Hospital-Acquired Pneumonia (HAP)

DEFINITION

Hospital-acquired pneumonia (HAP): pneumonia that occurs 48 hours or more after admission, and was not present at the time of admission.

MICROBIOLOGY

A review of respiratory cultures from Fraser Health medical units showed the following distribution:

Organism(s)	Frequency
Gram-negative enteric bacilli (primarily *E. coli*, *Klebsiella*, *Enterobacter*)	32 %
S. aureus (including MSSA and MRSA)	30 %
Pseudomonas aeruginosa	15 %
Haemophilus influenzae	5 %

Data from respiratory cultures collected 48 hours or more after hospital admission in 2022, excluding VAP isolates.

- *Enterococcus* and *Candida* are commonly isolated in sputum cultures of hospitalized patients. They are generally considered colonizers and do not warrant antimicrobial therapy.
- Viruses (rhinovirus, influenza, parainfluenza, SARS-CoV-2) are increasingly recognized as a cause of HAP.

EMPIRIC THERAPY

Classification		Duration (days)
Mild HAP *Not meeting criteria for moderate or severe HAP*	amoxicillin-clavulanate 500-125 mg one tab PO TID[1] **OR** amoxicillin-clavulanate 2000-200 mg IV Q8H **OR** ceftriaxone 2 g IV Q24H *If severe beta-lactam allergy:* moxifloxacin 400 mg PO/IV Q24H	**3-7**
Moderate HAP *Any of:* • *Hospitalized >2 weeks* • *Recent antibiotic exposure* • *Pseudomonas colonized*	piperacillin-tazobactam 4.5 g IV Q6H *If severe beta-lactam allergy:* levofloxacin 750 mg PO/IV Q24H *If known/suspected MRSA:* **ADD** vancomycin[1]	**3-7**
Severe HAP *Sepsis/Septic Shock* **OR** *Requiring ICU Admission*	piperacillin-tazobactam 4.5 g IV Q6H **AND** vancomycin[1] *If severe penicillin allergy:* meropenem 500 mg IV Q6H **AND** vancomycin[1] **OR** levofloxacin 750 mg PO Q24H **AND** vancomycin[1]	**3-7**

Doses may require adjustment for renal insufficiency

[1.] *Amoxicillin-clavulanate 875-125 mg PO BID is an acceptable alternative dosing.*

[2.] *For vancomycin dosing, refer to "Vancomycin Dosing and Therapeutic Monitoring" in the ASP Handbook*

ORAL TRANSITION

- Guided by microbiology results (See "Pathogen-Directed Therapy for Pneumonia")
- In the absence of positive microbiology, recommended oral transition:
  amoxicillin-clavulanate 875-125 mg one tab PO BID
  If severe penicillin allergy: moxifloxacin 400 mg PO Q24H

DURATION

- 3-7 days sufficient for the vast majority of HAP
  - Duration of therapy for HAP is mostly extrapolated from VAP literature (see VAP guidance).
- For HAP due to *Pseudomonas* — 7 days
- For HAP due to *S. aureus*: Without *S. aureus* bacteremia — 7 days
  With *S. aureus* bacteremia — Minimum 14 days (ID consult recommended)

REFERENCES

1. Kalil AC, Metersky ML, Klompas M, et al. Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society. *Clin Infect Dis*. 2016;63(5):e61-e111. doi:10.1093/cid/ciw353
2. Klompas M, McKenna C, Ochoa A, et al. Ultra-Short-Course Antibiotics for Suspected Pneumonia With Preserved Oxygenation. *Clin Infect Dis*. 2023;76(3):e1217-e1223. doi:10.1093/cid/ciac616