

COPD

Supplement

Behind the guidelines

Précis of the COPD clinical guidelines (the 'even more concise' guide to COPD)

COPD: the need for spirometry and accurate diagnosis

Putting COPD medications into perspective

Inhaled medications in COPD

Partners in COPD management in the primary care setting

COPD resources available from Lung Foundation Australia



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SUPPLEMENT

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MedicineToday

THE PEER REVIEWED JOURNAL OF CLINICAL PRACTICE

FOREWORD FROM THE SUPPLEMENT EDITORS

Why re-examine COPD? To start with, it is a major source of healthcare and personal burden worldwide, and it is not going away. It causes huge workloads in primary care and hospitals, and adds to difficulties in treating other chronic diseases. It causes patients and their families great anguish.

You might believe that COPD is self-induced, isolated to the lowest socioeconomic strata of men beyond working age, and not amenable to treatments. None of these sentiments could be further from the truth, as this new supplement clearly demonstrates!

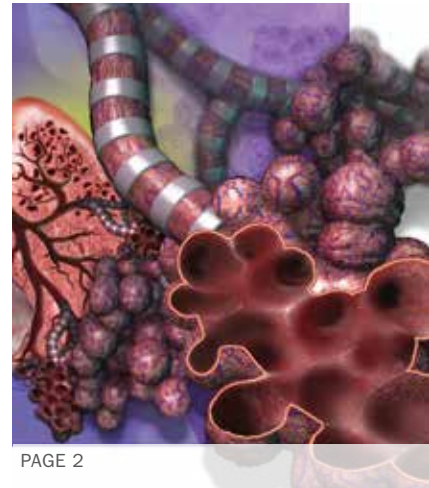
The authors discuss how common COPD actually is (10% of the adult population, half of whom are of working age, and half of whom are female); how to diagnose it (spirometry is required); the impact of COPD on quality of life (a chronic disease management plan is a great strategy); and what is available for helping patients (new drugs and inhaler devices, rehabilitation and Lung Foundation Australia resources). By accessing the Lung Foundation website you can find local pulmonary rehabilitation programs, and practical professional and patient support tools.

The recent explosion of new drugs, new combinations and new inhaler devices provides patients with extraordinary scope for improving health status, although the plethora of treatment possibilities may confuse you. This supplement offers a new optimism about COPD. It should help to reduce any confusion and provide you with simple approaches for diagnosing and managing this highly prevalent disease.



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Précis of the COPD clinical guidelines

(The 'even more concise' guide to COPD)

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Guidance on the management of COPD in primary care is provided in this summary of recommendations made in the current Australian COPD-X guidelines.

KEY POINTS

- COPD, a common, complex, chronic disease, is associated with significant morbidity and mortality.
- Simple COPD screening devices may help in determining patients who should proceed to formal spirometry, which is essential to confirm a COPD diagnosis.
- Smoking cessation is key in preventing COPD and improves prognosis.
- Pharmacological and nonpharmacological therapies can improve symptoms, quality of life and exercise capacity and reduce exacerbations.
- Comorbidities are common in patients with COPD and require targeted treatment, ideally through an individualised chronic disease care plan.
- Exacerbations require prompt treatment to prevent progressive functional deterioration and the likelihood of hospitalisation and death.

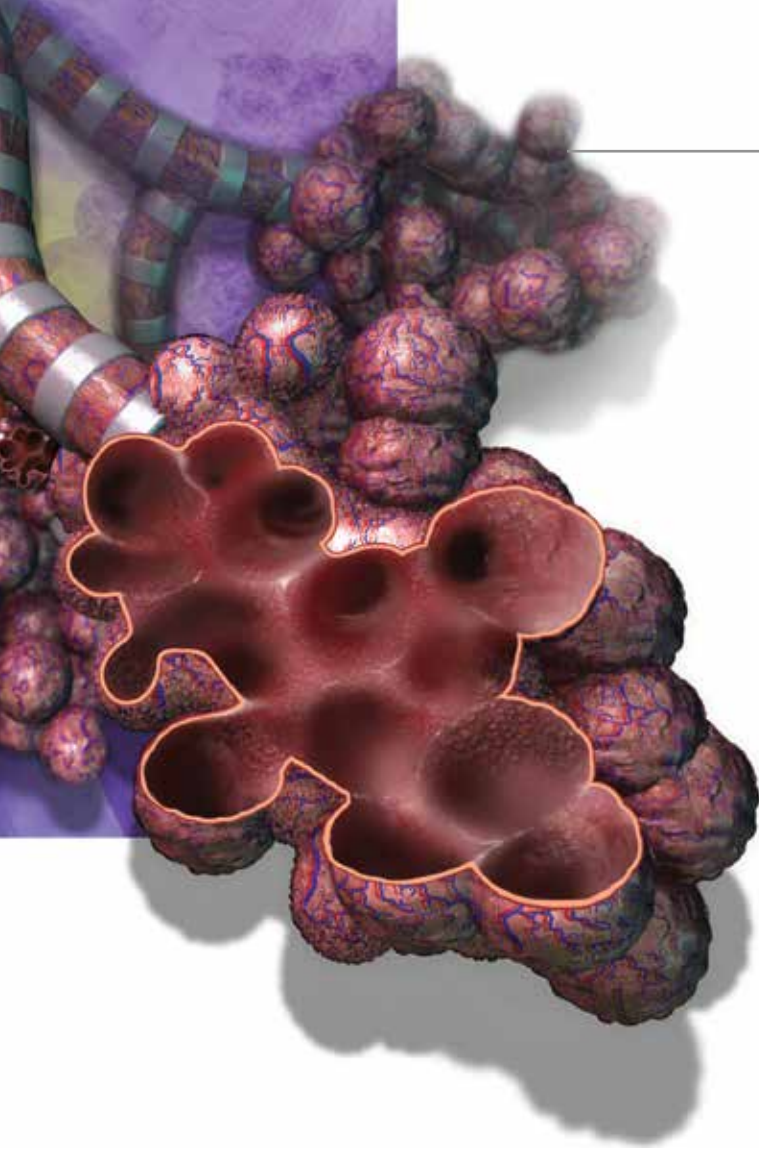


Chronic obstructive pulmonary disease (COPD) is a disease of global importance, and is estimated to cost over \$8 billion in direct health care expenditure annually in Australia.¹ It is a chronic lung disease characterised by persistent airflow limitation that is not fully reversible. It is also a complex disease, with multiple aetiological factors, clinical clusters and associated multimorbidities. Exacerbations and progressive decline in lung function contribute to worsening quality of life.

Lung Foundation Australia together with The Thoracic Society of Australia and New Zealand have produced a suite of COPD clinical guidelines to enhance clinical care for patients with COPD. The COPD-X guidelines provide the detailed evidence base for the new publication, *COPD-X Concise Guide for Primary Care*.^{2,3} Included in both publications is the *Stepwise Management of Stable COPD*, a focused one-page guide to

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nonpharmacological and pharmacological interventions (see page 39 of this supplement)

This introductory article to the *Medicine Today* COPD supplement is a précis of the current COPD guidelines. Given the ever-changing field of COPD management, we invite interested clinicians to view updates to the guidelines online (see the list of online resources on COPD in Box 1).

