UCSF guideline for management of suspected hospital-acquired or ventilator-acquired pneumonia in adult patients

Background/methods:

- This guideline establishes evidence-based consensus standards for management of suspected hospital-acquired pneumonia (HAP) or ventilator-associated pneumonia (VAP) in adult patients admitted to UCSF Medical Center. This is pneumonia that develops ≥ 48 hours after admission (HAP) or intubation (VAP) and which was not incubating at the time of admission.
    - This guideline does *not* cover healthcare-associated pneumonia (HCAP)
- This guideline is based on review of national guidelines, primary literature, and analysis of local unit-based antibiograms for respiratory cultures from 2012-2016. For antibiogram information, refer to idmp.ucsf.edu. Recommendations vary by unit based on the antibiograms for each unit.
- Practice guidelines are intended to assist with clinical decision-making for common situations but cannot replace personalized evaluation and management decisions based on individual patient factors.
- Guidelines will be updated every 2 years with updated antibiogram information
- Guideline task force representation included: Infectious Diseases (ID), Antimicrobial Stewardship, Pharmacy, Critical Care, Hospital Medicine, and Pulmonology

Intended population:

- Inclusion: Hospitalized inpatients with suspected HAP or VAP
- Exclusion: Community-acquired/onset infection, cystic fibrosis, lung transplant this hospitalization, chemotherapy-induced neutropenia

Microbiologic testing:

- Tracheal aspirate (TA) recommended for most intubated patients
- If not intubated, obtain sputum sample (or induced sputum) if patient has clear mental status and is able to produce sputum, but do not delay antibiotic treatment
- Consider influenza/RSV polymerase chain reaction (PCR) during influenza season (plus multiplex PCR if immunocompromised). See: http://idmp.ucsf.edu/ucsfmc-ucsfbch-treatment-influenza
- Hospital-acquired legionella is rare. If there is clinical concern for *Legionella* spp. (e.g. immunocompromised host, needing ICU-level of care for respiratory status), options for testing include:

- Nasopharyngeal (NP) swab, sputum, TA, or bronchoalveolar lavage (BAL) for legionella culture
- NP swab, sputum, TA, or BAL for legionella PCR
- Legionella urinary antigen (tests for serogroup 1; can be negative with other serogroups and species)

- Consult with Pulmonary and/or ID if:
  - Patient is not clinically responding within 48-72 hours of treatment initiation
  - Chest imaging is concerning for abscess or non-bacterial etiology (e.g. cavity, fungal-appearing nodules)
  - Empyema or complicated parapneumonic effusion is suspected or present

Empirical Therapy

Empirical therapy for HAP or VAP[a,b,c,d]					
	Septic shock	Stable, negative MRSA nasal swab PCR within 7 days		Stable, positive MRSA nasal swab PCR within 7 days or none available	
	Early or late	Early[f] (48 hours-≤5 days)	Late (> 5 days)	Early (48 hours-≤5 days)	Late (> 5 days)
9/13ICU[e]	Meropenem + Vancomycin + Ciprofloxacin	Piptazo	Piptazo + Ciprofloxacin	Piptazo + Vancomycin	Piptazo + Vancomycin + Ciprofloxacin
10ICC or 8/11ICU	Piptazo + Vancomycin + Ciprofloxacin	Piptazo		Piptazo + Vancomycin	
Non-ICU	Transfer to the ICU and follow directions for appropriate ICU	Piptazo		Piptazo + Vancomycin	

a. Known multidrug resistant organism (MDRO) respiratory colonization within 30 days: Include coverage for the known organism unless an organism not associated with respiratory infection (e.g. enterococcus, coagulase-negative staphylococcus, candida)

b. Penicillin-allergic patients: For stable patients, give cefepime by test-dose procedure (IgE mediated) or full-dose (non IgE-mediated); for septic shock patients, give aztreonam x 1 dose and then administer meropenem (9/13ICU) or cefepime (10ICC, 8/11ICU) by test-dose procedure (IgE-mediated) or administer cefepime full dose (non IgE-mediated). See UCSF Beta-lactam Allergy Guidelines.

c. True vancomycin allergy: Linezolid is an acceptable alternative. Daptomycin is not effective for pneumonia.

d. For dosing information, refer to http://idmp.ucsf.edu/antimicrobial-dosing-guidelines; if patient on continuous renal replacement therapy or ECMO, recommend consultation with ICU Pharmacy
e. For patients from one population "overflowing" to another unit, use clinical judgement to determine appropriate empirical antibiotic choice
f. Early versus late refers to time from hospital admission

