Bupa Cromwell Hospital

Lower Respiratory Tract Infection (Adults)

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Introduction and Purpose

Antimicrobial Guidelines are intended to provide clinicians guidance on the management (both treatment and prevention) of common infections. This guideline forms part of a series of antimicrobial guidelines.
The clinical guidelines provide evidence based and best practice on the management of patients with infective episodes. They include empirical antimicrobial therapy including dose, route and duration of therapy and where necessary microbiological investigations and

Objectives

- To improve the quality of antimicrobial prescribing and reduce inappropriate prescribing.
- To maximise the clinically effectiveness of antimicrobial agents used.
- To reduce drug related toxicity and development of antimicrobial resistance.
- To ensure cost effective use of antimicrobial agents.

Scope

This guideline applies to all healthcare professionals involved in the prescription, administration and monitoring of antimicrobial agents.

Development and consultation

The clinical guidelines have been produced by the lead clinician and lead pharmacist for each division in conjunction with microbiology.

Implementation and Monitoring and documentation

Implementation and adherence to the guidelines is the responsibility of the lead clinician and lead pharmacist for each division.
Key aspects of the guidelines will be monitored as part of the annual audit programme.

COMMUNITY ACQUIRED PNEUMONIA (CAP)

Defined as pneumonia (new consolidation on chest x-ray plus symptoms and/or signs of infection and/or raised inflammatory markers) occurring in subjects who are not in-patients and who are not severely immunocompromised.
Typical organisms: *Streptococcus pneumoniae* (approx. 50%), lower and varying proportions according to season but not country, *Mycoplasma pneumoniae, Chlamydia pneumoniae* and viruses (mainly influenza). Much less common causes include *Staphylococcus aureus, Legionella pneumophila, Haemophilus influenzae,* and *Moraxella catarrhalis.*

Markers of severity

(a) CURB-65 score

Score one point for the presence of each of the following:

- **C** onfusion (defined as mental test score of ≤8 or new disorientation in person, place or time)
- **U** rea >7mmol/L
- **R** espiratory rate ≥30/minute
- **B** lood pressure (SBP <90mmHg or DBP ≤60mmHg)
- **65** age >65 years

Clinical judgement is essential when deciding on the management of all patients with CAP. Patients scoring 3 or more should be considered for ITU admission. The risk of death is proportional to the CURB-65 five-point criteria score:

CURB-65 score	Mortality rate
0	<1%
1	3%
2	13%
3	17%
4	42%
5	57%

(b) Other markers

- Atrial fibrillation
- PO_2 <8kPa (despite FiO_2 of 60%)
- PCO_2 >6.4kPa
- Multilobar involvement
- Concurrent disease
- Leucopenia (WBC <4000 x 10^9/L)
- Leucocytosis (WBC ≥20,000 x10^9/L)
- Bacteraemia

Note: Check pneumococcal vaccine status and ask GP to prescribe in line with DOH recommendations (refer to the Green Book).

MILD – MODERATE CAP		
	1st line	**Penicillin allergy**
Out-patient Consider if CURB-65 score ≤ 1 and no hypoxia	Amoxicillin 500mg PO 8 hourly for 5 - 7 days	Clarithromycin* 500mg PO 12 hourly for 5 – 7 days
In-patient	Amoxicillin 500mg – 1g IV 8 hourly ***plus*** Clarithromycin* 500mg IV 12 hourly *Switch IV to oral when appropriate*: Amoxicillin 500mg – 1g PO 8 hourly ***plus*** Clarithromycin* 500mg PO 12 hourly Total duration: 5 – 7 days	Clarithromycin* 500mg IV 12 hourly *Switch IV to oral when appropriate*: Clarithromycin* 500mg PO 12 hourly Total duration: 5 – 7 days
* If macrolide intolerant or patient on amiodarone, substitute clarithromycin with doxycycline 200mg PO 24 hourly		

