Common Hospital Medicine Infections: Antibiotics and Treatment Guide

Overview of Hospital Medicine Infections

Hospital-acquired infections (HAIs) and community-acquired infections requiring hospitalization are frequent challenges in hospital medicine. These infections often involve resistant pathogens, necessitating careful antibiotic selection, duration management, and timely stepdown from IV to oral therapy to reduce complications, hospital stay, and resistance. Common infections include community-acquired pneumonia (CAP), hospital-acquired pneumonia (HAP), ventilator-associated pneumonia (VAP), urinary tract infections (UTIs), catheter-associated UTIs (CAUTIs), Clostridium difficile infection (CDI), skin and soft tissue infections (SSTIs), and intra-abdominal infections (IAIs). Hospitalists play a critical role in initiating therapy, monitoring response, and transitioning to oral antibiotics when appropriate. This guide provides a detailed comparison of these infections, antibiotics of choice, treatment durations, and stepdown recommendations, with a comprehensive table and clinical scenarios for practical application.

Importance of Antibiotic Selection and Stepdown

• **Antibiotic Selection:** Empiric therapy must cover likely pathogens, considering local resistance patterns, patient risk factors (e.g., recent antibiotics, comorbidities), and infection severity (e.g., sepsis).

• **Treatment Duration:** Shorter durations (e.g., 5-7 days) are often sufficient for uncomplicated infections, reducing resistance and side effects (e.g., CDI).

• **Stepdown to Oral Therapy:** Transitioning from IV to oral antibiotics when the patient is clinically stable (e.g., afebrile, improving symptoms, tolerating PO) reduces IV-related complications (e.g., line infections), hospital stay, and costs.

Disclaimer on Local Antibiogram Use

Disclaimer: The antibiotic choices and treatment recommendations provided in this document are based on general guidelines and common resistance patterns. However, antibiotic resistance varies significantly by region and institution. Please reference your local area's antibiogram to guide empiric antibiotic selection, as it provides critical data

on local resistance patterns and susceptibility profiles. Always tailor therapy based on culture results, patient-specific factors, and institutional protocols to ensure optimal treatment outcomes and minimize the risk of resistance.

Common Hospital Medicine Infections: Antibiotics, Duration, and Stepdown Recommendations

Infection	Likely Pathogens	Antibiotics of Choice (Empiric)	Treatment Duration	Stepdown Recommendations (IV to Oral)	Notes
Community-Acquired Pneumonia (CAP)	Streptococcus pneumoniae, Haemophilus influenzae, atypicals (Mycoplasma, Legionella)	Ceftriaxone 1 g IV daily + azithromycin 500 mg IV daily (or levofloxacin 750 mg IV daily if atypical coverage needed)	5-7 days (extend to 10 days if bacteremia)	Levofloxacin 750 mg PO daily or amoxicillin-clavulanate 875/125 mg PO BID + azithromycin 500 mg PO daily	Stepdown when afebrile 48h, SpO2 >90% on room air, tolerating PO.
Hospital-Acquired Pneumonia (HAP)	Pseudomonas aeruginosa, Klebsiella pneumoniae, MRSA	Piperacillin-tazobactam 4.5 g IV q6h + vancomycin 15 mg/kg IV q12h (add azithromycin if atypical suspected)	7-10 days (extend to 14 days if MDR)	Levofloxacin 750 mg PO daily (if Pseudomonas susceptible) or linezolid 600 mg PO BID (if MRSA)	Stepdown when afebrile 48h, improving CXR, no MDR concerns.
Ventilator-Associated Pneumonia (VAP)	Pseudomonas aeruginosa, Acinetobacter baumannii, MRSA	Meropenem 1 g IV q8h + vancomycin 15 mg/kg IV q12h (add tobramycin 5 mg/kg IV daily if MDR risk)	7-10 days (extend to 14 days if MDR or poor response)	Ciprofloxacin 500 mg PO BID (if Pseudomonas susceptible) or linezolid 600 mg PO BID (if MRSA)	Stepdown when afebrile 48h, improving oxygenation, tolerating PO.
Uncomplicated UTI (Cystitis)	Escherichia coli, Klebsiella pneumoniae	Nitrofurantoin 100 mg PO BID (outpatient) or ceftriaxone 1 g IV daily (inpatient)	5 days (nitrofurantoin) or 3-5 days (IV/ oral)	Nitrofurantoin 100 mg PO BID or TMP-SMX 160/800 mg PO BID (if susceptible)	Stepdown when afebrile, symptoms resolved, tolerating PO.

