

Severe Sepsis and Septic Shock Antibiotic Guide

Table 1: Antibiotic selection options for healthcare associated and/or immunocompromised patients

- **Healthcare associated:** intravenous therapy, wound care, or intravenous chemotherapy within the prior 30 days, residence in a nursing home or other long-term care facility, hospitalization in an acute care hospital for two or more days within the prior 90 days, attendance at a hospital or hemodialysis clinic within the prior 30 days
- **Immunocompromised:** Receiving chemotherapy, known systemic cancer not in remission, ANC <500, severe cell-mediated immune deficiency

Table 2: Antibiotic selection options for community acquired, immunocompetent patients

Table 3: Antibiotic selection options for patients with simple sepsis, community acquired, immunocompetent patients requiring hospitalization.

Risk Factors for Select Organisms

P. aeruginosa (and other resistant GNR)	MRSA	Invasive Candidiasis	VRE
<p>Community acquired:</p> <ul style="list-style-type: none"> • Prior IV antibiotics within 90 day • Known colonization with MDROs <p>Hospital acquired:</p> <ul style="list-style-type: none"> • Prior IV antibiotics within 90 days • 5 or more days of hospitalization prior to onset • Acute renal replacement therapy prior to onset • Septic shock • Known colonization with MDROs 	<ul style="list-style-type: none"> • Known colonization with MDROs • Recent MRSA infection • Known MRSA colonization • Skin & Skin Structure and/or IV access site: <ul style="list-style-type: none"> ◆ Purulence ◆ Abscess • Pneumonia <ul style="list-style-type: none"> ◆ Severe, rapidly progressive necrotizing pneumonia ◆ Note: absence of nasal colonization is strong evidence against MRSA pneumonia 	<ul style="list-style-type: none"> • Central venous catheter • Broad-spectrum antibiotics • + 1 of the following risk factors: <ul style="list-style-type: none"> ◆ Parenteral nutrition ◆ Dialysis ◆ Recent abdominal surgery ◆ Necrotizing Pancreatitis ◆ Systemic steroids or other immunosuppressive agents 	<ul style="list-style-type: none"> • Liver transplant • Known colonization • Prolonged broad antibacterial therapy • Prolonged profound immunosuppression

Antibiotic Allergies

Penicillin allergy (life-threatening):

- Substitute with aztreonam (except those with a history of type I hypersensitivity reaction to CEFTAZIDIME)
- If there is a history of type I immediate hypersensitivity (e.g., urticaria, angioedema, anaphylaxis, bronchospasm), substitute aztreonam for piperacillin/tazobactam, meropenem, or cefepime (unless the reaction was to ceftazidime). For a history of other serious reactions (Type II, III, or IV – e.g., hemolytic anemia, thrombocytopenia, serum sickness, erythema multiforme, SJS/TEN, DRESS, etc), avoid the specifically implicated drug, but others in the class may be used, except for cephalosporins with same R group side chains. If a beta-lactam agent is preferred, may consider consulting Allergy & Immunology for consideration of graded challenge, de-sensitization, or to rule out possible drug allergies when the patient is clinically stable.

Fluoroquinolone allergy:

- If there is a history of an immediate reaction to one fluoroquinolone, avoid use of any of the class.

Vancomycin allergy:

- Avoid if there is a history of bullous reaction, or of associated thrombocytopenia. If there is a history of possible immediate reaction or macular skin reactions, carefully assess the history. If the reaction involved flushing, pruritus, or urticaria, then, premedicate with an antihistamine (diphenhydramine or hydroxyzine) and acetaminophen, hold/reduce opiates (if possible), and infuse at ½ or 1/3 rate over 2-3 hours.

Table 1: Antibiotic selection options for healthcare associated and/or immunocompromised patients with severe sepsis/septic shock

