

Community Acquired Pneumonia (CAP)

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See also: pleural effusion

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Background

- An acute inflammatory condition caused by an infectious agent involving the lungs
- Organisms include viruses / Streptococcus pneumococcus / Haemophilus influenzae / Group A Streptococcus / Staphylococcus aureus / Mycoplasma pneumoniae
- A diagnosis of CAP should be made up to 48 hours of a hospital admission e.g. if treating secondary infection on NIV.
- Consider the possibility of infection or co-infection with viruses such as Covid or flu, particularly if the illness is not behaving as expected.

Assessment

Symptoms and signs suggestive of bacterial pneumonia:

- Cough, repeated / persistent **fever > 38 °C** (usually at least 48 hours) + **chest wall recession + tachypnoea** + crackles on auscultation
- In older children more common symptoms are breathlessness, pleuritic chest pain, abdominal pain (pneumonia is the commonest extra-abdominal cause of abdominal pain) and headache.

Generalised wheeze with low-grade temperature is NOT typical for bacterial pneumonia

The absence of focal crackles on auscultation do not exclude pneumonia in children

– occult pneumonia (pneumonia without chest signs) is not uncommon in our population

- Focal and repeatable reduced air entry or absent breath sounds may represent pleural effusion or pneumothorax – consider further investigation (see below).

Investigation and management of CAP is determined by severity of illness.

Features of severe CAP are:

- Significant tachypnoea
- Severe respiratory distress (significant recession (age < 12 months), nasal flaring, grunting)
- Signs of severe dehydration
- Significant tachycardia
- Apnoeas (ages < 12 months)
- Hypoxia (sustained O₂ sats ≤ 92% in air)
- Capillary refill time > 2 seconds
- Cyanosis

If features of sepsis, for urgent senior input (Paediatric or CED ST4 + or equivalent)

Investigations in children with CAP:

Unless CAP is severe, investigations are NOT routinely required

Consider performing:

1. CXR (AP)
2. Bloods: FBC, CRP, U&E, blood culture, blood gas
3. Consider microbiological tests e.g. Throat swab for viral respiratory screen, sputum sample for MC&S

CXR particularly if

- hypoxia or
- significant respiratory distress, or
- considering pleural effusion as a diagnosis (no improvement in symptoms despite >48 hours of adequate antibiotic therapy, focal reduced breath sounds, prolonged fever), or
- possibility of TB/atypical pneumonia e.g. recent immigrant

Management

Start antibiotic treatment as soon as possible after establishing the diagnosis.

Aim for < 4 hours or < 1 hour if sepsis suspected

When starting antibiotics, consider:

Severity of CAP, risk of complications, local antimicrobial resistance and surveillance data, recent antibiotic use and microbiological results.

See pages 3 and 4 for

- **Admission or home management?**
- **Oral or IV antibiotics?**
- **Which antibiotics?**

Reference documents:

1. BSAC Paediatric Pathways (bsac.org.uk). 2021. Accessed on 12/04/22 from <https://bsac.org.uk/paediatricpathways/pneumonia-empyema.php>
2. UK Paediatric Antimicrobial Stewardship Network Antimicrobial Paediatric Summary. February 2022. Accessed on 12/04/22 from <https://uk-pas.co.uk/Antimicrobial-Paediatric-Summary-UKPAS.pdf>
3. NICE (National Institute for Health and Care Excellence). Pneumonia (community-acquired): antimicrobial prescribing. NICE guideline: [NG138]. Accessed on 12/04/22 from <https://www.nice.org.uk/guidance/ng138>. 2019.
4. British Thoracic Society Community Acquired Pneumonia in Children Guideline Group. Guidelines for the management of community acquired pneumonia in children: update 2011. Thorax 2011;66:ii1-ii23.

Admission or home management?

Well child. No severe signs or symptoms of CAP:

- SpO2 >92% in air &
- Eating & Drinking &
- Obs within normal limits, &
- No co-morbidities or patient risk factors for severe infection e.g. CLD, neuromuscular disease, immunosuppression

Signs or symptoms of severe CAP:

- Requires O2 to keep O2 sats > 92%
- Requires respiratory support for increased WOB
- Requires IV fluids or NG feeds e.g. persistent vomiting, unable to feed
- High risk for severe infection e.g. CLD, neuromuscular disease, immunosuppression

Consider home management

Consider admission to hospital

- Oral antibiotics or ambulate with IV antibiotics and daily review
- Give parents information leaflet (available [here](#))
- Reassess if there is:
 - ! increased work of breathing, distress or agitation
 - ! persistence of fever 48 hours after initiation of treatment

- Oral or IV antibiotics with daily review
- 2/3rds maintenance IV / NG fluids if dehydrated or not drinking
- Oxygen via mask or high flow nasal cannula +/- NIV as required.

Physiotherapy is not routinely required but may be considered in children with co-morbidities e.g. neuromuscular disorders, CLD, or those with neurodisabilities.

Discharge advice to give to parents:

- Info on managing fever, preventing dehydration, and identifying deterioration.
- possible adverse effects of the antibiotic(s)
- how long symptoms are likely to last
- to seek clinical review if:
 - ! symptoms worsen rapidly or significantly or
 - ! persistence of fever 48 hours after treatment
 - ! the child becomes systemically very unwell.

Oral or IV antibiotics?

Consider IV antibiotics if:

- ! Unable to take oral antibiotics or severity of disease requires IVs e.g. very severe work of breathing, reduced level of consciousness
- ! Complicated CAP e.g. pleural effusion or necrotising
- ! Oral antibiotics not tolerated or absorbed e.g. persistent vomiting, severe diarrhoea
- ! No improvement despite ≥ 48 hours of adequate oral antibiotics (check dose and adherence)
- ! Co-morbidities that predispose to severe pneumonia (e.g. significant immunosuppression)

Which antibiotics?

Review for IV to oral switch at 48 hours

Total antibiotic duration 5 days (IV + oral)

Use BNFC for doses

Erythromycin is a pregnancy safe alternative to clarithromycin

| Non-severe CAP > 1 month old* | |
|--|--|
| First choice | Amoxicillin |
| Penicillin allergy | Clarithromycin OR doxycycline in > 8 years |
| *If under 1 month, treat as severe CAP | |
| Add clarithromycin if atypical pathogen suspected in > 5 years | |

| Severe CAP > 1 month old | |
|--|--|
| First choice | Co-amoxiclav |
| Penicillin allergy non-anaphylactic | Cefuroxime |
| Penicillin allergy anaphylaxis | Teicoplanin or vancomycin PLUS ciprofloxacin |
| Add clarithromycin if atypical pathogen suspected in > 5 years | |

| Severe CAP < 1 month old | |
|------------------------------------|--------------------------------------|
| First choice | Cefotaxime PLUS gentamicin if severe |

Follow-up

- Follow-up chest x-ray NOT required in those who were previously healthy and recovering uneventfully
- Children with **round pneumonia, pleural effusion, collapse or persisting symptoms** should be followed up in a Respiratory team clinic 6 - 8 weeks after discharge with a repeat CXR. Provide parents with X-ray request form on discharge.