Infection	Likely Pathogens	Antibiotics of Choice (Empiric)	Treatment Duration	Stepdown Recommendations (IV to Oral)	Notes
Complicated UTI (Pyelonephritis)	E. coli, Klebsiella, Proteus, MDR pathogens	Ceftriaxone 1 g IV daily or piperacillin-tazobactam 3.375 g IV q6h (if MDR risk)	7-14 days (5-7 days if fluoroquinolone)	Levofloxacin 750 mg PO daily or TMP-SMX 160/800 mg PO BID (if susceptible)	Stepdown when afebrile 48h, flank pain resolved, tolerating PO.
Catheter-Associated UTI (CAUTI)	E. coli, Pseudomonas, Enterococcus, MDR pathogens	Piperacillin-tazobactam 3.375 g IV q6h or ceftriaxone 1 g IV daily (based on culture)	7-10 days (extend to 14 days if bacteremia)	Ciprofloxacin 500 mg PO BID or amoxicillin 500 mg PO TID (based on culture)	Remove catheter, stepdown when afebrile 48h, symptoms resolved.
Clostridium difficile Infection (CDI)	C. diff	Vancomycin 125 mg PO QID (mild-severe) or vancomycin 500 mg PO QID + IV metronidazole 500 mg IV q8h (fulminant)	10 days (taper for recurrence)	Vancomycin 125 mg PO QID (no IV needed)	No stepdown from PO start), monitor for recurrence.
Skin/Soft Tissue Infection (SSTI, Non-Necrotizing)	Streptococcus pyogenes, Staphylococcus aureus (MSSA/MRSA)	Vancomycin 15 mg/kg IV q12h (MRSA risk) or cefazolin 1 g IV q8h (MSSA)	5-7 days (extend to 10 days if deep)	Clindamycin 300 mg PO TID or TMP-SMX 160/800 mg PO BID (MRSA)	Stepdown when afebrile, erythema reduced, tolerating PO.
Necrotizing SSTI	Polymicrobial, S. pyogenes, MRSA	Vancomycin 15 mg/kg IV q12h + piperacillin-tazobactam 4.5 g IV q6h + clindamycin 900 mg IV q8h (toxin suppression)	14-21 days (post-debridement)	Linezolid 600 mg PO BID + ciprofloxacin 500 mg PO BID	Surgical debridement critical, stepdown post-debridement, afebrile.

Infection	Likely Pathogens	Antibiotics of Choice (Empiric)	Treatment Duration	Stepdown Recommendations (IV to Oral)	Notes
Intra-Abdominal Infection (IAI, e.g., Appendicitis)	Polymicrobial (E. coli, Bacteroides, Enterococcus)	Piperacillin-tazobactam 3.375 g IV q6h or ceftriaxone 1 g IV daily + metronidazole 500 mg IV q8h	4-7 days (post-source control)	Amoxicillin-clavulanate 875/125 mg PO BID or ciprofloxacin 500 mg PO BID + metronidazole 500 mg PO TID	Stepdown after source control (e.g., appendectomy), afebrile 48h.

Hospital Medicine Implications

- **Early Recognition:**
  - Identify infection source promptly (e.g., CXR for CAP, UA for UTI).
  - Assess severity (e.g., qSOFA for sepsis, lactate for shock).
- **Antibiotic Stewardship:**
  - Start empiric therapy based on likely pathogens and local resistance patterns (refer to your local antibiogram).
  - De-escalate antibiotics within 48-72h based on cultures (e.g., from piperacillin- tazobactam to ceftriaxone for E. coli).
  - Avoid overtreatment (e.g., do not treat ASB unless indicated).
- **Stepdown Criteria:**
  - Afebrile for 48h, improving symptoms (e.g., reduced erythema in SSTI, improved oxygenation in pneumonia).
  - Tolerating PO intake, no GI issues (e.g., nausea, vomiting).
  - No need for IV access (e.g., no ongoing need for fluids, vasopressors).
- **Consultations:**
  - **ID:** For MDR pathogens, recurrent infections, or complex cases (e.g., CDI, necrotizing SSTI).
  - **Surgery:** For source control (e.g., IAI, necrotizing SSTI).
  - **Pulmonology:** For VAP with poor response, ABPA suspicion.
- **Monitoring:**
  - Vitals q4h (fever, tachycardia, hypotension).
  - Labs q24h (WBC, Cr, procalcitonin to guide duration).
  - Cultures q48h until negative (if bacteremia).
- **Discharge Planning:**
  - **Antibiotics:** Complete PO course (e.g., levofloxacin for CAP).
  - **Follow-Up:** ID, primary care within 1 week.
  - **Education:** Adherence, recurrence signs (e.g., fever, worsening symptoms).

