2018 Allina Health Adult Inpatient Antibiotic Reference Guide

Endorsed by the Allina Health Infectious Diseases Physician/Pharmacy Task Force and Sepsis Leadership Team

Allina Health Beta-lactam Allergy Assessment Tool

Allina Health Antibiograms

Respiratory – Pneumonia

Condition	First Line Therapy	Second Line Therapy	Notes
Community-acquired pneumonia	Ceftriaxone 1 g IV q24h ***PLUS*** Azithromycin 500 mg PO/IV q24h	1) Levofloxacin 750 mg PO/IV q24h 2) Ceftriaxone 1 g IV q24h ***PLUS*** Doxycycline 100 mg PO/IV q12h 3) Ertapenem 1 g IV q24h ***PLUS*** Azithromycin 500 mg IV q24h – pregnancy AND cephalosporin allergy or severe penicillin allergy	• Ceftriaxone + doxycycline for patients with concern for prolonged QTc • Levofloxacin for patients with a cephalosporin allergy • Consider adding vancomycin for MRSA if: necrotizing/cavitary infiltrates, empyema, or requires ICU admission • Duration of treatment should be a minimum of 5 days. Patient should be afebrile for 48-72 hours before discontinuation of therapy.
Hospital-acquired pneumonia • Pneumonia not incubating at the time of hospital admission, occurring ≥48 hours after admission, and not associated with mechanical ventilation	Cefepime 2 g IV q8h ***PLUS*** Vancomycin IV Pharmacy to Dose *Double antipseudomonal/gram-negative coverage criteria met*:* Cefepime 2 g IV q8h ***PLUS*** Ciprofloxacin 400 mg IV q8h OR Ciprofloxacin 750 mg PO q12h ***PLUS*** Vancomycin IV Pharmacy to Dose	Imipenem-cilastatin 500 mg IV q6h ***PLUS*** Vancomycin IV Pharmacy to Dose *Double antipseudomonal/gram-negative coverage criteria met*:* Imipenem-cilastatin 500 mg IV q6h ***PLUS*** Ciprofloxacin 400 mg IV q8h OR Ciprofloxacin 750 mg PO q12h ***PLUS*** Vancomycin IV Pharmacy to Dose	• Imipenem-cilastatin if cephalosporin allergy or severe penicillin allergy • Aminoglycoside for patients with concern for prolonged QTc • 7 days of antibiotic therapy recommended • *Double antipseudomonal/gram-negative coverage with two agents from a different class (β-Lactam + non- β-Lactam) if: IV antibiotic use within 90 days, septic shock, ventilatory support required due to HAP, bronchiectasis, cystic fibrosis
Ventilator-associated pneumonia • Pneumonia occurring >48 hours after endotracheal intubation	Cefepime 2 g IV q8h ***PLUS*** Vancomycin IV Pharmacy to Dose *Double antipseudomonal/gram-negative coverage criteria met*:* Cefepime 2 g IV q8h ***PLUS*** Ciprofloxacin 400 mg IV q8h ***PLUS*** Vancomycin IV Pharmacy to Dose	Imipenem-cilastatin 500 mg IV q6h ***PLUS*** Vancomycin IV Pharmacy to Dose *Double antipseudomonal/gram-negative coverage criteria met*:* Imipenem-cilastatin 500 mg IV q6h ***PLUS*** Ciprofloxacin 400 mg IV q8h ***PLUS*** Vancomycin IV Pharmacy to Dose	• Imipenem-cilastatin if cephalosporin allergy or severe penicillin allergy • Aminoglycoside for patients with concern for prolonged QTc • 7 days of antibiotic therapy recommended • *Double antipseudomonal/gram-negative coverage with two agents from a different class (β-Lactam + non- β-Lactam): if IV abx use within 90 days, septic shock, ARDS preceding VAP, ≥5 days hospitalization prior to VAP, acute renal replacement therapy prior to VAP, unit where >10% of gram-negative isolates are resistant to monotherapy, bronchiectasis, cystic fibrosis
Aspiration pneumonia	Ampicillin-sulbactam 3 g IV q6h ***Severe Sepsis/Septic Shock:*** Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours	1) Ceftriaxone 1 g IV q24h 2) Ertapenem 1 g IV q24h ***Severe Sepsis/Septic Shock:*** Imipenem-cilastatin 500 mg IV q6h	• Ceftriaxone if mild-moderate penicillin allergy; Ertapenem if cephalosporin allergy or severe penicillin allergy • 7 days of antibiotic therapy recommended • Healthcare-acquired aspiration pneumonia should follow the recommendations for HAP above

