



*National Institute for
Health and Clinical Excellence*

Quick reference guide

Issue date: June 2010

Chronic obstructive pulmonary disease

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

This is an update of NICE clinical guideline 12

About this booklet

This is a quick reference guide that summarises the recommendations NICE has made to the NHS in 'Chronic obstructive pulmonary disease in adults in primary and secondary care (update)' (NICE clinical guideline 101).

This guidance is an update of 'Chronic obstructive pulmonary disease in adults in primary and secondary care' (published February 2004). This booklet includes the recommendations developed in 2004 and the new recommendations from the 2010 update. New recommendations have been added on spirometry, assessment of prognostic factors, and to the section on inhaled therapy (which now incorporates the previously separate sections on inhaled bronchodilators, inhaled corticosteroids and inhaled combination therapy).

Who should read this booklet?

This quick reference guide is for consultants, GPs, nurses and other staff who care for adults with chronic obstructive pulmonary disease.

Who wrote the guideline?

The guideline was developed by the National Clinical Guideline Centre for Acute and Chronic Conditions. The Guideline Centre worked with a group of healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, who reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation.

For more information on how NICE clinical guidelines are developed, go to www.nice.org.uk

Where can I get more information about the guideline?

The NICE website has the recommendations in full, reviews of the evidence they are based on, a summary of the guideline for patients and carers, and tools to support implementation (see page 20 for more details).

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NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

This guidance represents the view of NICE, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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Introduction

An estimated 3 million people have chronic obstructive pulmonary disease (COPD) in the UK¹. Most people are not diagnosed until they are in their fifties.

COPD is predominantly caused by smoking and is characterised by airflow obstruction that is not fully reversible. The airflow obstruction does not change markedly over several months but is usually progressive in the long term. Exacerbations often occur, when there is a rapid and sustained worsening of the patient's symptoms beyond normal day-to-day variations.

There is no single diagnostic test for COPD. Diagnosis relies on a combination of history, physical examination and confirmation of airflow obstruction using spirometry.

Person-centred care

Treatment and care should take into account people's individual needs and preferences. Good communication is essential, supported by evidence-based information, to allow people to reach informed decisions about their care. Follow advice on seeking consent from the Department of Health or Welsh Assembly Government if needed. If the person agrees, families and carers should have the opportunity to be involved in decisions about treatment and care.

¹ Healthcare Commission (2006) Clearing the air: a national study of chronic obstructive pulmonary disease. London: Healthcare Commission.

Key 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 post-bronchodilator spirometry. All health professionals involved in the care of people 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.

Promote effective inhaled therapy

- In people with stable COPD who remain breathless or have exacerbations despite use of short-acting bronchodilators as required, offer the following as maintenance therapy:
 - if forced expiratory volume in 1 second (FEV_1) \geq 50% predicted: either long-acting beta₂ agonist (LABA) or long-acting muscarinic antagonist (LAMA)
 - if FEV_1 $<$ 50% predicted: either LABA with an inhaled corticosteroid (ICS) in a combination inhaler, or LAMA.
- Offer LAMA in addition to LABA + ICS to people with COPD who remain breathless or have exacerbations despite taking LABA + ICS, irrespective of their FEV_1 .

Provide pulmonary rehabilitation for all who need it

- Pulmonary rehabilitation should be made available to all appropriate people with COPD including those who have had a recent hospitalisation for an acute exacerbation.

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 non-invasive ventilation when indicated
 - use of hospital-at-home or assisted-discharge schemes.

Ensure multidisciplinary working

- COPD care should be delivered by a multidisciplinary team.