Severe Sepsis or Septic Shock (Healthcare associated OR Immunocompromised)	Antibacterial A (Select one of the following)	Antibacterial B (Select one of the following)	+/- Antibacterial C (Select one of the following)	+/- Antifungal
Undifferentiated or Vascular Access Device Infection	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Cefepime 2g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion – if at risk for ESBL infection • Aztreonam 2g IV q8h 	<ul style="list-style-type: none"> • Vancomycin Loading Dose + vancomycin 15mg/kg • Linezolid 600mg IV q12h - if at risk of VRE infection 	Tobramycin 7mg/kg IV Q24H - if at risk of P. aeruginosa infection	Caspofungin 70mg IV ONCE + caspofungin 50 mg IV Q24H - if at risk of invasive candidiasis
Pneumonia	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion – if at risk for ESBL infection • Cefepime 2g IV Q8H extended infusion • Aztreonam 2g IV q8h 	<ul style="list-style-type: none"> • Vancomycin Loading Dose + vancomycin 15mg/kg • Linezolid 600mg IV Q12H <p><u>PLUS</u></p> <ul style="list-style-type: none"> • Levofloxacin 750mg IV Q24H • <u>If fluoroquinolone allergy:</u> Azithromycin 500mg IV Q24H <u>plus</u> Tobramycin 7mg/kg IV Q24H - if at risk of P. aeruginosa infection 		
Urinary Tract Infection	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion – if at risk for ESBL infection • Aztreonam 2g IV q8h 	<ul style="list-style-type: none"> • Vancomycin Loading Dose + vancomycin 15mg/kg • Linezolid 600mg IV Q12H - if at risk of VRE infection 	+/- Tobramycin 5mg/kg IV Q24H - if at risk of P. aeruginosa infection	
Intra-Abdominal Infection	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion – if at risk for ESBL infection • Cefepime 2g IV Q8H extended infusion <u>plus</u> Metronidazole 500mg IV Q8H • Aztreonam 2g iv q8h <u>plus</u> Metronidazole 500mg iv q8h 	<ul style="list-style-type: none"> • Vancomycin Loading Dose + vancomycin 15mg/kg • Linezolid 600mg IV q12h - if at risk of VRE infection⁵ 		Caspofungin 70mg IV ONCE + caspofungin 50 mg IV Q24H - if at risk of invasive candidiasis

Severe Sepsis or Septic Shock (Healthcare associated OR Immunocompromised)	Antibacterial A (Select one of the following)	Antibacterial B (Select one of the following)	+/- Antibacterial C (Select one of the following)	+/- Antifungal
Skin/Skin Structure Infection – Pure cellulitis	Vancomycin Loading Dose + vancomycin 15mg/kg	Cefazolin 2g IV Q8H		
Skin/Skin Structure Infection with Special Risks (Special Risks: malignancy on chemotherapy, neutropenia, severe cell- mediated immunodeficiency, immersion injuries, animal bites, diabetic foot ulcer)	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion – if at risk for ESBL infection • Cefepime 2g IV Q8H extended infusion <u>plus</u> Metronidazole 500mg IV Q8H • Aztreonam 2g iv q8h <u>plus</u> Metronidazole 500mg iv q8h 	Vancomycin Loading Dose + vancomycin 15mg/kg		
Necrotizing Fasciitis (including Fournier’s Gangrene), Clostridial Gas Gangrene or Myonecrosis	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion – if at risk for ESBL infection • Cefepime 2g IV Q8H extended infusion <u>plus</u> Metronidazole 500mg IV Q8H • Aztreonam 2g iv Q8H <u>plus</u> Metronidazole 500mg iv q8h 	<ul style="list-style-type: none"> • Vancomycin Loading Dose + vancomycin 15mg/kg • Linezolid 600mg IV Q12H 	± Clindamycin 600mg IV Q8H (use in combination with vancomycin for toxin suppression)	
Bacterial Meningitis – “Spontaneous”	Ceftriaxone 2g IV Q12H	Vancomycin Loading Dose + vancomycin 15mg/kg	<ul style="list-style-type: none"> • Ampicillin 2g IV Q4H (>50 year of age OR immunocompromised) • <u>If penicillin allergy:</u> Meropenem 2g IV Q8H extended infusion 	
Bacterial Meningitis – Post-Trauma or Neurosurgery	<ul style="list-style-type: none"> • Cefepime 2g iv q8h extended infusion • Meropenem 2g IV Q8H extended infusion • Aztreonam 2g iv Q8H <u>plus</u> Ciprofloxacin 400mg IV Q8H 	Vancomycin Loading Dose + vancomycin 15mg/kg		

Table 2: Antibiotic selection options for community acquired, immunocompetent patients with severe sepsis/septic shock

