

Issue date: February 2004

Quick reference guide

Chronic obstructive pulmonary disease

**Management of chronic obstructive
pulmonary disease in adults in primary and
secondary care**

Clinical Guideline 12

Developed by the National Collaborating Centre for Chronic Conditions

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Grading Evidence recommendation is based on

- A** Evidence from at least one randomised controlled trial or systematic reviews or meta-analyses of randomised controlled trials
 - B** Evidence from at least one controlled study without randomisation or at least one other type of quasi-experimental study, or extrapolated from a randomised controlled trial, systematic review or meta-analysis
 - C** Evidence from non-experimental descriptive studies, such as comparative or case-control studies, or extrapolated from experimental or quasi-experimental studies
 - D** Expert committee reports or opinions, and/or clinical experience of respected authorities or extrapolated from studies
- NICE** NICE guidelines or Health Technology Appraisal programme
HSC Health Service Circular

For further details see the NICE guideline (www.nice.org.uk/CG012NICEguideline) and the full guideline (www.nice.org.uk/CG012fullguideline or http://thorax.bmjournals.com/content/vol159/suppl_1).

Working definition of chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) is characterised by airflow obstruction. The airflow obstruction is usually progressive, not fully reversible and does not change markedly over several months. The disease is predominantly caused by smoking.

- Airflow obstruction is defined as a reduced FEV₁ (forced expiratory volume in 1 second) and a reduced FEV₁/FVC ratio (where FVC is forced vital capacity), such that FEV₁ is less than 80% predicted and FEV₁/FVC is less than 0.7.
- The airflow obstruction is due to a combination of airway and parenchymal damage.
- The damage is the result of chronic inflammation that differs from that seen in asthma and which is usually the result of tobacco smoke.
- Significant airflow obstruction may be present before the individual is aware of it.
- COPD produces symptoms, disability and impaired quality of life which may respond to pharmacological and other therapies that have limited or no impact on the airflow obstruction.
- COPD is now the preferred term for the conditions in patients with airflow obstruction who were previously diagnosed as having chronic bronchitis or emphysema.
- Other factors, particularly occupational exposures, may also contribute to the development of COPD.

There is no single diagnostic test for COPD. Making a diagnosis relies on clinical judgement based on a combination of history, physical examination and confirmation of the presence of airflow obstruction using spirometry.

This guidance is written in the following context:

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Health professionals are expected to take it fully into account when exercising their clinical judgement. The guidance does not, however, override the individual responsibility of health professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Diagnose COPD

- A diagnosis of COPD should be considered in patients over the age of 35 who have a risk factor (generally smoking) and who present with exertional breathlessness, chronic cough, regular sputum production, frequent winter 'bronchitis' or wheeze.
- The presence of airflow obstruction should be confirmed by performing spirometry. All health professionals managing patients with COPD should have access to spirometry and be competent in the interpretation of the results.

Stop smoking

- Encouraging patients with COPD to stop smoking is one of the most important components of their management. All COPD patients still smoking, regardless of age, should be encouraged to stop, and offered help to do so, at every opportunity.

Effective inhaled therapy

- Long-acting inhaled bronchodilators (beta₂-agonists or anticholinergics) should be used to control symptoms and improve exercise capacity in patients who continue to experience problems despite the use of short-acting drugs.
- Inhaled corticosteroids should be added to long-acting bronchodilators to decrease exacerbation frequency in patients with an FEV₁ less than or equal to 50% predicted who have had two or more exacerbations requiring treatment with antibiotics or oral corticosteroids in a 12-month period.

Pulmonary rehabilitation for all who need it

- Pulmonary rehabilitation should be made available to all appropriate patients with COPD.

Use non-invasive ventilation

- Non-invasive ventilation (NIV) should be used as the treatment of choice for persistent hypercapnic ventilatory failure during exacerbations not responding to medical therapy. It should be delivered by staff trained in its application, experienced in its use and aware of its limitations.
- When patients are started on NIV, there should be a clear plan covering what to do in the event of deterioration and ceilings of therapy should be agreed.

Manage exacerbations

- The frequency of exacerbations should be reduced by appropriate use of inhaled corticosteroids and bronchodilators, and vaccinations.
- The impact of exacerbations should be minimised by:
 - giving self-management advice on responding promptly to the symptoms of an exacerbation
 - starting appropriate treatment with oral steroids and/or antibiotics
 - use of NIV when indicated
 - use of hospital-at-home or assisted-discharge schemes.