Key to terms

ATS: American Thoracic Society	LABA: Long-acting beta ₂ agonist
BMI: Body mass index	LAMA: Long-acting muscarinic antagonist
BODE: Body mass index, airflow obstruction, dyspnoea and exercise capacity	LTOT: Long-term oxygen therapy
COPD: Chronic obstructive pulmonary disease	MRC: Medical Research Council
ERS: European Respiratory Society	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	SABA: Short-acting beta ₂ agonist
GOLD: Global Initiative for Chronic Obstructive Lung Disease	SAMA: Short-acting muscarinic antagonist
ICS: Inhaled corticosteroid	SaO ₂ : Oxygen saturation of arterial blood
	T _L CO: Carbon monoxide lung transfer factor

Diagnosing COPD

Consider a diagnosis of COPD for people who are:

- over 35, **and**
- smokers or ex-smokers, **and**
- have any of these symptoms:
 - exertional breathlessness
 - chronic cough
 - regular sputum production
 - frequent winter 'bronchitis'
 - wheeze

- and do not have clinical features of asthma:

- chronic unproductive cough
- significantly variable breathlessness
- night-time waking with breathlessness and/or wheeze
- significant diurnal or day-to-day variability of symptoms

Ask about the following factors where COPD is suspected:

- weight loss
- effort intolerance
- waking at night
- ankle swelling
- fatigue
- occupational hazards
- chest pain
- haemoptysis

Perform initial diagnostic evaluation if COPD seems likely:

- post-bronchodilator spirometry (record absolute and percentage of predicted values)
- chest X-ray to exclude other diagnoses (investigate abnormalities using a CT scan)
- full blood count to identify anaemia or polycythaemia
- body mass index (BMI) calculation

Assess severity (see table 1)

Consider alternative diagnoses in older people without typical symptoms of COPD and FEV_1/FVC ratio < 0.7 , and younger people with symptoms of COPD and FEV_1/FVC ratio ≥ 0.7

Spirometric reversibility testing is not usually necessary as part of the diagnostic process or to plan initial therapy

If no doubt, diagnose COPD and start treatment (see page 9)

If still in doubt, make a provisional diagnosis and start empirical treatment (see page 9)

Reassess diagnosis in view of response to treatment:

- Clinically significant COPD is not present if FEV_1 and FEV_1/FVC ratio return to normal with drug therapy
- Asthma may be present if:
 - there is a > 400 ml response to bronchodilators
 - serial peak flow measurements show significant ($\geq 20\%$) diurnal or day-to-day variability
 - there is a > 400 ml response to 30 mg prednisolone daily for 2 weeks
- Refer for more detailed investigations if needed (see page 14)

For all people with diagnosed COPD:

- 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

Spirometry

- Consider spirometry in people with chronic bronchitis.
- All health professionals involved in the care of people with COPD should have access to spirometry and be able to interpret the results.
- Any healthcare worker with up-to-date training may perform spirometry.
- Spirometry services should be supported by quality control processes.
- Use ERS 1993 reference values² but be aware these may lead to underdiagnosis in older people and are not applicable in black and Asian populations[†].

Determining disease severity

- Disability in COPD can be poorly reflected in the FEV₁. A more comprehensive assessment also includes:
 - degree of airflow obstruction and disability
 - frequency of exacerbations
 - prognostic factors such as breathlessness (assessed using the Medical Research Council [MRC] scale), carbon monoxide lung transfer factor (T_LCO), health status, exercise capacity, BMI, partial pressure of oxygen in arterial blood (PaO₂) and cor pulmonale.
- Investigate symptoms that seem disproportionate to the spirometric impairment using a CT scan or T_LCO testing.
- Calculate the BODE index (BMI, airflow obstruction, dyspnoea and exercise capacity) to assess prognosis (where the component information is currently available).
- Assess severity of airflow obstruction using table 1.