Case finding and confirm diagnosis

Risk factors for COPD

Smoking is the most important risk factor for the development of COPD. Other risk factors include those related to the host (e.g. older age, genetic influences, impaired lung growth during childhood), socioeconomics, nutrition and environment (e.g. dusty occupations, outdoor or indoor air pollution). Chronic asthma is also an important risk factor for COPD.

Symptoms

COPD should be considered as a diagnosis in patients aged 35 years or older who have breathlessness, cough or sputum production, reduced activity levels and impaired exercise tolerance,⁴ especially those with a smoking history or relevant occupational exposure. COPD should also be considered in patients with recurrent chest infections.

1. ONLINE COPD RESOURCES

Lung Health Checklist

<http://lungfoundation.com.au/patient-area/checklist>

COPD-X Guidelines, Concise Guide for Primary Care and Stepwise Management for Stable COPD

<http://copdx.org.au>

COPD Action Plan

<http://lungfoundation.com.au/health-professionals/clinical-resources/copd/copd-action-plan>

DVD – Better Living with Your Lung Disease

<http://lungfoundation.com.au/patient-area/resources/dvd-releases>

Better Living with COPD – A Patient Guide

<http://lungfoundation.com.au/patient-area/resources/better-living-with-copd-a-patient-guide>

Pulmonary rehabilitation information

<http://lungfoundation.com.au/patient-area/resources/pulmonary-rehabilitation/pulmonary-rehabilitation-programs-2>

Inhaler technique fact sheets

<http://lungfoundation.com.au/patient-area/resources/inhaler-technique-fact-sheets>

National Asthma Council how-to videos for inhaler technique

www.nationalasthma.org.au

Lung Age Estimator

www.lungfoundation.com.au/health-professionals/clinical-resources/copd/primary-care-respiratory-toolkit

COPD Assessment Test

www.catestonline.org

Australian Immunisation Handbook

www.health.gov.au/internet/immunise/publishing.nsf/content/handbook10-home

Spirometry

The Lung Foundation's Lung Health Checklist (see Box 1) and a COPD screening device (such as the PiKo-6 or Vitalograph COPD-6) can help with case finding to target patients who should have spirometry testing.

Spirometry, performed using reproducible techniques, is the gold standard test to diagnose the chronic airflow obstruction that defines COPD. COPD is confirmed by the presence of persistent airflow limitation that is not fully reversible (post-bronchodilator ratio of forced expiratory volume in 1 second to forced vital capacity [FEV₁/FVC ratio] <0.7). Although respiratory symptoms and hyperinflation shown on a chest x-ray may suggest the possibility of COPD, these features alone do not reliably diagnose COPD.

Using the FEV₁/FVC ratio cut off of <0.7 may overdiagnose airflow obstruction in older patients and, conversely, may underdiagnose this in younger patients. If spirometry results are borderline or if there is any doubt about the diagnosis, patients should be referred for definitive lung function testing. Alternative tests and diagnoses should also be considered.

TABLE. GRADING OF SEVERITY OF COPD^{3,5}

COPD severity	FEV ₁ % predicted	Symptoms	History of exacerbations	Comorbid conditions*
Mild	60–80	Breathlessness on moderate exertion Recurrent chest infections Little or no effect on daily activities	Frequency may increase with severity	Present across all severity groups
Moderate	40–59	Increasing dyspnoea Breathlessness walking on level ground Increasing limitation of daily activities Cough and sputum production Exacerbations requiring corticosteroids and/or antibiotics		
Severe	<40	Dyspnoea on minimal exertion Daily activities severely curtailed Regular sputum production Chronic cough		

* Common comorbid conditions include cardiovascular disease, skeletal muscle dysfunction, metabolic syndrome, osteoporosis, anxiety or depression, lung cancer, peripheral vascular disease and obstructive sleep apnoea.

Reproduced with permission from the *COPD-X Concise Guide for Primary Care* (Lung Foundation Australia), and adapted from reference 5.

Differential diagnoses

When weighing up the differential diagnosis of COPD, asthma is suggested by more variable symptoms of breathlessness, wheeze, chest tightness and cough, and by the presence of bronchodilator reversibility (an increase in FEV₁ of >12% and >200 mL with salbutamol). Nevertheless, many features of COPD and asthma overlap.

Additional investigations can assist in differentiating COPD from other causes of breathlessness. These include a chest x-ray (for other pulmonary, pleural or cardiac conditions), an ECG and an echocardiogram (for cardiac conditions) and blood tests (e.g. for anaemia).

Severity of COPD

The severity of COPD can be classified by the degree of airflow obstruction (Table),^{3,5} as well as symptom severity and frequency of exacerbations. The COPD Assessment Test (see Box 1) and modified Medical Research Council questionnaire measure the impact of COPD in a range of domains, assisting with assessment of COPD severity and determining the personal impact of the disease on the patient. Respiratory failure (hypoxaemia, hypercapnia) and the presence of pulmonary hypertension or right heart failure are features suggestive of severe COPD.

Optimise function

Function of the patient with COPD is optimised by both nonpharmacological and pharmacological interventions.

Nonpharmacological interventions

Smoking cessation (see the section below 'Prevent deterioration'), pulmonary rehabilitation and regular physical activity are beneficial for patients with COPD. Education and self-management strategies are useful (see the section below 'Develop a plan of care').

Pulmonary rehabilitation consists of a co-ordinated program of exercise and education, typically lasting eight weeks. There is strong evidence for benefits from pulmonary rehabilitation, including reduced dyspnoea and fatigue, decreased rates of hospitalisation, improved exercise capacity and quality of life and good cost-effectiveness.^{6–12} Information about accessing pulmonary rehabilitation can be found on the Lung Foundation Australia website (see Box 1). Ongoing exercise maintenance programs, such as 'Lungs in Action' after pulmonary rehabilitation, are also important (Figure).

Pharmacological interventions

Inhaled medicines target the pathophysiology of COPD. These therapies are

introduced in a stepwise manner to treat symptoms and to reduce risk of exacerbations and deterioration. First, to treat chronic airflow limitation, bronchodilators are used both as relievers and for maintenance therapy to reduce breathlessness and prevent exacerbations. Second, in patients with more severe disease and frequent exacerbations, inhaled corticosteroids (ICSs) can be added to long-acting bronchodilators to prevent exacerbations and improve quality of life.

To determine how long a trial of therapy needs to be, consideration should be given to the aims of treatment. If the treatment trial is aimed at symptom relief only (for example, in those who do not suffer exacerbations), a trial of a month or so of therapy may be adequate to determine benefit. However, if there is an expectation that the treatment may prevent exacerbations, the treatment trial logically would need to be for several months (or longer), depending on the historical exacerbation frequency. As inhaled medicines are added or substituted, care should be taken not to 'double-up' inadvertently on medicines within the same class (see 'Guide to Addition of Therapies' in the *Stepwise Management of Stable COPD*, on page 40 of this supplement).