Clinical Scenarios

Scenario 1: Young Male with Community-Acquired Pneumonia

- Presentation: A 35-year-old male presents with 3 days of fever, cough, and dyspnea. Exam shows T 38.5°C, BP 120/80 mmHg, HR 100 bpm, RR 22/min, SpO2 90% on room air, lung crackles.
- Diagnostic Workup: **CXR:** Right lower lobe consolidation, sputum culture: Streptococcus pneumoniae, labs: WBC 14,000/µL, Cr 0.9 mg/dL, lactate 1.5 mmol/L.
- Diagnosis: CAP → Fever, consolidation, positive culture.
- Management: Admit to medicine (CAP). Start ceftriaxone 1 g IV daily + azithromycin 500 mg IV daily (local antibiogram: 90% S. pneumoniae susceptibility to ceftriaxone). Oxygen 2 L/min (SpO2 94%). Monitor vitals q4h, CXR q48h. Day 3: Afebrile, SpO2 96%, tolerating PO. Stepdown to levofloxacin 750 mg PO daily x 2 days (total 5 days). Discharged with primary care follow-up.

Scenario 2: Elderly Female with CAUTI and Sepsis

- Presentation: A 70-year-old female with an indwelling catheter (post-hip surgery) presents with fever and confusion. Exam shows T 39°C, BP 90/60 mmHg, HR 110 bpm, RR 24/min, GCS 14, no focal tenderness.
- Diagnostic Workup: qSOFA 3 (RR 24, SBP 90, GCS 14), UA: Pyuria, bacteriuria, culture: Klebsiella pneumoniae 10^4 CFU/mL, labs: WBC 18,000/µL, Cr 2.0 mg/dL (baseline 1.0), lactate 3.5 mmol/L, blood cultures: Positive.
- Diagnosis: CAUTI with sepsis → Fever, positive culture, qSOFA 3.
- Management: Admit to ICU (sepsis). Remove catheter, replace if needed. Start piperacillin- tazobactam 3.375 g IV q6h + vancomycin 15 mg/kg IV q12h (local antibiogram: 30% Klebsiella ESBL prevalence). Fluids (NS 2 L over 3h), norepinephrine 10 µg/min IV (MAP 70 mmHg). Consult ID: De-escalate to ceftriaxone 1 g IV daily (susceptible). Day 5: Afebrile, lactate 1.2 mmol/L, tolerating PO. Stepdown to ciprofloxacin 500 mg PO BID x 5 days (total 10 days). Discharged with urology follow-up.

Scenario 3: Middle-Aged Male with Necrotizing SSTI

- Presentation: A 50-year-old male with diabetes presents with 2 days of fever, severe leg pain, and rapidly spreading erythema. Exam shows T 39.5°C, BP 100/60 mmHg, HR 120 bpm, RR 22/min, necrotic skin, crepitus.
- Diagnostic Workup: **LRINEC score 8 (WBC, Cr, glucose), CT:** Gas in tissues, culture: Streptococcus pyogenes, labs: WBC 22,000/µL, Cr 1.8 mg/dL, lactate 2.5 mmol/L.

- Diagnosis: Necrotizing SSTI → Fever, necrosis, gas on imaging.
- Management: Admit to ICU (sepsis). Start vancomycin 15 mg/kg IV q12h + piperacillin- tazobactam 4.5 g IV q6h + clindamycin 900 mg IV q8h (local antibiogram: 20% MRSA prevalence). Consult surgery: Urgent debridement. Fluids (NS 2 L). Day 7: Afebrile, wound healing, tolerating PO. Stepdown to linezolid 600 mg PO BID + ciprofloxacin 500 mg PO BID x 7 days (total 14 days). Discharged with surgical/ID follow-up.

Visit: webcheatsheets.com for more education, fun resources and 10 category 1 AAPA CME credit!