Table 1. Severity of airflow obstruction

		NICE clinical guideline 12 (2004)	ATS/ERS 2004 ³	GOLD 2008 ⁴	NICE clinical guideline 101 (2010)
Post-bronchodilator FEV ₁ /FVC	FEV ₁ % predicted		Post-bronchodilator	Post-bronchodilator	Post-bronchodilator
< 0.7	≥ 80%		Mild	Stage 1 – Mild	Stage 1 – Mild*
< 0.7	50–79%	Mild	Moderate	Stage 2 – Moderate	Stage 2 – Moderate
< 0.7	30–49%	Moderate	Severe	Stage 3 – Severe	Stage 3 – Severe
< 0.7	< 30%	Severe	Very severe	Stage 4 – Very severe**	Stage 4 – Very severe**

* Symptoms should be present to diagnose COPD in people with mild airflow obstruction

** Or FEV₁ < 50% with respiratory failure

ATS, American Thoracic Society; ERS, European Respiratory Society; FVC, forced vital capacity; GOLD, Global Initiative for Chronic Obstructive Lung Disease

² Quanjer PH, Tammeling GJ, Cotes JE et al. (1993) Lung volumes and forced ventilatory flows. Report Working Party Standardization of Lung Function Tests, European Community for Steel and Coal. Official Statement of the European Respiratory Society. *European Respiratory Journal* (Suppl) 16: 5–40.

³ Celli BR, MacNee W (2004) Standards for the diagnosis and treatment of patients with COPD: a summary of the ATS/ERS position paper. *European Respiratory Journal* 23(6): 932–46.

⁴ Global Initiative for Chronic Obstructive Lung Disease (GOLD) (2008) Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease.

[†] Definitive spirometry reference values are not currently available for all ethnic populations. The GDG was aware of ongoing research in this area.

Managing stable COPD

Smoking cessation

- Record a smoking history, including pack years smoked, for everyone with COPD.
- All people with COPD who still smoke, regardless of age, should be encouraged to stop, and offered help to do so at every opportunity.
- Offer nicotine replacement therapy, varenicline⁵ or bupropion (unless contraindicated) combined with a support programme to optimise quit rates⁶:
 - varenicline is recommended within its licensed indications as an option for smokers who have expressed a desire to quit smoking*
 - varenicline should normally be prescribed only as part of a programme of behavioural support*.[*These recommendations are from 'Varenicline for smoking cessation' (NICE technology appraisal guidance 123).]

Treatment

- Assess the effectiveness of inhaled therapy and theophylline using lung function tests and other measures such as:
 - improvements in symptoms
 - activities of daily living
 - exercise capacity
 - speed of symptom relief (short-acting bronchodilators only).

⁵ See 'Varenicline for smoking cessation' (NICE technology appraisal guidance 123).

⁶ See 'Smoking cessation services' (NICE public health guidance 10).

Inhaled therapy

Breathlessness and/or exercise limitation

SABA or SAMA as required*

Exacerbations or persistent breathlessness

FEV₁ ≥ 50%

FEV₁ < 50%

LABA

LAMA**
Offer LAMA in preference to regular SAMA four times a day

LABA + ICS in a combination inhaler
Consider LABA + LAMA if ICS declined or not tolerated

LAMA**
Offer LAMA in preference to regular SAMA four times a day

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Consider LABA + LAMA if ICS declined or not tolerated

LAMA + LABA + ICS

Persistent exacerbations or breathlessness

—— Offer therapy
- - - - Consider therapy

- Choose a drug based on the person's symptomatic response and preference, the drug's side effects, potential to reduce exacerbations and cost.
- Do not use oral corticosteroid reversibility tests to identify patients who will benefit from inhaled corticosteroids.
- Be aware of the potential risk of developing side effects (including non-fatal pneumonia) in people with COPD treated with inhaled corticosteroids and be prepared to discuss this with patients.

* SABA as required may continue at all stages; ** Discontinue SAMA.
SABA, short-acting beta₂ agonist; SAMA, short-acting muscarinic antagonist.

