Nottingham University Hospitals NHS
NHS Trust

GUIDELINES FOR THE MANAGEMENT OF COMMUNITY-ACQUIRED PNEUMONIA IN ADULTS

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Ratified by	• Nottingham University Hospitals **Antimicrobial Guidelines** and Drugs and Therapeutics Committees
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Consultation	• Nottingham Antibiotic Guidelines Committee members • Respiratory Consultants
Evidence base	• Local microbiological sensitivity surveillance • Recommended best practice based on clinical experience of guideline developers • These guidelines are based on the British Thoracic Society Guidelines, (*Thorax* 2001;56 (suppl. IV)) and the subsequent update published on the BTS website in April 2004 (both available on http://www.brit-thoracic.org.uk/)
Changes from previous Guideline	• Removal of assessment of MRSA risk for non-aspiration pneumonia • Update March 2009 – Replacement of oral erythromycin with oral clarithromycin. Update of antibiotics guidelines website address.
Inclusion criteria	• Immuno-competent adult patients admitted with community acquired pneumonia (including aspiration)
Exclusion criteria	• Immunosuppressed patients, patients with hospital-acquired pneumonia (see separate guidelines), or patients with non-pneumonic lower respiratory tract infection e.g. COPD exacerbation
Audit	• Part of annual Directorate Audit Plans when appropriate
Distribution	• This guideline will be available on antibiotics guidelines website: Find under “clinical information” on NUHnet or see http://nuhnet/diagnostics_clinical_support/antibiotics or http://www.nuh.nhs.uk/antibiotics
Local contacts	• Dr V Weston Consultant Microbiologist

This guideline has been registered with the Trust.
Clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague. Caution is advised when using guidelines after a review date.

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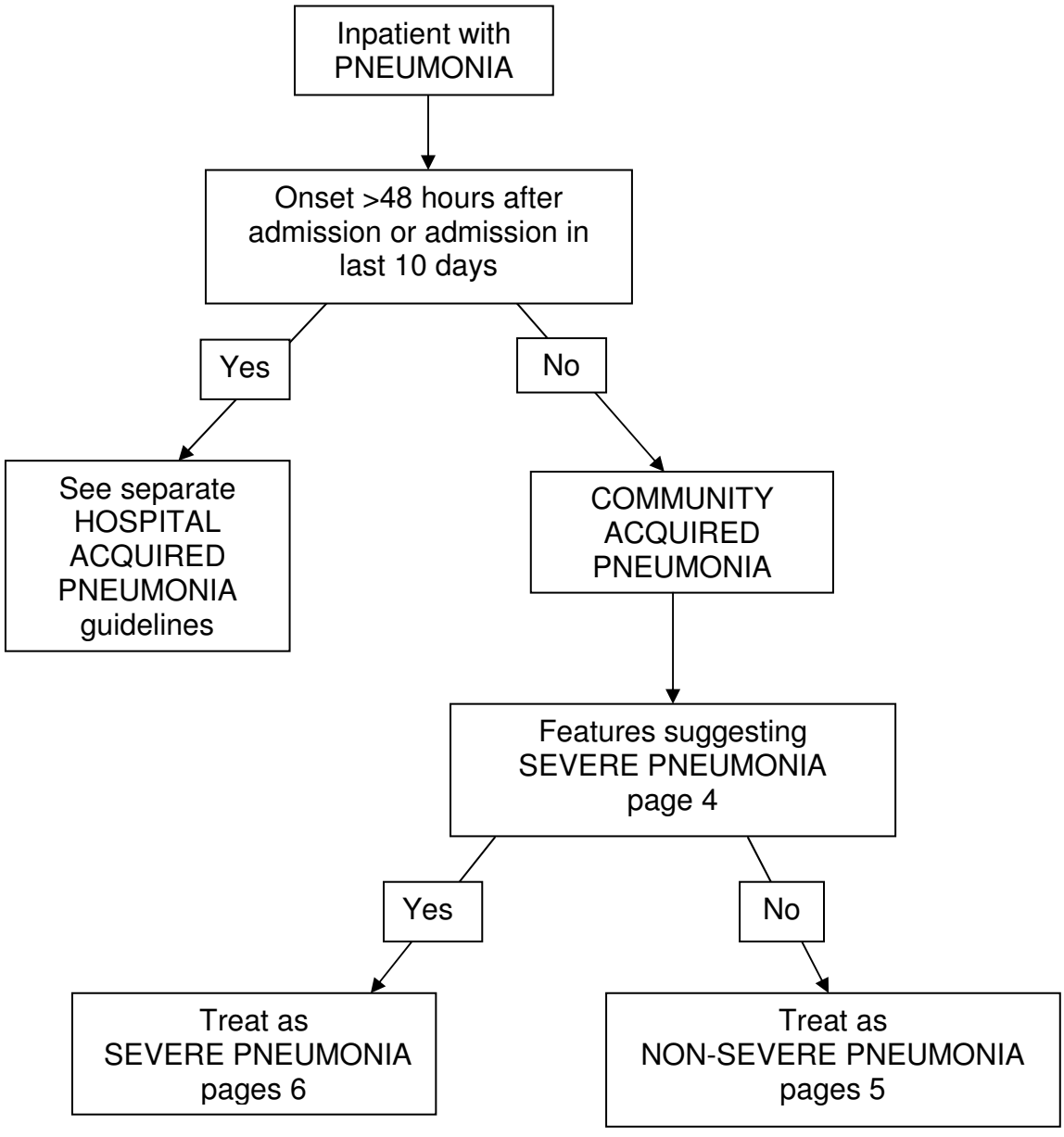

