

Managing LRTI in adults in the community

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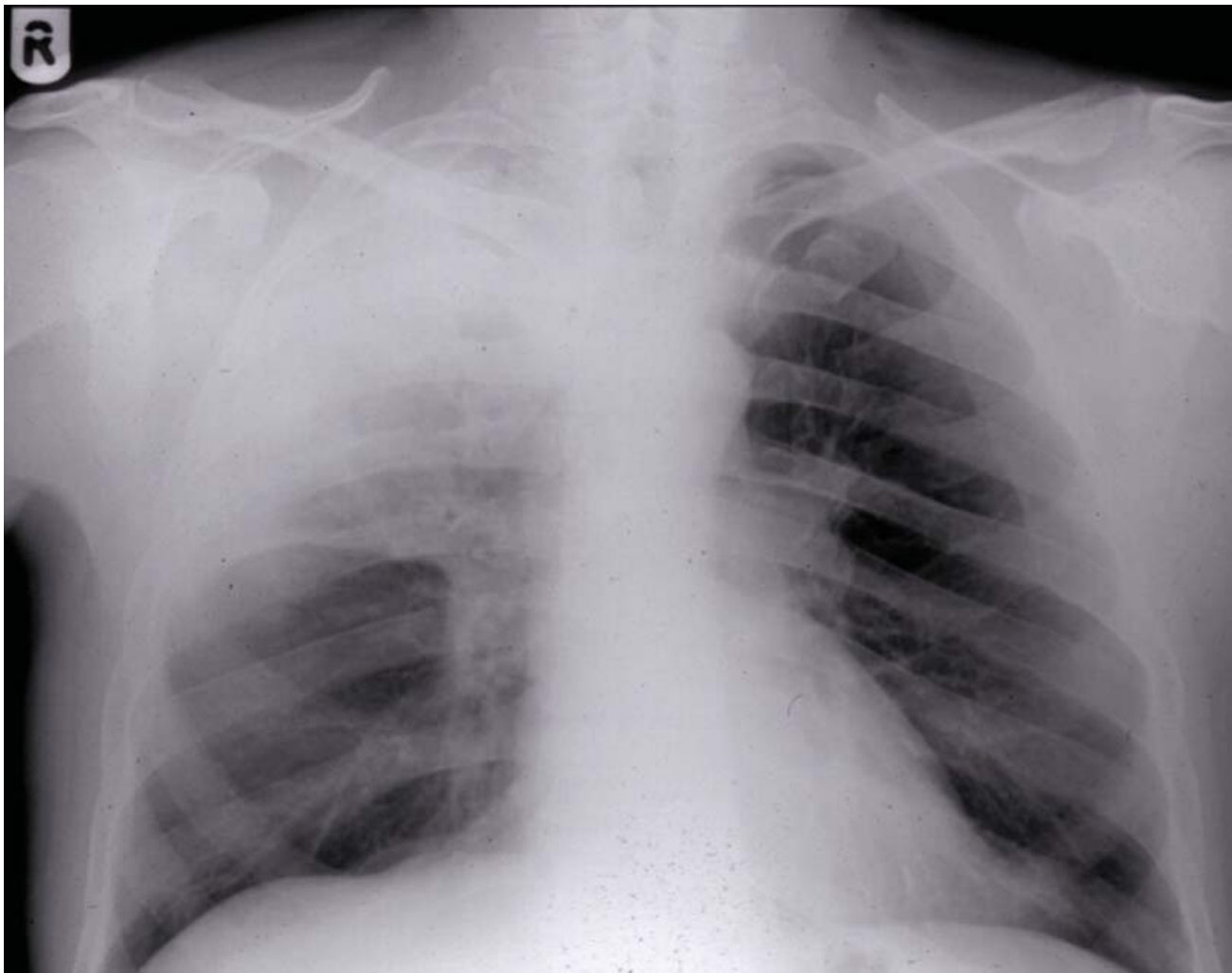


FIGURE 1

Chest radiograph
showing right
upper lobe
pneumonia

How can GPs differentiate pneumonia from simple LRTI?

How should patients be assessed for severity?

When should antibiotics be prescribed?



