# 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 prednisolone >15 mg/day, endoxan, chemotherapy, known systemic cancer not in remission, ANC <500, post transplantation, 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.**

***Extended infusion: to maximize the time above MIC**

**- Use where there's adequate nursing resource and equipment for prolonged drug infusion**

**- Use in selected cases with high severity of illness**

Start with a full loading dosage regardless of the renal function for all patients (No need for renal adjustment in the first 2-3 days)

a) meropenem 1gm x1 (over 30 min), then 1g q8h (over 3 hours) starting 8 hours after bolus OR
Piperacillin-tazobactam 4.5g x1 (over 30 min), then 4.5g q6h (over 4 hours) starting 6 hours after bolus

b) If pt already received a bolus dose, time subsequent doses accordingly (not necessary to re-bolus)

**Vancomycin** Loading Dose 20-25 mg/kg, followed by 15-20 mg/kg Q8-12H using **Actual Body Weight (ABW)**

**Risk Factors for Select Organisms**

| *P. aeruginosa* (and other resistant GNR) | MRSA | Invasive Candidiasis |
|---|---|---|
| Community acquired:<br>• Prior IV antibiotics within 90 day<br>• Known colonization with MDROs<br><br>Hospital acquired:<br>• Prior IV antibiotics within 90 days<br>• 5 or more days of hospitalization prior to onset<br>• Acute renal replacement therapy prior to onset<br>• Septic shock<br>• Known colonization with MDROs | • Recent MRSA infection<br>• Known MRSA colonization<br>• Skin & Skin Structure and/or IV access site:<br>Purulence<br>Abscess<br>• Severe, rapidly progressive necrotizing pneumonia | • Central venous catheter<br>• Broad-spectrum antibiotics<br>• + 1 of the following risk factors:<br>• Parenteral nutrition<br>• Dialysis<br>• Recent abdominal surgery<br>• Necrotizing Pancreatitis<br>• Systemic steroids or other immunosuppressive agents |

**Antibiotic Allergies**

**Penicillin allergy (life-threatening)**:

- If there is a history of type I immediate hypersensitivity (e.g., urticaria, angioedema, anaphylaxis, bronchospasm), substitute withpiperacillin/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.

**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 septic shock**

| Septic Shock<br>(Healthcare associated OR Immunocompromised) | Antibacterial A<br>(Select one of the following) | PLUS Antibacterial B<br>(Select one of the following) |
|---|---|---|
| **Undifferentiated** | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Cefepime** 2g IV Q8H<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection | ± **Amikacin** 15mg/kg IV Q24H |
| **Pneumonia** | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection<br>•**Cefepime** 2g IV Q8H | •**Azithromycin** 500mg PO/IV Q24H if at risk of *P. aeruginosa* infection plus Amikacin 15mg/kg IV Q24H if at risk of *A. baumannii* infection plus Colistin 300 mg IV then 150 mg IV Q12H |
| **Urinary Tract Infection** | •**Meropenem** 1g IV Q8H extended infusion*<br>•**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion* | |
| **Intra-Abdominal Infection** | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection<br>•**Cefepime** 2g IV Q8H **PLUS Metronidazole** 500mg IV Q8H | |
| **Vascular Access Device Infection** | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Cefepime** 2g IV Q8H<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection | •**Vancomycin** Loading Dose + vancomycin 15mg/kg |