Severe Sepsis or Septic Shock (Community acquired AND Immunocompetent)	Antibacterial A (Select one of the following)	Antibacterial B (Select one of the following)	+/- Antibacterial C (Select one of the following)
Undifferentiated	<ul style="list-style-type: none"> • Ertapenem 1g IV q24h • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Cefepime 2g IV Q8H extended infusion • Aztreonam 2g IV Q8H 	Vancomycin Loading Dose + vancomycin 15mg/kg	
Pneumonia	<ul style="list-style-type: none"> • Ceftriaxone 2g IV q24H <u>plus</u> Azithromycin 500mg IV q24h • Ceftriaxone 2g IV q24H <u>plus</u> Doxycycline 100mg IV Q12H • Levofloxacin 750mg IV q24h 		+/- Vancomycin Loading Dose (existing EPIC entry) + vancomycin 15mg/kg
Urinary Tract Infection	<ul style="list-style-type: none"> • Ertapenem 1g IV q24h • Aztreonam 2g iv q8h 	Vancomycin Loading Dose + vancomycin 15mg/kg (Especially if GPC on Gram stain of urine)	
Intra-Abdominal Infection	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Ertapenem 1g IV q24h • Aztreonam 2g iv q8h <u>plus</u> Metronidazole 500mg iv q8h 	Vancomycin Loading Dose + vancomycin 15mg/kg	
Skin/Skin Structure Infection – Pure cellulitis	<ul style="list-style-type: none"> • Cefazolin 2g IV Q8H 	Vancomycin Loading Dose + vancomycin 15mg/kg	
Skin/Skin Structure Infection with Special Risks (Special Risks: malignancy on chemotherapy, neutropenia, severe cell-mediated immunodeficiency, immersion injuries, animal bites, diabetic foot ulcer)	<ul style="list-style-type: none"> • Piperacillin-tazobactam 4.5g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion • Cefepime 2g IV Q8H extended infusion + Metronidazole 500mg IV Q8H • Aztreonam 2g IV Q8H <u>plus</u> Metronidazole 500mg IV Q8H 	Vancomycin Loading Dose + vancomycin 15mg/kg	
Bacterial Meningitis – “Spontaneous”	Ceftriaxone 2g IV q12h	Vancomycin Loading Dose + vancomycin 15mg/kg	Ampicillin 2g IV Q4H (>50 years of age)

Table 3: Antibiotic selection options for patients with simple sepsis, community acquired, immunocompetent patients requiring hospitalization.

Simple Sepsis (Community Acquired)	Antibiotic A (Select one of the following)	Antibiotic B (Select one of the following)	+/- Antibiotic C (Select one of the following)
Undifferentiated	<ul style="list-style-type: none"> • Ceftriaxone 2g IV q24h • Levofloxacin 750mg IV Q24H 		
Pneumonia	<ul style="list-style-type: none"> • Ceftriaxone 1g IV Q24H <u>plus</u> Azithromycin 500mg IV q24h • Ceftriaxone 1g IV q24H <u>plus</u> Doxycycline 100mg IV Q12H • Levofloxacin 750mg IV Q24H 		
Urinary Tract Infection	<ul style="list-style-type: none"> • Ceftriaxone 1g IV Q24H • Ciprofloxacin 400mg IV Q12H 		
Intra-abdominal Infection	<ul style="list-style-type: none"> • Ceftriaxone 1g IV Q24H • Ciprofloxacin 400mg IV Q12H 	Metronidazole 500mg IV Q8H	
Skin/Skin Structure Infection – Pure cellulitis	Cefazolin 2g IV Q8H	Vancomycin Loading Dose + vancomycin 15mg/kg	
Skin/Skin Structure Infection with Special Risks (Special Risks: malignancy on chemotherapy, neutropenia, severe cell-mediated immunodeficiency, immersion injuries, animal bites, diabetic foot ulcer)	<ul style="list-style-type: none"> • Piperacillin-tazobactam 3.375g IV Q8H extended infusion • Meropenem 1g IV Q8H extended infusion • Cefepime 1g IV Q6H <u>plus</u> Metronidazole 500mg IV Q8H 	Vancomycin Loading Dose + vancomycin 15mg/kg	
Bacterial Meningitis – “Spontaneous”	Ceftriaxone 2g IV q12h	Vancomycin Loading Dose + vancomycin 15mg/kg	Ampicillin 2g IV Q4H (>50 years of age)

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Stan Deresinski, MD: 11/2013

Jose Montoya, MD: 11/2013

Emily Mui, PharmD, BCPS: 11/2013

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Marisa Holubar, MD 05/2017

Lina Meng, PharmD, BCPS, BCCCP: 05/2017

Emily Mui, PharmD: 05/2017

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