

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

Martha Blum MD, PhD, Infectious Diseases
Djaouida Bouzar, MS, CLS Microbiologist
David Gardner, MD, Pathology
Lynn Hendrick, PharmD, Clinical Assistant Director, Pharmacy
Cheryl Moore, CLS, Director of Laboratory Services

Gram Negative Rods — non urine source

	Beta lactams				Cephalosporins				Quinolones				Carbapenems		Aminoglycosides		Folate
	Ampicillin	Amox/Clavulanate	Amp/Sulbactam	Aztreonam	Piperacillin/Tazobactam	Cefazolin	Ceftazidime	Ceftioxone	Ciprofloxacin	Levofloxacin	Ertapenem	Meropenem	Amikacin	Tobramycin	Trimethoprim/Sulfa		
Citrobacter freundii complex					6	83%	6	83%	6	100%	6	100%	6	100%	6		
Enterobacter cloacae complex	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
	0%	0%	81%	81%	0%	81%	81%	100%	100%	86%	100%	100%	100%	95%			
Escherichia coli	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
	54%	81%	58%	98%	69%	98%	98%	79%	79%	100%	100%	100%	94%	74%			
Escherichia coli, ESBL										16	16						
Klebsiella pneumoniae	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
	0%	100%	90%	97%	97%	100%	100%	97%	97%	100%	100%	100%	100%	94%			
Proteus mirabilis	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
	76%	100%	81%	100%	0%	100%	95%	76%	76%	100%	100%	81%	62%				
Pseudomonas aeruginosa																	
					36	39	39	39	39	37	37	36	39	39	39	39	39
					94%	90%		85%	82%	97%	97%	100%	97%	97%	97%	97%	97%

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 — non urine source

	Beta lactams/Cephalosporins										Aminoglycosides	Cyclic Lipo	Folate ant.	Glycopep	Macrol.	Oxazolid	Quinolones	Tetracycline	Other
	Ampicillin	Cefazolin	Ceftaxone	Oxacillin	Penicillin	Gentamicin	Gentamicin Synergy	Daptomycin	Thrimetho-sulfa	Vancomycin									
Enterococcus faecalis	55 100%					55 78%	53 78%			55 98%		55 98%							
Enterococcus non faecalis (faecium)	10 40%					10 100%	7 100%			10 60%		10 90%							
Staph. epidermidis	42 14%	42 14%			28 100%					42 100%	42 52%	42 98%	42 40%	40 78%					
Staph. aureus (MRSA)	69 0%	69 0%			69 94%		53 100%	69 100%	69 100%	69 100%	69 58%	69 100%	69 16%	69 91%					
Staph. aureus (MSSA)	106 100%	116 100%			116 96%		97 100%	116 97%	116 100%	116 81%	116 100%	116 100%	116 84%	116 91%					
Strep. pneumoniae		13 100%			13 92%					13 100%	12 83%		13 100%	13 85%	13 69%				

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