LOWER RESPIRATORY TRACT INFECTION (LRTI) COVERS A WIDE SPECTRUM OF SYMPTOMS,

signs and severity of illness from irritating bronchitis to life-threatening pneumonia. LRTI is a common cause of consultation in primary care. In

2004, approximately 5% of the population consulted their GP about LRTI at least once during the year, a rate comparable with those reported by previous UK studies.^{1,2} Figure 2, p24, illustrates the spectrum of LRTI in the community through to hospital admissions.³ In 2004, there were around 34,000 deaths caused by pneumonia in the UK.⁴

DIAGNOSIS

When considering a diagnosis of LRTI the main differentiation to make is between pneumonia and non-pneumonic LRTI. This is important both in terms of deciding who will require antibiotic therapy as well as which patients the severity criteria »

Table 1**Differential diagnosis of lower respiratory tract infection**

- Viral laryngitis/tracheitis/bronchitis e.g. influenza
- Pneumonia
- Influenza
- Asthma
- Chronic obstructive pulmonary disease (COPD) with or without exacerbation
- Pulmonary embolism
- Cardiac failure
- Allergy (e.g. occupational exposure)
- Bronchiectasis (including cystic fibrosis)
- Toxic inhalation
- Aspiration/gastro-oesophageal reflux

should be applied to. Simply labelling an illness as pneumonia per se is less important. It is more difficult to make this distinction in the community because of access constraints to chest radiography and the lack of a quick, simple marker to identify patients with true pneumonia accurately.

Furthermore, not all lower respiratory tract symptoms are caused by an infection that can be identified. Evidence suggests that there is no combination of symptoms or signs that can reliably confirm the diagnosis of pneumonia.⁵

In a Scandinavian study⁶ of 250 patients with LRTI, physicians' judgements of a diagnosis of pneumonia had a sensitivity of 74% (49-90%), specificity of 84% (78-88%), negative predictive value of 97% (94-99%) and a positive predictive value of only 27% (16-42%), compared with the results of chest radiographs. This suggests that we are good at excluding pneumonia but not at positively diagnosing it.

Equally there are other non-infective conditions, that may cause a similar constellation of symptoms and signs to LRTIs, which need to be considered (see table 1, above). Patients who have ongoing, symptomatic co-morbid illness, particularly respiratory or cardiac disease, are even trickier to diagnose with an LRTI because of the marked overlap of symptomatology. The emphasis in these patients is to tease out which symptoms are new or have recently changed in character.

Non-pneumonic LRTI is an acute illness that most commonly presents with cough, either new or changed in character. Other symptoms include: sputum production, breathlessness,

Table 2**Risk factors for LRTI/pneumonia**

Risk factors	Comments
Age	>65 years or <5 years
Chronic illness	Cardiovascular disease, respiratory disease (e.g. COPD), diabetes, HIV/AIDS, neuromuscular disorders causing aspiration
Impaired immune response	Chemotherapy, other immunosuppressant medications
Smoking	Reduced ciliary motility
Alcohol abuse	Reduced gag reflex, risk of aspiration, immunosuppression
Influenza	Winter months, epidemics/pandemics
Upper respiratory tract infection	
Lung cancer	Always consider in smokers
Previously damaged lung	Scarred lung e.g. old TB

wheeze, chest pain, fever, sore throat and coryza. There are usually no focal chest signs on physical examination.

The diagnosis of pneumonia in the community, without a chest radiograph, is suggested by symptoms that include:

- cough
 - (purulent) sputum production
 - breathlessness
 - pleurisy
 - occasionally haemoptysis
- along with**
- new focal signs on chest examination (e.g. crepitations, bronchial breathing, and dullness to percussion)
 - at least one systemic feature (e.g. sweating, fevers, shivers, aches and pains and/or temperature >38°C) and
 - no other explanation for the symptoms

AT RISK GROUPS

The risk factors for LRTI are listed in table 2, above. All these risk factors reduce the immune response to infection.

A recent observational study² of around 150,000 patients with LRTI in the UK found that the following factors were associated with increased respiratory infection-related mortality:

- increasing age
- smoking
- increasing Charlson co-morbidity index (predicts the 1 year mortality for a patient who may have a range of co-morbid diseases, with different weighted scores for a total of 22 conditions)⁷
- prior antibiotic prescribing
- frequent consultation
- prior specialist referral or hospital admission

Studies have shown that more than four in five adults consult late in the course of an acute LRTI.⁸ Patient education programmes may improve outcomes by encouraging earlier consultation.

