CLINICAL PRACTICE GUIDELINES FOR PNEUMONIA

**Community-acquired pneumonia** is a lower respiratory tract infection

acquired in the community within 24 hours to less than 2 weeks.

*Diagnosis of CAP through history and physical examination*

It commonly presents with an acute cough, abnormal vital signs of tachypnea (RR > 20

breaths per minute), tachycardia (CR > 100/min), and fever (T > 37.8ºC) with at least one abnormal chest finding of diminished breath sounds, rhonchi, cracklesor wheeze.

*Diagnostic tests useful in diagnosing CAP*

A chest x-ray should be done in a patient suspected with suspected pneumonia, and may contribute to assessing the severity of disease, prognostication and possible etiology. A complete blood count is also recommended.

Diagnostic testing for microbiologic studies will depend on the risk stratification of the patient. In low risk CAP, microbiologic studies are optional. In moderate and high risk CAP, blood culture and gram stain/culture of respiratory specimens should be done. If possible, tests to document the presence of *Legionella sp.* are recommended in hospitalized patients.

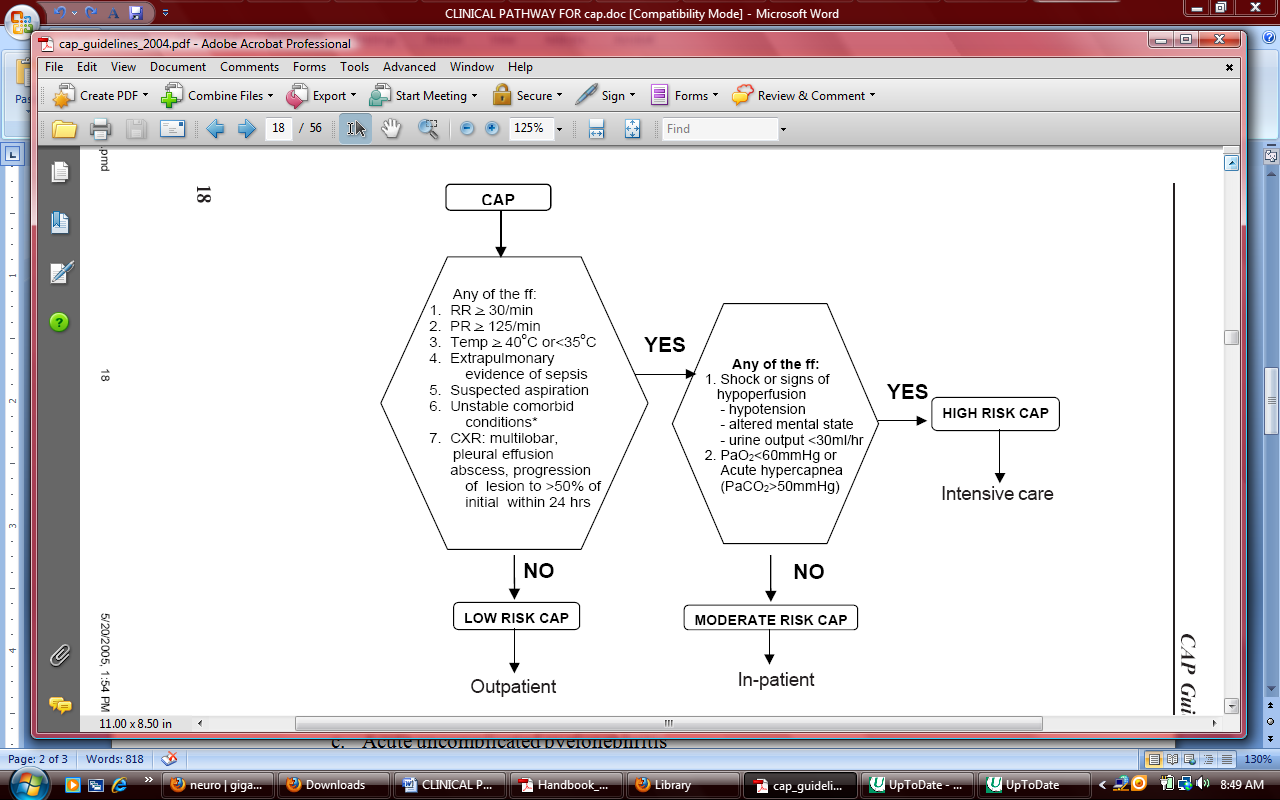
*Risk stratification for CAP*

This is based on the patient’s clinical presentation/condition and chest x-ray findings should be

used in the deciding if hospitalization is needed.