Bronchodilators

Short-acting bronchodilators. Short-acting β_2 -agonists (salbutamol or terbutaline) are used as short-term relievers of breathlessness in patients at any stage of COPD. The short-acting muscarinic antagonist, ipratropium, is now used less often because it has a slower onset of action.

Long-acting bronchodilators. The long-acting muscarinic antagonist (LAMA) inhalers provide bronchodilation and are given once daily (tiotropium, glycopyrronium, umeclidinium) or twice daily (acridinium). All are available on the PBS. LAMAs reduce dyspnoea, improve quality of life and decrease risk of exacerbations.¹³⁻¹⁵ Tiotropium has been shown to slow the rate of decline of lung function to a small extent and, possibly, to reduce mortality.^{16,17}

The long-acting β_2 -agonist (LABA) inhalers provide bronchodilation, and are given once daily (indacaterol; available on the PBS) or twice daily (salmeterol, eformoterol). LABAs improve lung function¹⁸ and quality of life, and reduce risk of exacerbations.^{19,20}

Either a LAMA or LABA inhaler can be commenced if breathlessness in a patient persists despite the use of a short-acting reliever. Once daily, fixed-dose combination LAMA/LABA inhalers in a single inhaler device (glycopyrronium/indacaterol, umeclidinium/vilanterol) are available through a PBS streamlined authority script. The indication for this dual bronchodilation is for patients with moderate to severe COPD who have persistent breathlessness despite stabilisation on a combination of two separate LAMA and LABA inhaler devices. LAMA/LABA fixed dose combination inhalers should not be used as first-line therapy.

Anti-inflammatory agents

Inhaled corticosteroid/long-acting beta₂-agonist (ICS/LABA) combination inhalers. ICS/LABA combination inhalers can be prescribed through the PBS for use in patients with moderate to severe COPD ($FEV_1 < 50\%$ predicted) who have a history of repeated exacerbations and have

significant symptoms despite regular β_2 -agonist bronchodilator therapy. ICS/LABA combination inhalers are given twice daily (fluticasone propionate/salmeterol, budesonide/eformoterol) or once daily (fluticasone furoate/vilanterol).

The airway inflammation in COPD is generally less steroid-responsive than asthma. Nevertheless, ICSs have been shown to reduce risk of exacerbations, and to slow the rate of decline of quality of life,²¹ especially when given in an ICS/LABA combination. They may also potentially slow the rate of decline of lung function and possibly reduce mortality.²²⁻²⁵ ICSs may increase the risk of pneumonia in patients with COPD.^{21, 26}

There is currently considerable debate about the exact role of ICSs in the management of COPD. If withdrawal of an ICS is considered due to complications or lack of benefit, then withdrawal should be tapered and dual bronchodilation used.²⁷

Inhaler adherence and technique

Patients often have suboptimal technique using their inhalers, of which there are now many types and individual patient preferences.²⁸ Both the patient's inhaler technique and their adherence to medication should be checked at each health professional visit, with direct coaching provided whenever appropriate. The National Asthma Council website has useful 'How To' videos to demonstrate inhaler technique (see Box 1).

Prevent deterioration Smoking cessation

It is imperative that patients with COPD stop smoking. Smoking cessation is key in preventing worsening of COPD and, importantly, slows the rate of decline in lung function and reduces mortality.^{29,30} Although some smokers are able quit 'cold turkey,' smoking cessation advice from health professionals increases quit rates.³¹ Anxiety and depression are associated with high rates of smoking and reduce the likelihood of success of smoking cessation.³² For those who are unable to quit, counselling combined



Figure. Encouraging regular physical activity: a patient taking part in an ongoing exercise maintenance program after pulmonary rehabilitation.

Lungs in Action photograph supplied by Lung Foundation Australia.

with nicotine replacement therapy, bupropion or varenicline is more effective than counselling alone.^{33,34} Personalised smoking cessation advice based on lung age and the Lung Age Estimator (see Box 1) may increase cessation rates.³⁵ In smokers who are more nicotine-dependent, the combination of a nicotine patch with a rapid delivery form of nicotine replacement therapy (for example, gum or lozenges) is more effective than one form alone.

Immunisation

Annual influenza vaccination is recommended for all patients with COPD. It reduces exacerbations and may reduce hospitalisations and death.^{36,37} The pneumococcal vaccine produces significant responses in immunocompetent adults (*Australian Immunisation Handbook*)³⁸ and is also recommended in patients with COPD, although there is no direct evidence supporting its efficacy in preventing exacerbations.

2. INDICATIONS FOR HOSPITALISATION OF PATIENTS WITH COPD

- Inadequate response to appropriate community-based management
- Inability to walk between rooms when previously mobile
- Inability to eat or sleep because of dyspnoea
- Cannot manage at home even with homecare resources
- High-risk comorbid condition (pulmonary or nonpulmonary)
- Altered mental status suggestive of hypercapnia
- Worsening hypoxaemia or cor pulmonale
- Newly occurring arrhythmia
- Oxygen saturation (SpO₂) <92% in patients not receiving home oxygen

Mucolytics

Some patients with COPD find mucolytics helpful in easing expectoration of sputum. There is some evidence that these agents (although not those currently available in Australia) reduce exacerbations, particularly in patients who are not also receiving an ICS.^{39,40}

Long-term oxygen therapy

Maximally treated, patients with stable COPD and persistent hypoxaemia (partial pressure of oxygen [PaO₂] ≤55 mmHg or PaO₂ ≤59 mmHg plus evidence of polycythaemia, pulmonary hypertension or right heart failure) may benefit from the provision of domiciliary oxygen. Long-term continuous treatment (>18 hours/day) with oxygen therapy has been shown to improve survival in such patients.⁴¹ Patients with stable COPD and with a persistently low oxygen saturation (SpO₂) as measured by pulse oximetry (SpO₂ <92%) warrant consideration of specialist respiratory service referral to assess the need for home oxygen therapy.

Develop a plan of care

For patients with COPD, disability increases with COPD severity and is worsened by

complications and comorbidities. An individualised chronic disease care plan can help by anticipating the episodic and long-term care needs of patients with COPD. COPD multidisciplinary care incorporating exercise, self-management education and exacerbation management can both improve exercise capacity and quality of life and reduce hospitalisation.^{42,43}

The clinical support team includes a range of healthcare professionals such as nurse practitioners, practice nurses, dietitians, physiotherapists, exercise physiologists, community and specialist pharmacists, social workers and psychologists. Such teams can enhance quality of life and reduce disability for patients with COPD.⁴⁴ Comprehensive management of patients with COPD should be considered in patients with complex disease and comorbidities. GP Management Plans (GPMP Item 721) and Team Care Arrangements (TCA Item 723), based on the agreed management goals of the patient, are practical methods of enlisting a clinical support team. A written COPD action plan should be discussed and included in the Management Plan. Carers and family members should be involved in this process.