Delivery systems

Inhalers	<ul style="list-style-type: none"> • Hand-held devices are usually best, with a spacer if appropriate • If a person cannot use a particular device, try another • Teach technique before prescribing and check regularly
Spacers	<ul style="list-style-type: none"> • Ensure the spacer is compatible with the inhaler • Individuals 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 • Do not clean spacers more than once a month. Clean with water and washing-up liquid and allow to air dry
Nebulisers	<ul style="list-style-type: none"> • Consider a nebuliser for people with distressing or disabling breathlessness despite maximum therapy with inhalers • Assess the individual and/or carer's ability to use the nebuliser before prescribing and arrange appropriate support and maintenance of equipment • Allow the patient to choose either a facemask or mouthpiece where possible • Continue nebuliser treatment only if there is an improvement in symptoms, daily living activities, exercise capacity or lung function

Oral therapy

Corticosteroids

- Maintenance use of oral corticosteroid therapy in COPD is not normally recommended.
- Some people with advanced COPD may need maintenance oral corticosteroids if treatment cannot be stopped after an exacerbation. Keep the dose as low as possible, monitor for osteoporosis and offer prophylaxis.

Theophylline

- Offer only after trials of short- and long-acting bronchodilators or to people who cannot use inhaled therapy.
- Theophylline can be used in combination with beta₂ agonists and muscarinic antagonists.
- Take care when prescribing to older people because of pharmacokinetics, comorbidities and interactions with other medications.
- Reduce theophylline dose if macrolide or fluoroquinolone antibiotics (or other drugs known to interact) are prescribed to treat an exacerbation.

Mucolytic therapy

- Consider in people with a chronic productive cough and continue use if symptoms improve.
- Do not routinely use to prevent exacerbations.

Treatments that are not recommended:

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

Oxygen therapy

Long-term oxygen therapy

- Assess the need for oxygen therapy in people with any of the following:
 - very severe airflow obstruction (FEV₁ less than 30% predicted)
 - cyanosis
 - polycythaemia
 - peripheral oedema
 - a raised jugular venous pressure
 - oxygen saturations less than or equal to 92% breathing air.
- Consider assessment for people with severe airflow obstruction (FEV₁ 30–49% predicted).
- Assess by measuring arterial blood gases on two occasions at least 3 weeks apart in people with confirmed, stable COPD who are receiving optimum medical management.
- Offer long-term oxygen therapy (LTOT) to people with PaO₂ less than 7.3 kPa when stable, or greater than 7.3 and less than 8 kPa when stable and:
 - secondary polycythaemia **or**
 - nocturnal hypoxaemia **or**
 - peripheral oedema **or**
 - pulmonary hypertension.
- Be aware that inappropriate oxygen therapy in people with COPD may cause respiratory depression.
- All healthcare settings should have a pulse oximeter to ensure all people needing LTOT are identified and to review people receiving LTOT at least once a year.
- People receiving LTOT should breathe supplemental oxygen for at least 15 hours a day. If they smoke, warn them about the risk of fire and explosion.
- Use oxygen concentrators to provide the fixed supply for LTOT at home.
- Refer people who are hypercapnic or acidotic on LTOT to a specialist centre for consideration of long-term NIV.

Ambulatory oxygen therapy

- Offer ambulatory oxygen to people already on LTOT who want to use oxygen outside the home, following assessment by a specialist.
- Consider in motivated individuals who have exercise desaturation and PaO₂ less than or equal to 7.3 kPa and whose exercise capacity and/or breathlessness improve with oxygen.

Short-burst oxygen therapy

- Consider short-burst oxygen therapy (from cylinders) only for episodes of severe breathlessness not relieved by other treatments and continue only if breathlessness improves.

