

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
<i>S. aureus</i> (including MSSA and MRSA)	30 %
<i>Haemophilus</i> & <i>Moraxella</i>	15 %
Gram-negative enteric bacilli (primarily <i>E. coli</i> , <i>Klebsiella</i> , <i>Enterobacter</i>)	15 %
<i>Pseudomonas aeruginosa</i>	15 %

- *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) are increasingly recognized as a cause of HAP.

EMPIRIC THERAPY

Classification		Duration (days)
Mild HAP <i>Not meeting criteria for moderate or severe HAP</i>	amoxicillin-clavulanate 875-125 mg one tab PO BID OR ceftriaxone 2 g IV q24h <i>If severe beta-lactam allergy: moxifloxacin 400 mg PO/IV q24h</i>	7
Moderate HAP <i>Any of:</i> <ul style="list-style-type: none"> • Hospitalized >2 weeks • Recent antibiotic exposure • <i>Pseudomonas</i> colonized 	piperacillin-tazobactam 4.5 g IV q6h <i>If severe beta-lactam allergy: levofloxacin 750 mg PO/IV q24h</i> <i>If known/suspected MRSA: ADD vancomycin¹</i>	7
Severe HAP <i>Sepsis/Septic Shock</i> OR <i>Requiring ICU Admission</i>	piperacillin-tazobactam 4.5 g IV q6h AND vancomycin ¹ <i>If severe beta-lactam allergy:</i> meropenem 500 mg IV q6h AND vancomycin ¹ OR levofloxacin 750 mg PO q24h AND vancomycin ¹ <i>If septic shock or needing ventilatory support, consider adding 2nd anti-pseudomonal agent from a different class:</i> ADD tobramycin 7 mg/kg IV q24h ² OR ciprofloxacin 400 mg IV q8h	7

Doses may require adjustment for renal insufficiency

¹ For vancomycin dosing, refer to "Vancomycin Dosing and Therapeutic Monitoring" in the ASP Handbook

² For aminoglycoside dosing, refer to dosing reference (such as Lexicomp) or discuss with clinical pharmacist

Oral Step-Down

- Guided by microbiology results (See "Pathogen-Directed Therapy for Pneumonia")
- In the absence of positive microbiology, recommended step-down:
 amoxicillin-clavulanate 875-125 mg one tab PO BID
If severe penicillin/cephalosporin allergy: moxifloxacin 400 mg PO q24h

Duration

- 7 days sufficient for the vast majority of HAP, including *Pseudomonas*.
- For HAP due to *S. aureus*:
 Without *S. aureus* bacteremia 7 days
 With *S. aureus* bacteremia **Minimum** 14 days (ID Consult recommended)
- If diagnosis of HAP was questionable and patient quickly improves, consider stopping therapy after 3 days.