Community-acquired pneumonia (CAP) in adults is often caused by a single organism, the most common being Streptococcus pneumoniae, which is responsible for most cases of severe illness and death, particularly in the elderly.

Other important causes of bacterial CAP in adults include:

(i) Mycoplasma pneumoniae,
(ii) Chlamydia pneumoniae and
(iii) Legionella species.

Haemophilus influenzae is responsible for less than 5% of cases of CAP and is seen predominantly in chronic obstructive pulmonary disease.

The choice of antibiotic for CAP is usually empirical because the clinical presentation and X-ray appearances are not sufficiently specific to direct therapy against any one of the likely causative organisms, and standard microbiological tests have a relatively low yield.

Patient mortality and hospital length of stay are significantly reduced if antimicrobial therapy is commenced within 8 hours (and preferably 4 hours) of initial presentation with CAP.

### Pneumonia Severity Index

- Large studies have validated a scoring system the Pneumonia Severity Index (PSI) that stratifies patients with CAP according to their age, co-morbidities and severity, to define their risk of death.

1. Young patients with widespread chest X-ray changes or who are hypoxic on air (e.g. PaO2 <70 mm Hg; O2 saturation <94%) should be considered to be at high risk, regardless of their PSI class.
2. PSI provides a guide to overall mortality risk, but some patients may worsen during the initial 24 to 48 hours.
3. Patients in PSI class IV and V are at greatest risk of requiring ICU admission, but 14% to 32% of patients with CAP requiring ICU admission initially have PSI class III or less.

### Laboratory Observations

- Blood culture positive
- Leukocytosis or leukopenia
- Microscopy of sputum
- Culture of blood, sputum or pleural fluid
- Results of radiographic examination of chest
- Respiratory volume: abnormal
- Blood gas analysis: hypoxia, hypercarbia

### Risk factors for poor outcome

- Hypoxia (PaO2/FiO2 <300 mmHg)
- Acidosis (base deficit > 6)
- Age > 65 years
- Pneumonia of lower respiratory tract origin
- Respiratory failure
- Sepsis

### Epidemiological clues to etiology

- Community-acquired pneumonia
- Risk factors for severe community-acquired pneumonia
- Antibiotic therapy of severe CAP requiring ICU

### Risk factors for developing severe community-acquired pneumonia

- Advanced age
- COPD
- Chronic obstructive pulmonary disease
- Nonsteroidal anti-inflammatory drugs

### Pneumonia Severity Index

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Community Enveloped Pathogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Klebsiella pneumoniae</td>
<td>S. pneumoniae, Mycoplasma pneumoniae, Legionella pseudomallei</td>
</tr>
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</table>

### Treatment of severe CAP

- For patients requiring intensive care management, broad-spectrum antimicrobials are initially required to treat Streptococcus pneumoniae, Legionella pneumophila, and enteric Gram-negative bacilli.
- In nontropical regions, use:
  - azithromycin 500 mg IV, daily
  - erythromycin 500 mg to 1 g IV (preferably through a central line), 6-hourly
  - ceftriaxone 1 g IV, daily
  - cefotaxime 1 g IV, 8-hourly
  - PLUS THE COMBINATION OF benzypenicillin 1.2 g IV, 4-hourly
  - PLUS gentamicin 4 to 6 mg/kg IV, daily
- In patients with immediate penicillin hypersensitivity, in addition to azithromycin or erythromycin, use:
  - moxifloxacin 400 mg IV, daily
- Modify therapy after microbiological diagnosis.
- Duration of therapy for class V CAP depends on the rate of patient response and the result of microbiological investigations.
- Switch to oral antibiotics after there has been significant improvement and the patient has been stable for 48 hours (generally a total of IV + oral) of 7 to 14 days therapy will be required.
- In some regions of tropical Australia, Burkholderia pseudomallei and Acinetobacter baumannii are important causes of severe CAP, with B. pseudomallei being in incidence only to Streptococcus pneumoniae.
- Risk factors for B. pseudomallei and A. baumannii include diabetes, alcoholism, chronic renal failure and chronic lung disease.
- In these regions, as initial therapy use:
  - meropenem 1 g IV, 8-hourly
  - imipenem 1 g IV, 6-hourly
  - PLUS EITHER azithromycin 500 mg IV, daily
  - or erythromycin 500 mg to 1 g IV (preferably through a central line), 6-hourly.
- Modify therapy after microbiological diagnosis.
- Treatment duration depends on the rate of patient response and the etiology of the pneumonia.