

COMMUNITY ACQUIRED PNEUMONIA

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- A 35-year-old male, presents with fever and cough. He was well until 3 days earlier, when he suffered the onset of nasal stuffiness, mild sore throat, and a cough productive of small amounts of clear sputum. Today, he decided to seek physician assistance because of an increase in temperature to 38.3°C and spasms of coughing that produce purulent secretions. On one occasion, he noted a few flecks of bright red blood in his sputum. The patient has no history of familial illness, hospitalizations.

DEFINITION

- Lower respiratory tract infection in a non-hospitalized person associated with symptoms of acute infection **with or without** new opacity on chest radiograph
- Acute infection of the pulmonary parenchyma acquired outside of a health care setting.

TYPES OF CAP

- Typical CAP (60-70%)
 - Streptococcus pneumoniae
- Atypical CAP (30-40%)
 - Influenza virus
 - Mycoplasma
 - Chlamydia
 - Legionella

SIGNS & SYMPTOMS

- Clinical symptoms
 - Cough (productive or non-productive)
 - Fever Chills/Rigors
 - Dyspnea
 - Fatigue/Myalgia
 - Gastrointestinal (Legionella)

SIGNS & SYMPTOMS

- Physical exam
 - Dullness to percussion of chest
 - Crackles on auscultation
 - Bronchial breath sounds
 - Egophony (“E” to “A” changes)

RISK FACTORS

- ▶ **Older age** – The risk of CAP rises with age.
- ▶ incidence of hospitalization for CAP among adults ≥ 65 years old

- ▶ **Chronic comorbidities** – (COPD), chronic lung disease (eg, bronchiectasis, asthma), chronic heart disease (particularly congestive heart failure), stroke, diabetes mellitus, malnutrition and immunocompromising conditions

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- ▶ **Viral respiratory tract infection** – Viral respiratory tract infections can lead to primary viral pneumonias and also predispose to secondary bacterial pneumonia.
 - ▶ MERS AND COVID19 pneumonia

IMPAIRED AIRWAY PROTECTION :

RISK OF MACROASPIRATION OF STOMACH CONTENTS

MICROASPIRATION OF UPPER AIRWAY SECRETIONS

ALTERATION IN CONSCIOUSNESS (EG, DUE TO STROKE, SEIZURE, ANESTHESIA, DRUG OR ALCOHOL USE)

DYSPHAGIA DUE TO ESOPHAGEAL LESIONS OR DYSMOTILITY

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- **Smoking and alcohol overuse:** Smoking, alcohol and opioid use are key modifiable behavioral risk factors for CAP .
 - **Other lifestyle factors:** Other factors that have been associated with an increased risk of CAP include crowded living conditions (eg, prisons, homeless shelters).
 - Residence in low-income settings, and exposure to environmental toxins (eg, solvents, paints, or gasoline)

MICROBIOLOGY

- *Streptococcus pneumonia* (pneumococcus) and respiratory viruses are the most frequently detected pathogens in patients with CAP.

TYPICAL BACTERIA

- *S. pneumoniae* (most common bacterial cause)
- *Haemophilus influenzae*
- *Moraxella catarrhalis*
- *Staphylococcus aureus*
- Group A streptococci
- Aerobic gram-negative bacteria
- anaerobes (associated with aspiration)

ATYPICAL BACTERIA

- *Legionella* spp
- *Mycoplasma pneumoniae*
- *Chlamydia pneumoniae*
- *Chlamydia psittaci*
- *Coxiella burnetii*

RESPIRATORY VIRUSES

- ▶ •Influenza A and B viruses
- ▶ Coronaviruses (eg, Middle East respiratory syndrome coronavirus, COVID 19)
- ▶ •Rhinoviruses
- ▶ •Parainfluenza viruses
- ▶ •Adenoviruses