SEVERE CAP (including all with CURB-65 score ≥3)	
1st line	Cefuroxime 750mg – 1.5g IV 8 hourly ***plus*** Clarithromycin* 500mg IV 12 hourly *Switch IV to oral when appropriate:* Co-amoxiclav 625mg PO 8 hourly ***plus*** Clarithromycin* 500mg PO 12 hourly Total duration: 10 – 14 days
Penicillin allergy	Teicoplanin 400mg IV 12 hourly for 3 doses then 400mg IV 24 hourly ***plus*** Clarithromycin* 500mg IV 12 hourly *Switch IV to oral when appropriate.* Total duration: 10 – 14 days
* If macrolide intolerant or patient on amiodarone, substitute clarithromycin with doxycycline 200mg PO 24 hourly	

HOSPITAL ACQUIRED PNEUMONIA (HAP)

Defined as pneumonia developing more than 48 hours after admission to hospital that was not considered to be present or developing at the time of admission. Sub-divided into:

(a) **Simple HAP** - Occurring usually early during an admission in patients who have not had complex clinical regimes / antibiotic prescriptions.

Typical organisms include *S. pneumoniae*, *H influenzae* and *S. aureus* (especially head injury).

(b) **Complex HAP** - Occurring in patients with complex and prolonged hospital admissions with frequent previous treatment course of antibiotics and ITU admissions. Similar pathogens to ventilator associated pneumonia.

Typical organisms - Evidence for pathogenesis unclear and Kock's postulates not proven for most organisms. Many organisms can be isolated and include *S. aureus* (including MRSA) and a variety of gram negative organisms, many of which are likely to represent antibiotic replacement flora only.

1st line		**Penicillin allergy**
Simple HAP	Cefuroxime 750mg – 1.5g IV 8 hourly ***OR*** Co-amoxiclav 1.2g IV 8 hourly *Switch IV to oral when appropriate:* Co-amoxiclav 625mg PO 8 hourly Total duration: 5 days	Clarithromycin 500mg IV / PO 12 hourly *Switch IV to oral when appropriate:* Clarithromycin 500mg PO 12 hourly Total duration: 5 days
Complex HAP ***Seek specialist advice***	Ceftazidime 2g IV 8 hourly (if no previous cephalosporins) ***OR*** Piperacillin & tazobactam 4.5g IV 8 hourly Total duration: 5 days	Ciprofloxacin 500mg PO 12 hourly (or 400mg IV 12 hourly if oral route compromised) Total duration: 5 days Teicoplanin may be prescribed on specialist advice.

ASPIRATION PNEUMONIA

Defined as new consolidation, usually basal, occurring after a witnessed or self reported episode of inhalation of vomit. Otherwise suspect aspiration if basal consolidation occurs shortly after general anaesthesia, loss of consciousness or upper GI endoscopy. May be community (e.g. alcoholics, epileptics) or hospital (e.g. post anaesthesia) acquired.
Typical organisms - A complex mixture of anaerobes and mouth flora. Many cases may represent chemical pneumonitis without significant infection. Diagnosis should therefore be reviewed after 3 days.

1st line *Review diagnosis after 3 days. Many do NOT require further antibiotics.*	Co-amoxiclav 1.2g IV 8 hourly ***OR*** Amoxicillin 500mg IV 8 hourly ***plus*** Metronizadole 500mg IV 8 hourly *Switch IV to oral when appropriate:* Co-amoxiclav 625mg PO 8 hourly **OR** Amoxicillin 500mg PO 8 hourly plus Metronidazole 400mg PO 8 hourly Total duration: 7 days
Penicillin allergy	Clindamycin 300mg IV / PO 6 hourly for 5 – 7 days (For patients >90kg use 450mg PO 6 hourly)

INFECTIVE EXACERBATION OF COPD

COPD exacerbations are often but not always associated with acute bacterial bronchitis. Consider antibiotics if the patient has:

(a) Increase in volume and purulent sputum
(b) Sputum culture positive for a likely pathogen (e.g. *S. pneumoniae, H. influenzae, M. catarrhalis, P. aeruginosa*)
(c) Increase in inflammatory markers; however frequently these are only mildly raised in infective exacerbations of COPD

The presence of **new consolidation means the patient has pneumonia not acute bronchitis** and should be treated according to the pneumonia guidelines.