Genitourinary

Condition	First Line Therapy	Second Line Therapy	Notes
Uncomplicated cystitis	1) Ceftriaxone 1 g IV q24h 2) Nitrofurantoin* 100 mg PO q12h 3) Cephalexin 500 mg PO q12h	1) Ertapenem 1 g IV q24h 2) Gentamicin IV Pharmacy to Dose 3) Ciprofloxacin 250 mg po q12h 4) SMX/TMP DS po q12h	• Strongly recommend AGAINST treatment of asymptomatic bacteriuria in most patients • Add vancomycin IV for MRSA and Enterococcus coverage (if patient has Foley catheter, urinary stents, or <7 days urinary instrumentation) • *Nitrofurantoin recommended in females with CrCl>40 mL/min and males with CrCl >60 ml/min • ↑ E. coli resistance to Cipro (15-23%), SMX/TMP (20-25%), Ampicillin (41-46%) • Avoid ciprofloxacin, gentamicin & SMX/TMP in pregnancy and warfarin • Ertapenem if cephalosporin allergy, severe penicillin allergy or history of ESBL organism • Usual duration depends on severity and choice of agent and dose
Pyelonephritis (uncomplicated)	Ceftriaxone 1 g IV q24h	1) Ertapenem 1 g IV q24h 2) Gentamicin IV Pharmacy to Dose	
Complicated Cystitis • Men, pregnant, functional abnormality, immunocompromised, indwelling or recent catheter/stent	Ceftriaxone 1 g IV q24h ***Severe Sepsis or Septic Shock:*** Cefepime 2 g IV q8h	Ertapenem 1 g IV q24h ***Severe Sepsis or Septic Shock:*** Imipenem-cilastatin 500 mg IV q6h	

Skin/Soft Tissue

Condition	First Line Therapy	Second Line Therapy	Notes
Cellulitis	Cefazolin 1-2 g IV q8h • 1g if ≤ 80 kg • 2g if > 80 kg	Vancomycin IV Pharmacy to Dose	• Vancomycin if cephalosporin or severe penicillin allergy, cephalosporin allergy, abscess or purulence • Elevation of infected area is recommended • Recommended duration of antibiotic therapy is 5 days, but can be extended if not improved (up to 14 days)
Necrotizing skin & soft tissue infection	Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours ***PLUS*** Vancomycin IV Pharmacy to Dose ***PLUS*** Clindamycin 600 mg IV q8h	Imipenem-cilastatin 500 mg IV q6h ***PLUS*** Vancomycin IV Pharmacy to Dose ***PLUS*** Clindamycin 600 mg IV q8h	• Imipenem-cilastatin if cephalosporin or severe penicillin allergy • Surgery and ID should be consulted • Consider clindamycin 900 mg if confirmed or suspected Streptococcal toxic shock
Diabetic foot infection - Moderate • Local infection with erythema >2 cm, or involving structures deeper than skin and subcutaneous tissue and no systemic inflammatory response signs	Ampicillin-sulbactam 3 g IV q6h	Ertapenem 1 g IV q24h	• Ertapenem if severe penicillin allergy • Treatment must include wound care • Usual duration is 1-3 weeks. Antibiotics can be discontinued once clinical signs and symptoms have resolved
Diabetic foot infection - Severe • Local infection with the signs of SIRS, as manifested by ≥2 of the following: ○ Temperature >38°C or <36°C ○ Heart rate >90 beats/min ○ Respiratory rate >20 breaths/min ○ WBC >12,000 or <4,000	1) Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours ***PLUS*** Vancomycin IV Pharmacy to Dose 2) Cefepime 2 g IV q8h ***PLUS*** Metronidazole 500 mg IV q12h ***PLUS*** Vancomycin IV Pharmacy to Dose	Imipenem-cilastatin 500 mg IV q6h ***PLUS*** Vancomycin IV Pharmacy to Dose	• Imipenem-cilastatin if severe penicillin allergy • Treatment must include wound care • Usual duration is 2-4 weeks. Antibiotics can be discontinued once clinical signs and symptoms have resolved

