LOWER RESPIRATORY TRACT INFECTIONS
Community-acquired Pneumonia (CAP)

Community acquired pneumonia (CAP) is defined as pneumonia that is acquired outside hospital, or within 48 hours of admission with presence of the following symptoms and signs, which cannot otherwise be explained:

- Acute lower respiratory tract infection symptoms i.e., cough and one or more other symptoms such as dyspnoea, sputum production, pleural pain.
- Focal chest signs of recent onset such as decreased or asymmetric breath sounds, bronchial breath sounds, dullness to percussion, coarse crepitations, and vocal fremitus.
- Systemic symptoms or signs: typically tachypnoea, tachycardia, and dyspnoea, pyrexia >38^{o}C, sweating, shivers (rigours), aches and pains, hypoxia, confusion (uncommon but may be seen in older people).

Pneumonia that develops in a nursing home resident is included in this definition.

CAP accounts for 5–12% of all lower respiratory tract infections managed by GPs in the community. The rate of hospital admission in people with community-acquired pneumonia is 22–42%.

People most at risk of CAP and its complications include: >65 yrs, underlying lung disease, smokers, immunosuppressed, learning disability, malnourished, chronic liver disease secondary to alcohol misuse.

Complications include pleural effusion and empyema, lung abscess, acute respiratory distress syndrome, sepsis, and disseminated infection.

Bacterial causes:
Typical bacteria

- *Streptococcus pneumoniae* (main causative pathogen of community-acquired pneumonia worldwide, independent of age)
- *Haemophilus influenzae*
- *Moraxella catarrhalis*
- *Staphylococcus aureus* and *Group A Streptococcus*

Atypical bacteria
("atypical" refers to the intrinsic resistance of these organisms to beta lactams and their inability to be visualised on Gram stain or cultured using traditional techniques)

- *Mycoplasma pneumoniae* (particularly in young adults, usually in 4 yearly peaks that last for 12-15 months, rare in >65yr olds).
- *Chlamydophila pneumoniae*
- *Chlamydophila psittaci* (consider in history of pet birds).
- *Legionella pneumophila* (consider in history of recent travel).

If a clinical diagnosis of CAP has been made, determine whether adults are at:

- low,
- intermediate,
- or high risk of death using the CRB65 scoring system.

Assessment of adult patients using clinical judgment guided by the CRB-65 score helps to determine the management of CAP for patients in the community.

CRB65 score is calculated by giving 1 point for each of the following prognostic features:

- **C**onfusion (Abbreviated Mental Test <8, or new disorientation in person, place or time),
- **R**espiratory rate >30 breaths/min,
- **B**lood pressure (diastolic <60mmHg or systolic<90mmHg),
- > **65** years.

Adults are stratified for risk of death (within 30 days) as follows:

- 0: low risk (less than 1% mortality risk)
- 1 or 2: intermediate risk (1% to 10% mortality risk)
- 3 or 4: high risk (more than 10% mortality risk).

Use clinical judgement in addition to the CRB-65 score to decide if an adult should be admitted. Consider other factors such as the person's wishes, social support available, pre-existing comorbid conditions and general frailty, pregnancy, pulse oximetry.

Score of 3 or more → arrange urgent admission to hospital.
Score of 1 or 2 → hospital assessment should be considered (particularly for people with score 2)
Score of 0 → treatment at home should be considered, depending on clinical judgement and the person's social circumstances.

Treatment

- Confirmation of diagnosis with a chest X-ray is helpful where available.
- Offer antibiotic treatment for people with CAP.
- When deciding which antibiotic to prescribe, consider the severity of the illness, risk of complications, recent antibiotic use, and recent microbiological results.
- A 5-day course for low-severity pneumonia treated in the community should be sufficient, longer courses may be necessary for hospitalised patients or those with more severe pneumonia.
- If symptoms do not improve as expected after 3 days review for potential complications and any positive microbiology results. Extending the course for longer than 5 days can be considered.

- Seek risk factors for *Legionella* and *Staphylococcus aureus* infection.
  - For *Legionella*, these may include exposure to air conditioning systems, recent travel, cooling towers, spa pools and other artificial water systems.
  - For *S. aureus* these may include recent influenza, nursing home residents, aspiration, and chronically ill or debilitated patients.
  - *Mycoplasma pneumoniae* infection occurs in outbreaks approximately every 4 years and is more common in school-aged children.

- Severity is assessed by clinical judgement in children and young people.
- Urgent hospital admission for severe signs and symptoms.

Referral and Seeking Specialist Advice

1. Refer adults to hospital if:
   - Symptoms or signs suggest a more serious illness or condition (for example cardiorespiratory failure or sepsis), or
   - Symptoms are not improving as expected with antibiotics.
2. Consider referring adults or seeking specialist advice if they have bacteria resistant to oral antibiotics or they cannot take oral medicines.
3. Consider referring children and young people to hospital or seek specialist paediatric advice on further investigation and management.

Patient advice:

- Advise the person on self-care strategies such as rest, adequate fluid intake, and the use of simple analgesia such as paracetamol for symptomatic relief.
- Over-the-counter cough medicines are not recommended.
- Discuss possible adverse effects of antibiotics.
- Advise the person to seek medical advice if any of the following occur: symptoms worsen rapidly or significantly, symptoms do not start to improve with 3 days, or they are not improving as expected.
- Explain to the person that after starting antibiotic treatment, symptoms should improve, although the speed of improvement will depend on the severity of illness. It is usually expected that by:

- 1 week — fever should have resolved.
- 4 weeks — chest pain and sputum production should have substantially reduced.
- 6 weeks — cough and breathlessness should have substantially reduced.
- 3 months — most symptoms should have resolved but fatigue might still be present.
- 6 months — symptoms should have fully resolved.