COMMON PATHOGENS

Acute adult LRTI presenting to GPs is a predominantly viral illness most commonly caused by rhinoviruses and influenza viruses.⁹ The most common bacterial cause of pneumonia is *Streptococcus pneumoniae*. Frequently no organism is identified, indeed one study¹⁰ failed to demonstrate any organism in 45% of cases (n=316). Atypical infections such as *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* are less frequent. The clinical features of bacterial and viral LRTIs are indistinguishable,⁹ and indeed the outcomes are also the same.⁹ Common pathogens are listed in table 3, opposite. The data in table 3 was gathered during a 4-yearly peak of mycoplasma infection. Also the incidence of Chlamydia infection of 17.4% is probably slightly high. Previous studies have shown it to be between 5 and 15%.

In the most recent influenza pandemic that did not involve the use of antibiotics to suppress bacteria, the 1918-1919 pandemic, histological and bacteriologic evidence suggests that the vast majority of influenza deaths resulted from secondary bacterial pneumonia, largely due to pneumococcal infections.¹¹

Table 3**Infectious agents isolated from previously well patients with LRTI symptoms¹⁰**

Pathogen	Organism	Incidence (%)
Bacteria	<i>Strep. pneumoniae</i>	17.1
	<i>H. influenzae</i>	9.5
	<i>Moraxella catarrhalis</i>	2.2
	<i>Staph. aureus</i>	-
Atypicals	<i>Mycoplasma pneumoniae</i>	7.3
	<i>Chlamydia pneumoniae</i>	17.4
Viruses		19.3
Mixed infection		13.6
No organism		45.3

Table 4**CRB-65 severity score**

Observation	Parameter
Confusion	new or of recent onset, MSQ<8/10
Respiratory rate	>30/min
Blood pressure	systolic <90mmHg ± diastolic <60mmHg
Age	>65 years

INVESTIGATIONS

In patients where you suspect non-pneumonic LRTI, the evidence suggests that chest radiography and blood tests for C-reactive protein are not helpful in their management in the community, neither are sputum purulence nor positive sputum culture.⁵ Indeed recent guidelines from the European Respiratory Society do not recommend routine microbiological investigations for LRTI in community settings.¹²

Equally for patients with clinically suspected true community-acquired pneumonia that is not severe, general investigations are unnecessary for the majority of patients managed in the community. The British Thoracic Society (BTS) guidelines recommend that GPs, particularly those working in out-of-hours and emergency assessment centres, should consider the use of pulse oximeters.¹³

The new BTS guideline update for the management of community acquired pneumonia recommends that a chest radiograph should not be carried out in patients with suspected CAP unless:

- the diagnosis is in doubt and a chest radiograph will help in a differential diagnosis and management of the acute illness
- progress following treatment for suspected CAP is not satisfactory at review or
- the patient is considered at risk of underlying lung pathology such as lung cancer.¹³

There has been recent interest in procalcitonin (PCT) levels. PCT levels increase during bacterial infection and decrease during recovery so can be used to guide antibiotic therapy in individual patients as a surrogate biomarker either in deciding whether to commence an antibiotic or to help decide if an antibiotic may be discontinued. This requires highly sensitive PCT assays.¹⁴⁻¹⁷ There is some evidence¹⁸⁻²⁰ that antibiotic stewardship is possible using this method. However, an estimate of the cost of measuring a PCT level is £30 and requires specific expertise, so whether it will be feasible to roll this test out as routine in the community is certainly up for debate. Also in one study, the positive predictive value of PCT was low for diagnosing pneumonia, bacterial infection, or adverse outcome and similar to C-reactive protein in this respect.²¹

ASSESSING SEVERITY

It is clearly very important to recognise which patients with an LRTI or pneumonia are more severely unwell and require hospital treatment. The CURB-65 and CRB-65 scores (see table 4, above) are most widely used, however, it must be stressed that these severity scores have only been validated in patients with radiographically confirmed pneumonia.

They are also most useful in informing which patients do not have severe illness and can be safely discharged from hospital, rather than

being used to decide who is admitted. Despite this CRB-65 is still a helpful tool in the community. Patients scoring 0 or 1 have the lowest mortality risk, however, a score of 2 or more should be a cause for concern and the patient may need to be admitted to hospital for assessment.^{5,13}

Other markers of severity that are less significant in terms of morbidity and mortality, but still helpful in making a decision regarding hospitalisation are:

- presence of co-existing disease
- high or low temperature (<35°C or ≥40°C)
- significant hypoxia (<94%) or
- tachycardia (>125/min)

Finally other reasons to consider hospital admission include social or physical factors such as the need for intravenous antibiotic therapy in confused patients. Ultimately, the clinical judgement of the assessing GP plays a large part in the decision to admit to hospital.