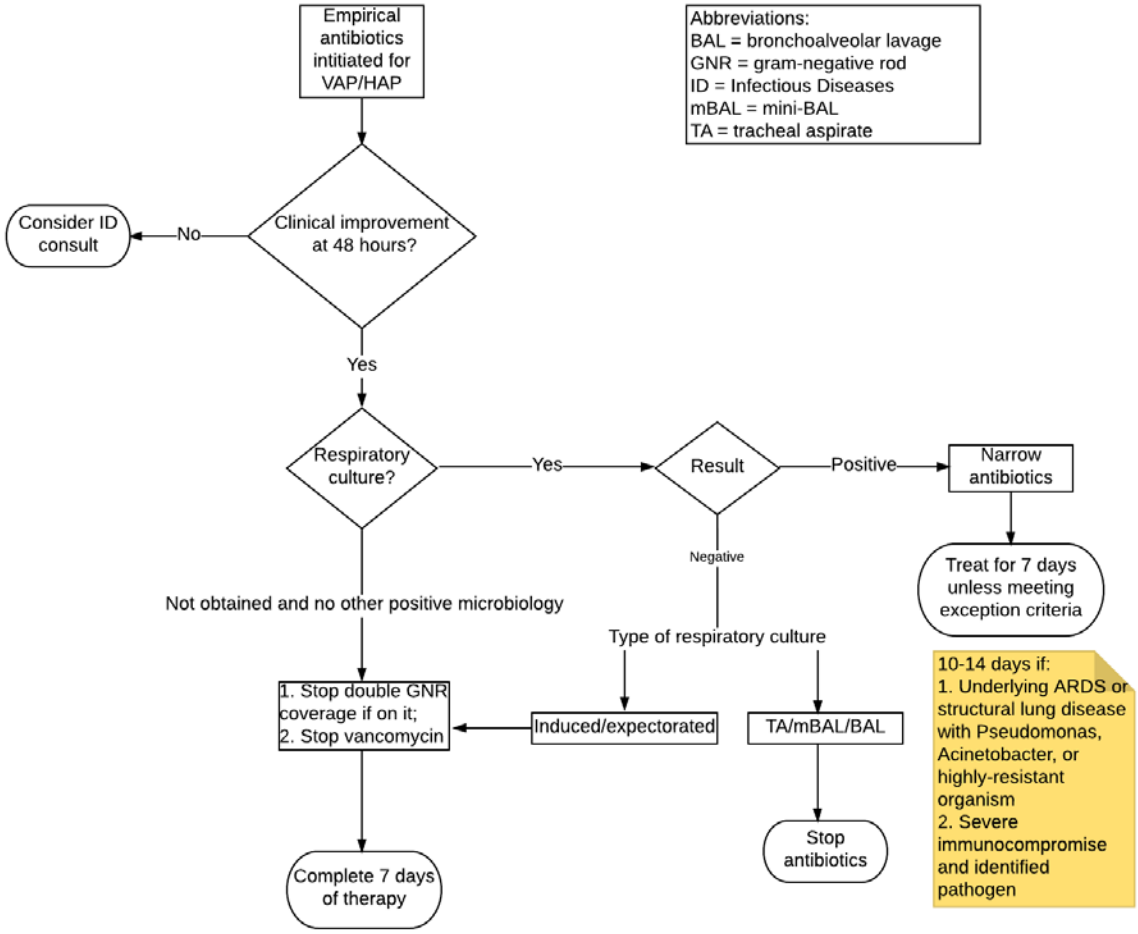
- Stenotrophomonas is a common colonizer that can also cause infection. Routine coverage is not recommended but might be considered in certain situations (e.g. immunocompromised, known colonization). If considering stenotrophomonas coverage, consult with ID or Antimicrobial Stewardship
- In patients with tracheobronchitis (e.g. increased secretions in the absence of chest imaging suggestive of pneumonia), treatment is generally not recommended. Recommend consultation with Critical Care if it is being considered

Definitive therapy

- Duration of therapy: 7 days from initiation of active therapy
    - Durations of therapy should be individualized in the following groups:
        - Patients with underlying ARDS or significant structural lung disease who have *Pseudomonas aeruginosa*, *Acinetobacter spp.*, or highly-resistant bacterial infections: 10-14 days
        - Severe immunocompromise (e.g. recent organ transplantation or treatment for rejection within 3 months, congenital immunodeficiency, etc) and identified pathogen: 10-14 days
        - Associated bacteremia
        - Lack of clinical improvement at 48 hours (ongoing fevers or need for vasopressors): Recommend consultation with ID or Pulmonology
        - Empyema
- If cultures are negative at 72 hours and no other source of infection and clinically improved/stable, stop antibiotics unless alternative infection is found
    - If cultures are obtained > 1 hour after antibiotic administration and are negative, follow algorithm for cultures not obtained
    - If cultures are obtained > 1 hour after antibiotic administration and are positive for a pathogenic organism, therapy can be targeted to that organism
- Definitive therapy should be directed at the organism(s) isolated on culture based on susceptibility testing. Please consult Antimicrobial Stewardship or ID if assistance is desired.
    - If dual gram-negative therapy was initiated based on the table above, streamline to one agent once susceptibilities are known

    - Exception: *Pseudomonas aeruginosa* with bacteremia in a patient with ongoing septic shock requiring vasopressor therapy
- Inhaled antibiotics should be reserved for unique scenarios (e.g. GNRs only susceptible to aminoglycosides and/or colistin). Please consult with ID for recommendations if this treatment strategy is being considered.

UCSF Antibiotic Management of HAP/VAP in Adults



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UCSF Infectious Diseases Management Program: idmp.ucsf.edu