Patient self-management support includes a range of initiatives such as education, awareness programs and support groups involving patients and health professionals. Support can be delivered via multiple modalities: face-to-face consultation, internet, TV and telephone. Self-management plans involving written action plans for exacerbation management and education and counselling strategies that incorporate disease and symptom management, emotional support, problem solving and decision-making have been shown to improve health outcomes.⁴⁵

Caution is advised when considering patient suitability for self-management support. Evidence suggests that only those who adhere to self-management plans derive benefits such as decreased exacerbation recovery time.⁴⁶ Action plans can aid recognition of, and response to, exacerbations,⁴⁷ but they should not replace

comprehensive self-management plans that incorporate elements such as education and regular review for suitable patients.

It is difficult to accurately assess end of life timing in patients with COPD. If you would not be surprised if your patient were to die in the next 12 months or if your patient is severely symptomatic and troubled by frequent exacerbations, referral to a palliative care service may be appropriate. 'Anticipatory care planning' seeks to identify such patients and foster early engagement with palliative care services. Proactive management of disabling symptoms such as severe dyspnoea with oral opioids may be helpful.⁴⁸ Advance care planning and end-of-life discussions should also be carefully considered.

Manage exacerbations

A COPD exacerbation is characterised by an increase in the patient's dyspnoea, cough and/or sputum beyond the normal variation in daily symptoms, is acute in onset and may warrant a change in regular medication or hospital admission. A past history of exacerbations is the best predictor of subsequent exacerbations. Hospitalisation for an acute exacerbation of COPD can be considered as a sentinel event. It is not generally realised that a patient who is hospitalised for an exacerbation of their COPD is at greater risk of dying in the next 12 months than a patient suffering a myocardial infarction.⁴⁹ Patients with more severe COPD (based on FEV₁) are prone to more frequent exacerbations.⁵⁰

The usual triggers for exacerbations include viral or bacterial respiratory infection, left ventricular failure, psychosocial stressors and air pollution.^{51,52} Pulmonary embolism should be considered in patients who require hospitalisation for an acute exacerbation but do not have the typical symptoms of infection.⁵³

Early diagnosis and prompt management of exacerbations improves recovery and quality of life, reduces hospitalisation and may prevent progressive functional deterioration.⁵⁴⁻⁵⁷ Preventing COPD exacerbations is important, as mortality

increases and quality of life decreases with the frequency of exacerbations. An action plan can help patients and carers recognise and respond to the early signs of an exacerbation. Indications for hospitalisation of patients with COPD are listed in Box 2.

Pharmacological management of exacerbation

Increased doses of inhaled bronchodilator, such as salbutamol four to eight puffs (400 to 800 µg) via metered dose inhaler (MDI) and spacer every three to four hours, should be prescribed for exacerbations of COPD, and are as effective in this form as via nebuliser.⁵⁸ Oral prednisolone 30 to 50 mg should be taken in the morning for five days and then stopped; tapering the dose is rarely necessary.⁵⁹ Patients with exacerbations with clinical features of infection (increased volume and change in colour of sputum and/or fever) benefit from antibiotics. Oral amoxicillin (500 mg every eight hours) or doxycycline (200 mg orally for the first dose then 100 mg daily) for five days are appropriate first-line agents.

If hypoxaemia is present, oxygen should be administered via nasal cannula at a rate of 0.5 to 2 L/minute, aiming for an oxygen saturation (SpO₂) of 88 to 92%. Patients with hypercapnia (PaCO₂ >45 mmHg) and respiratory acidosis (blood pH <7.35) on arterial blood gas sampling should be treated in hospital with noninvasive ventilation (NIV). NIV can reduce mortality, length of stay in hospital and the need for endotracheal intubation.⁶⁰

A member of the primary healthcare team should ideally review patients within seven days of hospital discharge to reinforce all aspects of COPD management during this critical period (see the *Concise Guide* for a post-discharge checklist).³ The discharge plan should be shared with the primary care team and patients should receive self-management education. Patients should be referred for pulmonary rehabilitation after the acute instability has resolved to reduce readmission rates and improve quality of life.¹¹

Conclusion

COPD is a common, complex, chronic disease, with multiple aetiological factors, clinical clusters and associated multimorbidities. It is associated with significant morbidity and mortality. Simple COPD screening devices may assist in determining who should proceed to formal spirometry, which is required to confirm the diagnosis. Smoking cessation is key in managing COPD and improves prognosis. Pharmacological and nonpharmacological therapy can improve symptoms, quality of life and exercise capacity and reduce exacerbations. Comorbidities are common and require targeted treatment, ideally through an individualised chronic disease care plan. Exacerbations require prompt treatment to prevent progressive functional deterioration and the likelihood of hospitalisation and death. Oxygen therapy in those who are hypoxaemic may reduce mortality.

The online resources listed in Box 1 should assist in diagnosing and managing COPD.

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COPD

The need for spirometry and accurate diagnosis

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Despite the challenges of making an accurate diagnosis of COPD, early identification of this disease is valuable to ensure effective treatments are instituted and disease progression halted.

KEY POINTS

- A high proportion of cases of COPD in primary care are not recognised or patients are incorrectly labelled as having COPD.
- Spirometry is essential to diagnose COPD.
- The diagnosis of COPD is often delayed thereby missing opportunities to prevent worsening of disease.
- Screening systematically or opportunistically with a short questionnaire and lung-function screening device can be used for COPD case finding.

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In primary care in Australia chronic obstructive pulmonary disease (COPD) is undiagnosed or incorrectly diagnosed in significant numbers of patients. About 20% of people without a previous diagnosis but at high risk of COPD have the disease when tested with spirometry,¹ and 30 to 40% of patients with a GP-recorded diagnosis of COPD do not have it based on their spirometry results.^{2,3}

The reasons for lack of recognition of COPD, even when patients may have presented regularly with symptoms, are multifactorial and complex and can lead to delayed diagnosis until more advanced airway obstruction has developed. Patients also often ignore limitations and symptoms that develop slowly, consequently reinforcing the importance of objective testing with spirometry to diagnose COPD and appropriately targeted testing for those at high risk.