Multidisciplinary working

- COPD care should be delivered by a multidisciplinary team.

MRC dyspnoea scale

Grade Degree of breathlessness related to activities

- | | |
|---|--|
| 1 | Not troubled by breathlessness except on strenuous exercise |
| 2 | Short of breath when hurrying or walking up a slight hill |
| 3 | Walks slower than contemporaries on level ground because of breathlessness, or has to stop for breath when walking at own pace |
| 4 | Stops for breath after walking about 100 m or after a few minutes on level ground |
| 5 | Too breathless to leave the house, or breathless when dressing or undressing |

Adapted from Fletcher CM, Elmes PC, Fairbairn MB et al. (1959) The significance of respiratory symptoms and the diagnosis of chronic bronchitis in a working population. *British Medical Journal* 2:257–66.

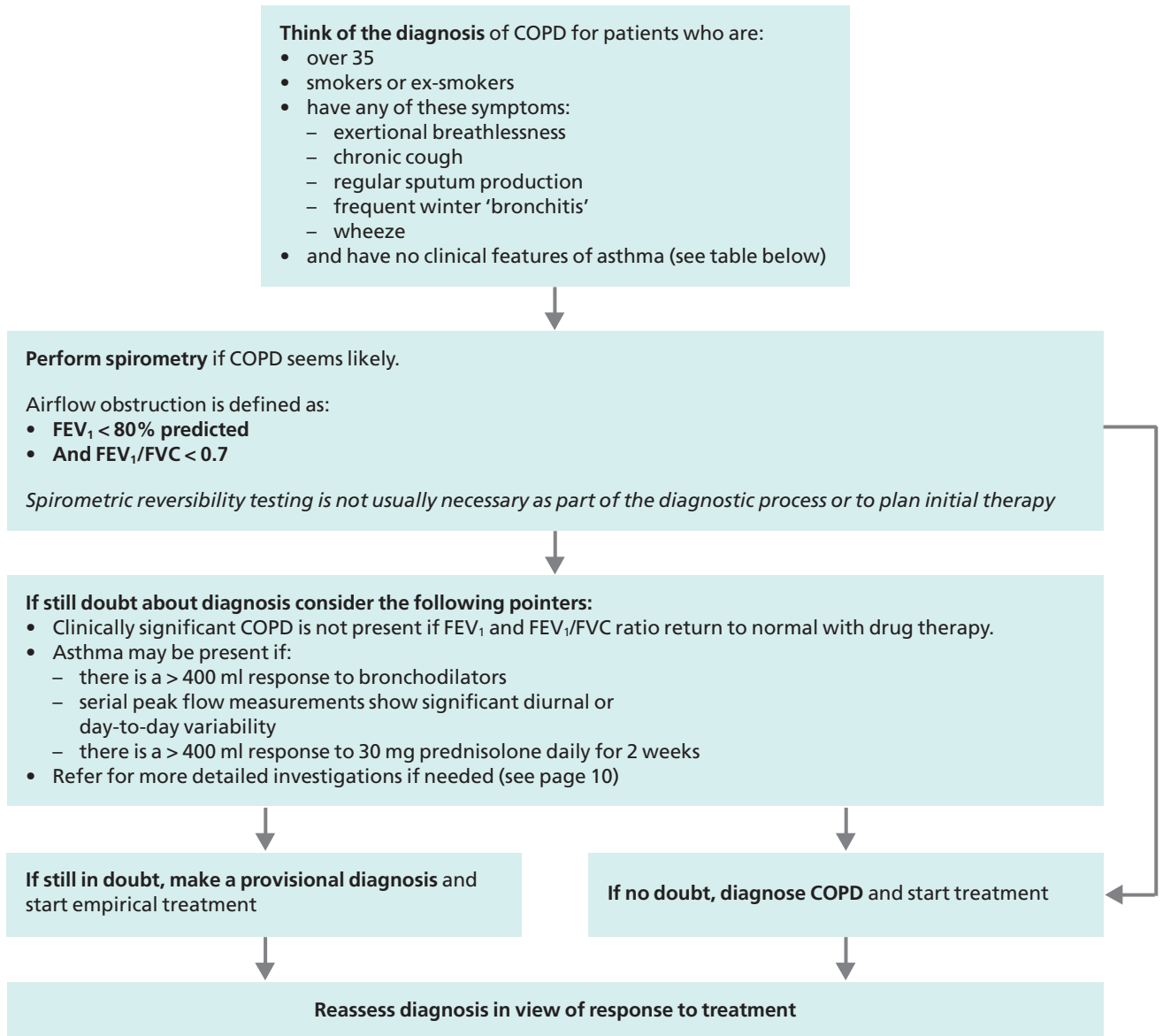
Abbreviations used in this guide

BMI	Body mass index	LTOT	Long-term oxygen therapy
COPD	Chronic obstructive pulmonary disease	NIV	Non-invasive ventilation
FEV ₁	Forced expiratory volume in 1 second	PaO ₂	Partial pressure of oxygen in arterial blood
FVC	Forced vital capacity	SaO ₂	Oxygen saturation of arterial blood (percentage)

Diagnosing COPD

Definition of COPD

COPD is characterised by airflow obstruction. The airflow obstruction is usually progressive, not fully reversible and does not change markedly over several months. The disease is predominantly caused by smoking.



Clinical features differentiating COPD and asthma		
	COPD	Asthma
Smoker or ex-smoker	Nearly all	Possibly
Symptoms under age 35	Rare	Common
Chronic productive cough	Common	Uncommon
Breathlessness	Persistent and progressive	Variable
Night-time waking with breathlessness and/or wheeze	Uncommon	Common
Significant diurnal or day-to-day variability of symptoms	Uncommon	Common

Managing stable COPD

Follow up and review

All patients with COPD

- For all patients with COPD: **D**
 - highlight the diagnosis of COPD in the notes and computer database (using Read codes)
 - record the results of spirometric tests at diagnosis – absolute and percentage of predicted
 - record opportunistic measurements of spirometric parameters (a loss of 500 ml over 5 years will identify patients with rapidly progressing disease who may need specialist referral and investigation).
- See table below for checklist of issues to cover at follow up. **D**
- Severity of airflow limitation: mild FEV₁ 50–80%; moderate FEV₁ 30–49%; severe FEV₁ < 30%. **D**
- Mild airflow obstruction can be associated with significant disability, so assessment of disease severity should also take into account the frequency of exacerbations and prognostic factors such as breathlessness (assessed using the MRC scale on page 3), health status, exercise capacity and presence of cor pulmonale. **D**

Severe COPD

- Patients with stable severe disease do not normally need regular hospital review, but there should be locally agreed mechanisms to allow rapid hospital assessment when necessary. **D**
- Patients requiring interventions such as long-term non-invasive ventilation should be reviewed regularly by specialists. **D**