1st line		**Penicillin allergy**
Standard patient i.e. no antibiotics in previous 4 weeks	Amoxicillin 500mg PO 8 hourly for 5 – 7 days	Doxycycline 200mg PO 24 hourly for 5 – 7 days
Unresponsive to antibiotics in previous 4 weeks OR known resistance	Doxycycline 200mg PO 24 hourly **OR** Co-amoxiclav 625mg PO 8 hourly for 5 – 7 days	Ciprofloxacin 500mg PO 12 hourly for 5 – 7 days

PNEUMONIA IN THE IMMUNOCOMPROMISED HOST (excluding HIV)

Defined as pneumonia in patients with marked impairment of immune function, excluding HIV. Includes neutropenia, organ transplant recipients, prolonged treatment with immunosuppressive medication (cyclosporin, sirolimus, tacrolimus, high dose methotrexate, >30mg prednisolone or equivalent per day for 4 weeks) and inherited severe immune deficiency e.g. chronic granulomatous disease. Organisms include but are not limited to *S. pneumoniae, S. aureus* (including MRSA)*, P. aeruginosa,* respiratory viruses, CMV and fungi (PCP, *Aspergillus*, rarer moulds, *Nocardia* spp.).

This treatment requires specialist advice from infectious disease and / or respiratory physicians. Immediate treatment as for neutropenic sepsis, but continuation of therapy MUST be discussed with Microbiology.

EMPYEMA

Clinical definition includes bacterial infection of the pleural space. May be:

(a) **Community acquired** either associated with CAP or a primary empyema with no associated consolidation. Likely pathogens: *S. pneumoniae, S. milleri,* anaerobes, *S. aureus.*

(b) **Hospital acquired** either associated with HAP or after pleural intubations or thoracic surgery. The microbiology, and its significance, can be complex and difficult to interpret.

Diagnosis:

- Suggested by the presence of a significant pleural effusion associated with, pneumonia or symptoms and/or signs of infection and/or high inflammatory markers.
- Radiological/ultrasound appearances indicating loculated pleural effusions are highly suggestive of empyema.
- Confirmation by pleural tap and the presence of one of the following: (a) visibly turbid pleural fluid (b) pleural fluid pH < 7.2 (c) culture of bacteria from the pleural fluid.
- ALWAYS PERFORM A PLEURAL TAP ON PATIENTS WITH PLEURAL EFFUSION AND SIGNS OR SYMPTOMS OF INFECTION TO EXCLUDE EMPYEMA (perform tap before starting antibiotics).

Treatment requires specialist advice from respiratory medicine and infectious diseases and microbiology. Effective and timely pleural drainage is imperative.

LUNG ABSCESS

Defined as a cavitating lung infection (with an air-fluid level visible on CXR) surrounded by a defined wall i.e. it is a radiological diagnosis. Classically the patient produces large volumes of purulent foul smelling sputum, but this in practice is unusual. Likely pathogens include anaerobes, *S. aureus* (including MRSA in in-patients) and *S. milleri*. Antibiotic replacement organisms (usually Gram negative) may also be present and probably of little relevance.

Treatment requires specialist advice from respiratory medicine and infectious diseases and microbiology.

BRONCHIECTASIS (NON CYSTIC FIBROSIS)

Bronchiectasis is defined as the abnormal dilatation of bronchi and is readily detected by high resolution CT scanning. However bronchial dilatation is not an infrequent finding on CT scans in patients with no clinical evidence for bronchiectasis. Hence a clinical diagnosis of bronchiectasis requires CT scan evidence for bronchiectasis plus suitable clinical symptoms. Symptoms vary in severity usually falling in to one of the following patterns (listed in order of increasing severity):

1. Frequent attacks of acute bronchitis (infective exacerbations) with no background symptoms.
2. Recurrent acute bronchitis on a background of daily mucoid sputum.
3. Daily purulent sputum with occasional exacerbations.
4. Daily purulent sputum with frequent exacerbations.

Bronchiectasis is also a common cause of both minor and major (life-threatening) haemoptysis even if the bronchiectasis is otherwise asymptomatic. Likely pathogens include *H. influenzae, S. pneumoniae, M. catarrhalis* (milder disease), with the addition of *P. aeruginosa* for patients with severe disease.

Treatment requires specialist advice from respiratory medicine.

REFERENCES

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