DIAGNOSIS- LABS

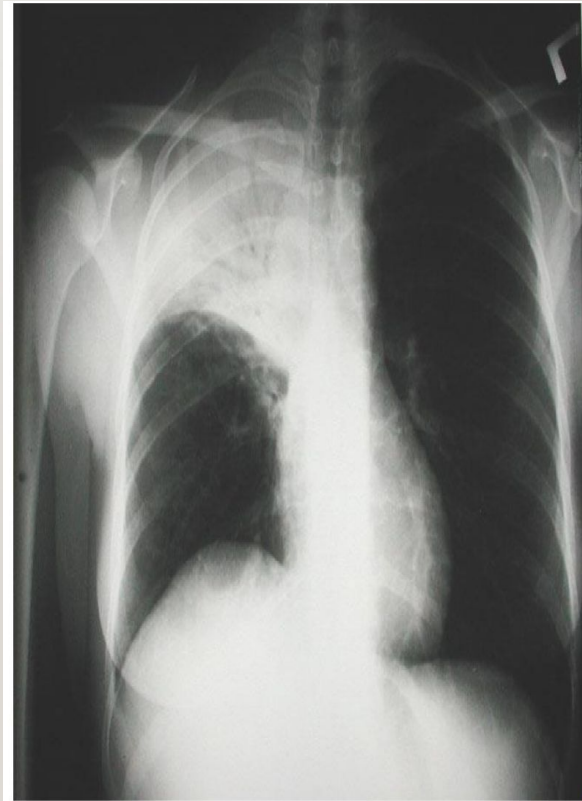
- **All patients with suspected CAP should have chest radiograph**
- Leukocyte count
- Sputum Gram stain
- Blood cultures x 2
- Serum/urine antigens

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- **Inflammatory markers, (ESR), (CRP) procalcitonin . CBC**
 - **Organ dysfunction** such as renal dysfunction, liver dysfunction, and/or thrombocytopenia .
 - **Blood cultures**
 - **Sputum**
 - **MERS-CoV.**
 - **COVID PCR**
 - **Urinary antigen**

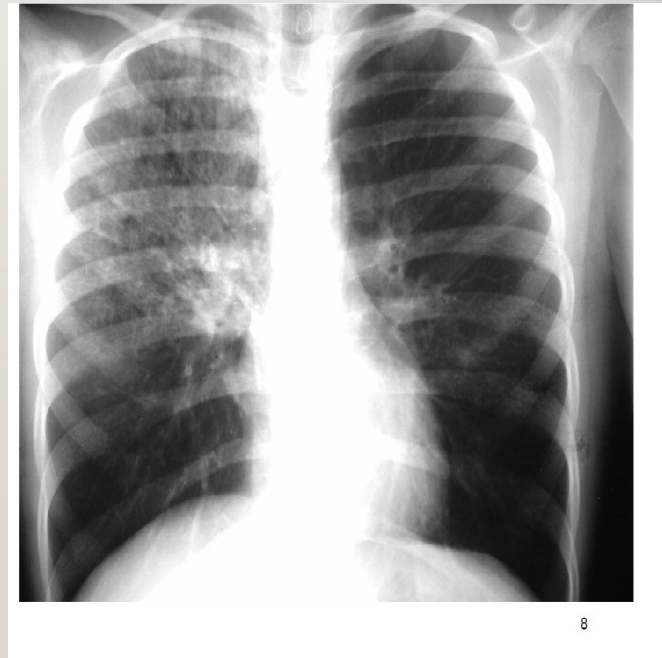
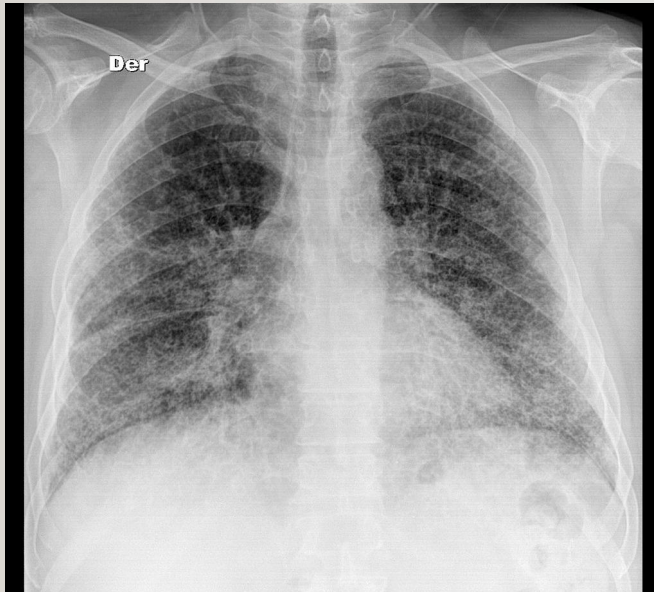
RADIOLOGIC EVALUATION