Follow up of patients with COPD in primary care

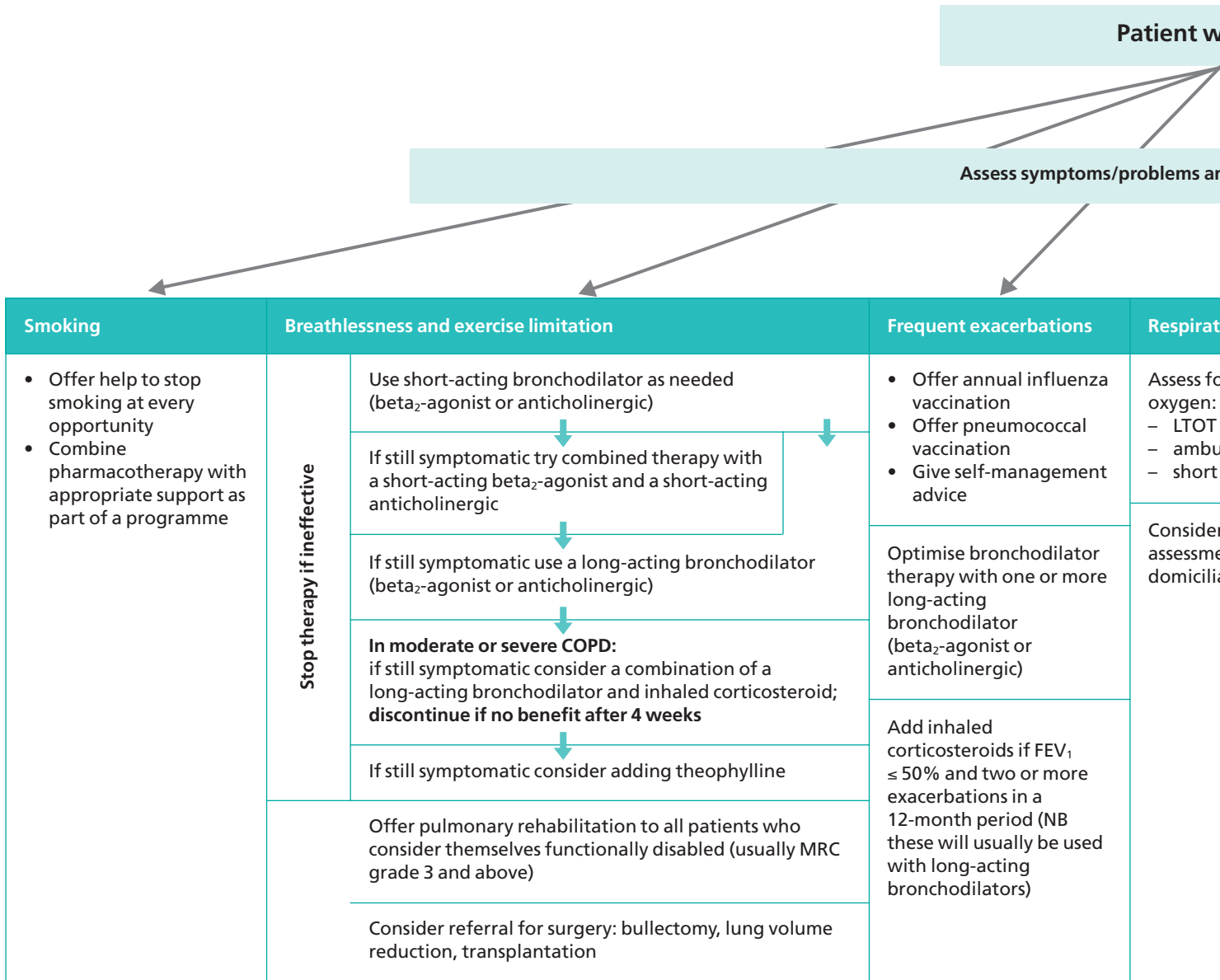
	Mild/moderate Frequency: at least annual	Severe Frequency: at least twice per year
Clinical assessment	<ul style="list-style-type: none"> • Smoking status and desire to quit • Adequacy of symptom control: <ul style="list-style-type: none"> – breathlessness – exercise tolerance – estimated exacerbation frequency • Presence of complications • Effects of each drug treatment • Inhaler technique • Need for referral to specialist and therapy services • Need for pulmonary rehabilitation 	<ul style="list-style-type: none"> • Smoking status and desire to quit • Adequacy of symptom control: <ul style="list-style-type: none"> – breathlessness – exercise tolerance – estimated exacerbation frequency • Presence of cor pulmonale • Need for long-term oxygen therapy • Patient's nutritional state • Presence of depression • Effects of each drug treatment • Inhaler technique • Need for social services and occupational therapy input • Need for referral to specialist and therapy services • Need for pulmonary rehabilitation
Measurements to make	<ul style="list-style-type: none"> • FEV₁ and FVC • Body mass index (BMI) • MRC dyspnoea score 	<ul style="list-style-type: none"> • FEV₁ and FVC • BMI • MRC dyspnoea score (see page 3) • Oxygen saturation of arterial blood (SaO₂)

Smoking cessation

- All COPD patients who smoke should be encouraged to stop at every opportunity, and offered bupropion or nicotine replacement therapy (unless contraindicated), combined with a support programme. **B**
