

Suggested Empiric Antimicrobial Agents of Choice in Hospitalized Adults: Aspirus System (15th edition)

Created by: Steven Studinski, PharmD.

Co-creator: Patricia Christopherson, PharmD, BCPS

Contents

Antibiogram	2
Antimicrobial Stewardship Pearls	3
Acute Exacerbation of Chronic Bronchitis/ Chronic Obstructive Pulmonary Disease	5
Community- Acquired Pneumonia (CAP)	6
Hospital-Acquired/ Ventilator-Associated Pneumonia (HAP)	7
Febrile Neutropenia	8
Complicated Intra-Abdominal or Biliary Tract Infection, and Pancreatitis	9
<i>Clostridioides difficile</i> Infection (CDI)	10
<i>Staphylococcus aureus</i> bacteremia	11
Urinary Tract Infections (UTI)	12
Community-Acquired Bacterial Meningitis	13
Skin and Soft Tissue infections (SSTI)	14
Diabetic Foot Infections (DFI)	15
Open Fracture- Antibiotic Prophylaxis	16
Bone and Joint Infections	16

2023 Aspirus System Antibigram

# OF ISOLATES	GRAM NEGATIVE BACILLI REPORTED AS % SUSCEPTIBLE: JAN.2023 - DEC.2023	Ampicillin	Ampicillin/ Sulbactam	Piperacillin/ Tazobactam	Cefazolin	Ceftriaxone	Cefepime	TMP/SMX	Levofloxacin	Gentamicin	Tobramycin	Nitrofurantoin	Ertapenem	Meropenem
312	<i>Citrobacter freundii</i> complex			81		80	100	91	91	98	98	94	100	100
171	<i>Enterobacter</i> (<i>Klebsiella</i>) <i>aerogenes</i>			84		87	100	98	96	100	100	13	99	100
461	<i>Enterobacter cloacae</i> complex			86		87	99	94	95	99	99	33	98	100
10248	<i>Escherichia coli</i>	66	74	98	91	96	98	86	86	94	95	98	100	100
395	<i>Klebsiella oxytoca</i>		63	93	62	96	99	97	98	99	99	87	100	100
1425	<i>Klebsiella pneumoniae</i>		88	95	95	97	98	92	92	98	98	29	99	100
224	Other <i>Klebsiella</i> sp.		93	97	97	98	100	97	95	98	98	55	100	100
102	<i>Morganella morganii</i>		7	98		92	98	85	86	94	98		100	100
856	<i>Proteus mirabilis</i>	86	91	100	91	99	99	84	82	91	92		100	100
1014	<i>Pseudomonas aeruginosa</i>			93					78	^	99			96
160	<i>Serratia marcescens</i>					97	99	100	94	100	90		99	100

# OF ISOLATES	GRAM POSITIVE COCCI REPORTED AS % SUSCEPTIBLE: JAN.2023-DEC.2023	Ampicillin	Oxacillin	Penicillin	Ceftriaxone	Clindamycin	Erythromycin	Levofloxacin	Gentamicin*	Nitrofurantoin	Rifampin*	Tetracycline	TMP/SMX	Vancomycin
93	<i>Enterococcus faecium</i>	37		36					88 SYN	25		42		74
1254	<i>Enterococcus faecalis</i>	100		99					79 SYN	99	100	29		100
2449	<i>Staphylococcus aureus</i>		76			81	63	80	99	99	100	93	97	100
1905	MSSA (75% of <i>Staph aureus</i>)		100			83	74	91	99	100	100	94	99	100
544	MRSA (25% of <i>Staph aureus</i>)		0			71	24	41	99	99	100	87	93	100
770	<i>Staphylococcus epidermidis</i>		49	10		67	40	76	95	100	99	80	68	100
167	<i>Staphylococcus lugdunensis</i>		92	41		88	89	99	100	100	100	98	99	100
115	<i>Streptococcus agalactiae</i> (Gp B)			100		48	42					12		100
70	<i>Streptococcus pneumoniae</i>					90	61	100				84		100
	68 Non-Meningitis^			100	100									
	2 Meningitis^^			100	100									

CY 2023 *Haemophilus influenzae*
30% Beta Lactamase Positive

*Should not be used alone to treat staphylococcal infections
SYN: Synergy with Amicillin or Vancomycin
^Gentamicin is no longer recommended for coverage of *Pseudomonas aeruginosa*
^^*Streptococcus pneumoniae* Meningitis breakpoints are lower than pneumonia/bacteremia