Intra-Abdominal

Condition	First Line Therapy	Second Line Therapy	Notes
Community-acquired acute biliary infections – Mild to Moderate	Ceftriaxone 1g IV q24h	Ertapenem 1 g IV q24	• Ertapenem if cephalosporin allergy • Discontinue antibiotics within 24 hours s/p cholecystectomy unless infection outside gallbladder • Duration of therapy should be limited to 4–7 days, unless difficult to achieve adequate source control • Ampicillin-sulbactam not recommended due to high *E. coli* resistance rates • Use fluoroquinolones with caution due to increasing *E. coli* resistance (77% susceptible ANW antibiogram)
Community-acquired acute biliary infections – Severe (severe physiologic disturbance, advanced age (>70 years), immunocompromised) *OR* **Acute cholangitis following bilio-enteric anastomosis of any severity**	1) Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours 2) Cefepime 2 g IV q8h ***PLUS*** Metronidazole 500 mg IV q12h	Imipenem-cilastatin 500 mg IV q6h	• Imipenem-cilastatin if cephalosporin allergy or severe penicillin allergy • Discontinue antibiotics within 24 hours s/p cholecystectomy unless infection outside gallbladder • Duration of therapy should be limited to 4–7 days, unless difficult to achieve adequate source control
Extra-biliary infections – Mild to Moderate	Ceftriaxone 1-2 g IV q24h ***PLUS*** Metronidazole 500 mg IV q12h	Ertapenem 1 g IV q24h	• Ertapenem if cephalosporin allergy • Discontinue antibiotics within 24 hours s/p appendectomy unless evidence of perforation, abscess, or local peritonitis • Duration of therapy should be limited to 4–7 days, unless difficult to achieve adequate source control • Antibiotics are NOT recommended for pancreatitis unless necrotizing
Extra-biliary infections – Severe (severe physiologic disturbance, advanced age (>70 years), immunocompromised)	1) Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours 2) Cefepime 2 g IV q8h ***PLUS*** Metronidazole 500 mg IV q12h	Imipenem-cilastatin 500 mg IV q6h	• Imipenem-cilastatin if severe penicillin allergy
Health care-associated intra-abdominal infections (biliary and extra-biliary)	1) Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours 2) Cefepime 2 g IV q8h ***PLUS*** Metronidazole 500 mg IV q12h	Imipenem-cilastatin 500 mg IV q6h	• Add vancomycin for MRSA coverage if following criteria met: known colonization/previous treatment failure or significant antibiotic exposure • Imipenem-cilastatin if cephalosporin allergy or severe penicillin allergy • Discontinue antibiotics within 24 hours s/p cholecystectomy unless infection outside gallbladder • Discontinue antibiotics within 24 hours s/p appendectomy unless evidence of perforation, abscess, or local peritonitis • Duration of therapy should be limited to 4–7 days, unless difficult to achieve adequate source control

Neutropenic Fever

Condition	First Line Therapy	Second Line Therapy	Notes
Neutropenic Fever • Single oral temp ≥ 38.3C (101F) or if hypothermic with temp < 35 C (95F). Neutropenia is a neutrophil count < 500 cells/mm.	Cefepime 2 g IV q8h	Imipenem 500 mg IV q6h	• Imipenem for if severe penicillin or cephalosporin allergy, h/o ESBL, failing broad-spectrum antibiotics, or high risk for multidrug resistant organism (intubated > 48 hours, h/o MDRO, nursing facility or > 3 days in hospital in past 90 days, previous exposure to broad-spectrum antibiotics in past 90 days)