- If a person with COPD is unsuccessful in an attempt to quit smoking, the person's readiness to quit should be reassessed at 6 months to allow the smoker to regain adequate motivation. However, if external factors interfere with an individual's initial attempt to stop smoking, it may be reasonable to try again sooner. **NICE**

Management of stable COPD

Patients with COPD should have access to the wide range of skills available from a multidisciplinary team



Palliative care

- Opiates can be used for the palliation of breathlessness in patients
- Use benzodiazepines, tricyclic antidepressants, major tranquillisers
- Involve multidisciplinary palliative care teams

with COPD

and manage as described below

Respiratory failure	Cor pulmonale	Abnormal BMI	Chronic productive cough	Anxiety and depression
<ul style="list-style-type: none"> • Refer for appropriate • Respiratory burst • Refer for referral for long-term NIV 	<ul style="list-style-type: none"> • Assess need for oxygen • Use diuretics 	<ul style="list-style-type: none"> • Refer for dietetic advice • Give nutritional supplements if the BMI is low 	<ul style="list-style-type: none"> • Consider trial of mucolytic therapy • Continue if symptomatic improvement 	<ul style="list-style-type: none"> • Be aware of anxiety and depression and screen for them in those most physically disabled • Treat with conventional pharmacotherapy

Patients with end-stage COPD unresponsive to other medical therapy should be considered for lung transplantation and oxygen when appropriate

Options for drug treatment

- To assess the effectiveness of COPD treatments, use improvements in symptoms, activities of daily living, exercise capacity and rapidity of symptom relief, in addition to lung function tests.
- The choice of drug(s) should take into account the patient's response to a trial of the drug, side effects, patient preference and cost.