Managing symptoms and conditions in stable COPD

Assess symptoms or condition and manage as described below

<p>Breathlessness and exacerbations</p>	<ul style="list-style-type: none"> ● Manage breathlessness and exercise limitation with inhaled therapy (see page 9) ● For exacerbations or persistent breathlessness: <ul style="list-style-type: none"> – use long-acting bronchodilators or LABA + ICS (see page 9) – consider adding theophylline if still symptomatic ● Offer pulmonary rehabilitation to all suitable people (see page 16) ● Refer patients who are breathless, have a single large bulla on a CT scan and an FEV₁ less than 50% predicted for consideration of bullectomy ● Refer people with severe COPD for consideration of lung volume reduction surgery if they remain breathless with marked restrictions of their activities of daily living, despite maximal medical therapy (including rehabilitation), and meet all of the following: <ul style="list-style-type: none"> – FEV₁ greater than 20% predicted – PaCO₂ less than 7.3 kPa – upper lobe predominant emphysema – T_LCO greater than 20% predicted ● Consider referring people with severe COPD for assessment for lung transplantation if they remain breathless with marked restrictions of their activities of daily living despite maximal medical therapy. Considerations include: <ul style="list-style-type: none"> – age – FEV₁ – PaCO₂ – homogeneously distributed emphysema on CT scan – elevated pulmonary artery pressures with progressive deterioration – comorbidities – local surgical protocols
<p>Frequent exacerbations</p>	<ul style="list-style-type: none"> ● Optimise inhaled therapy (see page 9) ● Offer vaccinations and prophylaxis (see page 16) ● Give self-management advice (see page 17) ● Consider osteoporosis prophylaxis for people requiring frequent oral corticosteroids
<p>Cor pulmonale</p>	<ul style="list-style-type: none"> ● Consider in people who have peripheral oedema, a raised venous pressure, a systolic parasternal heave, a loud pulmonary second heart sound ● Exclude other causes of peripheral oedema ● Perform pulse oximetry, ECG and echocardiogram if features of cor pulmonale ● Assess need for LTOT ● Treat oedema with diuretic ● Angiotensin-converting enzyme inhibitors, calcium channel blockers, alpha-blockers are not recommended ● Digoxin may be used where there is atrial fibrillation

Respiratory failure	<ul style="list-style-type: none"> ● Assess for appropriate oxygen (see page 11) ● Consider referral for assessment for long-term domiciliary NIV therapy
Abnormal BMI	<ul style="list-style-type: none"> ● Refer for dietetic advice (see page 14) ● Offer nutritional supplements if the BMI is low⁸ ● Pay attention to weight changes in older patients (especially > 3 kg)
Chronic productive cough	<ul style="list-style-type: none"> ● Consider mucolytic therapy (see page 10)
Anxiety and depression	<ul style="list-style-type: none"> ● Screen for anxiety and depression using validated tools in people who: <ul style="list-style-type: none"> – are hypoxic – are severely breathless or – have recently been seen or treated at a hospital for an exacerbation ● Refer to 'Depression with a chronic physical health problem' (NICE clinical guideline 91).
Alpha-1 antitrypsin deficiency	<ul style="list-style-type: none"> ● Offer referral to a specialist centre to discuss the clinical management of this condition ● Alpha-1 antitrypsin replacement therapy is not recommended
Palliative setting	<ul style="list-style-type: none"> ● Opioids should be used when appropriate for the palliation of breathlessness in people with end-stage COPD unresponsive to other medical therapy ● Use benzodiazepines, tricyclic antidepressants, major tranquillisers and oxygen to treat breathlessness ● Provide access to multidisciplinary palliative care teams and hospices

⁸ See 'Nutrition support in adults' (NICE clinical guideline 32).

Multidisciplinary working

- COPD care should be delivered by a multidisciplinary team that includes respiratory nurse specialists. When defining the team's activity consider identifying people at risk of exacerbation and providing care to prevent emergency admissions, and providing education and exercise advice.
- Patients who are referred do not always have to be seen by a respiratory physician. Consider referral to a specialist department, as shown in table 2.

Table 2. Referral to other health professionals and agencies

Physiotherapy	To teach people with excessive sputum how to use positive expiratory pressure masks and active cycle of breathing techniques
Dietetic advice	People with BMI that is high, low or changing over time
Occupational therapy	People who need help with activities of daily living
Social services	People who are disabled by COPD
Multidisciplinary palliative care teams	People with end-stage COPD and their families and carers

Referral for specialist advice

- Referral for advice, specialist investigations or treatment may be appropriate at any stage of disease, not just for people who are severely disabled.

