Guidelines for the Initiation of Empirical Antibiotic therapy in Respiratory Disease (Adults)

Community Acquired Pneumonia

1) Is it pneumonia? ie new symptoms and signs of a lower respiratory tract infection with NEW CXR SHADOWING.
2) Assess severity (SEVERE vs NON-SEVERE), use clinical judgement, CURB-65 score (see adjacent box), and additional features (e.g. hypoxia < 92% or < 8.0kPa, multilobar consolidation etc).
3) Microbiology specimens:- Severe pneumonia:- send sputum and blood for culture, send urine for pneumococcal & legionella antigen. For non-severe:- send sputum, only send blood for culture if pyrexial.
4) Choose an antibiotic regimen (see below for guidance). Record reasoning in the medical notes.
5) Reassess patient & antibiotic regimen daily. Adjust according to microbiology results. Consider STEP DOWN from IV to oral Rx if apyrexial at 24 - 48 hrs with improving clinical state (↓ WC, ↓ CRP, ↑ PaO₂ )
6) A TOTAL (IV+ oral) of 7 days is usually adequate in non-severe CAP & 10 days in uncomplicated severe CAP.

CURB-65 score
Scoring system used to aid clinical judgement including:
a) need for admission
b) antibiotic choice
c) need for escalation of therapy
d) risk of mortality
Score 1 for each of the following:-
New Confusion
Urea >7
Respiratory rate > 30/min
Blood pressure: systolic <90mm Hg, diastolic < 60mmHg
Age over 65
Score 0 or 1 = non-severe pneumonia
Score 3, 4 or 5 = severe pneumonia
Score 2 = use additional factors for guidance
(Relevance of CURB-65 score to outcome - mortality or need for ITU for CURB-65 if:
score 0 → 0.7%, 1 → 3.2%, 2 → 13%, 3 → 17%, 4 → 41.5%, 5→ 57%)

Special considerations
i) If CAP is after recent influenza infection consider adding IV/Oral flucloxacillin 0.5 – 1.0 g QDS.
ii) If severe CAP is not responding to treatment, review culture results, discuss with Senior and Microbiology if necessary
iii) 14-28 days may be needed in certain circumstances eg Legionella. Always seek microbiological advice.
iv) Klebsiella pneumoniae is a rare pathogen (~1.5%) and will not be covered by the Benzylpenicillin/Teicoplanin and Clarithromycin combination alone

Aspiration pneumonia
• Risk factors – ↓ level of consciousness and depressed gag reflex, dysphagia due to local obstruction or neuro disease, intubation and gastric feeding, oesophageal dysmotility and reflux and persistent vomiting, alcoholism
• Key issue is differentiation between chemical pneumonitis and infection. Antibiotic always indicated in the latter i.e aspiration pneumonia
• In community acquired aspiration pneumonia regimens should cover oral anaerobes and S.milleri group, if hospital acquired suspected then aerobic gram negative bacilli should also be covered

Further information: Microbiology ☑ 4105, Ward Pharmacist, Medicines Information ☑ 4270
### Guidance for the Initiation of Empirical Antibiotics in Community Acquired Pneumonia (CAP)