Inhaled bronchodilator therapy

- Treat breathlessness and exercise limitation initially with short-acting bronchodilators (beta₂-agonists or anticholinergics) as needed. **B**
- If this does not control symptoms, prescribe a long-acting bronchodilator. **A**
- Also prescribe a long-acting bronchodilator if the patient has two or more exacerbations a year. **D**

Theophylline

- Prescribe only after trials of short- and long-acting bronchodilators, because of the need to monitor plasma levels and interactions. **D**
- Particular caution is needed in elderly patients. **D**

Inhaled corticosteroids

- Prescribe for patients with an FEV₁ of 50% predicted or less, who have two or more exacerbations needing treatment with antibiotics or oral corticosteroids a year. **B**
- Warn patients about the possible risk of osteoporosis and other side effects of high-dose inhaled corticosteroids. **D**
- None of the inhaled corticosteroids currently available is licensed alone for use in COPD.

Oral corticosteroids

- Maintenance use of oral corticosteroid therapy in COPD is not recommended. **D**
- However, a few patients with advanced COPD may need maintenance oral corticosteroids if oral corticosteroids cannot be withdrawn after an exacerbation. **D**
- In those cases, keep the dose as low as possible, monitor patients for osteoporosis and prescribe prophylaxis. **D**

Combination therapy

- Drug combinations can increase clinical benefits. Examples include: **A**
 - beta₂-agonist and anticholinergic
 - beta₂-agonist and theophylline
 - anticholinergic and theophylline
 - long-acting beta₂-agonist and inhaled corticosteroid.

Delivery systems

Inhalers

- Most patients, whatever their age, can learn how to use an inhaler unless they have significant cognitive impairment.
- Hand-held devices are usually best, with a spacer if appropriate. **D**
- If a patient cannot use a particular device, try another. **D**
- Teach technique before prescribing an inhaler, and check regularly. **D**
- Titrate the dose against response for each patient. **D**

Spacers

- Ensure the spacer is compatible with the patient's inhaler. **D**
- Patients should make single actuations of the inhaler into the spacer, and inhale as soon as possible, repeating as needed. Tidal breathing is as effective as single breaths. **D**

Nebulisers

- Consider a nebuliser for patients with distressing or disabling breathlessness despite maximal therapy with inhalers. **D**
- Assess the patient and/or carer's ability to use the nebuliser before prescribing, and arrange access to equipment, servicing, advice and support. **D**
- Allow the patient to choose whether to use a facemask or mouthpiece, unless taking a drug (such as an anticholinergic drug) where a mouthpiece is required. **D**
- Continue nebuliser treatment only if there is a reduction in symptoms, or an improvement in activities of daily living, exercise capacity or lung function. **D**

Oxygen therapy

Long-term oxygen therapy

- Long-term oxygen therapy (LTOT) is indicated in patients with PaO₂ (partial pressure of oxygen in arterial blood) less than 7.3 kPa when stable, or 7.3–8 kPa when stable and one of secondary polycythaemia, nocturnal hypoxaemia, peripheral oedema or pulmonary hypertension. **A**
- Patients should breathe supplemental oxygen for at least 15 hours a day. **A**
- Assess the need for oxygen therapy in patients with: **D**
 - severe airflow obstruction (FEV₁ less than 30% predicted)
 - cyanosis
 - polycythaemia
 - peripheral oedema
 - a raised jugular venous pressure or
 - oxygen saturations less than or equal to 92% breathing air.
- Consider assessment for patients with moderate airflow obstruction (FEV₁ 30–49% predicted). **D**
- Practices should have a pulse oximeter to ensure all patients needing LTOT are identified. **D**
- Oxygen concentrators should be used to provide the fixed supply at home for long-term oxygen therapy. **D**