Antimicrobial Stewardship Pearls

When ordering antimicrobials. Follow the Stewardship Approach:

- Utilize stewardship ORDER SETS to pick empiric therapies then NARROW (DE-ESCALATE) antimicrobials as far as possible based on culture results to lessen resistance.
- Before initiating empiric therapy OR changing antibiotics due to lack of response to a current regimen, make certain that all relevant cultures have been obtained or repeated.
- Convert IV to PO as soon as possible to shorten length of stay and reduce line infections.
- De-escalate away from coverage of *Pseudomonas* (e.g., pip-tazo, cefepime, levo/cipro) and MRSA (e.g., vanco, linezolid, dapto) **after 48 hours of no growth of these organisms on properly obtained cultures.**
- SHORTER IS BETTER! Treat for the shortest duration possible to optimize patient outcomes.

AVOID empiric use of fluoroquinolones (FQs) and Clindamycin

- High risk of *C. diff* with both agents
- High rates of resistance with both agents
- FQs have **BLACK BOX** warnings due to tendonitis, tendon rupture, CNS effects, peripheral neuropathy, hypo/hyperglycemia, and ruptured AAA

AVOID use of Pip-tazo, Cefepime, Vancomycin, Linezolid, and Daptomycin when NOT indicated

- Utilize stewardship Order Sets and this pocket card to guide empiric use of these agents. Even in sepsis, overuse of these agents when not indicated causes harm by increasing resistance, mortality, costs, length of stay, and *C. diff*.
- If using these and other broad-spectrum agents, source cultures/PCR should be obtained to aid in de-escalation.

Staph aureus (MRSA) PCR Swabs

- Use to rule out MRSA pneumonia or wound/purulent skin and soft tissue infections.
- MRSA, NAT, Amplified (Nares) (MRSA PCR-Nares): >96% negative predictive value for MRSA pneumonia.
- MRSA, Skin and Soft Tissue, NAT Amplified (MRSA PCR- SSTI): >97% negative predictive value for MRSA skin and soft tissue infections.

Covering ESBL organisms

- Ertapenem is the drug of choice for infections due to ESBL- producing Gram-negative organisms
- Refer to most recent IDSA Guidance on Antimicrobial Resistant Gram-negative Infections

Double coverage of Gram-negative organisms

- Routine use of double coverage is NOT necessary in majority of cases
- If patient has specific history of a multi-drug resistance organism can consider double coverage
- Avoid using fluoroquinolones due to high resistance rates. An aminoglycoside and beta-lactam combination is preferred

- If used, quickly stop the 2nd agent after 48hrs of no growth OR when an organism is cultured, and sensitivities are known. There is NO benefit to double coverage once sensitivities are known.

Surgical Prophylaxis

- Antibiotic administration should begin and end within 60 min prior to incision (120 min for vanco or levo/cipro).
- Penicillin allergic patients should receive cefazolin or cefoxitin as they are safe and have 50-60% less odds of SSI.
- Patients on antibiotics still need additional pre-op antibiotics OR if the concurrent antibiotic is suitable for prophylaxis, it should be rescheduled to be given within 60 min prior to incision.

Follow-Up Blood Cultures:

- Do not routinely obtain follow-up blood cultures to document clearance of bacteremia in patients who are NOT worsening. Blood cultures to document clearance of bacteremia are only recommended for patients with endocarditis, candidemia, and Enterococcal or Staphylococcus aureus bacteremia.
- ID Consult recommended for Staph aureus bacteremia, endocarditis, Candidemia, Enterococcal bacteremia and CNS infections.

Stewardship Order Sets in Epic: the recommendations in this document are contained in these order sets:

- [Aspirus Infectious Disease "Blue Card" Empiric Antibiotics](#)
- [Adult Sepsis Treatment AND ED Adults Sepsis Treatment](#)
- [Aspirus Adult Sepsis Step-Down Antimicrobial Orders](#)
- [Aspirus C. diff Infection Treatment](#)
- [Aspirus Beta-Lactam Antibiotic Graded Challenge \(Adult\)](#)

Severe Sepsis and Septic Shock: the recommendations in this document are for NON-Sepsis indications:

- See [Adult Sepsis Treatment AND ED Adult Sepsis Treatment](#) order sets for recs

Acute Exacerbation of Chronic Bronchitis/ Chronic Obstructive Pulmonary Disease

Note: Antibiotics recommended for acute exacerbations with increased **dyspnea, sputum volume, AND purulence.**

Consider ordering procalcitonin and discontinuing antibiotics if value is <0.5.

