# Lower respiratory tract infection

## *Executive summary*

## Introduction

Pneumonia or lower respiratory tract infection (LRI) is a common condition in both adults and children. It may be viral in origin, but the risks of not treating bacterial infection are high in this setting, so it is more usual to treat it as bacterial infection.

## Target users

* Doctors
* Nurses

## Target area of use

* Gate clinic
* Outpatient department
* Ward

## Key areas of focus / New additions / Changes

Introduces the use of CRB65 / CURB65 scores for adults.

Consolidates best practice for treatment of children and adults.

Provides advice on supportive care and when it is safe to discharge a patient.

## Limitations

None

## Presenting symptoms and signs

In all age groups, LRI may present with fever, cough, fast breathing and crackles in the lung. Young children especially may lack specifically respiratory symptoms, but may not be able to feed or drink.

### Important things to look for

Assess the severity of the infection. Patients with signs of severe lower respiratory tract infection should be referred from the Gate clinic to the outpatient clinic.

In children, these signs are:

* Age less than 6 months old
* Feeding difficulty
* Looks unwell
* Chest indrawing, flaring nostrils, head nodding, grunting
* Central cyanosis or O2 sats < 90%
* Raised respiratory rate

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| > 50 bpm | Under 1 year |
| > 40 bpm | 1-5 years |
| > 30 bpm | Above 5 years |

* If they return no better after 1-2 days.

In adults, the signs are:

* Confusion
* Respiratory rate above 30 bpm
* BP < 90/60 mmHg
* Age > 65 years old
* O2 saturations are < 90%.

## Management in Gate clinic

Treat all patients not referred to the outpatient clinic with **Amoxicillin** 30 mg/kg (max 500 mg) TDS for 5 days. If the patient is allergic to penicillin then use **Azithromycin** 10 mg/kg (max 500 mg) OD for 3 days.

Tell the patient to return if they deteriorate or if they are no better after 2 days.

Advise patients that full recovery from LRI is a long slow process. Their fever should have resolved within a week of treatment, but it can take 4 weeks for the sputum to clear and the chest pain to resolve and 6 weeks for cough and shortness of breath to resolve. So long as they are feeling better, they will not need to seek further medical help for these symptoms.

When reassessing adults, young people and children with LRI, be aware of possible non-bacterial causes such as the flu virus and COVID-19.

## Management in OPD

### Classification of adults

Adults referred to OPD should be assessed using the CRB65 score, the primary care tool for assessing 30-day mortality risk for adults presenting with pneumonia. One point is given for each of the following signs:

* Confusion
* Respiratory rate above 30
* BP < 90/60
* Age > 65 years old

Management of patients based on CRB65 score:

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| **Score** | **Management** |
| 0 | Gate clinic |
| 1 | Send to OPD for assessment |
| > 1 | Admit |

### Classification of children

Classify the infection as pneumonia or severe pneumonia.

Severe pneumonia is present when there is any one of:

* Sats < 90% or central cyanosis
* Severe respiratory distress with grunting or severe chest indrawing
* Danger signs: inability to breastfeed or to drink, lethargy, reduced level of consciousness, fits

Other cases are pneumonia.

Admit all children with severe pneumonia. Children with pneumonia can usually be managed as outpatients, but can be admitted if there is any additional reason for concern.

### Other considerations for all patients

Consider a diagnosis of TB in any patient who has had a cough for more than 2 weeks, who also describes weight loss, night sweats or has a TB contact. Request 2 sputums for AFBs and review the patient to check they have improved after 5-7 days. Check the SOP on Investigation of TB for guidance on whether GeneXpert is indicated.

Consider alternative diagnoses such as PCP or TB in patients known to be HIV positive or who appear to be chronically unwell.

Treat patients managed for LRI in OPD the same way as those managed in Gate clinic.

## Management on the ward

**Investigations**

All patients admitted to the ward with presumed LRI should be investigated with FBC, U&Es, Blood cultures and CXR. Request sputum AFBs in any patient with risk factors for TB.

Adults who are admitted to the ward should be assessed using the CURB65 score. This is the same as CRB65, but with one extra point available for a raised urea (above 7 mmol/l). This score assesses the 30-day mortality risk in adults with pneumonia.

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| **Score** | **Mortality risk** | **Management** |
| 0 or 1 | Low (<3%) | Manage as outpatient |
| 2 | Intermediate (3-15%) | 7 day course of oral antibiotics – admit if looks unwell |
| > 2 | High (>15%) | Admit and give iv antibiotics |

Note that a patient with a score of 3 or above is high risk with a mortality risk of above 15%.

