Community Acquired Pneumonia: Improving Care and Patient Health Outcomes Together

Community Acquired Pneumonia (CAP): Diagnosis and Care Improvement Project

A SCaI regional, multidisciplinary CAP diagnosis and care improvement initiative was launched in Q2 of 2006. Team members included: ED, ID, Nursing, Lab, Hospitalists/Pulmonologists, Pharmacy, Quality and Patient Safety.

Project goals include:

- Improve reliability and timeliness of treatment
- Improve health outcomes through consistent more rapid treatment
- Improve appropriate antibiotic stewardship
- Facilitate appropriate patient placement and discharge.

JCAHO CAP Initiative

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Mean Time (minutes):

- PH 1: 107.0
- PH 2a: 208.0
- PH 3a: 146.1
- PH 4a: 151.5
- PH 5a: 151.5
- PH 6a: 151.5

Initial Antibiotic Received within 4 hours NCUP:

- PH 1: 95.0%
- PH 2a: 88.5%
- PH 3a: 77.8%

Initial Antibiotic Received within 8 hours NCUP:

- PH 1: 181.5
- PH 2a: 176.0
- PH 3a: 255.0

Antibiotic Timing:

- PH 1: 95.0%
- PH 2a: 88.5%
- PH 3a: 77.8%

Adult smoking cessation advice:

- PH 1: 90.2%
- PH 2a: 82.6%
- PH 3a: 66.7%

Blood Cult Performed Prior to Abx:

- PH 1: 57.4%
- PH 2a: 33.3%
- PH 3a: 50.0%

Initial Antibiotic Selection ICUP:

- PH 1: 90.4%
- PH 2a: 88.6%
- PH 3a: 100.0%

Blood Cult Performed 24hrs. ICUP:

- PH 1: 88.2%
- PH 2a: 67.9%
- PH 3a: 37.5%

Initial Antibiotic Selection Non-ICUP:

- PH 1: 99.6%
- PH 2a: 100.0%
- PH 3a: 100.0%

Oxygenation Assessment:

- PH 1: REGWH
Improving CAP diagnosis: Knowing the Risks

Specific risk factors have been validated to identify patients with potentially higher morbidity of CAP who may most benefit by hospitalization. The Pneumonia Severity Index (PSI) factors include:

- Gender, male at increased risk
- Increased age
- Neoplastic disease
- Liver disease
- Congestive heart failure
- Cerebrovascular disease
- Renal disease
- Tachypnea
- Hypothermia
- Hypotension
- Tachyycardia
- Multilobar radiographic pulmonary infiltrate
- Pleuritic chest pain


Improving CAP diagnosis: Collecting the Right Data

Assessment should also include:

- Co-morbid conditions, diabetes mellitus, HIV infection, neoplasia, chemotherapy, known prior resistant bacterial organism colonization/infection e.g. MRSA
- Recent (within 2 months) antimicrobial therapy
- Treatment with immunosuppressive agents
- Change in mental status
- Blood cultures on all patients before antibiotics are given and again within 24 hours of admission to ICU

NOTE: Each blood culture should have 2 samples from different sites with 8-10 ml in each bottle
- Oxygenation assessment, may be done by O2 Sat and/or ABG
- Sputum, nasolaryngeal suction, tracheal suction specimens on all hospitalized patients with r/o CAP
- Smoking history
- Home living conditions e.g. nursing home or congregate living

CAP Management: Hospital vs Outpatient

Determination of placement is based on the PSI score and other co-factors.

- If pts has serious co-morbidities, consider admission.
- If pts is over 50, has less significant co-morbidities, or significantly abnormal vital signs and a risk score over 90, admission is suggested.
- Otherwise consider outpatient treatment.
- Assign patients to risk class I-V based on risk score
CAP Treatment:  
Appropriate, Prompt, Reassessed

Antibiotics should be:  
- Based on the SCPMG regional 2006 CAP Guidelines  
- Given as soon as possible after diagnosis  
- Adjusted as needed per culture and diagnostic results

Immunizations should be provided as needed prior to discharge:  
- Pneumococcal vaccine; pts ≥65 or with co-morbidities  
- Influenza vaccine; pts ≥50 or with co-morbidities during current Flu season (Oct through Feb)