- Standard Therapy:
 - Doxycycline 100 mg PO q12h or Azithromycin 500 mg PO q24h
- Severe life-threatening respiratory failure:
 - Ceftriaxone 2 g IV q24h + [Doxycycline 100 mg IV q12h OR Azithromycin 500 mg IV q24h]

Duration of therapy: 5 days

Reference: 2024 gold report. Global Initiative for Chronic Obstructive Lung Disease - GOLD.

Community- Acquired Pneumonia (CAP)

Note: HCAP or Healthcare Associated Pneumonia is no longer used and patients from long term care facility or recent hospitalizations do not always require pseudomonas or MRSA coverage unless they meet criteria noted below. If covering for **MRSA**, order **MRSA PCR**, and stop vancomycin if negative.

- Standard Therapy:
 - Ceftriaxone 1g IV q24h + Azithromycin 500 mg IV/PO or Doxycycline 100 mg IV/PO BID
- When to add Pseudomonas coverage:
 - If pseudomonas present in recent culture (within 1 year) or patient has ≥ 3 of the risk factors below: Switch Ceftriaxone to Cefepime 1 g q6h, or Pip-Tazo 3.375 Q8h
 - Pseudomonas risk factors (≥ 3): immunosuppression, non-ambulatory, tube feeding, gastric acid suppression (H2RA or PPI), hospitalization ≥ 2 days in the last 90 days, use of **IV antibiotics** in the last 90 days.
- When to add MRSA coverage:
 - If presentation consistent with MRSA (see below), recent culture (within 1 year) with MRSA present, or patient has ≥ 2 risk factors noted below: Order **MRSA Nares PCR and Vancomycin per pharmacy.**
 - *Discontinue Vancomycin if MRSA NARES is negative*
 - Presentation consistent with MRSA: Gross hemoptysis, leukopenia, rapid progressive CXR and/or lung necrosis or cavitation
 - MRSA risk factors (≥ 2): Dialysis in past 30 days, recent MRSA history, congestive heart failure, hospitalization ≥ 2 days in the last 90 days, use of **IV antibiotics** in the last 90 days.
- When to add anaerobic coverage:
 - Note: Empiric anaerobic coverage of aspiration pneumonia is **NOT** recommended
 - If lung abscess or empyema: Adults: Add Metronidazole 500 mg q12h.

Duration of Therapy:

- 5 days if afebrile for 48-72 hours, at baseline oxygen, and has ≤ 1 abnormal vital signs (HR > 100 , RR > 24 , SBP ≤ 90). Azithromycin no longer than 5 days.
- 7 days if patient has not met the criteria above for 5 day duration.

Reference: Metlay JP, Waterer GW, Long AC, et al. Diagnosis and treatment of adults with community-acquired pneumonia. An official clinical practice guideline of the american thoracic society and infectious diseases society of america. *Am J Respir Crit Care Med.* 2019;200(7):e45-e67

Hospital-Acquired/Ventilator-Associated Pneumonia (HAP)

Note: Order respiratory cultures and **MRSA Nares PCR** to guide de-escalation. If mixed flora results, lab will exclude presence of MRSA and *Pseudomonas* to aid in de-escalation.

- Standard therapy
 - Cefepime 1 g IV q6h OR Zosyn 3.375 g IV q8h AND Vanco per pharmacy
 - *Discontinue Vancomycin and de-escalate Pip-Tazo OR cefepime at 48 hours if no MRSA/*Pseudomonas* in a quality respiratory culture.
- When to add anaerobic coverage
 - Note: Empiric anaerobic coverage of aspiration pneumonia is **NOT** recommended
 - If lung abscess or empyema and patient is on Cefepime: add Metronidazole 500 mg q12h

Duration of Therapy: 7 days (including MRSA and *Pseudomonas* infections)

Reference: Kalil AC, Metersky ML, Klompas M, et al. Management of adults with hospital-acquired and ventilator-associated pneumonia: 2016 clinical practice guidelines by the infectious diseases society of america and the american thoracic society. *Clinical Infectious Diseases*. 2016;63(5):e61-e111.