Ambulatory and short-burst oxygen therapy

- Ambulatory oxygen should be prescribed for patients already on LTOT who want to continue with therapy outside the home. **D**
- Short-burst oxygen therapy should only be considered for episodes of severe breathlessness not relieved by other treatments. **C**

Vaccination and anti-viral therapy

- Patients with COPD should be offered pneumococcal vaccination and an annual influenza vaccination. **HSC**
- Within their licensed indications, zanamivir and oseltamivir are recommended for at-risk patients who present with influenza-like illness within 48 hours of onset of symptoms. Patients with COPD should have a fast-acting bronchodilator available when taking zanamivir because of the risk of bronchospasm. **NICE**

Other management issues

Cor pulmonale

- Consider cor pulmonale in patients who have: **D**
 - peripheral oedema
 - a raised venous pressure
 - a systolic parasternal heave
 - a loud pulmonary second heart sound.
- Assess patients with cor pulmonale for the need for long-term oxygen therapy. **A**
- Treat oedema with diuretic therapy. **D**

Pulmonary rehabilitation

- Offer to all appropriate patients with COPD. In practice, this means those who consider themselves functionally disabled by COPD (usually MRC grade 3 and above). **D**
- Pulmonary rehabilitation is not suitable for patients who are unable to walk, have unstable angina or who have had a recent myocardial infarction. **D**
- The programme should be tailored to the patient's needs, and should include physical training, disease education, nutritional, psychological and behavioural intervention. **A**

Mucolytic therapy

- Consider mucolytic therapy in patients with a chronic productive cough. **B**
- Continue therapy if there is symptomatic improvement. **D**

Treatments that are not recommended:

- Anti-oxidant therapy (alpha-tocopherol and beta-carotene supplements). **A**
- Anti-tussive therapy. **D**
- Prophylactic antibiotic therapy. **D**

Anxiety and depression

- Healthcare professionals should be alert to anxiety and depression, particularly in patients who are hypoxic, have severe dyspnoea or have been seen at or admitted to hospital. **D**
- Treat anxiety and depression with medication, taking time to explain to the patient why this is needed. **C**

Other management issues (continued)

Travel and leisure advice

- Assess patients who are planning air travel and use long-term oxygen therapy or have FEV₁ less than 50% predicted in line with BTS recommendations. **D**
- Patients with bullous disease should be warned about the theoretically increased risk of pneumothorax during air travel. **D**

Self-management of exacerbations

- Patients at risk of having an exacerbation should be encouraged to respond quickly to the symptoms of an exacerbation by: **D**
 - starting oral corticosteroid therapy if increased breathlessness interferes with activities of daily living (unless contraindicated)
 - starting antibiotic therapy if their sputum is purulent
 - adjusting bronchodilator therapy to control symptoms.
- Give patients at risk of exacerbations a course of antibiotic and corticosteroid tablets to keep at home, and advise them to contact a healthcare professional if their symptoms do not improve. **D**
- Monitor the use of these drugs. **D**

Multidisciplinary working

- Patients with COPD should be managed by a multidisciplinary team that includes professionals such as respiratory nurse specialists and can assess and manage COPD. Functions to consider when defining the activity of the multidisciplinary team include advising patients on self-management, identifying patients at risk of exacerbation and providing care to prevent emergency admissions, advising on exercise, and educating patients and other health professionals. **D**
- Sometimes the patient may need to be referred to a specialist department, such as physiotherapy.

Education

- Education packages should take account of the different needs of patients at different stages of their disease. **D**
- Asthma education packages are not suitable for patients with COPD. **A**
- Patients with moderate and severe COPD should know about the technique of NIV and its benefits and limitations, so that, if it is ever necessary in the future, they will be aware of these issues. **D**

Referral to other health professionals and agencies

- Physiotherapy – patients with excessive sputum should be taught use of positive expiratory pressure masks and active cycle of breathing techniques. **D**
- Dietetic advice – patients with BMI that is high, low or changing over time. **D**
- Occupational therapy – patients who need help with activities of daily living. **D**
- Social services department – patients who are disabled by COPD. **D**
- Multidisciplinary palliative care teams – patients with end-stage COPD and their families and carers. **D**

Referral for specialist advice

Referral for advice, or specialist investigations or treatment may be appropriate at any stage of disease, not just for the most severely disabled patients. Some possible reasons for referral include: **D**

- diagnostic uncertainty
- suspected severe COPD
- the patient requests a second opinion
- onset of cor pulmonale
- assessment for oxygen therapy, long-term nebuliser therapy or oral corticosteroid therapy
- bullous lung disease
- rapid decline in FEV₁
- assessment for pulmonary rehabilitation
- assessment for lung volume reduction surgery or lung transplantation
- dysfunctional breathing
- patient aged under 40 years or a family history of alpha-1 antitrypsin deficiency
- symptoms disproportionate to lung function deficit
- frequent infections
- haemoptysis.