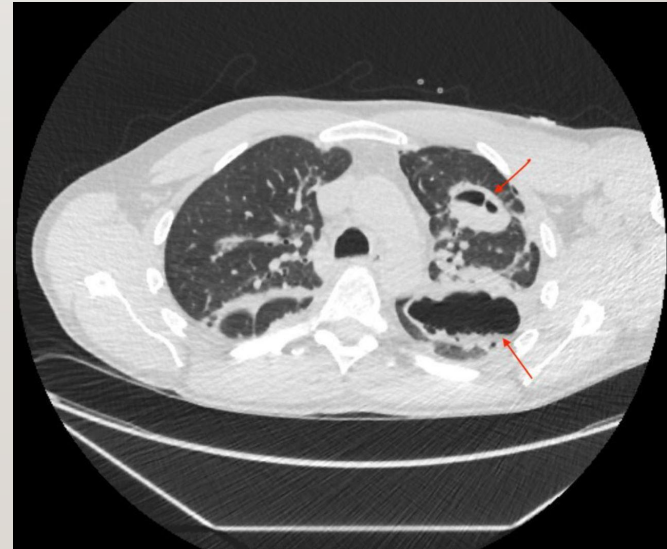
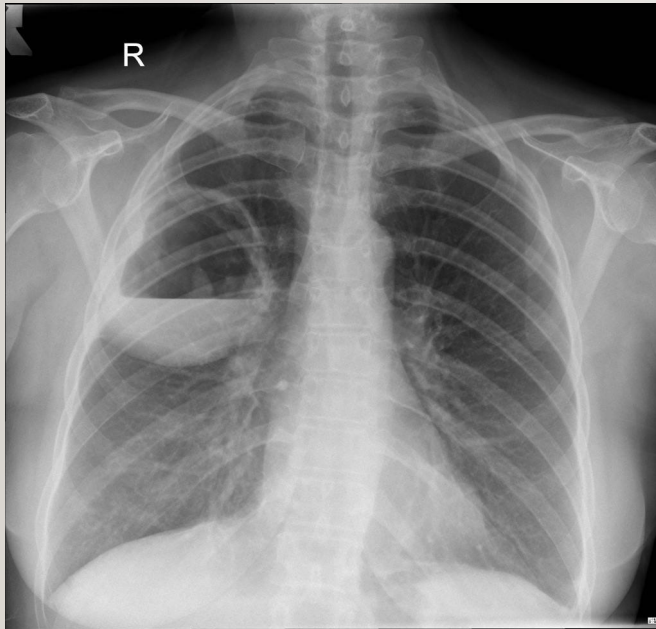
CONSOLIDATION