Febrile Neutropenia

Note: Single temperature $\geq 101^{\circ}\text{F}$ OR $\geq 100.4^{\circ}\text{F}$ sustained for 1 hr AND ANC ≤ 500 cells/ μL OR ANC predicted to be less than 500 cells/ μL in 48 hours.

- Standard Therapy:

[Cefepime 2g IV q8h](#)

- When to add anaerobic coverage?

If intra-abdominal infection or severe mucositis:

Switch Cefepime to Pip-Tazo 3.375 q8h

- When to add MRSA coverage?

If **septic shock**: ADD Tobramycin x1 dose AND Vancomycin per Pharmacy

If skin or indwelling catheter infection, pneumonia, hypotension, or recent history of MRSA: ADD Vancomycin per pharmacy.

- De-escalation:

If source and organism is identified target with antibiotics per antibiogram or culture susceptibilities.

If no cultures with gram positive organisms within 48 hours vancomycin should be stopped.

Reference:

1. Freifeld AG, Bow EJ, Sepkowitz KA, et al. Clinical practice guideline for the use of antimicrobial agents in neutropenic patients with cancer: 2010 update by the infectious diseases society of america. *Clinical Infectious Diseases*. 2011;52(4):e56-e93.
2. Baden LR, Swaminathan S, Angarone M, et al. Prevention and treatment of cancer-related infections, version 2.2022, NCCN clinical practice guidelines in oncology. *J Natl Compr Canc Netw* 2016; 14: 882–913.

Complicated Intra-Abdominal or Biliary Tract Infection, and Pancreatitis

- Standard Therapy
 - Pancreatitis: Routine antibiotics are NOT recommended. Antibiotics are indicated if >30% pancreatic necrosis noted on admit CT or repeat CT with contrast 48 hours after admission. Obtain CT-directed FNA culture to guide antibiotics.
 - Extra-biliary, abscesses and perforations:
Ceftriaxone 2 g IV q24h Plus Metronidazole 500 mg IV q12h
 - Cholecystitis and Cholangitis:
Ceftriaxone 2 g IV q24h ± Metronidazole 500 mg q12h
- When to add *Pseudomonas* coverage?
 - Health care associated intra-abdominal infections: Pip-Tazo 3.375 g IV q8h OR [Cefepime 1 g IV q6h Plus Metronidazole 500 mg IV BID]

Duration: 4-7 days with adequate with source control

References:

1. Solomkin JS, Mazuski JE, Bradley JS, et al. Diagnosis and management of complicated intra-abdominal infection in adults and children: guidelines by the surgical infection society and the infectious diseases society of america. *Clinical Infectious Diseases*. 2010;50(2):133-164.
2. Sawyer RG, Claridge JA, Nathens AB, et al. Trial of short-course antimicrobial therapy for intraabdominal infection. *N Engl J Med*. 2015;372(21):1996-2005.

Clostridioides difficile Infection (CDI)

Note:

1. All unnecessary antibiotics should be stopped to increase cure rates. Utilize *C. diff* testing algorithm located on the antimicrobial stewardship page as well as the [Aspirus C. diff Treatment](#) order set.
2. NAT/GDH positive and Toxin A/B negative = colonization. NO TREATMENT INDICATED. Positive toxin required for treatment.
3. IV vancomycin will have no effect on *C. Diff* due to poor GI absorption
 - Initial Episode:
 - Standard: [Vancomycin 125 mg PO q6h for 10 days](#)
 - Fulminant (hypotension, shock, toxic megacolon, SCr ≥ 1.5): [Vancomycin 500 mg PO q6h for 10 days PLUS Metronidazole 500 mg IV q8h \$\pm\$ Vancomycin enema \(if ileus noted\) for 10 days](#)
 - First recurrence:
 - If metronidazole used for initial episode: [Vancomycin 125 mg PO q6h for 10 days](#)
 - If vancomycin PO used initial episode: [Vancomycin Taper and Pulse regimen](#) located in the [Aspirus C. diff Treatment](#) order set.
 - Second or Subsequent Recurrence:
 - [Vancomycin Taper and Pulse regimen](#) located in the [Aspirus C. diff Treatment](#) order set.

Reference: Johnson S, Laverne V, Skinner AM, et al. Clinical practice guideline by the infectious diseases society of america (Idsa) and society for healthcare epidemiology of america (Shea): 2021 focused update guidelines on management of clostridioides difficile infection in adults. *Clinical Infectious Diseases*. 2021;73(5):e1029-e1044.