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| **Clinical features of patients with CAP according to risk categories** | | |
| **LOW RISK** | **MODERATE RISK** | **HIGH RISK** |
| **Stable vital signs**  • RR < 30  breaths/min  • PR < 125  beats/min  • SBP > 90 mmHg  • DBP > 60 mmHg  **No or stable**  **comorbid conditions**  **No evidence of**  **extrapulmonary**  **sepsis**  **No evidence of**  **aspiration**  **Chest X-ray:**  • localized infiltrates  • no evidence of  pleural effusion nor  abscess  • not progressive  within 24 hrs | **Unstable vital signs**:  • RR > 30 breaths/min  • PR > 125 beats/min  • Temp > 40oC or <35oC  **Unstable comorbid condition**  *(i.e. uncontrolled diabetes mellitus,*  *active malignancies, progressing*  *neurologic disease , congestive*  *heart failure (CHF) Class II-IV,*  *unstable coronary artery disease,*  *renal failure on dialysis, uncompensated*  *COPD, decompensated*  *liver disease)*  **Evidence of extrapulmonary sepsis**  (hepatic, hematologic,  gastrointestinal, endocrine)  **Suspected aspiration**  **Chest X-ray:**  • multilobar infiltrates  • pleural effusion or abscess  • progression of findings to > 50% in  24 hrs | **Any of the clinical**  **feature of**  **moderate risk**  **CAP plus any of**  **the following:**  1. Shock or signs of  hypoperfusion  • hypotension  • altered mental  state  • urine output <  30 ml/hr  2. Hypoxia (PaO2 <  60 mmHg) or  Acute hypercapnea  (PaCO2 > 50 mmHg)  **Chest X-ray:**  • as in moderate  risk CAP |

*Algorithm for management/Indications for hospitalization*



*Empiric Antibiotic Treatment*

Antibiotic treatment should be started within 4 hours of diagnosis of CAP.

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| Risk Stratification | Potential Pathogen | Empiric Therapy |
| Low Risk | *Streptococcus pneumoniae*  *Haemophilus influenzae*  *Chlamydophilia pneumoniae*  *Mycoplasma pneumoniae*  *Moraxella catarrhalis*  Enteric Gram-negative bacilli  (among those with co-morbid  illness) | **Previously healthy:**  amoxicillin  **OR**  extended macrolides  Alternative: cotrimoxazole  **With stable comorbid illness:**  co-amoxiclav **OR *s***ultamicillin  **OR**  2nd generation cephalosporins  **OR**  extended macrolides |
| Moderate Risk | *Streptococcus pneumoniae*  *Haemophilus influenzae*  *Chlamydophilia pneumoniae*  *Mycoplasma pneumoniae*  *Moraxella catarrhalis*  Enteric Gram-negative bacilli  *Legionella pneumophila*  Anaerobes (among those with  risk of aspiration) | IV nonpseudomonal b-lactam  with or without b-lactamase  inhibitor + macrolide  **OR**  antipneumococcal  fluoroquinolones (FQ) |
| High Risk | *Streptococcus pneumoniae*  *Haemophilus influenzae*  *Chlamydophilia pneumoniae*  *Mycoplasma pneumoniae*  *Moraxella catarrhalis*  Enteric Gram-negative bacilli  *Legionella pneumophila*  Anaerobes (among those with  risk of aspiration)  *Staphylococcus aureus*  *Pseudomonas aeruginosa* | **No risk for *P. aeruginosa*:**  a. IV nonpseudomonal blactam  with or without blactamase  inhibitor +  IV macrolide  b. IV antipneumococcal FQ  **With risk for *P. aeruginosa:***  IV pseudomonal b-lactam with  or without b-lactamase  inhibitor  +  IV macrolide or  IV antipneumococcal FQ  +/-  aminoglycoside or  IV ciprofloxacin |

