

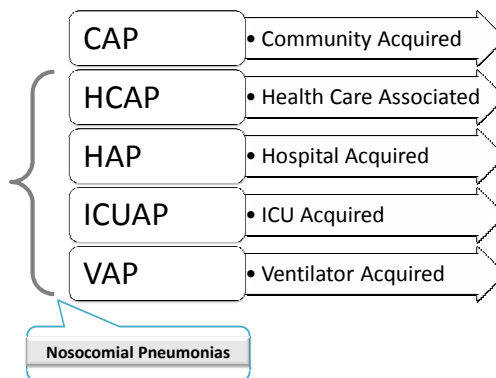
Community Acquired Pneumonia (CAP)

- Definition
- ... an acute infection of the pulmonary parenchyma that is associated with at least some symptoms of acute infection, accompanied by the presence of an acute infiltrate on a chest radiograph, or auscultatory findings consistent with pneumonia, in a patient not hospitalized or residing in a long term care facility for ≥ 14 days before onset of symptoms.

Bartlett. Clin Infect Dis 2000;31:347-82.

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Pneumonias – Classification



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CAP – The Two Presentations

Classical	Atypical
<ul style="list-style-type: none"> • Sudden onset of CAP • High fever, shaking chills • Pleuritic chest pain, SOB • Productive cough • Rusty sputum, blood tinge • Poor general condition • High mortality up to 20% in patients of bacteremia • S.pneumoniae causative 	<ul style="list-style-type: none"> • Gradual & insidious onset • Low grade fever • Dry cough, No blood tinge • Good GC – Walking CAP • Low mortality 1-2%; except in cases of Legionellosis • Mycoplasma, Chlamydiae, Legionella, Rickettsiae, Viruses are causative

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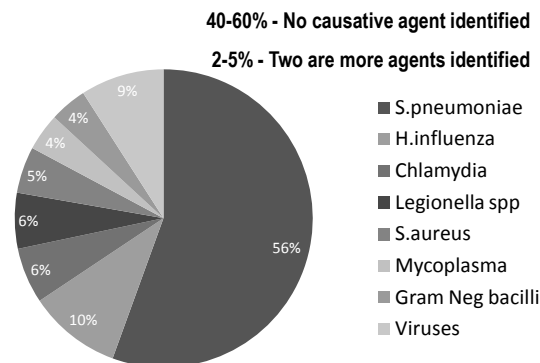
CAP – Risk Factors for Pneumonia

- Age
- Obesity; Exercise is protective
- Smoking, PVD
- Asthma, COPD
- Immuno-suppression, HIV
- Institutionalization, Old age homes etc
- Dementia

ID Clinics 1998;12:723. Am J Med 1994;96:313

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CAP – The Pathogens Involved



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Streptococcus pneumoniae

(Pneumococcus)

- Most common cause of CAP
- About 2/3 of CAP are due to S.pneumoniae
- These are gram positive diplococci
- Typical symptoms (e.g. malaise, shaking chills fever, rusty sputum, pleuritic chest pain, cough)
- Lobar infiltrate on CXR
- May be Immuno suppressed host
- 25% will have bacteremia – serious effects

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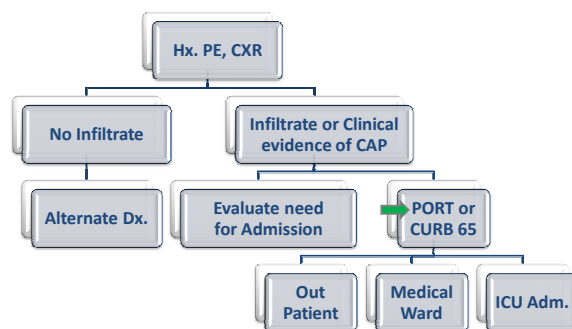
CAP – Risk Factors for Mortality

- Age > 65
- Bacteremia (for *S. pneumoniae*)
- *S. aureus*, MRSA, *Pseudomonas*
- Extent of radiographic changes
- Degree of immuno-suppression
- Amount of alcohol consumption

ID Clinics 1998;12:723. Am J Med 1994;96:313

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CAP – Evaluation of a Patient



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CAP – Laboratory Tests

- CXR – PA & lateral
- CBC with Differential
- BUN and Creatinine
- FBG, PPBG
- Liver enzymes