Exacerbations

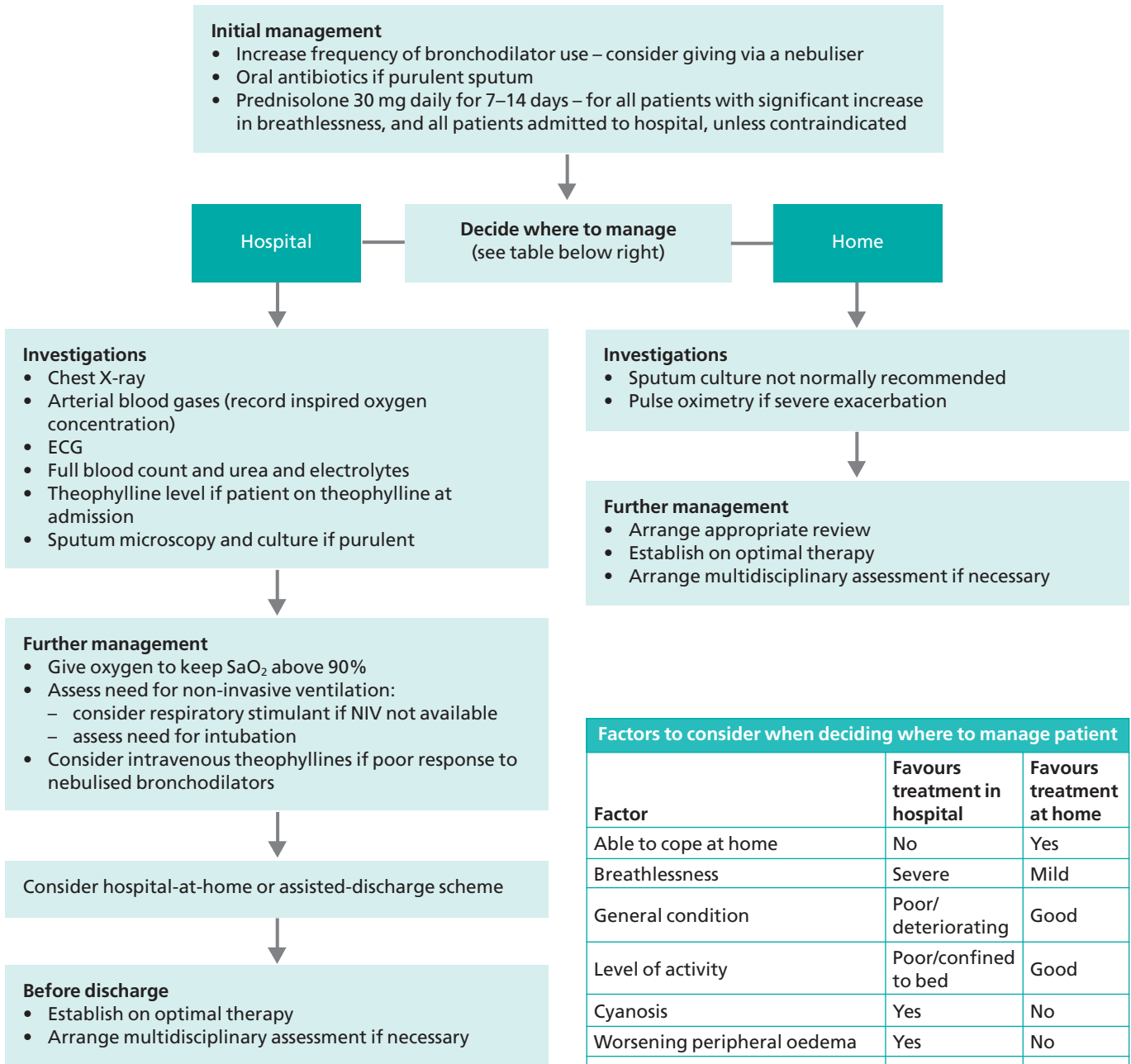
An exacerbation is a sustained worsening of the patient's symptoms from his or her usual stable state that is beyond normal day-to-day variations, and is acute in onset. Commonly reported symptoms are worsening breathlessness, cough, increased sputum production and change in sputum colour.