COMMUNITY MANAGEMENT

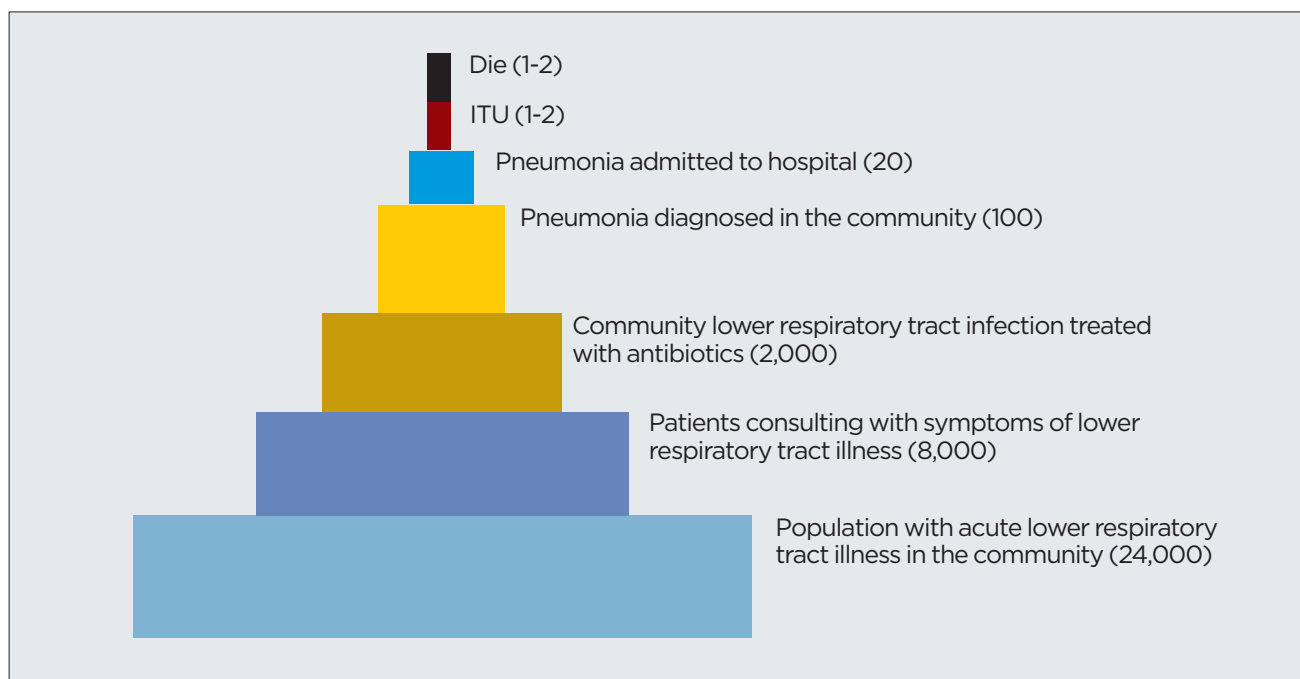
All patients who present with LRTI should be given general management advice, i.e. to drink plenty of fluids, use appropriate analgesics and antipyretics, rest and avoid smoking.

The main challenge in primary care is to determine which of the many patients who currently receive antibiotics do not need them.²² Several randomised controlled trials, meta-analyses and systematic reviews have investigated the treatment of non-pneumonic LRTI in the community²³⁻²⁶ and have shown that antibiotic treatment leads to no or little advantage.^{25,27} Antibiotics should not normally be prescribed for previously well patients who do not have chest signs or features of severity. Sputum purulence alone is not an indication for antibiotics in a previously well patient with no chest signs.