- Serum electrolytes
- Gram stain of sputum
- Culture of sputum
- Pre Rx. blood cultures
- Oxygen saturation

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Clinical Parameter	Scoring	Clinical Parameter	Scoring
Age in years	Example	Altered Sensorium	20 points
For Men (Age in yrs)	50	Respiratory Rate > 30	20 points
For Women (Age -10)	(50-10)	SBP < 90 mm	20 points
NH Resident	10 points	Temp < 35° C or > 40° C	15 points
Co-morbid Illnesses		Pulse > 125 per min	10 points
Neoplasia	30 points	Investigation Findings	
Liver Disease	20 points	Arterial pH < 7.35	30 points
CHF	10 points	BUN > 30	20 points
CVD	10 points	Serum Na < 130	20 points
Renal Disease (CKD)	10 points	Hematocrit < 30%	10 points
PORT Scoring – PSI			
Pneumonia Patient Outcomes Research Team (PORT)			
		Blood Glucose > 250	10 points
		Pa O ₂	10 points
		X Ray e/o Pleural Effusion	10 points

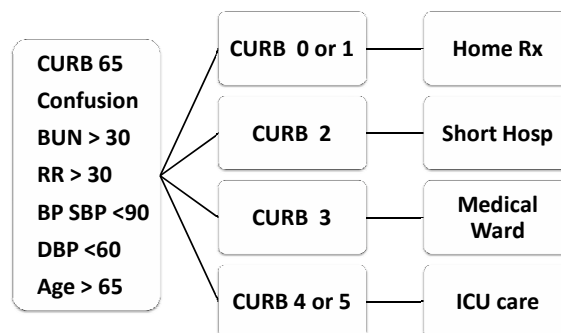
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CAP – Management based on PSI Score

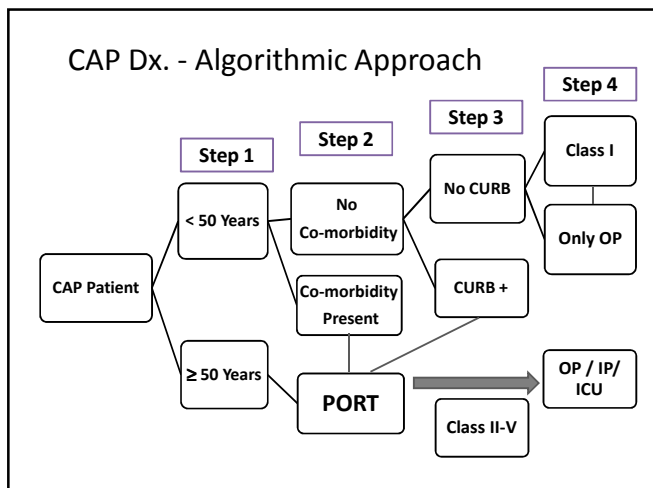
PORT Class	PSI Score	Mortality %	Treatment Strategy
Class I	No RF	0.1 – 0.4	Out patient
Class II	≤ 70	0.6 – 0.7	Out patient
Class III	71 - 90	0.9 – 2.8	Brief Hospitalization
Class IV	91 - 130	8.5 – 9.3	Inpatient
Class V	> 130	27 – 31.1	IP - ICU

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CURB 65 Rule – Management of CAP



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Who Should be Hospitalized?

Class I and II	Usually do not require hospitalization
Class III	May require brief hospitalization
Class IV and V	Usually do require hospitalization

Severity of CAP with poor prognosis

RR > 30; PaO₂/FiO₂ < 250, or PO₂ < 60 on room air

Need for mechanical ventilation; Multi lobar involvement

Hypotension; Need for vasopressors

Oliguria; Altered mental status

CAP – Criteria for ICU Admission

Major criteria

- Invasive mechanical ventilation required
- Septic shock with the need of vasopressors

Minor criteria (least 3)

- Confusion/disorientation
- Blood urea nitrogen ≥ 20 mg%
- Respiratory rate ≥ 30 / min; Core temp. < 36° C
- Severe hypotension; PaO₂/FiO₂ ratio ≤ 250
- Multi-lobar infiltrates
- WBC < 4000 cells; Platelets <100,000