<table>
<thead>
<tr>
<th>Non-severe CAP (Non-clinical reasons for admission or previously untreated in the community)</th>
<th>IV Drugs</th>
<th>Oral Drugs</th>
<th>Drugs in Penicillin Allergy</th>
</tr>
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<tbody>
<tr>
<td>'CURB-65' 0 or 1</td>
<td>IV Amoxicillin 500mg – 1g 8 hourly</td>
<td>Amoxicillin 500mg - 1g 8 hourly&lt;br&gt;Consider adding&lt;br&gt;Oral Clarithromycin 500mg 12 hourly if patient not responding</td>
<td>Oral Doxycycline 200mg 12 hourly for 48 hours then 200mg every 24 hours</td>
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<th>Non-severe CAP (If IV Rx needed eg unable to swallow)</th>
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<td>'CURB-65' 0 or 1</td>
<td>Consider adding&lt;br&gt;IV Clarithromycin 500mg 12 hourly if not responding&lt;br&gt;Review need for IV within 48 hrs</td>
<td>Step down to: -&lt;br&gt;Oral Amoxicillin 500mg - 1g 8 hourly&lt;br&gt;+/- Oral Clarithromycin 500mg 12 hourly</td>
<td>Clarithromycin IV 500mg 12 hourly&lt;br&gt;Review need for IV within 48 hrs&lt;br&gt;Step down to: -&lt;br&gt;Oral Clarithromycin 500mg 12 hourly</td>
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<th>Severe CAP (≤ 70 years old)</th>
<th>IV Drugs</th>
<th>Oral Drugs</th>
<th>Drugs in Penicillin Allergy</th>
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<tr>
<td>see ‘CURB-65’ guidance above</td>
<td>IV Co-amoxiclav 1.2g 8 hourly&lt;br&gt;PLUS&lt;br&gt;IV Clarithromycin 500mg 12 hourly&lt;br&gt;Review need for IV within 48 hrs</td>
<td>Step down to: -&lt;br&gt;Oral Co-amoxiclav 625mg 8 hourly&lt;br&gt;PLUS&lt;br&gt;Oral Clarithromycin 500mg 12 hourly</td>
<td>IV Teicoplanin 400mg 12 hourly for 3 doses then 400mg every 24 hours&lt;br&gt;PLUS&lt;br&gt;IV Clarithromycin 500mg 12 hourly&lt;br&gt;# Add Gentamicin once daily if clinical concern &amp; review need for further dose at 24hrs (see Trust Gentamicin policy)&lt;br&gt;Review need for IV within 48 hrs&lt;br&gt;Step down to: -&lt;br&gt;Oral Clarithromycin 500mg 12 hourly</td>
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<tr>
<th>Severe CAP (&gt; 70 years old, to minimise the risk of developing C. Difficile)</th>
<th>IV Drugs</th>
<th>Oral Drugs</th>
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<tr>
<td>see ‘CURB-65’ guidance above</td>
<td>IV Benzylpenicillin 1.2g-2.4g 6 hourly&lt;br&gt;PLUS&lt;br&gt;IV Clarithromycin 500mg 12 hourly&lt;br&gt;# Add Gentamicin once daily if clinical concern &amp; review need for further dose at 24 hrs (see Trust Gentamicin policy)&lt;br&gt;Review need for IV within 48 hrs</td>
<td>Step down to: -&lt;br&gt;Oral Doxycycline 200mg 12 hourly for 48 hours then 200mg every 24 hours</td>
<td>IV Teicoplanin 400mg 12 hourly for 3 doses then 400mg every 24 hours&lt;br&gt;PLUS&lt;br&gt;IV Clarithromycin 500mg 12 hourly&lt;br&gt;# Add Gentamicin once daily if clinical concern &amp; review need for further dose at 24hrs (see Trust Gentamicin policy)&lt;br&gt;Review need for IV within 48 hrs&lt;br&gt;Step down to: -&lt;br&gt;Oral Clarithromycin 500mg 12 hourly</td>
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<th>Aspiration pneumonia (all ages)</th>
<th>IV Drugs</th>
<th>Oral Drugs</th>
<th>Drugs in Penicillin Allergy</th>
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<tr>
<td>IV or oral: decision based on clinical assessment</td>
<td>IV Amoxicillin 500-1g 8 hourly&lt;br&gt;PLUS&lt;br&gt;IV Metronidazole 500mg 8 hourly</td>
<td>Oral Amoxicillin 500-1g 8 hourly&lt;br&gt;PLUS&lt;br&gt;Oral Metronidazole 400mg 8 hourly</td>
<td>IV Clarithromycin 500mg 12 hourly&lt;br&gt;PLUS&lt;br&gt;IV Metronidazole 500mg 8 hourly step down to&lt;br&gt;PO Clarithromycin 500mg 12 hourly PLUS&lt;br&gt;PO Metronidazole 400mg 8 hourly</td>
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### Special considerations
- Klebsiella pneumoniae is a rare pathogen (~1.5%) & will not be covered by the Benzylpenicillin/Teicoplanin & Clarithromycin combination alone.
### Guidance for Empirical use of Antibiotics in Hospital Acquired Pneumonia (onset >72 hrs admission)