Outpatient Treatment Risk Class 1

First-Line Therapy  
- doxycycline 100 mg PO BID for 10 days  
- azithromycin 500 mg PO on first day, followed by 250 mg PO daily for 4 more days  
- erythromycin ethylsuccinate (EES) 400 mg PO QID

Alternative Therapy  
- cefuroxime axetil 500 mg PO BID for 10 days  
- doxycycline 100 mg PO BID for 10 days  
- amoxicillin 1 gram PO BID for 10 days  
- doxycycline 100 mg PO BID for 10 days

Outpatient Therapy Class II and III

First Line Therapy  
- doxycycline 100 mg PO BID for 10 days

OR
- cefuroxime axetil 500 mg PO BID for 10 days  
  PLUS  
  azithromycin 500 mg PO daily for 7 days

Alternative Therapy  
- moxifloxacin 400 mg PO daily 10 days
### Inpatient Therapy: Risk Class IV or General Medical Ward

**First Line Therapy**
- *ceftriaxone* 1-2 gm IV daily
- *azithromycin* 500 mg PO/IV daily

**PLUS**
- *moxifloxacin* 400 mg IV/PO daily for 10 days

**Alternative Therapy**
- *ceftriaxone* 1-2 gm IV daily
- *doxycycline* 100 mg IV/PO BID

### Inpatient Therapy: Risk Class V or Intensive Care Unit

Severe pneumonia, consider MRSA (see following slide)

**First Line Therapy**
- *ceftriaxone* 1-2 gm IV daily
- *azithromycin* 500 mg IV daily

**PLUS**
- *moxifloxacin* 400 mg IV daily

OR
- *piperacillin-tazobactam* 4.5 gm IV Q6H

**Alternative Therapy**
- *moxifloxacin* 400 mg IV daily
- (monotherapy efficacy not established in this class)

OR
- *ceftriaxone* 1-2 gm IV daily

**PLUS**
- *doxycycline* 100 mg IV BID

### Patients at risk for unusual organisms

**Empiric therapy prior to culture results**

**Pseudomonas:** *First Line Therapy*
- *piperacillin-tazobactam* 4.5 gm IV Q6H
  
**OR**
- *ciprofloxacin* 400 mg IV Q8H

**Alternative Therapy:**
- *imipenem* 0.5 gm IV Q6H or
- *meropenem* 1 gm IV Q6H

**MRSA:**
- Place patient in contact isolation.
  
And

- *Vancomycin* 1 gm IV Q12H per pharmacy protocol

**NOTE:** Consult with ID or pulmonary for complicated cases
Improving CAP timeliness of care:
Actions and Documentation

Rapid identification of high risk patients, prompt clinical assessment, intervention and clear documentation promote improved clinical outcomes.

Critical items to document include:

- Exact time blood cultures were drawn; nursing note ex: "labs, including blood cultures, drawn at 9:15 AM"
- Oxygenation assessment and intervention
- Antibiotic administration as rapidly as possible, target is under 4 hours from hospital arrival
- Determine and document DNR status within 24 hrs of admission
- Provide smoking cessation information to patient before discharge

Other Considerations

- Consider likelihood of pulmonary embolism which can imitate pneumonia signs/symptoms
- Think TB in pts with history, s/s compatible with TB
- Think Coccidioidomycosis with compatible history, s/s
- Think Pneumocystis with hypoxia, s/s or history of potential HIV risk
- Pts with unusual pneumonias, or bacteremic pneumococcal pneumonia should be tested for HIV
- Contact ID and/or Pulmonary as needed for potential empyema, parapneumonic effusion
- Engage Discharge Planning early in hospital stay to facilitate post discharge placement

Medical Center Physician CAP Champions

- Baldwin Park: Bruce Corigliano
- Bellflower: Nelson Garcia and Laurie Ann Chu
- Fontana: Jea H Lee (Benny)
- South Bay: Jared Spotkov
- Los Angeles: Jim Nomura
- Orange County: Anthony Shay
- Panorama City: Bhavani Rao
- Riverside: Edna Wong
- San Diego: Dale Lieu
- West LA: Winnie Huang
- Woodland Hills: Arleen Rockoff
## Medical Center ACP Leaders

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<tr>
<th>Medical Center</th>
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<tr>
<td>Antelope Valley</td>
<td>Jeanne Rhynsburger</td>
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<tr>
<td>Baldwin Park</td>
<td>Diane Shields</td>
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