Staphylococcus aureus bacteremia

- Methicillin-Sensitive *Staphylococcus aureus* (MSSA)
 - Cefazolin 2 g IV q8h OR Nafcillin 2 g q4h PLUS ID consult
 - Note: **Vancomycin is NOT** recommended due to increased mortality and overall worse outcomes
- Methicillin-Resistant *Staphylococcus aureus* (MRSA)
 - Vancomycin per Pharmacy PLUS ID consult

Notes:

1. Repeat blood cultures (2 sets) every 24-48 hours until negative x48 hours. Discontinue cultures once negative x48 hours.
2. Remove any indwelling catheters
3. Obtain TTE. If prosthetic valve, or TTE negative and fever/ bacteremia not resolved in 48 hrs, obtain TEE.

Duration:

- Uncomplicated *Staph Aureus* Bacteremia: No metastatic infection, negative echocardiogram, no implanted prostheses, no fever within 72 hr of initiation of TARGETED antibiotics, and negative repeat blood cultures 2-4 days after initial positive while on targeted therapy.
 - 14 days of IV antibiotics generally recommended. ID consult recommended to determine duration and appropriateness of using highly bioavailable oral antibiotics in lieu of IV antibiotics.
- Complicated *Staph Aureus* Bacteremia: All other cases that do not meet uncomplicated criteria.
 - 4-6 weeks IV antibiotics from most recent negative blood culture. ID consult recommended to guide duration and oral antibiotic options when appropriate.

Urinary Tract Infections (UTI)

Notes:

1. Urine studies (Urinalysis/Urine cultures) should **NOT** be obtained in the absence of UTI symptoms. UTI symptoms include urgency, frequency, dysuria, suprapubic pain/tenderness.
 2. Elderly patients with altered mental status, s/p a fall, or with weakness, WITHOUT UTI symptoms, fever, or hemodynamic instability should NOT have urine studies obtained and should NOT receive antibiotics.
 3. Asymptomatic Bacteriuria (ASB) and Catheter-Associated Asymptomatic Bacteriuria (CA-ASB) should not be tested or treated for except for pregnancy or urologic procedures involving mucosal bleeding (i.e TURP). CA-ASB defined: $\geq 100,000$ CFU/ml, with or without pyuria in the absence of UTI signs or symptoms **should NOT be treated**. Pyuria in the absence of symptoms is NOT an indication for antibiotics.
- Uncomplicated UTI/ Cystitis: Urgency, frequency, dysuria, suprapubic pain/ tenderness in otherwise healthy, non-pregnant women
 - Nitrofurantoin 100 mg BID for 5 days OR trimethoprim-sulfamethoxazole (TMP/SMX) 160-800 mg PO BID for 3 days OR Cephalexin 500 mg BID for 3-7 days
 - Complicated UTI (cUTI) and Pyelonephritis: Infection in the presence of an anatomical abnormality AND/OR infection that has spread from the bladder to the kidneys
 - Community acquired: Ceftriaxone 1 g IV q24h
 - Hospital acquired: Cefepime 1 g q6h
 - Catheter-Associated UTI (CA-UTI): UTI signs/ symptoms AND $\geq 100,000$ CFU/ml AND pyuria
 - Cefepime 1 g q6h

Duration:

- Uncomplicated UTI: 3-7 days depending on agent used (see above)
- Pyelonephritis/ Complicated UTI: 5-14 days relative to agent used. (beta-lactams = 14 days, TMP/SMX = 14 days, levofloxacin = 5 days, ciprofloxacin = 7 days)
- Catheter-Associated UTI: 3-5 days in women ≤ 65 YO without upper urinary symptoms, after catheter removal. 7 days with swift symptom resolution. 10-14 days with delayed clinical response.

References:

1. Nicolle LE, Gupta K, Bradley SF, et al. Clinical practice guideline for the management of asymptomatic bacteriuria: 2019 update by the infectious diseases society of america. *Clinical Infectious Diseases*. Published online March 21, 2019.
2. Gupta K, Hooton TM, Naber KG, et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women: a 2010 update by the infectious diseases society of america and the european society for microbiology and infectious diseases. *Clinical Infectious Diseases*. 2011;52(5):e103-e120.
3. Hooton TM, Bradley SF, Cardenas DD, et al. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 international clinical practice guidelines from the infectious diseases society of america. *Clinical Infectious Diseases*. 2010;50(5):625-663.