Introduction

Community-acquired pneumonia is common and associated with significant mortality and morbidity. These guidelines refer to the management of adults with community-acquired pneumonia, they are NOT aimed at pneumonia in immunosuppressed patients, patients with non-pneumonic lower respiratory tract infection e.g. exacerbation of COPD or hospital acquired pneumonia (see flow chart and separate guidelines). These guidelines are based on the British Thoracic Society Guidelines published in Thorax in December 2001 (*Thorax* 2001;**56** (suppl. IV)) and the subsequent update published on the BTS website in April 2004 (both are available on http://www.brit-thoracic.org.uk/).

Definition

Community-acquired pneumonia (CAP) is defined as symptoms and signs consistent with an acute lower respiratory tract infection associated with new radiographic shadowing for which there is no other explanation (e.g. not pulmonary oedema or infarction), which develops in the community or within 48 hours of hospital admission.

Clinical Features

Fever, cough, chest pain and shortness of breath may be the presenting features but some patients particularly elderly patients may present with non-specific symptoms such as new confusion.

Microbiology

Streptococcus pneumoniae is the commonest cause and risk in all age groups

Haemophilus influenzae is a less common cause

Mycoplasma pneumoniae is more common in young adults with epidemics every 3-4 years

Anaerobes are possible if the patient has a history suggestive of aspiration as a precipitating cause.

Other causes include *Legionella pneumophila* and *S. aureus,* which are more commonly found in patients with severe disease. Methicillin resistant *S. aureus* infection (MRSA) infection should be considered in patients admitted from nursing/ residential homes, who have been colonised with MRSA in the past. *Chlamydia psittaci*, C*oxiella burnetii* and enteric Gram negative bacilli are uncommon causes.

