Purpose: To guide appropriate antimicrobial use and decrease microbial resistance on the trauma service

Background: Appropriate empiric therapy is critical for decreasing mortality associated with severe infections. Empiric regimens should be chosen based on local antibiograms, common bacteria associated with the suspected infection, and patient specific factors. Rotation of antimicrobials is not currently recommended by the IDSA as a strategy to reduce antibiotic resistance, as data do not support its use. Guidelines for empiric antimicrobial utilization and dosing and appropriate de-escalation strategies such as MRSA nasal PCR screening allow for hospitals to optimize treatments of infections.

Components:

- **Prophylactic Antibiotics** *(see respective PMGs)*
  - Duration: ≤ 24h
  - Narrow spectrum antibiotics
    - Perioperative abdominal trauma
    - Open orthopedic fractures
    - Craniofacial trauma

- **Evidence-based diagnosis of infections**
  - VAP: quantitative BAL (≥ $10^4$ CFU/mL)
  - Targeted empiric therapy (when known source)

- **Empiric Antibiotic Protocols**
  - Directed by unit-specific antibiograms
  - Indication-specific empiric therapy
    - Pneumonia (CAP/HAP/VAP)
    - UTI *(see respective PMG)*
    - Intra-abdominal
    - Bacteremia, CNS, or unknown source
  - De-escalation strategies
    - MRSA Nasal PCR Screening
  - Evidence-based antibiotic duration

### Indication-Specific Preferred Empiric Antibiotics:

<table>
<thead>
<tr>
<th>Empiric Antibiotic</th>
<th>CAP*</th>
<th>VAP^ or HAP#</th>
<th>Intra-abdominal Infection**</th>
<th>Bacteremia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Empiric Antibiotic</strong></td>
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<tr>
<td>Ceftriaxone + Azithromycin</td>
<td>Vancomycin + Cefepime</td>
<td>Piperacillin/tazobactam ± Vancomycin ± Fluconazole</td>
<td>Vancomycin + Cefepime</td>
<td></td>
</tr>
<tr>
<td>PCN Allergy</td>
<td>Levofloxacin</td>
<td>Vancomycin + Levofloxacin</td>
<td>Levofoxacin + Metronidazole ± Vancomycin ± Fluconazole</td>
<td>Vancomycin + Levofloxacin</td>
</tr>
</tbody>
</table>

*Community- acquired pneumonia (CAP): pneumonia acquired outside of the hospital setting

^Ventilator-acquired pneumonia (VAP): pneumonia occurring greater than 48 hours after endotracheal intubation

^Hospital-acquired pneumonia (HAP): pneumonia not incubating at the time of hospital admission and occurring ≥ 48h after admission and includes ventilator-associated pneumonia
**Intra-abdominal Infection Considerations:**

- **Consider adding fluconazole:**
  - Upper gastrointestinal perforations AND critically ill (e.g., septic shock)
  - Recurrent bowel perforations
  - Surgically treated pancreatitis
  - Candida growth on cultures
  - Known colonization with candida
  - Immunocompromised patients

- **Consider addition of vancomycin:**
  - Prior MRSA infection
  - Recent hospitalization and/or nursing facility exposure
  - Intravenous antibiotic use within the past 90 days

**De-escalation Strategies:**

- **Presumed HAP:**
  - Start vancomycin + anti-pseudomonal therapy

- **Presumed IAI + meet MRSA coverage criteria:**
  - Start vancomycin + anti-pseudomonal therapy

**Order MRSA PCR Nasal Swab**

- **Negative**
  - Discontinue vancomycin

- **Positive**
  - Continue vancomycin and de-escalate based on culture results

**Considerations:**

- Not for patients with VAP
- Repeat MRSA PCR nasal swab if 7 days have elapsed since prior swab and starting antibiotics for a new infection (HAP and IAI only).
- Can consider re-initiating vancomycin in patients with a negative MRSA PCR nasal swab if patient is decompensating.
Duration of Therapy:

- CAP: 5-7 days
  - Can discontinue antibiotics as early as day 5 of therapy if clinically stable
- HAP/VAP: 7 days
- Intra-abdominal infection
  - Source-control: 4 days after source control
  - No source-control: 7 days then trial stopping antibiotics if clinically stable.
- Bacteremia
  - Gram negative
    - Uncomplicated: 7 days
    - Complicated (hemodynamic instability, persistently febrile, uncontrolled focus of infection, endocarditis, recurrent bacteremia, polymicrobial growth, or immunosuppression): 14 days
  - Gram positive
    - ID consult required for *S. aureus* or *Enterococcus* bacteremia
    - Duration: 2-6 weeks depending on presence/absence of endocarditis, repeat cultures (obtained 2-4 days after initial set), defervescence within 72h of antimicrobial therapy, and evidence of metastatic sites of infection
- Empyema
  - 2-6 weeks
  - Recommend ID consult due to prolonged antibiotics requiring outpatient follow-up
References


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Authors:
Brad Dennis, MD
Jill Streams, MD
Leanne Atchison, PharmD
Jennifer Beavers, PharmD, BCPS
Jeremy Jenkins, PharmD