INTERSTITIAL INFILTRATES



CAVITATION

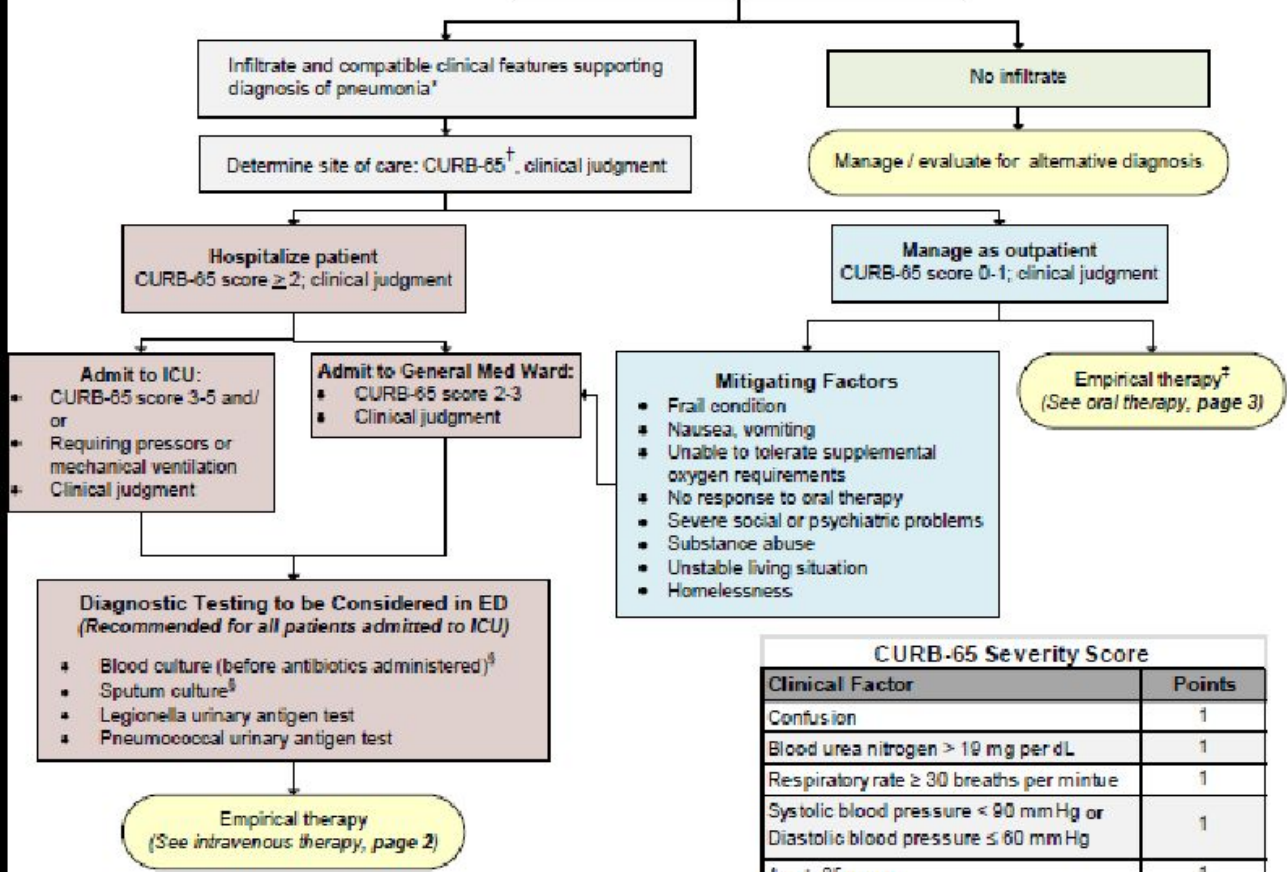


EVALUATION AND INITIAL MANAGEMENT OF COMMUNITY-ACQUIRED PNEUMONIA (CAP)



Evaluation and Initial Management of CAP

- History
- Physical examination
- Pulse oximetry
- CBC
- Chemistry panel
- Chest X-ray



* Compatible clinical features include but are not limited to: fever, hypothermia, rigors, sweats, new cough with / without sputum production, change in color of secretions, chest discomfort, or onset of dyspnea.

† See CURB-65 Severity Scores in boxes on the right.

‡ Obtain cultures as clinically indicated.