Investigations

All patients should have the following investigations on admission

1) Oxygenation assessment
2) Chest X-ray
3) Urea, electrolytes and liver function tests
4) C-reactive protein (CRP)
5) Blood cultures x 2 sets preferably before antibiotic therapy is commenced
6) Sputum for culture from patients with non-severe CAP if able to expectorate and no prior antibiotic treatment or if failing to improve. Sputum or bronchoscopy sample for culture including legionella culture and viral investigation should be obtained in severe CAP.
7) Acute serum for storage to be sent in all patients with date of onset clearly stated on the request form. Followed by a convalescent serum taken 7-10 days after onset of symptoms in all cases of severe pneumonia or features suggesting an atypical infection for respiratory serology, stating date of onset on the request form.
8) Urine for legionella and pneumococcal antigen if severe pneumonia
9) Throat swab in Viral transport medium for viral investigation if severe pneumonia or possible viral pneumonia.

Severity assessment

Assessment of the severity of the pneumonia is the key to planning appropriate management of the patient. Regular assessment of severity during the course of the illness should be performed.

Clinical adverse prognostic features ('**CURB-65**') are:-

- **C**onfusion: new mental confusion (defined as an Abbreviated Mental Test score of 8 or less)
- **U**rea: new raised > 7 mmol/L
- **R**espiratory rate: raised ≥30/min
- **B**lood pressure: low blood pressure (systolic blood pressure < 90 mm Hg and/or diastolic blood pressure ≤60 mm Hg)
- **65**: Age ≥ 65 years.

Patients with **0-2** adverse prognostic features are managed as **non-severe CAP.**

Those with **3 or more** of the adverse prognostic features are at a high risk of death and should be managed as **severe CAP**.

Management

- Oxygen therapy with monitoring of oxygen saturations and F_iO_2, aiming to maintain $Pao_2 \geq 8KPa$ and $Sao_2 \geq 92\%$
- Patients should be assessed for volume depletion and may require intravenous fluids
- Temperature, respiratory rate, pulse, blood pressure, mental status, oxygen saturation and inspired oxygen concentration should be monitored and recorded initially at least twice daily and more frequently in those with severe pneumonia or requiring regular oxygen therapy

Antibiotic treatment

- This regimen restricts the use of cephalosporins to non severe penicillin allergy as they are a major risk for *Clostridium difficile* diarrhoea in hospitalised elderly patients. It also restricts the use of the quinolone antibiotic levofloxacin for patients with severe penicillin allergy as there has been a recent emergence of *C. difficile* disease associated with prior quinolone antibiotic therapy.
- Antibiotic regimens vary significantly according to the severity of disease, so accurate assessment is essential.

Please note:
Antibiotics may require dose adjustment in renal impairment.
Discuss with a ward pharmacist or check Antibiotic Doses in Renal Impairment for Adults available under *Renal Dosing* on the antibiotic websites:
Find under "Clinical Information" on the NUHnet or see
http://nuhnet/diagnostics_clinical_support/antibiotics/

HOSPITALISED WITH NON-SEVERE CAP (SCORE 0-2)

- Most patients can be adequately treated with oral antibiotics:
  Amoxicillin 500mg–1g tds **plus** Clarithromycin 500mg bd for 5 to **7 days**
- If penicillin allergy: Levofloxacin 500mg **od** for 5 to **7 days**
- If unable to take oral therapy:

IV Amoxicillin 1g tds (Cefuroxime 1.5 g tds if mild penicillin allergy) **plus** Clarithromycin 500mg bd (convert to oral clarithromycin and amoxicillin as above ASAP) for 5 to **7 days total**

- If severe allergy to penicillins/cephalosporin allergic **and** unable to take oral therapy discuss with the on-call medical microbiologist.

NB Patients admitted for non-clinical reasons and would otherwise be treated at home should receive either Amoxicillin, or if allergic, Clarithromycin.