Diagnosing COPD

The diagnosis of COPD rests on spirometry and the demonstration of airflow limitation that is not fully reversible. This 'gold standard' is mandatory to confirm a diagnosis.⁴

Airflow limitation that is not fully reversible is defined as a ratio of forced expiratory volume in one second (FEV₁) to forced vital capacity (FVC), the FEV₁/FVC ratio, <0.7 after bronchodilator administration, and obstruction by FEV₁ <80% of the predicted value. Both Australian and international guidelines use this definition for COPD diagnosis,^{4,5} although an alternative criterion has been proposed, based on the lower limit of normal (LLN) of the FEV₁/FVC ratio. Although use of the LLN may reduce the risk of slight overdiagnosis of COPD in older populations or underdiagnosis in younger people when using the fixed ratio,⁶ the simplicity

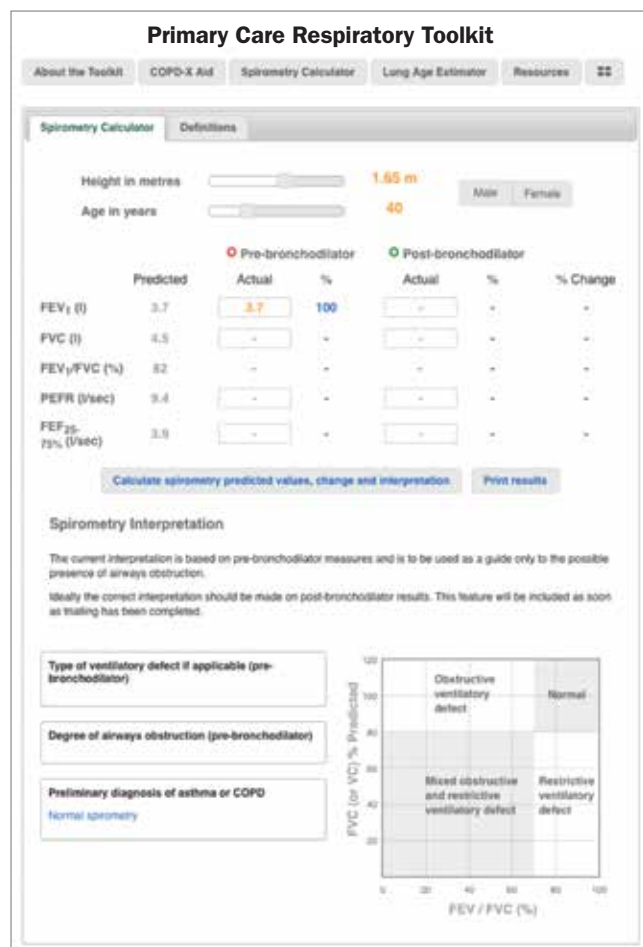


Figure 1. The Spirometry Calculator provides a useful tool for understanding and interpreting spirometry results. It is available from the Lung Foundation's Primary Care Respiratory Toolkit (<http://lungfoundation.com.au/health-professionals/clinical-resources/copd/primary-care-respiratory-toolkit>).

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of the fixed FEV₁/FVC ratio makes this the currently preferred approach.

In a survey of 45- to 70-year-olds in Australia, an alarming 49% of those with moderate or severe COPD did not have a respiratory diagnosis, and only one-third of patients with COPD or asthma seen by a GP had undergone respiratory function testing within 12 months.⁷ This could be equated with making a diagnosis of hypertension without measuring blood pressure.

In addition to being the diagnostic test for COPD, spirometry can be used to determine the severity of COPD by classification of FEV₁, thereby allowing the objective monitoring of disease progression. When used in conjunction with the level of symptoms, spirometry can then guide appropriate therapy. This is illustrated in the Lung Foundation Australia's *Stepwise Management of Stable COPD*, on page 39 of this supplement.⁸

Spirometry testing

Several factors can be barriers to conducting spirometry and practical solutions or alternatives need to be considered. Although spirometer ownership may appear high in general practice, the selection of a suitable spirometer is important, and there is often a low rate of use.⁹ The lack of expertise in spirometry contributes to an observed low quality of test results.¹⁰ An information paper describing spirometer selection in general practice is available from National Asthma Council Australia (www.nationalasthma.org.au/health-professionals/spirometry-resources/spirometer-users-buyers-guide).¹¹

It is well recognised that GPs may not feel confident performing spirometry or interpreting results, so referring patients to a spirometry service or pulmonary function laboratory is an appropriate alternative.^{12,13} Other factors that may contribute to a practice policy to refer patients elsewhere for testing and interpretation include costs of equipment and consumables, as well as the opportunity cost and the low reimbursement level for a spirometry test, which requires testing with bronchodilator reversibility (Medicare Benefits Schedule [MBS] item 11506).

Training in spirometry

If spirometry is performed in the practice, effective training and ongoing quality control of tests are essential. Training for GPs and practice nurses is available through the free National Asthma Council Australia course (six hours) or update (2.5 hours) across Australia (www.nationalasthma.org.au/health-professionals/spirometry-resources/spirometry-training) and other state-based organisations also offer training (<http://lungfoundation.com.au/health-professionals/clinical-resources/copd/spirometry>).

Spirometry technique and interpretation

Most adults can perform spirometry reliably to acceptable standards with effective coaching by a trained operator; the essential point is that forced exhalation is dependent on the patient's effort. Modern spirometers assess the quality of and grade each test against accepted international standards for acceptability and reproducibility, thus enabling monitoring of spirometry testing within the practice.¹⁴ Spirometers also include age-specific predicted values for interpretation and identification of lung function relative to normal age-defined values.

Regular assessment of spirometry testing techniques is highly recommended to ensure high quality and therefore reliability in primary care testing. An online service (Spirometry 360), which is available for a licence fee, addresses the need for quality feedback after training (www.spirometry360.org) and has been successfully trialled in South Australia.¹⁵

The online Spirometry Calculator in the Lung Foundation's Primary Care Respiratory Toolkit can also help with interpreting spirometry results for an individual patient (Figure 1;

<http://lungfoundation.com.au/health-professionals/clinical-resources/copd/primary-care-respiratory-toolkit>).

How to identify patients with COPD

The early identification of patients with COPD can be achieved using a systematic process and targeted case finding as well as opportunistically screening those at risk.

Case finding

Because patients may not recognise or report their symptoms and many GPs deal preferentially with acute symptoms or other conditions during consultations, a systematic approach to identifying COPD should be implemented in general practice. One example would be a practice nurse administering a simple questionnaire – for example, the Lung Health Checklist (<http://www.lungfoundation.com.au/patient-area/checklist>) – to identify people who are at risk of lung disease and screening them with rapid testing using a COPD screening device. Those who test positive can then undergo a diagnostic spirometry test for COPD. Although the use of the COPD screening device does require that the nurse or other operator receives appropriate training, the case-finding approach limits the risk of late diagnosis and also reduces more time-consuming spirometry testing.

Opportunistic or systematic approach

Although untargeted screening for COPD in primary care is not recommended,^{16,17} the possibility of COPD should be considered in all smokers and exsmokers over the age of 35 years, as recommended in the Australian COPD-X guidelines.⁴ In addition, the presence or history of risk factors such as smoking; previous acute respiratory exacerbations; occupational exposure to dusts, gas or fumes; or family history of COPD should be sought specifically. The Lung Health Checklist is a suitable tool for lung screening and can be used online or downloaded as pdfs (<http://lungfoundation.com.au/patient-area/checklist>). It has been translated into Arabic, Hindi, Samoan, Spanish, Chinese and Vietnamese.

A positive answer to any of the questions listed in the Box indicates that a patient over the age of 35 years is at risk of having COPD and needs further testing, either by preliminary lung function screening or full diagnostic spirometry.