| **Septic Shock**<br>**(Healthcare associated OR Immunocompromised)** | **Antibacterial A**<br>**(Select one of the following)** | **PLUS Antibacterial B**<br>**(Select one of the following)** |
|---|---|---|
| **Skin/Skin Structure Infection – Pure cellulitis** | •**Vancomycin** Loading Dose + vancomycin 15mg/kg | •**Cefazolin** 2g IV Q8H |
| **Skin/Skin Structure Infection with Special Risks**<br>(Special Risks: malignancy on chemotherapy, neutropenia, severe cell-mediated immunodeficiency, immersion injuries, animal bites, diabetic foot ulcer) | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection<br>•**Cefepime** 2g IV Q8H<br>**PLUS Metronidazole** 500mg IV Q8H | •**Vancomycin** Loading Dose + vancomycin 15mg/kg |
| **Necrotizing Fasciitis (including Fournier's Gangrene), Clostridial Gas Gangrene or Myconecrosis** | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection<br>•**Cefepime** 2g IV Q8H<br>**PLUS Metronidazole** 500mg IV Q8H | •**Vancomycin** Loading Dose + vancomycin 15mg/kg<br>± **Clindamycin** 600mg IV Q8H (use in combination with vancomycin for toxin suppression) |
| **Bacterial Meningitis –** "Spontaneous" | •**Ceftriaxone** 2g IV Q12H | •**Ampicillin** 2g IV Q4H (>50 year of age OR immunocompromised)<br>•If penicillin allergy: **Meropenem** 2g IV Q8H extended infusion* |
| **Bacterial Meningitis – Post-Trauma or Neurosurgery** | •**Cefepime**2g IV Q8H<br>•**Meropenem**2g IV Q8H extended infusion* – if at risk for ESBL infection | •**Vancomycin** Loading Dose + vancomycin 15mg/kg |

**Table 2: Antibiotic selection options for community acquired, immunocompetent patients with septic shock**

| **Septic Shock**<br>**(Community acquired AND Immunocompetent)** | **Antibacterial A**<br>**(Select one of the following)** | **PLUS Antibacterial B**<br>**(Select one of the following)** |
|---|---|---|
| **Undifferentiated** | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Cefepime** 2g IV Q8H<br><br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection | ± **Amikacin** 15mg/kg IV Q24H |
| **Pneumonia** | •**Ceftriaxone** 2g IV q24H | •**Azithromycin** 500mg PO/IV Q24H |
| **Urinary Tract Infection** | •**Ertapenem** 1g IV q24h | |
| **Intra-Abdominal Infection** | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Ertapenem** 1g IV q24h | |
| **Skin/Skin Structure Infection – Pure cellulitis** | •**Cefazolin** 2g IV Q8H | |
| **Skin/Skin Structure Infection with Special Risks**<br>(Special Risks: malignancy on chemotherapy, neutropenia, severe cell-mediated immunodeficiency, immersion injuries, animal bites, diabetic foot ulcer) | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection<br>•**Cefepime** 2g IV Q8H<br>**PLUS Metronidazole** 500mg IV Q8H | •**Vancomycin** Loading Dose + vancomycin 15mg/kg<br>± **Clindamycin** 600mg IV Q8H (use in combination with vancomycin for toxin suppression) |
| **Bacterial Meningitis –** "Spontaneous" | •**Ceftriaxone** 2g IV Q12H | •**Ampicillin** 2g IV Q4H (>50 year of age) |

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

| Sepsis<br>(Community acquired) | Antibacterial A<br>(Select one of the following) | PLUS Antibacterial B<br>(Select one of the following) |
|---|---|---|
| **Undifferentiated** | •**Ceftriaxone** 2g IV q24h | |
| **Pneumonia** | •**Ceftriaxone** 2g IV q24H | •**Azithromycin** 500mg PO/IV Q24H |
| **Urinary Tract Infection** | •**Ceftriaxone** 1g IV q24h | |
| **Intra-Abdominal Infection** | •**Ceftriaxone** 1g IV q24h | •**Metronidazole** 500mg IV Q8H |
| **Skin/Skin Structure Infection – Pure cellulitis** | •**Cefazolin** 2g IV Q8H | |
| **Skin/Skin Structure Infection with Special Risks**<br>(Special Risks: malignancy on chemotherapy, neutropenia, severe cell-mediated immunodeficiency, immersion injuries, animal bites, diabetic foot ulcer) | •**Piperacillin-tazobactam** 4.5g IV Q6H extended infusion*<br>•**Meropenem** 1g IV Q8H extended infusion* – if at risk for ESBL infection<br>•**Cefepime**2g IV Q8H<br>**PLUS Metronidazole** 500mg IV Q8H | |
| **Bacterial Meningitis –** "Spontaneous" | •**Ceftriaxone** 2g IV Q12H | •**Ampicillin** 2g IV Q4H (>50 year of age) |