Possible reasons for referral include:

- diagnostic uncertainty
- suspected severe COPD
- the individual 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
- onset of symptoms under 40 years or a family history of alpha-1 antitrypsin deficiency
- symptoms disproportionate to lung function deficit
- frequent infections
- haemoptysis.

Follow-up and review

- Review people with mild or moderate COPD at least once a year and those with very severe COPD at least twice a year. Cover the assessments and measurements in table 3.
- People with stable severe COPD do not normally need regular hospital review, but there should be locally agreed mechanisms to allow rapid hospital assessment when necessary.
- People requiring interventions such as long-term NIV should be reviewed regularly by specialists.

Table 3. Follow-up of people with COPD in primary care

Mild, moderate or severe airflow obstruction (stages 1–3)	Very severe airflow obstruction (stage 4)
<p>Assess:</p> <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 	<p>Assess:</p> <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 LTOT ● 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
<p>Measure:</p> <ul style="list-style-type: none"> ● FEV₁ and FVC ● BMI ● MRC dyspnoea score 	<p>Measure:</p> <ul style="list-style-type: none"> ● FEV₁ and FVC ● BMI ● MRC dyspnoea score ● Oxygen saturation of arterial blood (SaO₂)

Other management issues

Pulmonary rehabilitation	<ul style="list-style-type: none"> ● Outline the commitment required for pulmonary rehabilitation and the consequent benefits to people with COPD ● Offer to all appropriate people with COPD, including those who have had a recent hospitalisation for an exacerbation and those who consider themselves functionally disabled by COPD (usually MRC grade 3 and above) ● Pulmonary rehabilitation is not suitable for people who cannot walk, have unstable angina or who have had a recent myocardial infarction ● Tailor the programme to individual needs, and include physical training, disease education, and nutritional, psychological and behavioural intervention ● Hold pulmonary rehabilitation sessions at a practical time in a conveniently located, accessible building to increase concordance
Fitness for general surgery	<ul style="list-style-type: none"> ● The ultimate clinical decision to proceed with surgery should rest with a consultant anaesthetist and consultant surgeon ● It should take account of the person's comorbidities, functional status and the necessity of surgery ● Do not use lung function as the sole assessment criterion. Use composite assessment tools such as the ASA scoring system to predict risk ● If time permits, optimise the patient's medical management before surgery. This might include pulmonary rehabilitation
Patient education	<ul style="list-style-type: none"> ● Education packages should take account of the different needs at different stages of the disease ● Asthma education packages are not suitable for people with COPD ● Inform people with moderate and severe COPD about NIV and its benefits and limitations
Vaccinations	<ul style="list-style-type: none"> ● Offer pneumococcal vaccination and an annual influenza vaccination⁷ as recommended by the Chief Medical Officer
Travel and leisure advice	<ul style="list-style-type: none"> ● Assess people who are planning air travel and use LTOT or have FEV₁ less than 50% predicted using British Thoracic Society recommendations ● Inform people with bullous disease of the increased risk of pneumothorax during air travel ● Scuba diving is not generally recommended for people with COPD. Advise people with queries to take specialist advice

⁷ For further information about prophylaxis and treatment of influenza see 'Oseltamivir, amantadine (review) and zanamivir for the prophylaxis of influenza' (NICE technology appraisal guidance 158) and 'Amantadine, oseltamivir and zanamivir for the treatment of influenza' (NICE technology appraisal guidance 168).