Adopting a systematic approach to identifying COPD will involve other members of the practice team, as recommended in the 'Red Book' guidelines for preventive activities in general practice.¹⁶ Practices are encouraged to make organisational changes; use clinical audit to identify middle-aged patients who have not

QUESTIONS TO ASK PATIENTS OVER THE AGE OF 35 YEARS TO ASSESS COPD RISK AND NEED FOR FURTHER TESTING

- Are you a smoker or an exsmoker?
- Do you or have you worked in a job that exposed you to dust, gas or fumes?
- Do you cough several times most days?
- Do you cough up phlegm or mucus most days?
- Do you get out of breath more easily than others your age?
- Do you experience chest tightness/wheeze?
- Do you experience frequent chest infections?

received preventive activity and implement a recall system or opportunistically arrange a health check. Planned health checks for middle-aged adults and patients over 75 years (Health assessment MBS Items 701, 703, 705, 707), as well as indigenous patients (Health assessment MBS Item 715), are opportunities for case finding. These checks can be facilitated by the involvement of practice nurses.

COPD education for practice nurses is available online from the Lung Foundation (<http://lungfoundation.com.au/health-professionals/training-and-education/copd-nurse-training-and-support-program>). This will equip nurses with the knowledge and skills to support a systematic approach to identifying and supporting patients with COPD.

Lung function screening devices

Expiratory flow devices such as the PiKo-6 or Vitalograph COPD-6 are readily available to follow up patients at risk of COPD and either rule out or confirm the need for diagnostic testing with spirometry (Figures 2a and b). These devices are relatively inexpensive and easy to use. They assess expiratory volumes at one and six seconds and are, therefore, suitable for most patients as they do not require complete emptying of the lungs. Minimal training is required to conduct the procedure and interpret the results. Both devices use colour-coded



Figures 2a and b. COPD screening devices. a (left). PiKo-6 hand held device. b (right). Vitalograph COPD-6 hand held device.

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Figure 3. *Save your Breath* booklet and the patient guide *Better Living with COPD* are two of the Lung Foundation's resources for patients diagnosed with COPD.

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interpretation to make them easy to use in screening. Many Australian GPs and practice nurses have received training in their use over the past seven years.

The Lung Foundation has a short, free online video for training in operating both the PiKo-6 and Vitalograph COPD-6 devices (http://lungfoundation.com.au/images/stories/assets/copd_screen/lfsd.html). Printed materials for interpreting and following up the results can be downloaded to widely used medical software (<http://lungfoundation.com.au/health-professionals/clinical-resources/copd/targeted-copd-case-finding-using-copd-screening-devices-in-the-community>).

Benefits of recognising COPD

Although there is no cure for COPD, treatment can help slow the progression of the condition¹⁸ and improves symptom control.^{4,5} Delayed diagnosis may deny potentially effective treatment and also, importantly, results in lost opportunity to prevent disease progression.

Stopping smoking is the most important target for people with COPD as it is the most effective intervention to reduce symptoms and prevent progression of COPD and lung function impairment.¹⁸ Supporting patients' self-management for COPD can prevent a more severe exacerbation and deterioration in lung function. Self-management approaches can include being aware of daily medications as well as being proactive in the case of a flare-up of symptoms by taking appropriate treatment, with oral corticosteroids and antibiotics.

Preventive options recommended in COPD guidelines can be maximally implemented by consultations with the primary care team and allied health professionals using Chronic Disease Management items of the MBS: the General Practice Management Plan (GPMP Item 721), Team Care Arrangements (TCA

Item 723) and Chronic Disease Management Nurse Monitoring (Item 10997).

Resources are available to provide patients recently diagnosed with COPD with information about living with the condition, treatment options and inhaler technique fact sheets (<http://lungfoundation.com.au/patient-area/resources>; Figure 3).

Once diagnosed with COPD, patients require ongoing and regular monitoring because treatment recommendations change as the disease progresses. Frequent COPD exacerbations are associated with an accelerated decline in lung function and decrease in health status as well as decreased survival. There are treatment strategies that can reduce the risk of exacerbations and their consequences.

Differential diagnosis in airway disease

Both asthma and COPD are very common diseases of the airways. Overlap between them often causes diagnostic and management confusion.¹⁹ Symptoms may be common to both conditions and, although some features may differ (Table), there is considerable overlap as many people with asthma smoke and longstanding asthma may have a degree of irreversibility.

Although asthma and COPD are usually considered distinct conditions with their own diagnostic and management approaches, many adults who had asthma in their earlier years, especially if they smoke, can develop changes in bronchial wall structure and airway inflammatory features that resemble COPD, and they may also lose some bronchodilator responsiveness. This outcome may be seen in up to half of those with obstructive airways disease.¹⁹

The co-occurrence of COPD and asthma denotes a worse prognosis. It also provides a strong indication for the use of inhaled corticosteroids (ICS) in addition to long-acting bronchodilators, without the strictures on severity of FEV₁ reduction and presence of COPD exacerbations. Emerging evidence also supports consideration of the use of a long-acting muscarinic antagonist in asthma that is not controlled by ICS use with or without a long acting β_2 -agonist.

Despite this apparent convergence between asthma and COPD management in adults, there remains concern that overuse of high-dose ICS in people without a history of asthma or COPD exacerbations increases the risk of developing pneumonia and other long-term health consequences. It is therefore still the case that diagnostic accuracy should be encouraged, and so spirometry with bronchodilator responsiveness testing remains an important tool.

Summary

COPD is a common condition that is underdiagnosed and undertreated. Implementing a case-finding system in the general practice setting for those at risk of COPD can improve diagnosis. Spirometry is the gold standard for the diagnosis of COPD.

TABLE. COMPARISON OF FEATURES OF COPD AND ASTHMA

COPD	Asthma
Onset in mid-life	Onset often early in life
Symptoms slowly progress	Symptoms vary from day to day
Dyspnoea during exercise	Symptoms at night/early morning
May not have atopy	Allergy, rhinitis and/or eczema may be present
Uncommon family history	Common family history of asthma and/or allergic diseases

Improved use of testing in general practice and implementing quality monitoring, or seeking alternative solutions to improve access to spirometry, are essential for best practice management of COPD. Monitoring disease progression through regular spirometry can improve patient management. **MT**

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Putting COPD medications into perspective

CHRISTOPHER WORSNOP MB BS, BSc, PhD, FRACP, FCCP



Over the past few years, several new drugs have been added to the bronchodilators and inhaled corticosteroids used for treating COPD. There is no strong evidence to say that one drug within a class is better than another and the decision about which drugs to use is mainly about patient preference, although multiple drugs from the same class should not be used in the same patient.