§ If culture cannot be obtained, DO NOT delay antibiotic administration.

Clinical Factor	Points
Confusion	1
Blood urea nitrogen > 19 mg per dL	1
Respiratory rate ≥ 30 breaths per minute	1
Systolic blood pressure < 90 mm Hg or Diastolic blood pressure ≤ 60 mm Hg	1
Age ≥ 65 years	1
Recommendations	CURB-65 Score
Low risk, consider home treatment	0
Short inpatient hospitalization or closely supervised outpatient treatment	1
Short inpatient hospitalization or closely supervised outpatient treatment	2
Severe pneumonia; hospital and consider admitting to intensive care unit	3
	≥ 4

Table 2: Oral Therapy

Patient Population	Antibiotic	Recommended Dosing	Notes
Previously Healthy and No Recent Antibiotic Therapy in Past 3 Months <i>If previous therapy known, use an alternative agent</i>	azithromycin or doxycycline	500 mg PO Q24 hrs. 100 mg PO Q12 hrs.	If comorbidities, consider moxifloxacin as an alternative.
	amoxicillin / clavulanate or amoxicillin (high dose) or cefdinir	2000/125 mg PO Q12 hrs.* 1 g PO Q8 hrs.* 300 mg PO Q12 hours*	High dose amox/clav targets drug-resistant S. pneumoniae (DRSP). Patients with co-morbidities or recent antimicrobial therapy are at risk of DRSP.
	Plus (+) either azithromycin or doxycycline	500 mg PO Q24 hrs. 100 mg PO Q12 hrs.	
	OR monotherapy levofloxacin	750 mg PO Q24 hrs.*	
Suspected Aspiration	amoxicillin / clavulanate or clindamycin	2000/125 mg PO Q12 hrs.* 300-450 mg PO Q6 hrs.	High dose amox/clav targets drug-resistant S. pneumoniae (DRSP). Patients with co-morbidities or recent antimicrobial therapy are at risk of DRSP.

* Dose should be adjusted for renal function.

Note: Patients presenting from the community with any of the following health care exposures are at risk for MRSA and

Patient Population	Antibiotic	Recommended Dosing	Notes
Non-ICU Patient without <i>Pseudomonal</i> Risk	ceftriaxone Plus (+) azithromycin	2 g IV Q24 hrs.* 500 mg IV Q24 hrs.	If < 65 years of age and no risk factors for drug-resistant pneumococcus, azithromycin is appropriate at discharge.
	OR monotherapy levofloxacin	750 mg IV Q24 hrs.**	
ICU Patient without <i>Pseudomonal</i> Risk	ceftriaxone*	2 g IV Q24 hrs.	If documented severe β -lactam allergy, use levofloxacin plus aztreonam (2 g IV Q8 hrs.***) as an alternative.
	Plus (+) either azithromycin or levofloxacin	500 mg IV Q24 hrs. 750 mg IV Q24 hrs.**	
ICU and Non-ICU Patients with <i>Pseudomonal</i> Risk***	piperacillin / tazobactam or cefepime	4.5 g IV Q8 hrs.** 2 g IV Q8 hrs.**	If documented severe β -lactam allergy, use aztreonam plus levofloxacin with tobramycin (7 mg/kg IV Q24 hrs.***) as an alternative.
	Plus(+) tobramycin and azithromycin	7 mg/kg IV Q24 hrs.** 500 mg IV Q24 hrs.	
Suspected Aspiration****	ampicillin / subactam or ertapenem	3 g IV Q8 hrs.** 1 g IV Q24 hrs.**	Ertapenem should be used in patients with penicillin allergies.
	Add vancomycin	15-20 mg/kg Q12 hrs.**	
Suspected MRSA Pneumonia			Consider loading dose of 25 mg/kg.

*Ceftriaxone 1 g IV Q24 hrs. is adequate for patients weighing < 80 kg.

**Dose should be adjusted for renal function.



Thank You