Gastrointestinal/Infectious Diarrhea

Condition	First Line Therapy	Notes
Clostridium Difficile	Vancomycin 125 mg PO q6h x10 days	▪ Repeat testing is not recommended ▪ 1st reoccurrence: If metronidazole used for initial episode, then use vancomycin 125 mg PO QID x 10 days. If initially treated with vancomycin, then vancomycin again with prolonged tapered and pulsed vancomycin regimen ▪ ≥2 reoccurrences: Vancomycin in a tapered and pulsed regimen. Refer to ID or GI provider. • See Sanford guide or IDSA Clostridium difficile guidelines for tapered and pulsed regimen • 14 days may be considered for patients who have not achieved symptom resolution at 10 days • Rectal vancomycin may be required if complete ileus or unable to tolerate PO
Clostridium Difficile – Fulminant (hypotension or shock, ileus, megacolon)	Metronidazole 500 mg IV q8h ***PLUS*** Vancomycin 500 mg PO q6h	

Obstetric and Gynecologic

Condition	First Line Therapy	Second Line Therapy	Notes
Chorioamnionitis/ Intra-amniotic infection	Ampicillin-sulbactam 3 g IV q6h **Severe Sepsis/Septic Shock:** Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours	Ertapenem 1 g IV q24h **Severe Sepsis/Septic Shock:** Imipenem-cilastatin 500 mg IV q6h	• Ertapenem if severe penicillin allergy • Cesarean delivery – one additional dose after delivery Vaginal delivery –discontinue after delivery • Add vancomycin for MRSA coverage if healthcare acquired and following criteria met: known colonization/previous treatment failure or significant antibiotic exposure
Post-partum Endometritis	Ampicillin-sulbactam 3 g IV q6h **Severe Sepsis/Septic Shock:** Piperacillin-tazobactam 4.5 g IV x 1 over 30 minutes, followed by 3.375 g IV q8h over 4 hours	Ertapenem 1 g IV q24h **Severe Sepsis/Septic Shock:** Imipenem-cilastatin 500 mg IV q6h	• Ertapenem if severe penicillin allergy • Continue IV until afebrile for 24-48 hrs and no fundal tenderness • Add vancomycin for MRSA coverage if healthcare acquired and following criteria met: known colonization/previous treatment failure or significant antibiotic exposure

Central Nervous System

Condition	First Line Therapy	Second Line Therapy	Notes
Meningitis – community acquired	Acyclovir 10 mg/kg (IBW) IV q8h ***PLUS*** Ceftriaxone 2 g IV q12h ***PLUS*** Vancomycin IV Pharmacy to Dose ***ADD Ampicillin 2 g IV q4h*** *if age >50, solid organ transplant or on steroids for ≥1 month (≥20 mg of prednisone or equivalent)*	Acyclovir 10 mg/kg (IBW) IV q8h ***PLUS*** Meropenem 2 g IV q8h ***PLUS*** Vancomycin IV Pharmacy to Dose	• Meropenem if cephalosporin allergy or severe penicillin allergy • Duration of therapy based on isolated pathogen: ○ *Neisseria meningitides* x7 days ○ *Haemophilus influenza* x7 days ○ *Streptococcus pneumonia* x10-14 days ○ Aerobic gram-negative bacilli 21 days ○ *Listeria monocytogenes* ≥21 days ○ *Staphylococcus aureus* x14 days

Meningitis – nosocomial/CSF shunt	Cefepime 2 g IV q8h ***PLUS*** Vancomycin IV Pharmacy to Dose	Meropenem 2 g IV q8h ***PLUS*** Vancomycin IV Pharmacy to Dose	• Meropenem if cephalosporin allergy or severe penicillin allergy • Usual duration of therapy 10-14 days

Ear/Nose/Throat

Condition	First Line Therapy	Second Line Therapy	Notes
Rhinosinusitis	Amoxicillin-clavulanic acid 875 mg PO BID	Levofloxacin 500 mg PO daily	• Antibiotics not recommended as most cases are viral • May be bacterial if all of the following are met: persistent symptoms (≥ 10 days), high fever (≥ 39 °C) and purulent nasal discharge or facial pain for 3-4 consecutive days, Worsening signs or symptoms • Levofloxacin if severe penicillin allergy • Usual duration 5-7 days