Antibiotics of choice for CAP

<p>Macrolide -M</p> <ul style="list-style-type: none"> • Azithromycin • Clarithromycin • Erythromycin • Telithromycin • Doxycycline 	<p>Fluroquinolone-FQ</p> <ul style="list-style-type: none"> • Levofloxacin • Moxifloxacin • Gatifloxacin • Trovafloxacin 	<p>Betalactum - B</p> <ul style="list-style-type: none"> • Ceftriaxone • Cefotaxime • B Inhibitor - BI • Sulbactam • Tazobactam • Piperacillin
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Empiric Treatment – Outpatient

Healthy and no risk factors for DR *S.pneumoniae*

1. Macrolide or Doxycycline

Presence of co-morbidities, use of antimicrobials within the previous 3 months, and regions with a high rate (>25%) of infection with Macrolide resistant *S. pneumoniae*

1. Respiratory FQ – Moxiflox, Gemiflox or Levoflox
2. Beta-lactam (High dose Amoxicillin, Amoxicillin-Clavulanate is preferred; Ceftriaxone, Cefpodoxime, Cefuroxime) plus a Macrolide or Doxycycline

Empiric Treatment – Inpatient – Non ICU

1. A Respiratory Fluoroquinolone (FQ) or
2. A Beta-lactam plus a Macrolide (or Doxycycline) (Here Beta-lactam agents are 3 Generation Cefotaxime, Ceftriaxone, Amoxiclav)
3. If Penicillin-allergic Respiratory FQ or Ertapenem is another option

Empiric Treatment: Inpatient in ICU

1. A Beta-lactam (Cefotaxime, Ceftriaxone, or Ampicillin-Sulbactam) plus either Azithromycin or Fluoroquinolone
2. For penicillin-allergic patients, a respiratory Fluoroquinolone and Aztreonam

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Empiric Rx. – Suspected Pseudomonas

1. Piperacillin-Tazobactam, Cefepime, Carbapenems (Imipenem, or Meropenem) **plus either** Cipro or Levofloxacin
2. Above Beta-lactam + Aminoglycoside + Azithromycin
3. Above Beta-lactam + Aminoglycoside + an antipseudomonal and antipneumococcal FQ
4. If Penicillin allergic - Aztreonam to substitute the Beta- lactam

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Empiric Rx. – CA MRSA

For Community Acquired Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA)

- Vancomycin or Linezolid
Neither is an optimal drug for MSSA
- For Methicillin Sensitive *S. aureus* (MSSA)
B-lactam and sometimes a respiratory Fluoroquinolone, (until susceptibility results).
- Specific therapy with a penicillinase-resistant semisynthetic penicillin or 1 gen cephalosporin

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CAP – Summary of Empiric Treatment

Outpatient Rx – any one of the three

- Macrolide or Doxycycline or Fluoroquinolone
- Patients in General Medical Ward
- 3rd Generation Cephalosporin + Macrolide
 - Betalactum / B-I + Macrolide or B / B-I + FQ
 - Fluoroquinolone alone

Patients in ICU

- 3GC + Macrolide or 3GC + FQ
- B/B-I + Macrolide or B/B-I + FQ

IDSA guidelines: Clin Infect Dis 2000;31:347-82

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Strategies for Prevention of CAP

- Cessation smoking
- Influenza Vaccine (Flu shot – Oct through Feb)
It offers 90% protection and reduces mortality by 80%
- Pneumococcal Vaccine (Pneumonia shot)
It protects against 23 types of Pneumococci
70% of us have Pneumococci in our RT
It is not 100% protective but reduces mortality
Age 19-64 with co morbidity of high for pneumonia
Above 65 all must get it even without high risk
- Starting first dose of antibiotic with in 4 h & O₂ status

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CAP – How Best to Win the War?

- Early antibiotic administration within 4-6 hours
- Empiric antibiotic Rx. as per guidelines (IDSA / ATS)
- PORT – PSI scoring and Classification of cases
- Early hospitalization in Class IV and V
- Change Abx. as per pathogen & sensitivity pattern
- Decrease smoking cessation advice / counseling
- Arterial oxygenation assessment in the first 24 h
- Blood culture collection in the first 24 h prior to Abx.
- Pneumococcal & Influenza vaccination; Smoking **X**

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