Community-Acquired Bacterial Meningitis

Note:

1. In addition to blood cultures, an LP and a PCR of the CSF can be used to identify causative organisms.
 2. Dexamethasone MUST be started prior to or with the first antibiotic dose to be effective.
- Standard Therapy
 - Ceftriaxone 2 g IV q12h AND Vancomycin per Pharmacy PLUS Dexamethasone 10 mg IV q6h
 - When to add *Listeria monocytogenes* coverage?
 - If age >50 years old, pregnant, or immunosuppressed: ADD Ampicillin 2 g IV q4h
 - When to add Antiviral coverage?
 - If encephalopathy AND concern for HSV: ADD Acyclovir 10 mg/kg ideal body weight IV q8h

Duration:

- Dexamethasone indicated only for 2-4 days IF *Strep pneumococcus* or *H. influenzae* isolated. **STOP** if any other organism is identified.
- Duration is organism dependent: *N. meningitis* = 7-10 days, *H. influenzae* = 7-10 days, *S. pneumoniae* 10-14 days, *S. agalactiae* = 14-21 days, Enterobacteriaceae = 14-21 days, *L. monocytogenes* = 21 days, HSV = 14-28 days.

Reference: Tunkel AR, Hartman BJ, Kaplan SL, et al. Practice guidelines for the management of bacterial meningitis. *Clinical Infectious Diseases*. 2004;39(9):1267-1284.

Skin and Soft Tissue infections (SSTI)

Note: If covering MRSA, order **MRSA PCR-SSTI** and stop MRSA coverage if negative (MRSA PCR >97% negative predictive value)

- Nonpurulent Cellulitis:
 - Penicillin-G 4 million units q6h OR Cefazolin 2 g IV q8h
 - Duration: 5 days (extension to 10 days appropriate if not improved by day 5)
- Purulent Cellulitis:
 - Incision and Drainage + MRSA PCR-SSTI + Cefazolin 2 g IV q8h
 - If MRSA SSTI positive switch Cefazolin to Vanco per pharmacy
 - Duration: 5-10 days (7-14 days if febrile neutropenia patient)
- Abscess:
 - Standard: Incision and Drainage + MRSA PCR-SSTI + TMP/SMX 1-2DS PO q12h OR Doxycycline 100 mg PO q12h
 - Severe: Incision and Drainage + MRSA PCR-SSTI + Vancomycin per pharmacy monotherapy
 - Switch to Cefazolin 2 g IV q8h OR Cephalexin 500 mg PO q6h OR Dicloxacillin 500 mg PO q6h if MSSA
 - Duration: 5-10 days (7-14 days if febrile neutropenia patient)
- Decubitus Ulcer:
 - Wound care is crucial for the healing process.
 - Culture + MRSA SSTI PCR + Ceftriaxone 2 g IV q24h and Vancomycin per Pharmacy
 - When to add Pseudomonas coverage:
 - If pseudomonas present in recent culture (within 1 year) or patient has ≥ 3 of the risk factors below: Switch Ceftriaxone to Cefepime 1 g q6h, or Pip-Tazo 3.375 g Q8h
 - Pseudomonas risk factors (≥3): immunosuppression, non-ambulatory, tube feeding, gastric acid suppression (H2RA or PPI), hospitalization ≥2 days in the last 90 days, use of IV antibiotics in the last 90 days.
 - Discontinue Vancomycin if no MRSA/MRSE/Enterococcus
- Necrotizing Skin infections
 - Standard: Surgical intervention + Cultures AND MRSA SSTI PCR + Pip-Tazo 3.375 g IV q8h plus Clindamycin 600 mg IV q8h plus Vancomycin per pharmacy
 - Clindamycin is only used for toxin binding and should be limited to 3-5 days of therapy
 - If recent Severe Type I Penicillin allergy: Cefepime 1 g IV q6h + Metronidazole 500 mg IV q12h+ Linezolid 600 mg IV q12h
 - Linezolid used for toxin binding and MRSA coverage
 - Discontinue Vancomycin if MRSA PCR negative or no MRSA in cultures at 48 hours.

Diabetic Foot Infections (DFI)

Note: Empiric coverage of *Pseudomonas aeruginosa* is no longer recommended in all cases. Do NOT treat clinically uninfected foot ulcers with systemic or local antibiotic therapy when the goal is to reduce the risk of new infection or to promote ulcer healing.

