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 < 30breaths/min• PR < 125beats/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 ofpleural effusion norabscess• not progressivewithin 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% in24 hrs | **Any of the clinical****feature of****moderate risk****CAP plus any of****the following:**1. Shock or signs ofhypoperfusion• hypotension• altered mentalstate• urine output <30 ml/hr2. Hypoxia (PaO2 <60 mmHg) orAcute hypercapnea(PaCO2 > 50 mmHg)**Chest X-ray:**• as in moderaterisk 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-morbidillness) | **Previously healthy:**amoxicillin**OR**extended macrolidesAlternative: 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 withrisk of aspiration) | IV nonpseudomonal b-lactamwith or without b-lactamaseinhibitor + macrolide**OR**antipneumococcalfluoroquinolones (FQ) |
| High Risk | *Streptococcus pneumoniae**Haemophilus influenzae**Chlamydophilia pneumoniae**Mycoplasma pneumoniae**Moraxella catarrhalis*Enteric Gram-negative bacilli*Legionella pneumophila*Anaerobes (among those withrisk of aspiration)*Staphylococcus aureus**Pseudomonas aeruginosa* | **No risk for *P. aeruginosa*:**a. IV nonpseudomonal blactamwith or without blactamaseinhibitor +IV macrolideb. IV antipneumococcal FQ**With risk for *P. aeruginosa:***IV pseudomonal b-lactam withor without b-lactamaseinhibitor+IV macrolide orIV antipneumococcal FQ+/-aminoglycoside orIV 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 ODClarithromycin500 mg BID | ***B-lactams w/ -lactamase******inhibitor:***Co-amoxiclav 625 mg TID or  1 gm BIDSultamicillin 750 mg BID***2nd gen. cephalosporins***Cefuroxime 500 mg BIDCefaclor 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 hClarithromycin PO or IV 500 mg q 12 h***Antipneumococcal Fluoroquinolones***Levofloxacin PO or IV 500 mg q 24 hMoxifloxacin PO or IV400 mg q 24 h***b-lactams w/ b-lactamase inhibitor:***Sulbactam-Ampicillin IV 1.5 g q 8 hCoamoxiclav 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 hClarithromycin 500 mg q 12 h***Fluoroquinolones***Levofloxacin 500 mg q 24 hMoxifloxacin 400 mg q 24 hCiprofloxacin 400 mg q 12 h***Aminoglycosides***Amikacin 15 mg/kg q 24hGentamicin 3 mg/kg q 24 h***b-lactams w/ b-lactamase******inhibitor:***Sulbactam-Ampicillin 1.5 g q 6-8 hCo-amoxiclav 1.2 g q 6-8 h | ***Carbapenem***Ertapenem 1 g q 24 hImipenem 500 mg q6Meropenem 1gm q8***Anti-pseudomonal* *-lactams*:**Cefepime 1 g q 8-12 hTicarcillin-Clavulanate 3.2 g q 8 hPiperacillin-Tazobactam 4.5g q 8*Others:**(Additiona Anaerobic coverage*Clindamycin 600 mg q6Metronidazole 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.