KEY POINTS

- Inhaled bronchodilators, either a long-acting muscarinic antagonist (LAMA) or a long-acting β_2 -agonist (LABA) are the first-line medications for patients with COPD.
- A LAMA and a LABA may be used together if further clinical effect is needed.
- Inhaled corticosteroids have a role in patients with severe COPD who are experiencing exacerbations or in those with coexisting asthma.
- Although new drugs have been added to these three classes recently, there is no strong evidence to say that one drug within a class is better than another.
- Multiple drugs from the same class should not be used in the same patient.
- The choice of drug is mainly based on patient preference of inhaler device and once- or twice-daily dosing.

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There are four main components in the long-term management of patients with chronic obstructive pulmonary disease (COPD): smoking cessation, regular exercise with or without pulmonary rehabilitation, medications, and influenza and pneumococcal vaccinations. This article focuses on medications, but this does not imply that they are more important than the other components. In fact, smoking cessation is the most important aspect of COPD management as it is the only treatment that has been convincingly shown to slow the progressive decline in lung function in those who continue to smoke. Indeed, when patients participate in a full pulmonary rehabilitation program the benefits are at least as great as with use of the full range of medications.

Each of the four management components should be applied simultaneously. COPD medications have benefits in both past and current smokers, and also have added benefits when combined with regular exercise. This article addresses the long-term management of patients with COPD; it does not cover the management of acute exacerbations.

Inhaled versus oral medications

The vast majority of people being treated for COPD will be using inhaled medications. Doses of these drugs given by the inhaled route can be much smaller than if they were given systemically. Many of these drugs have little systemic absorption from the lungs and little or no absorption from the gastrointestinal tract, and there is a high level of systemic degradation when some of the dose is swallowed or if the drug is mistakenly taken orally. These factors lead to a very good benefit to side effect ratio, with many of the drugs having little in the way of systemic effects.

The use of oral medications such as long-term prednisolone, theophylline and long-term antibiotics is not part of the routine

management of COPD. These medications, therefore, will not be discussed further here, other than to say that the lack of efficacy compared with the inhaled medications and the much greater tendency for side effects precludes their chronic use in most patients.

Classes of inhaled medications

The inhaled medications used in patients with COPD are bronchodilators and corticosteroids. None of these can cure COPD and there is little evidence to show that they can alter the course of the disease process. The main purpose of their use, therefore, is to make patients feel better; that is, to reduce symptoms such as breathlessness, improve exercise capacity, improve quality of life and reduce exacerbations. This is important to remember as the medications do not have a role in patients with COPD who really are not limited in their activities and have no symptoms and no exacerbations.

The treatment of COPD with medications is outlined in Box 1 and the drug classes used are discussed below.

Inhaled bronchodilators

First-line drug treatment for patients with COPD is with inhaled bronchodilators, of which there are two classes, the muscarinic antagonists (formerly known as the anticholinergic agents) and the β_2 -agonists. These medications relax the bronchial smooth muscle in the airways, thereby increasing the airway diameter. As the resistance of the airways is inversely related to the radius to the power of four, a small increase in the radius can lead to a marked drop in airway resistance.

Breathlessness in patients with COPD is related to hyperinflation of the chest. The reduced resistance allows more air to be breathed out, which reduces hyperinflation and so reduces dyspnoea and enables greater exercise tolerance. The symptoms in COPD do not correlate with forced expiratory volume in one second (FEV₁), and changes in FEV₁ do not predict improvement in symptoms or even health-related quality of life with the use of long-term bronchodilators. Thus, even though spirometry is essential in diagnosing COPD, it has less of a role in predicting response to treatment or in monitoring response to bronchodilators in COPD than in asthma.

Smooth muscle contraction is only one component of the airway narrowing in patients with COPD as there are also inflammatory and structural changes in the airways. Thus bronchodilators may have limited or no benefit. As it is not possible to predict which patients with COPD will benefit, a trial of treatment is needed to see if the symptoms improve.

It is common for patients with COPD to have low levels of activity to avoid the uncomfortable feeling of dyspnoea. Therefore, when a patient is prescribed a bronchodilator, they need to be encouraged to try to be more active to feel the benefits of the medication.

1. TREATING COPD WITH MEDICATIONS (PBS LISTED)*

• Start with

- LAMA or LABA:
tiotropium or glycopyrronium or aclidinium or umeclidinium (LAMAs) or indacaterol (LABA)

• Progress to

- LAMA and LABA:
tiotropium or glycopyrronium or aclidinium or umeclidinium and indacaterol
OR glycopyrronium/indacaterol combination or umeclidinium/vilanterol combination

OR in more severe COPD with a history of exacerbations

- LAMA and LABA and ICS:
tiotropium or glycopyrronium or aclidinium or umeclidinium AND fluticasone propionate/salmeterol 500/50 μ g twice daily or budesonide/eformoterol 400/12 μ g twice daily or fluticasone furoate/vilanterol 100/25 μ g once daily

Abbreviations: COPD = chronic obstructive pulmonary disease; ICS = inhaled corticosteroid; LABA = long-acting β_2 -agonist; LAMA = long-acting muscarinic antagonist.

* Medications listed in chronological order of availability on PBS (oldest first). There is little to distinguish between drugs within a class.

As the bronchoconstriction is present most of the time, it makes sense to use long-acting bronchodilators rather than short-acting ones such as the muscarinic antagonist ipratropium and the β_2 -agonists salbutamol and terbutaline.

Muscarinic antagonists

Muscarinic antagonists block muscarinic receptors in the airway smooth muscle, causing the muscle to relax. Four long-acting muscarinic antagonists (LAMAs) are available in Australia on the PBS for COPD (Box 2). Tiotropium has been available for many years in Australia for COPD. It is used once daily with a dry powder inhaler device that needs to be loaded by the patient just before each use. The three newer LAMAs are glycopyrronium and umeclidinium, which are taken once daily, and aclidinium, which is taken twice daily.

There is no evidence to indicate if one LAMA is better than another. However, there is some controversy over whether once-daily or twice-daily dosing is preferable in patients with COPD because once daily is more convenient but twice daily may better deal with patients' symptoms. There are no comparative data to settle this issue so the choice should be left to discussion with the patient.

As LAMAs have minimal side effects they are dosed to produce maximal clinical benefit, so all four are only available in one dose. (Although some patients develop a dry mouth with these drugs, LAMAs do not produce other side effects more than placebo in clinical trials.) There is no benefit in using more than

2. USING INHALED BRONCHODILATORS AND CORTICOSTEROIDS PBS-LISTED FOR COPD*

To avoid doubling up within a class of drug for COPD, do not use more than one drug/drug combination from each column at a time

LAMAs [†]	LABAs [†]	ICSs [†]
<ul style="list-style-type: none"> Tiotropium Glycopyrronium Acclidinium Umeclidinium Glycopyrronium/indacaterol Umeclidinium/vilanterol 	<ul style="list-style-type: none"> Indacaterol Glycopyrronium/indacaterol Umeclidinium/vilanterol Fluticasone propionate/salmeterol 500/50 µg Budesonide/eformoterol 400/12 µg Fluticasone furoate/vilanterol 100/25 µg 	<ul style="list-style-type: none"> Fluticasone propionate/salmeterol 500/50 µg Budesonide/eformoterol 400/12 µg Fluticasone furoate/vilanterol 100/25 µg

Abbreviations:
 COPD = chronic obstructive pulmonary disease
 ICS = inhaled corticosteroid
 LABA = long-acting β_2 -agonist
 LAMA = long-acting muscarinic antagonist

* Medications listed in chronological order of availability on PBS (oldest first). There is little to distinguish between drugs within a class.
[†] Combination products (with other classes) included. The LABA vilanterol is only available as a combination therapy for COPD; the LABAs eformoterol and salmeterol are generally not used as monotherapies for COPD.

one LAMA at a time, including during exacerbations. There are no data on changing the patient's LAMA to the short-acting muscarinic antagonist ipratropium during an exacerbation. Some clinicians will simply keep the patient on the LAMA as long as the patient can still use the relevant inhaler. If ipratropium is used during an exacerbation then the LAMA should be stopped because there is no evidence that using more than one muscarinic antagonist at a time adds any benefit and there is the potential to increase the risk of side effects in this case.