Antibiotic Treatment for Adults Aged 18 Years and Over

Medicine	Oral Dose	Duration of Treatment
First choice oral antibiotics if *low severity*: based on clinical judgement and guided by CRB65 score = 0 (Indicates that the patient is likely to be suitable for home treatment)		
Amoxicillin	**500mg three times a day**	**5 days**
Alternative oral antibiotics if low severity, for penicillin allergy or if amoxicillin unsuitable e,g, - atypical pathogens		
Doxycycline	200mg first day then 100mg once daily for 4 days	5 days in total
OR Clarithromycin	500mg twice a day	5 days
OR Erythromycin (In pregnancy)	500mg four times a day	5 days
First choice oral antibiotics if *moderate severity*: based on clinical judgement and guided by CRB65 score = 1-2 (Indicates a need to consider hospital referral and antibiotics may need to include cover for the atypical pathogens); guided by microbiological results when available		
Amoxicillin	**500mg to 1000mg three times a day**	**5 days**
If atypical pathogens suspected ADD IN		
Clarithromycin **OR**	500mg twice a day	5 days
Erythromycin (In pregnancy)	500mg four times a day	5 days
Alternative oral antibiotics if moderate severity, for penicillin allergy; guided by microbiological results when available		
Doxycycline	200mg first day then 100mg once daily for 4 days	5 days
OR Clarithromycin	500mg twice a day	5 days
OR Erythromycin (in pregnancy)	500mg four times a day	5 days
For *high severity*: based on clinical judgement and guided by CRB65 score = 3-4 **(Patient requires URGENT hospital admission)**		

When to treat in Children:

Most lower respiratory tract infections are of viral aetiology - consider bacterial pneumonia if persistent / recurrent fever over preceding 24-48 hours with chest wall recession and tachypnoea. Presence of generalised wheeze makes viral aetiology far more likely.

For children aged 5 years and over requiring treatment with antibiotics, consider prescribing tablets/capsules and signposting to pill swallowing information on the Healthier Together website or Medicines for Children website. If the child is unable to swallow the tablets/capsules, see the advice from Specialist Pharmacy Service (SPS) about using solid oral dosage form antibiotics in children.

- Offer a 3-day course of antibiotics for babies and children aged 3 months (corrected gestational age) to 11 years with non-severe CAP without complications or underlying disease.
- Consider extending use of antibiotics beyond 3 days if they are not clinically stable, for example, if they are in respiratory distress or their oxygen saturation levels have not improved as expected.

- For all children and young people with CAP, stop antibiotic treatment after 5 days unless microbiological results suggest a longer course is needed or the child or young person is not clinically stable.

If symptoms have not improved after first line therapy, consider sending a sample, for example a sputum sample for microbiological testing. The sample should be taken before starting the second line antibiotic.

If patient has penicillin allergy label, ensure this is reviewed as incorrectly labelling a child with a penicillin allergy has a lifelong impact on mortality and morbidity (click here for information on correctly applying penicillin labels in children).

Antibiotic Treatment for Children and Young People Over 1 Month and Under 18 Years

Medicine	Oral Dose	Duration of Treatment
First Choice oral antibiotics if non-severe signs and symptoms		
Amoxicillin (higher doses can be used for all ages; see BNF for children)	1 month to 2 months: 125 mg three times a day	5 days
	3months – 11 months: 125mg three times a day 1 – 4 years: 250mg three times a day 5 – 11 years: 500mg three times a day	**3 days**
	12 - 17 years, 500 mg three times a day	5 days
Alternative oral antibiotics if non-severe symptoms or signs, for penicillin allergy or if amoxicillin unsuitable e.g.atypical pathogens suspected.		
Clarithromycin	1 month to 2 months: Under 8 kg, 7.5 mg/kg twice a day	5 days
	3 months to 11 years: Under 8 kg: 7.5mg/kg twice a day 8 kg – 11 kg: 62.5mg twice a day 12 kg – 19 kg: 125mg twice a day 20 kg – 29 kg: 187.5mg twice a day 30 kg – 40 kg: 250mg twice a day	**3 days**
	12 to 17 years: 250mg to 500mg twice a day	5 days
OR Erythromycin (In pregnancy)	8 years to 11 years, 250 mg to 500 mg four times a day	**3 days**
	12 years to 17 years, 250 mg to 500 mg four times a day	5 days
OR Doxycycline (See BNF for children for use of doxycycline in children <12years)	12 to 17 years: 200mg first day then 100mg once daily for 4 days	5 days in total

Patient or carer advice

- **Explain to parents or carers of children** with CAP that after starting treatment their child's symptoms should steadily improve, although the rate of improvement will vary, and some symptoms will persist after stopping antibiotics. For most children:
  - fever (without use of antipyretics) and difficulty breathing should have resolved within 3 to 4 days.

  - cough should gradually improve but may persist for up to 4 weeks after discharge and does not usually require further review if the child is otherwise well.
- **Advise parents or carers of children** with CAP to seek further advice if there is persisting fever combined with: **increased work of breathing or reduced fluid intake for children or poor feeding for infants or unresolving fatigue.**