SEVERE CAP (SCORE 3 OR GREATER)

- Therapy should be initiated **immediately** after diagnosis:

  Co-amoxiclav IV 1.2 g tds (Cefuroxime IV 1.5 g tds if mild penicillin allergy)
  and Clarithromycin IV 500 mg bd

- Review the severity scoring and the need for IV antibiotics on the post take ward round **and** the need for IV treatment on a daily basis thereafter. Antibiotic treatment should be reviewed at 48 hours when microbiology results become available.
- Patients with severe pneumonia **or** those not responding to treatment: please discuss further investigation and treatment with a medical microbiologist.
- Convert above to oral Co-amoxiclav 625mg tds (prescribed as co-amoxiclav 375mg plus amoxicillin 250mg) and Clarithromycin 500mg bd when clinically resolving (Levofloxacin 500mg BD monotherapy if penicillin allergic, no need for clarithromycin) see further treatment section page 8 and IV-PO switch guideline on antibiotics website: Find under "Clinical Information" on the NUHnet or see http://nuhnet/diagnostics_clinical_support/antibiotics/

- If **severely allergic to penicillins**

  Levofloxacin 500 mg po BD **plus** Vancomycin 1g IV BD
  (reduce Vancomycin to 1g IV OD if >65 yrs or renal impairment)

- If severe allergy to penicillins/cephalosporin allergic **and** unable to take oral therapy discuss with the on-call medical microbiologist.

Duration of Treatment
For patients with severe pneumonia that is microbiologically undefined, treatment should be given for 7-10 days. This should be extended to 14-21 days where legionella, staphylococcal or Gram negative pneumonia are suspected or confirmed.

Risk of MRSA in Aspiration pneumonia

MRSA infection is more likely in current inpatients, but patients admitted from the community are at risk of MRSA infection if they have any of the risk factors listed below:

- Previous MRSA infection / colonisation
- Long-term urinary catheter
- Treated as an inpatient in the last six months
- Resident of a nursing or residential home with breaks in skin e.g. leg ulcers
- Outpatient with an indwelling line

ASPIRATION PNEUMONIA (NON-SEVERE)

Co-amoxiclav 625 mg po tds (dispensed as Co-amoxiclav 375 mg with Amoxicillin 250 mg) or if NBM Co-amoxiclav IV 1.2g tds, total duration 5-7 days

ASPIRATION PNEUMONIA (SEVERE)

Co-amoxiclav IV 1.2g tds (If rash with penicillins Cefuroxime IV 1.5g tds **plus** Metronidazole IV 500mg tds)
plus
if MRSA a possibility (see above) stat Gentamicin IV infusion 5mg/kg (max 500mg) (If CrCl <40ml/min reduce dose- see antibiotics website)
plus
if possible atypical pathogen Clarithromycin IV 500mg bd
Review antibiotics at 48 hours with microbiology results and once safe to swallow consult IV-PO switch guideline on antibiotics website: Find under "Clinical Information" on the NUHnet or see http://nuhnet/diagnostics_clinical_support/antibiotics/
Total duration of IV+PO therapy 7-10 days

If severe allergy to penicillins/cephalosporin allergic discuss with the on-call medical microbiologist.

Further treatment

- Review the severity scoring and the need for IV antibiotics on the post take ward round **and** the need for IV treatment on a daily basis thereafter.

- Patients initially treated with parenteral antibiotics should be transferred to an oral antibiotic (providing there are no contraindications) as soon as clinical improvement occurs and the patient has been apyrexial for 24 hours.

- The oral equivalents of the IV therapies are:-

Initial IV therapy	Oral equivalent
IV amoxicillin	PO amoxicillin 500mg - 1g tds
IV clarithromycin	PO clarithromycin 500mg bd
IV cefuroxime or co-amoxiclav	co-amoxiclav 375mg with amoxicillin 250mg tds (levofloxacin 500mg bd* if penicillin allergy)

- Levofloxacin has good activity against atypical pathogens. Addition of macrolides is not usually required.

- For patients with severe pneumonia that is microbiologically undefined, treatment should be given for 10 days. This should be extended to 14-21 days where legionella, staphylococcal or Gram negative pneumonia are suspected or confirmed.

- Patients with severe pneumonia **or** those not responding to treatment: please discuss further investigation and treatment with a medical microbiologist.

- Antibiotic treatment should be reviewed at 48 hours when microbiology results become available