GPs should give non-pneumonic LRTI patients written information to help them understand their illness and why the decision has been taken not to prescribe an antibiotic, this approach should also reduce re-consultation rates.⁵ For patients with true community acquired pneumonia, options for antibiotic treatment are listed in table 5, p24. »

FIGURE 2

The spectrum of LRTI in the community through to hospital admissions



Adapted from Macfarlane JT. Lower respiratory tract infection and pneumonia in the community. *Semin Respir Infect* 1999; 14: 151-62

Table 5**Community antibiotic therapy for CAP¹³**

Patient group	First choice antibiotic	Alternative choices
Non-severe, home treated CAP	amoxicillin 5mg tds orally for 7 days	doxycycline or clarithromycin
Life-threatening CAP referred to hospital	penicillin G 1.2g intravenously	amoxicillin 1g orally
Severe CAP with admission delay >6 hours	consider antibiotics	

When you review a patient with CAP in the community will be determined by the initial severity assessment and other factors such as the availability of reliable help at home. Patients assessed as low severity should improve on appropriate therapy within 48 hours, at which time severity reassessment is recommended. Those who fail to improve within 48 hours should be considered for hospital admission. Patients who do not fulfil the criteria for low severity and are managed at home will require more frequent review.¹³

Follow-up chest radiographs should be performed at 6 weeks in patients with radiological changes consistent with pneumonia in the following situations to exclude underlying malignancy:

- smokers
- patient > 50 years old
- persistent physical symptoms and signs.

PREVENTION

Smoking cessation should be encouraged at every opportunity with

the use of appropriate smoking cessation aids. Influenza vaccination is recommended for those aged ≥65 years and for people of any age with underlying chronic disease or living in long-stay residential care, and for health and social care workers.^{5,13} Pneumococcal polysaccharide vaccine (PPV) should be given to all those aged two years or older in whom pneumococcal infection is likely to be more common or more serious in terms of increased morbidity and mortality. PPV should be given to everyone ≥65 on a one-off basis, at the same time as routine annual influenza vaccine.^{5,13}

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key points

SELECTED BY

Dr Peter Saul

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When considering a diagnosis of LRTI the main

differentiation to make is between pneumonia and non-pneumonic LRTI. It is more difficult to make this distinction in the community because of access constraints to chest radiography and the lack of a quick, simple marker to identify patients with true pneumonia accurately.

The diagnosis of pneumonia in the community, without

a chest radiograph, is suggested by symptoms that include: cough; (purulent) sputum production; breathlessness; pleurisy; occasional haemoptysis along with new focal signs on chest examination (e.g. crepitations, bronchial breathing, and dullness to percussion); at least one systemic feature (e.g. sweating, fevers, shivers, aches and pains and/or temperature $>38^{\circ}\text{C}$); and no other explanation for the symptoms.

A recent observational study of around 150,000 patients

with LRTI in the UK found that the following factors were associated with increased respiratory infection-related mortality: increasing age; smoking; increasing Charlson co-morbidity index; prior antibiotic prescribing; frequent consultation and prior specialist referral or admission.

Acute adult LRTI presenting to GPs is a predominantly

viral illness most commonly caused by rhinoviruses and influenza viruses. The most common bacterial cause of pneumonia is *Streptococcus pneumoniae* but frequently no organism is identified.

In patients where you suspect non-pneumonic LRTI,

the evidence suggests that chest radiography and blood tests for CRP are not helpful in their management in the community. The BTS guidelines recommend that GPs, particularly those working in out-of-hours and emergency assessment centres, should consider using pulse oximeters.

It is clearly very important to recognise which patients

with an LRTI or pneumonia are more severely unwell and require hospital treatment. The CRB-65 is a helpful tool in the community. Patients scoring 0 or 1 have the lowest mortality risk, however, a score of 2 or more should be a cause for concern and the patient may need to be admitted to hospital for assessment. Other markers of severity that are less significant in terms of morbidity and mortality, but still helpful in making a decision regarding hospitalisation are: presence of co-existing disease; high or low temperature ($<35^{\circ}\text{C}$ or $\geq 40^{\circ}\text{C}$); significant hypoxia ($<94\%$); or tachycardia ($>125/\text{min}$).

All patients who present with LRTI should be given

general management advice, i.e., drink plenty of fluids, use appropriate analgesics and antipyretics. Antibiotics should not normally be prescribed for previously well patients who do not have chest signs or features of severity. Patients assessed as low severity should improve on appropriate therapy within 48 hours, at which time reassessment is recommended. Those who have not improved should be considered for hospital admission.

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Useful websites

The new BTS guidelines on community acquired pneumonia can be accessed at:

www.brit-thoracic.org.uk

Patient information can be obtained from the British Lung Foundation:

www.lunguk.org

Patient information leaflets on lower respiratory tract infection and pneumonia can also be found at:

www.patient.co.uk/health

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