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| **Low Risk CAP** *(all taken orally)* | ***B-lactams:***  Amoxicillin 500 mg TID  ***Trim/sulfonamide:***  Cotrimoxazole 160/800 mg BID  ***Macrolides***  Azithromycin 500 mg OD  Clarithromycin500 mg BID | ***B-lactams w/ -lactamase***  ***inhibitor:***  Co-amoxiclav 625 mg TID or  1 gm BID  Sultamicillin 750 mg BID  ***2nd gen. cephalosporins***  Cefuroxime 500 mg BID  Cefaclor 500 mg TID or  750 mg BID |
| **Moderate Risk CAP** | ***Macrolides***  Erythromycin IV 0.5 - 1 g q 6h  Azithromycin PO or IV 500 mg q 24 h  Clarithromycin PO or IV 500 mg q 12 h  ***Antipneumococcal Fluoroquinolones***  Levofloxacin PO or IV 500 mg q 24 h  Moxifloxacin PO or IV400 mg q 24 h  ***b-lactams w/ b-lactamase inhibitor:***  Sulbactam-Ampicillin IV 1.5 g q 8 h  Coamoxiclav IV 1.2 g q 8 h | ***2nd gen. cephalosporins***  Cefuroxime IV 1.5 g q 8 h  ***Carbapenem***  Ertapenem IV 1 g q 24 h  (with anaerobic activity) |
| **High Risk CAP** *(all routes are intravenous)* | ***Macrolides***  Erythromycin 0.5-1 g q 6h  Azithromycin 500 mg q 24 h  Clarithromycin 500 mg q 12 h  ***Fluoroquinolones***  Levofloxacin 500 mg q 24 h  Moxifloxacin 400 mg q 24 h  Ciprofloxacin 400 mg q 12 h  ***Aminoglycosides***  Amikacin 15 mg/kg q 24h  Gentamicin 3 mg/kg q 24 h  ***b-lactams w/ b-lactamase***  ***inhibitor:***  Sulbactam-Ampicillin 1.5 g q 6-8 h  Co-amoxiclav 1.2 g q 6-8 h | ***Carbapenem***  Ertapenem 1 g q 24 h  Imipenem 500 mg q6  Meropenem 1gm q8  ***Anti-pseudomonal* *-lactams*:**  Cefepime 1 g q 8-12 h  Ticarcillin-Clavulanate 3.2 g q 8 h  Piperacillin-Tazobactam 4.5g q 8  *Others:*  *(Additiona Anaerobic coverage*  Clindamycin 600 mg q6  Metronidazole 500 mg q8 |

*Response to treatment*

Within 24-72 hours, most patients with uncomplicated bacterial pneumonia will respond totreatment ; re-evaluation of patients, therefore, should be done after 72 hours of initiating therapy. A patient is considered to have

responded to treatment if fever declines within 72 hours, temperature normalizes within 5 days and respiratory signs, particularly tachypnea, return to normal. In patients with low risk CAP showing good therapeutic response, a follow-up chest x-ray is not considered necessary.

*No response to treatment*

If no improvement occurs after 72 hours of treatment and the dosage is correct change the antibiotic. If the dosage is inadequate, correct the dosage and continue the drug. If patient still has no response, patient should be reassessed for possible resistance to antibiotics being given or the presence of other pathogens such as *M. tuberculosis*, viruses, parasites or fungi; treatment should be revised accordingly. Follow-up chest x-ray in these patients may also be helpful in considering other differentials such as pneumothorax, cavitation and extension to previously uninvolved lobes, pulmonary edema and ARDS. In the elderly, *S. pneumoniae* and

*L. pneumophila* may be causes of slowly resolving pneumonia.

*Switching to oral treatment*

If there is response to treatment as indicated above, switching to oral therapy is recommended as early as 72 hours following initiation of empirical treatment. Streamlining of the empiric antibiotic therapy may be done once the patient shows signs of clinical improvement, has stable vital signs and has a functioning gastrointestinal tract. Switch therapy to an oral agent will allow discharge from the hospital as early as the 4th day of hospitalization.

*Duration of treatment*

The duration of treatment is 5-10 days for bacterial pneumonia, except for *S. aureus, P. aeruginosa* where treatment should be prolonged to 10-14 days. A 2-week period of therapy is

recommended for *Mycoplasma* and *Chlamydophilia* while *Legionella* is treated for 14-21 days.

*Criteria for discharge*

During the 24 hours before discharge, the patient should have the following

characteristics (unless this represents the baseline status):

1. temperature of 36-37.5 oC

2. systolic BP >90 mmHg

3. pulse < 100/min

4. blood oxygen saturation >90%

5. respiratory rate between 16-24/minute

6. with a functioning gastrointestinal tract

*Follow-up*

A repeat radiograph is recommended during a follow-up office visit, approximately 4 to 6

weeks after hospital discharge, to establish a new radiographic baseline and to exclude the possibility of malignancy associated with CAP, particularly in older smokers.