<table>
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<tr>
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<th>IV DRUGS</th>
<th>ORAL DRUGS</th>
<th>DRUGS IN PENICILLIN ALLERGY</th>
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<tr>
<td><strong>HOSPITAL ACQUIRED PNEUMONIA</strong></td>
<td></td>
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<tr>
<td>NON-SEVERE</td>
<td>IV Amoxicillin 500mg-1g 8 hourly AND # IV Gentamicin once daily (see Trust Gentamicin policy)</td>
<td>Oral Doxycycline 200mg 12 hourly for 48 hours then 200mg every 24 hours If not responding at 48 hours consider Rx as SEVERE</td>
<td>Oral Doxycycline 200mg 12 hourly for 48 hours then 200mg every 24 hours If not responding at 48 hours consider Rx as SEVERE</td>
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<td><strong>HOSPITAL ACQUIRED PNEUMONIA</strong></td>
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<tr>
<td>SEVERE and normal renal function</td>
<td>IV Co-amoxiclav 1.2g 8 hourly OR *If Pseudomonas or clinical concern IV Piperacillin &amp; tazobactam (tazocin) 4.5g 8 hourly (NB these antibiotics contain a penicillin) ADD IV Teicoplanin 400mg 12 hourly for 3 doses then 400mg every 24 hours. if known MRSA/MRSA pneumonia possible</td>
<td>Step down :- Review culture results. Discuss with Senior or Microbiology if necessary.</td>
<td>IV Teicoplanin 400mg 12 hourly for 3 doses then 400mg every 24 hours ADD # IV Gentamicin once daily (see Trust Gentamicin policy) Review need for IV within 48 hrs. Step down :- Review culture results. Discuss with Seniors or Microbiology if necessary.</td>
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<td><strong>HOSPITAL ACQUIRED PNEUMONIA</strong></td>
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<tr>
<td>SEVERE and abnormal renal function (eg Cr &gt;150mmol/l; eGFR &lt; 40ml/min)</td>
<td>IV Teicoplanin 400mg 12 hourly for 3 doses then 400mg every 24 hours. if known MRSA/MRSA pneumonia possible</td>
<td>Step down :- Review culture results. Discuss with Senior or Microbiology if necessary.</td>
<td>IV Teicoplanin 400mg 12 hourly for 3 doses then 400mg every 24 hours Review need for IV within 48 hrs AND Oral Ciprofloxacin 500mg 12 hourly. Review culture results. Discuss with Seniors or Microbiology if necessary.</td>
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<tr>
<td><strong>HOSPITAL ACQUIRED ASPARATION PNEUMONIA</strong></td>
<td>ADD Metronidazole IV 500mg 8 hourly To ‘Hospital Acquired’ regimen (not needed if on Co-amoxiclav or Tazocin) Review need for IV within 48 hrs</td>
<td>ADD Oral Metronidazole 400mg 8 hourly To ‘Hospital Acquired’ regimen</td>
<td>ADD Metronidazole IV 500mg 8 hourly To ‘Hospital Acquired’ regimen</td>
</tr>
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# See Trust Gentamicin policy, ICID

*Risk of Pseudomonas pneumonia increased by known colonisation, inpatient > 7 days, ventilation on ICU this admission, > 2 recent antibiotic courses

Guidelines for the Initiation of Empirical Antibiotic Therapy in Respiratory Disease (Adults)
Authors: Dr Catherine Thompson - Consultant Physician, Dr Julian Hemming - Consultant Microbiologist, Christine Dodd, Lead Antimicrobial Pharmacist
ARG Approval: January 2008 Policy Date: March 2007, Updated: January 2008
DTC Approval: February 2008 Review Date: March 2009
Guidance for the Initiation of Empirical Antibiotics in an Infective Exacerbation of COPD

**Acute Exacerbation of Chronic Obstructive Pulmonary Disease (COPD)**

Acute exacerbations of COPD are characterised by worsening of a previously stable situation. Differentiation from pneumonia is based on the **ABSENCE OF NEW CXR shadowing** and localising physical signs in the chest. Antibiotics are appropriate if there is purulent sputum and/or ↑sputum volume together with ↑ SOB/wheeze.

Ensure a sputum sample is sent.

For most patients a **TOTAL of 5-7 days** antibiotics is likely to be adequate.

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<tr>
<td><strong>MODERATE DISEASE</strong> <em>(Consider the therapy already started in the community eg if on low dose try a higher dose of same antibiotic)</em></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Choice&lt;br&gt;Amoxicillin 500mg - 1g 8 hourly&lt;br&gt;OR&lt;br&gt;Doxycycline 200mg as a single dose then 100mg every 24 hours&lt;br&gt;2&lt;sup&gt;nd&lt;/sup&gt; Choice&lt;br&gt;(no response to 1&lt;sup&gt;st&lt;/sup&gt; Choice &gt; 48 hrs)&lt;br&gt;Oral Co-amoxiclav 625mg 8 hourly&lt;br&gt;3&lt;sup&gt;rd&lt;/sup&gt; Choice&lt;br&gt;(no response to 1&lt;sup&gt;st&lt;/sup&gt; &amp; 2&lt;sup&gt;nd&lt;/sup&gt; choices)&lt;br&gt;Oral Ciprofloxacin 500mg 12 hourly</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Choice&lt;br&gt;Oral Doxycycline 200mg as a single dose then 100mg every 24 hours&lt;br&gt;2&lt;sup&gt;nd&lt;/sup&gt; Choice&lt;br&gt;(no response to 1&lt;sup&gt;st&lt;/sup&gt; Choice &gt; 48hrs)&lt;br&gt;Oral Ciprofloxacin 500mg 12 hourly</td>
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<tr>
<td><strong>SEVERE DISEASE</strong> <em>(eg respiratory failure/non-invasive ventilation)</em>&lt;br&gt;Co-amoxiclav 1.2g 8 hourly&lt;br&gt;Review need for IV within 48 hrs</td>
<td>Step down to:-&lt;br&gt;Amoxicillin 500 mg 8 hourly&lt;br&gt;OR&lt;br&gt;Co-amoxiclav 625mg 8 hourly</td>
<td>Clarithromycin 500mg 12 hourly IV&lt;br&gt;Step down to:-&lt;br&gt;Oral Clarithromycin 500mg 12 hourly</td>
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Review sputum results & discuss with Senior or Microbiology if necessary.
Guidance for the Initiation of Empirical Antibiotics for Community Acquired Pneumonia (CAP) for patients > 70 years of age (to minimise risk of C.difficile infection)