- Most patients can be managed at home. Some factors to consider when deciding whether to admit a patient are listed in the table on page 11. **D**
- Investigations and treatment are summarised in the algorithm on page 11.

Managing exacerbations of COPD

Exacerbations of COPD can be associated with increased:

- dyspnoea
- sputum purulence
- sputum volume



Factors to consider when deciding where to manage patient

Factor	Favours treatment in hospital	Favours treatment at home
Able to cope at home	No	Yes
Breathlessness	Severe	Mild
General condition	Poor/deteriorating	Good
Level of activity	Poor/confined to bed	Good
Cyanosis	Yes	No
Worsening peripheral oedema	Yes	No
Level of consciousness	Impaired	Normal
Already receiving LTOT	Yes	No
Social circumstances	Living alone/not coping	Good
Acute confusion	Yes	No
Rapid rate of onset	Yes	No
Significant comorbidity (particularly cardiac disease and insulin-dependent diabetes)	Yes	No
SaO ₂ < 90%	Yes	No
Changes on the chest radiograph	Present	No
Arterial pH level	< 7.35	≥ 7.35
Arterial PaO ₂	< 7 kPa	≥ 7 kPa

Implementation of this guidance

Local health communities should review their existing practice for the management of COPD against this guideline. The review should consider the resources required to implement the recommendations set out in this guidance, the people and processes involved and the timeline over which full implementation is envisaged. It is in the interests of patients that the implementation timeline is as rapid as possible.

Relevant local clinical guidelines, care pathways and protocols should be reviewed in the light of this guidance and revised accordingly.

Further information

Quick reference guide

This quick reference guide to the Institute's guideline on COPD contains the key priorities for implementation, summaries of the guidance, and notes on implementation. It is intended primarily for health professionals working in primary care and A&E departments. The distribution list for this quick reference guide is available on the NICE website at www.nice.org.uk/CG012distributionlist

NICE guideline

The NICE guideline *Chronic obstructive pulmonary disease: management of chronic obstructive pulmonary disease in adults in primary and secondary care* contains the following sections:

Key priorities for implementation

1 Guidance

2 Notes on the scope of the guidance

3 Implementation in the NHS

4 Research recommendations

5 Full guideline

6 Related NICE guidance

7 Review date.

The NICE guideline also gives details of the scheme used for grading the recommendations, membership of the Guideline Development Group and the Guideline Review Panel, and technical details on criteria for audit. The NICE guideline is available on the NICE website at www.nice.org.uk/CG012NICEguideline

Full guideline

The full guideline includes the evidence on which the recommendations are based, in addition to the information in the NICE guideline. It is published by the National Collaborating Centre for Chronic Conditions. It is available

from http://thorax.bmjournals.com/content/vol159/suppl_1 and www.nice.org.uk/CG012fullguideline

Information for the public

NICE has produced information describing this guidance for people with COPD, their families and carers, and the public. This information is available in English and Welsh from www.nice.org.uk/CG012publicinfo

Review date

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin earlier than 4 years if significant evidence that affects the guideline recommendations is identified sooner. The updated guideline will be available within 2 years of the start of the review process.

Related guidance

The Institute's guidance on the use of nicotine replacement therapy (NRT) and bupropion for smoking cessation is available from: www.nice.org.uk/Docref.asp?d=30617 and its guidance on the use of zanamivir, oseltamivir and amantadine for the treatment of influenza is available from www.nice.org.uk/Docref.asp?d=58060

NICE is in the process of developing the following guidance:

- *Depression: the management of depression in primary and secondary care*. Clinical guideline. (Publication expected June 2004.)
- *Anxiety: management of generalised anxiety disorder and panic disorder (with or without agoraphobia) in adults in primary, secondary and community care*. Clinical guideline (Publication expected June 2004.)
- *Nutritional supplements: feeding methods including enteral and parenteral feeding*. Clinical guideline. (Publication expected December 2005.)

Ordering information

Copies of this quick reference guide can be obtained from the NICE website at www.nice.org.uk/CG012quickrefguide or from the NHS Response Line by telephoning 0870 1555 455 and quoting reference number N0462. Information for the public can be obtained by quoting reference number N0463 for the English version and N0464 for a version in English and Welsh.

Published by the National Institute for Clinical Excellence, February 2004 ISBN: 1-84257-543-0

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