- **Mild:** systemic signs only skin/tissue and erythema ≤ 2 cm. Target aerobic gram-positive pathogens only (beta-hemolytic streptococci and *Staphylococcus aureus* including methicillin-resistant strains if indicated).
 - Standard Therapy:
Cephalexin 500 mg PO every 6 hours OR Amox-Clav 875/125 mg PO every 12 hours
 - When to add MRSA coverage:
If recent history of MRSA → Order MRSA PCR (SSTI) AND
Add Doxycycline 100 mg PO every 12 hours OR TMP/SMX 2 DS PO every 12 hours
- **Moderate:** No systemic signs and only skin/tissue and erythema ≥ 2 cm, OR deeper (abscess, osteo, septic arthritis, and no SIRS). Obtain deep tissue or bone biopsy culture **BEFORE** antibiotics. Do **NOT** empirically target antibiotic therapy against *Pseudomonas aeruginosa* in cases of moderate DFI
 - Standard Therapy:
Amox-Clav 875 mg PO every 12 hours OR Amp-Sul 3 g IV every 6 hours OR Ceftriaxone 2g IV every 24 hours PLUS Metro 500mg IV every 12 hours
 - When to add Pseudomonas coverage
If it has been isolated in recent cultures (within 1 year) OR ≥ 3 of the risk factors below: immunosuppression, non-ambulatory, tube feeding, gastric acid suppression (H2RA or PPI), hospitalization ≥ 2 days in the last 90 days, use of **IV antibiotics** in the last 90 days.
Switch Ceftriaxone to Cefepime 1 g q6h, or Pip-Tazo 3.375 Q8h
 - When to add MRSA coverage:
If history of MRSA recent culture (within 1 year) with MRSA present, or patient has ≥ 2 risk factors: MRSA risk factors (≥ 2): Dialysis in past 30 days, recent MRSA history, congestive heart failure, hospitalization ≥ 2 days in the last 90 days, use of **IV antibiotics** in the last 90 days.
Order MRSA PCR - SSTI and ADD Vancomycin per pharmacy
Discontinue Vancomycin if MRSA NARES is negative
- **Severe:** Moderate criteria AND ≥ 2 SIRS. Obtain deep tissue or bone biopsy culture and MRSA PCR (SSTI) **BEFORE** antibiotics if possible. Do **NOT** empirically target antibiotic therapy against *Pseudomonas aeruginosa* in cases of severe DFI.
 - Standard Therapy:
Ceftriaxone 2g IV every 24 hours PLUS Metronidazole 500mg IV every 12 hours PLUS Vancomycin per pharmacy
 - When to add Pseudomonas coverage
See when to add pseudomonas coverage for moderate infections.
*Discontinue Vancomycin if no MRSA/MRSE/Enterococcus and de-escalate Cefepime and Pip-tazo to ceftriaxone and metronidazole if no pseudomonas

Reference: Éric Senneville, Zaina Albalawi, Suzanne A van Asten, Zulfiqarali G Abbas, Geneve Allison, Javier Aragón-Sánchez, John M Embil, Lawrence A Lavery, Majdi Alhasan, Orhan Oz, Ilker Uçkay, Vilma Urbančič-Rovan, Zhang-Rong Xu, Edgar J G Peters, IWGDF/IDSA Guidelines on the Diagnosis and Treatment of Diabetes-related Foot Infections (IWGDF/IDSA 2023), Clinical Infectious Diseases, 2023;, ciad527, <https://doi.org/10.1093/cid/ciad527>

Open Fracture- Antibiotic Prophylaxis

Type I and II: Clean wound <1 cm long OR laceration >1 cm long without extensive tissue damage

- Cefazolin 2 g IV q8h for 24 hours
- If contamination, treat as Type III based on type of contamination.

Type III: Open segmental fracture w/ extensive soft tissue damage OR traumatic amputation

- No gross contamination: Ceftriaxone 2 g IV q24h for 48 hours OR 24 hours after wound closure.
- Soil/ fecal contamination: Ceftriaxone 2 g IV q24h Plus Metronidazole 500 mg IV q12h for 48 hours after wound closure.
- If history of MRSA: Obtain MRSA SSTI PCR and add Vancomycin per Pharmacy.

Bone and Joint Infections

Note: In hemodynamically stable patients, consider holding antibiotics until deep tissue cultures can be obtained

Standard therapy:

- Ceftriaxone 2 g IV q24h Plus Vancomycin per pharmacy
 - Order MRSA SSTI PCR and stop MRSA coverage if negative.