Clinical assessment including CURB 65 score
(See CAP guidance ICID, includes guidance for < 70 yrs)

- **Community Acquired Pneumonia**
  - (or onset <72 hours after hospital admission)
  - age > 70 yrs

**NON-SEVERE CAP**

- **IV Benzylpenicillin 1.2 - 2.4g 6 hourly**
- **AND**
- **IV Clarithromycin 500mg 12 hourly**
- **ADD**
  - **Gentamicin once daily dosing**
  - if clinical concern* and review need for further dose in 24 hours
  - (See Trust Gentamicin Policy)

**Penicillin allergy**
- **Oral Doxycycline 200mg 12 hourly for 48 hours followed by 200mg every 24 hours**
- **If NBM**
  - **IV Amoxicillin 500mg – 1g 8 hourly**
  - **ADD**
  - **IV Clarithromycin 500mg 12 hourly**

If no response in 24-48 hours and clinically deteriorating

Treat as **SEVERE CAP**

**SEVERE CAP**

- **IV Benzylpenicillin 1.2 - 2.4g 6 hourly**
- **AND**
- **IV Clarithromycin 500mg 12 hourly**
- **ADD**
  - **Gentamicin once daily dosing**
  - if clinical concern* and review need for further dose in 24 hours
  - (See Trust Gentamicin Policy)

**Penicillin allergy**
- **Oral Doxycycline 200mg 12 hourly for 48 hours followed by 200mg every 24 hours**
- **If NBM**
  - **IV Amoxicillin 500mg – 1g 8 hourly**
  - **ADD**
  - **IV Clarithromycin 500mg 12 hourly**

Clinical deterioration at 24-48 hours?

**NO**

- Review IV antibiotics at 24-48 hours and switch to oral therapy when clinically indicated (see CAP guidance ICID)

**YES**

- Review culture results with Senior then discuss with Microbiology if necessary

*Klebsiella pneumonia is a rare pathogen (~1.5% of CAP) and will not be covered by IV BenzylPenicillin/IV Teicoplanin and Clarithromycin regimen*
Guidelines for the Initiation of Empirical Antibiotics for Hospital Acquired Pneumonia

*Hospital Acquired Pneumonia*
new infection occurring >72 hours after admission
(any age)

### NON-SEVERE
(based on clinical assessment)

- **Oral Doxycycline 200 mg 12 hourly for 48 hours followed by 200mg daily**

  - If no improvement or clinically deteriorating at 24-48hrs
  - **Go to SEVERE**

### SEVERE
(based on clinical assessment)

- **Concern about renal dysfunction eg Cr>150mmol/l or CrCl < 40ml/min ?**

  - **NO**
    - **IV Amoxicillin 1g 8 hourly AND IV Gentamicin once daily (See Trust Gentamicin Policy)**
    - **Penicillin allergy**
      - **IV Teicoplanin 400mg 12 hourly for 3 doses followed by 400mg daily AND IV Gentamicin once daily (See Trust Gentamicin Policy)**
    - If aspiration likely
      - **ADD Metronidazole IV 500mgs 8 hourly or 400mgs 8 hourly orally**
  - **YES**
    - **IV Co-amoxiclav 1.2 g 8 hourly OR IV Piperacillin & tazobactam (tazocin) 4.5g 8 hourly**, if there is clinical concern of Pseudomonas (eg inpatient > 7days, >2 recent antibiotic courses, known colonisation)
    - **Caution! Both these antibiotics contain penicillin** (see box below if allergy)
    - If known MRSA and/or MRSA pneumonia infection a possibility:
      - **ADD IV Teicoplanin 400mg 12 hourly for 3 doses followed by 400mg every 24 hours**

**Note**: Always review culture results with Senior then discuss with Microbiology if necessary

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