**Treatment**

Once a diagnosis of LRI is made empirical antibiotics should be started:

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| **Patient group** | **No Penicillin allergy** | **Penicillin allergy** |
| Outpatient treatment for all ages | po **Amoxicillin** 30 mg/kg (max 500 mg) TDS for 5/7 | po **Azithromycin** 10 mg/kg (max 500 mg) OD for 3/7  OR  P.O. **Doxycycline** 200 mg day 1, then 100 mg OD for 4 days (5 days in total) - Avoid in children <12 years |
| Moderate risk inpatient treatment (adults with CURB65 score = 2 or children admitted with pneumonia) | po **Amoxicillin** 30 mg/kg (max 500 mg) TDS for 7/7 | po **Azithromycin** 10 mg/kg (max 500 mg) OD for 3/7  OR  P.O. **Doxycycline** 200 mg day 1, then 100 mg OD for 4 days (5 days in total) - Avoid in children <12 years |
| High risk inpatient treatment for adults (with higher CURB65 score) | iv **Benzylpenicillin** 50,000 units/kg (max 2 MU) QDS | iv **Chloramphenicol** 25 mg/kg (max 500mg) QDS |
| Patient is particularly ill or failing to respond to treatment | Add iv **Chloramphenicol** 25 mg/kg (max 500mg) QDS or po **Azithromycin** 10 mg/kg (max 500 mg) OD for 3/7 | Add po **Azithromycin** 10 mg/kg (max 500 mg) OD for 3/7 |
| Severe pneumonia in children under 5 years old | iv **Ampicillin** 50 mg/kg (max 1 g) QDS *and* **Gentamicin** 7.5 mg/kg OD |  |
| Patient not improving after 48 hours of iv antibiotics | Replace with iv **Ceftriaxone** 80 mg/kg (max 2 g) OD | Replace with iv **Ceftriaxone** 80 mg/kg (max 2 g) OD |

Once a patient is clinically improving, cardiovascularly stable, afebrile and able to take oral medications, they can be switched to oral medications. Aim to complete at least a 7 day course of treatment including the period on iv antibiotics. If they have been treated with Ceftriaxone or Ampicillin and Gentamicin, use **Co-amoxiclav**. Prescribe by amoxicillin dose – 30 mg/kg up to 500 mg TDS. However if the amoxicillin per dose is greater than 250 mg, then use one co-amoxiclav tablet (250 mg Amoxicillin + 125 mg clavulanate) and make up the dose with plain amoxicillin.

If a patient is not responding to treatment, reconsider a diagnosis of TB. Other diagnoses to consider include COPD, bronchiectasis, pleural effusion or empyema, underlying malignancy, or pertussis.

Supportive treatment includes:

* **Paracetamol** and/or **ibuprofen** to control pain and allow good coughing, as well as to reduce fevers.
* **Oxygen** therapy to maintain saturations above 92%.
* **iv fluids** if the patient cannot drink because of shortness of breath or tiredness or if the airway is at risk. Try to avoid an NG tube if breathing is compromised.
* **Encourage oral feeding** (or breast feeding).

**Discharge criteria**

Patients should not be discharged from the ward if they have had 2 or more of the following in the last 24 hours:

* Temperature > 37.5ºC
* Raised RR

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| > 50 bpm | Under 1 year |
| > 40 bpm | 1-5 years |
| > 30 bpm | 5-15 years |
| > 24 bpm | Adults |

* HR > 100 bpm
* Systolic BP < 90 mmHg
* O2 saturations < 90%
* Confusion
* Difficulty in eating

**References**

Barson 2017. Pneumonia in children: Inpatient treatment. UpToDate May 2017.

Barson 2016. Community-acquired pneumonia in children: Outpatient treatment. UpToDate June 2016.

File 2017. Treatment of community-acquired pneumonia in adults who require hospitalization. UpToDate Sept 2017.

File 2017. Treatment of community-acquired pneumonia in adults in the outpatient setting. UpToDate June 2017.

Harris et al. British Thoracic Society guidelines for the management of community acquired pneumonia in children: update 2011. Thorax 2011; 66:ii1-ii23.

NICE 2014. Pneumonia in adults: diagnosis and management. Clinical Guideline CG191. December 2014.

NICE 2020. Pneumonia (community-acquired):antimicrobial prescribing. Clinical Guideline NG138. September 2019. Available from [www.nice.org.uk/guidance/ng138](http://www.nice.org.uk/guidance/ng138)

World Health Organization 2013. Pocket book of hospital care for children: Guidelines for the management of common illnesses with limited resources. 2nd ed. Geneva: World Health Organization; 2013.

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