Managing exacerbations of COPD

Self-management

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

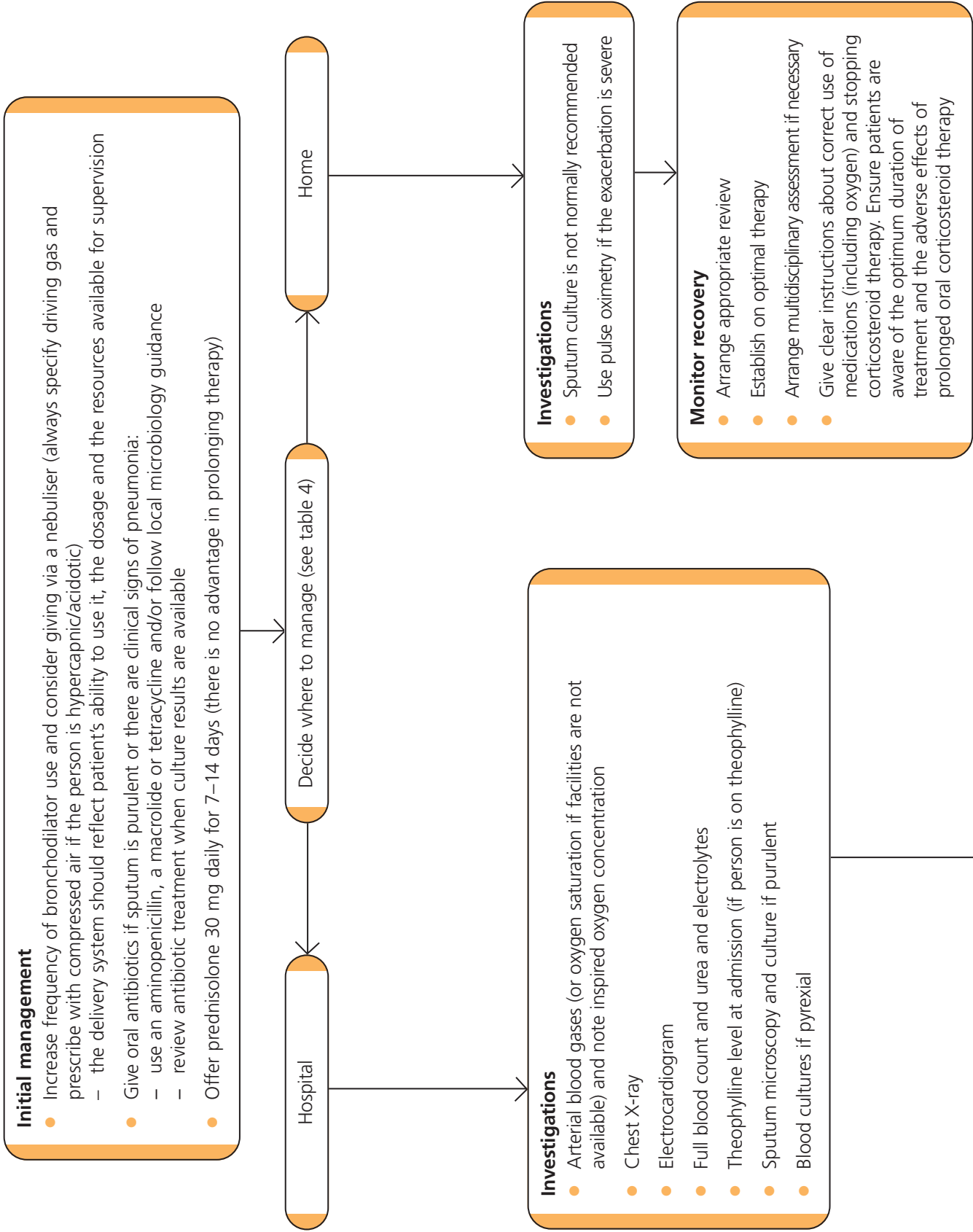
Assessing the need for hospital treatment

- Use table 4 to help decide whether to manage an individual in hospital or at home. Take into account the person's preference.

