	29 83%	29 97%	29 100%	29 100%	29 100%	29 100%	29 100%	29 100%	29 100%	29 100%	29 100%	29 100%	26 46%		
Enterobacter cloacae complex	51 0%	51 0%	51 92%	51 0%	51 88%	51 90%	51 90%	51 86%	51 94%	51 90%	51 98%	51 100%	51 96%	51 88%	51 88%	33 30%		
Escherichia coli	1398 61%	1395 64%	1393 97%	1397 75%	1135 94%	1398 98%	1398 98%	1398 79%	1398 80%	1392 99%	1394 99%	1398 94%	1395 94%	1395 78%	1348 80%			
E coli , ESBL (urine and non urine)								117 12%	117 13%	124 97%	125 99%	117 61%	117 49%	117 44%	116 92%			
Klebsiella oxytoca	48	48	48	48	48	48	48	48	47	48	48	48	48	48	41			
Raoultella ornithinolytica	0%	44%	94%	19%	92%	96%	96%	90%	98%	100%	100%	98%	96%	90%	83%			
Klebsiella pneumoniae	204 0%	203 82%	203 96%	203 88%	193 98%	203 99%	203 99%	203 98%	203 98%	203 100%	203 100%	203 99%	203 99%	203 93%	196 44%			
Klebsiella pneumoniae, ESBL (urine and non urine)								19 21%	19 74%	19 74%	19 100%	19 74%	19 68%	19 5%	19 16%			
Proteus mirabilis	165 79%	164 99%	165 85%	165 99%	136 94%	165 97%	165 99%	165 60%	165 70%	165 98%	165 83%	165 83%	165 82%	165 71%	138 0%			
Pseudomonas aeruginosa			158 91%			168 95%		168 80%	168 79%		156 93%	157 99%	168 98%					

\* Cefazolin predicts results for the oral agents- Cefador, ceftinir, ceftopodoxime, ceftrozil, cefturoxime axetil and loracarbef when used for therapy of uncomplicated UTI's due to E. coli, K. pneumoniae, and P. mirabilis. A valid statistical analysis should include 30 or more isolates, organisms with less than 30 isolates are listed for informational purpose only.



### COMMENTS:

1. Data are obtained from MIC and disk diffusion testing methods.
2. Shaded rows = % susceptible  
Non-shaded rows = number of organisms isolated.
3. Outpatient MRSA (methicillin resistant Staph aureus): In 2018, 135 of 369 (36.5%) outpatient Staph aureus isolates were MRSA. Prior years as follows: 2017 – 29.8%, 2016 – 29.1%, 2015 - 30%, 2014 – 41.2%.
4. ESBL (extended spectrum beta lactamases): in 2018, 161 of 1940 (8.3%) of E coli isolates (combined inpatient and outpatient) produced ESBL. Prior years as follows: 2017 – 7.5%, 2016 – 8.1%, 2015 – 8.3%, 2014 – 6.8%, 2013 – 5%.

## Gram Positive Organisms

	Beta lactams/Cephalosporins				Aminoglycosides				Lipopeptide / Tetracycline				Folate ant. / Glycopeptide		Quinolones		Oxazolid	Rifampin	Other
	Ampicillin	Cefazolin	Ceftriaxone (Meningitis)	Ceftriaxone (Non Meningitis)	Oxacillin	Penicillin (Meningitis)	Penicillin (non meningitis)	Gentamicin	Gentamicin Synergy	Clindamycin	Daptomycin	Tetracycline	Trimethoprim/sulfa	Vancomycin	Ciprofloxacin	Levofloxacin	Linezolid	Rifampin	Nitrofurantoin (Urine only)
Enterococcus faecalis	298 99%								57 77%	58 100%	245 23%		298 99%	245 83%	298 100%			245 100%	
Enterococcus non faecalis (faecium)	11 27%								1 100%	2 100%	10 50%		11 91%	9 11%	11 91%				
Staph. epidermidis										75 33%	77 34%		78 100%	78 45%	78 95%			78 98%	50
Staph. aureus (MRSA)										135	135		135	135	135			135	23
Methicillin Resistant Staph. aureus										0%	0%		100%	100%	100%			100%	100%
Staph. aureus (MSSA)										234 100%	264 100%		264 100%	264 82%	264 100%			264 100%	26
Methicillin Sensitive Staph. aureus													8 100%	8 100%	8 100%			8 100%	92%
Strep. pneumoniae																			

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