

INPATIENT 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 May use cephalexin for 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 q12h	Alternative Nitrofurantoin (Macrobid) 100mg BID <i>Check for resistance to Sulfa or cephalosporin</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 —
urine source**

	Beta lactams			Cephalosporins			Quinolones			Carbapenems			Aminoglycosides			Folate	Other	
	Ampicillin	Amox/Clavulanate	Amp/Sulbactam	Aztreonam	Piperacillin/Tazobactam	Cefazolin	Cefazolin urine	Ceftazidime	Ceftaxone	Ciprofloxacin	Levofloxacin	Ertapenem	Meropenem	Amikacin	Gentamicin	Tobramycin	Trimethoprim/Sulfa	Nitrofurantoin
Citrobacter freundii complex					13		13	13	13	13	13	10	13	13	13	13	13	13
Enterobacter cloacae complex					9	9	9	9	9	9	9	9	9	9	9	9	9	19
Escherichia coli	289 63%	289 87%	289 66%		289 97%	286 91%	289 100%	288 99%	289 99%	289 75%	289 78%	289 100%	289 100%	288 93%	289 92%	289 81%	289 97%	
Escherichia coli, ESBL (Urine)									28	27	28	28	28	28	28	28	28	28
Klebsiella oxytoca	10 0%	10			10	10	10	10	10	10	10	10	10	10	10	10	10	10
Klebsiella pneumoniae	61 0%	61 95%	61 84%		61 95%	60 93%	61 95%	61 93%	61 98%	61 98%	60 97%	60 98%	60 98%	61 98%	61 100%	61 95%	61 51%	
Proteus mirabilis	57 75%	56 89%			57	57	57	57	57	57	57							
Pseudomonas aeruginosa				33 79%			33		33	33		32 88%	32	32	33	33		

* Cefazolin predicts results for the oral agents-Cefaclor, cefdinir, cefpodoxime, ceftiofur, cefuroxime 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 isolates
3. Inpatient MRSA (methicillin resistant Staph aureus): In 2018, 69 of 175 (39.4%) inpatient Staph aureus isolates were MRSA. Prior years as follows: 2017 – 37.8%, 2016 – 41.3%, 2015 – 35.6%, 2014 – 52.5%.
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 — urine source

Antibiotic	62	62	62	62	62	62
Ampicillin	98%	100%	31%	97%	71%	100%
Linezolid						
Tetracycline						
Vancomycin						
Levofloxacin						
Nitrofurantoin						

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