Table 4. Factors to consider when deciding where to manage exacerbations

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

Investigating and managing exacerbations of COPD



Further management

- If necessary, oxygen should be given to keep the SaO₂ within the individualised target range*
- Consider intravenous theophyllines, with appropriate monitoring, if response to nebulised bronchodilators is poor
- Assess need for NIV:
 - consider NIV for patients who are slow to wean from invasive ventilation
 - use NIV for persistent hypercapnic ventilatory failure despite optimal medical therapy. Plan what to do in the event of deterioration and agree ceilings of therapy
 - consider doxapram if NIV not available
- NIV should be delivered in a dedicated setting by trained, experienced staff who are aware of its limitations
- Treatment on intensive care units, including invasive ventilation, should be made available where necessary
- Assess need for intubation using:
 - age
 - FEV₁
 - functional status
 - BMI
 - requirement for oxygen when stable
 - comorbidities
 - previous admissions to intensive care units
- Give antibiotics if chest X-ray shows consolidation
- Consider physiotherapy using positive expiratory pressure masks to help with clearing sputum

Monitor recovery

- Regularly assess symptoms and observe functional capacity. Do not routinely perform daily monitoring of peak expiratory flow or FEV₁
- Repeat arterial blood gas measurements regularly, according to the response to treatment
- Use pulse oximetry to monitor recovery from non-hypercapnic, non-acidotic respiratory failure
- Use intermittent arterial blood gas measurements to monitor recovery from hypercapnic or acidotic respiratory failure until the person is stable
- Switch to hand-held inhalers when condition is stable

Consider hospital-at-home or assisted-discharge scheme

- Select patients according to available resources and absence of factors associated with a worse prognosis
- The team should be experienced in managing COPD and may include nurses, physiotherapists, occupational therapists and generic health workers

Before discharge

- Check oximetry or arterial blood gas results are satisfactory in people who experienced respiratory failure
- Perform spirometry
- Re-establish on optimal maintenance therapy and assess routine care
- Arrange follow-up and home care
- Give clear instructions about correct use of medications (including oxygen) and stopping corticosteroid treatment. Ensure patients are aware of the optimum duration of treatment and the adverse effects of prolonged oral corticosteroid therapy
- Formally assess daily living activities if concerns remain about how the person will cope at home

* Readers should refer to local protocols.

Further information

Ordering information

You can download the following documents from www.nice.org.uk/guidance/CG101

- The NICE guideline – all the recommendations.
- A quick reference guide (this document) – a summary of the recommendations for healthcare professionals.
- ‘Understanding NICE guidance’ – a summary for patients and carers.
- The full guideline – all the recommendations, details of how they were developed, and reviews of the evidence they were based on.

For printed copies of the quick reference guide or ‘Understanding NICE guidance’, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk and quote:

- N2199 (quick reference guide)
- N2200 (‘Understanding NICE guidance’).

Implementation tools

NICE has developed tools to help organisations implement this guidance (see www.nice.org.uk/guidance/CG101).

Related NICE guidance

All published NICE guidance is available at www.nice.org.uk

- Depression with a chronic physical health problem. NICE clinical guideline 91 (2009)
- Depression in adults (update). NICE clinical guideline 90 (2009)
- Amantadine, oseltamivir and zanamivir for the treatment of influenza. NICE technology appraisal 168 (2009)
- Oseltamivir, amantadine (review) and zanamivir for the prophylaxis of influenza. NICE technology appraisal 158 (2008)
- Smoking cessation services in primary care, pharmacies, local authorities and workplaces. NICE public health guidance 10 (2008)
- Varenicline for smoking cessation. NICE technology appraisal 123 (2007)
 - Nutrition support in adults. NICE clinical guideline 32 (2006)
 - Anxiety (amended): management of anxiety in adults in primary, secondary and community care. NICE clinical guideline 22 (2004)

Updating the guideline

This guideline will be updated as needed, and information about the progress of any update will be available at www.nice.org.uk/guidance/CG101

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N2199 1P 65k Jun 10

ISBN 978-1-84936-262-7