Beta₂ agonists

Beta₂ agonists bind to and stimulate β_2 -receptors causing airway muscle relaxation. Indacaterol is the only long-acting β_2 -agonist (LABA) available as monotherapy on the PBS for COPD in Australia (Box 2). It is given once per day, and is available in two doses, 150 µg and 300 µg; the 150 µg dose will be used in most patients, but patients with more severe disease may be prescribed the 300 µg dose. A few people may cough a couple of times after inhaling indacaterol, but as its systemic absorption is very low, side effects such as tremor and tachycardia are no greater than with placebo.

As β_2 -agonists used without inhaled corticosteroids (ICSs) in asthma have been shown to make asthma worse and even increase mortality, there is a concern about the patient with COPD who also has asthma. Indacaterol should not be used in patients with both COPD and asthma without an ICS also being used.

Vilanterol, another once-daily LABA, is only available as combination therapies (with the LAMA umeclidinium and with the ICS fluticasone furoate).

Olodaterol is a once-daily LABA that may become available soon, either to be used alone or in combination with tiotropium. It has a TGA indication for COPD but is not listed on the PBS.

Salmeterol has an indication for COPD but is not on the PBS as monotherapy for use in patients with COPD. Eformoterol

does not have an indication as a single agent for COPD in Australia. These drugs are generally not used as monotherapies for COPD.

Combined inhaled bronchodilators

There is no evidence to indicate whether a LAMA or LABA should be tried first. When LAMAs and LABAs are combined they produce increased benefits in terms of better lung function, fewer symptoms, better quality of life and increased exercise capacity, although not double the effects of each alone. Patients often use both a LAMA and a LABA because of the greater reduction in symptoms provided.

Some LAMAs and LABAs are now available packaged in the same inhaler, making the combined use more convenient, namely glycopyrronium/indacaterol and umeclidinium/vilanterol (Box 2). Acclidinium/eformoterol and tiotropium/olodaterol may become available soon (they have TGA indications for COPD but are not currently listed on the PBS).

Inhaled corticosteroids

ICSs have been shown to reduce exacerbations in patients with COPD, particularly those with more severe disease. However, they are not thought to control the underlying disease process as they have minimal effect on the predominantly neutrophilic inflammation present in COPD. They should not, therefore, be regarded as a drug of first choice in patients with COPD or be used routinely in such patients. ICSs are less effective in current smokers.

In Australia, the ICS inhalers that contain only ICS (i.e. those for fluticasone propionate, budesonide and ciclesonide) do not have an indication for COPD. However, if asthma is also present then their use should be considered. Inhalers containing several ICS/LABA combinations are indicated for use in patients with COPD, as discussed below.

Combined inhaled bronchodilators and corticosteroids

Clinical trials have shown that ICSs have greater benefits in patients with COPD when combined with LABAs. The ICS/LABA combinations that have been used in Australia for many years for patients with COPD are fluticasone propionate/salmeterol 500/50 µg twice daily and budesonide/eformoterol 400/12 µg twice daily (Box 2). These corticosteroid doses are large and may produce side effects in some patients (e.g. oral thrush, dysphonia and skin bruising). Thus the potential benefits should be balanced against the occurrence of side effects.

A new ICS/LABA combination, fluticasone furoate/vilanterol, is now available. This has been developed for both asthma and COPD. Its COPD indication is for those patients with severe COPD (i.e. those having a FEV₁ less than 50% predicted) and who are experiencing exacerbations. The combination is taken once daily and is available in two strengths: only the 100/25 µg dose is indicated for COPD, and there is no advantage in using the higher dose (i.e. 200/25 µg, which is only indicated for asthma) in patients with COPD.

It is now well accepted that there is an increased risk of pneumonia in patients with COPD taking an ICS, especially with the high dose formulations approved for use in COPD in Australia. The benefits of ICSs outweigh this risk when ICSs are used in patients who have experienced multiple exacerbations, but it is important to educate patients about seeking prompt medical attention should they develop a chest infection.

The inhalers for COPD

As new inhaled medications have been developed for patients with COPD, new inhaler devices have also been developed, specifically designed for use by patients with COPD. There is now a wide range of dry powder devices, and a new soft mist metered dose inhaler may also be available soon.

With the correct use of the dry powder devices, the drugs should be deliverable to the airways of even those patients with severe COPD (a FEV₁ less than 50% predicted). Some devices require a capsule to be loaded each time they are used, and some

are preloaded. Clinicians should be familiar with these so that sensible decisions can be made about which device is best for each individual patient. Of course, it is imperative that patients are educated about how to use the devices correctly and that they have their technique reviewed regularly.

When pressurised metered dose inhalers (MDI) are used, it is preferable that spacers are also used.

Conclusion

The management of patients with COPD does not simply involve prescribing drugs. Providing advice about smoking cessation, regular exercise, and influenza and pneumococcal vaccinations are at least as important.

The first-line medications are inhaled bronchodilators, either a LAMA or a LABA. A LAMA and a LABA may be used together if further clinical effect is needed. An ICS may be added in patients with severe COPD who are experiencing exacerbations or in those with coexisting asthma. Over the past few years, new drugs have been added to these three classes. There is no strong evidence to say that one drug within a class is better than another. It is important, however, to be aware of the class to which each of the drugs belongs so that multiple drugs from the same class are not used by the same patient. The decision about which drugs to use mainly concerns which inhaler device is preferred by the patient, and whether once-daily or twice-daily dosing is preferred. **MT**

Further reading

Abramson M, Frith P, Yang I, et al. COPD-X concise guide for primary care. Brisbane: Lung Foundation Australia; 2014. Available online at: <http://lungfoundation.com.au/wp-content/uploads/2015/06/LFA-COPD-X-Concise-Guide-for-Primary-Care.pdf> (accessed July 2015).

Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management and prevention of COPD 2015. GOLD; 2015. Available online at: http://www.goldcopd.org/uploads/users/files/GOLD_Report_2015.pdf (accessed July 2015).

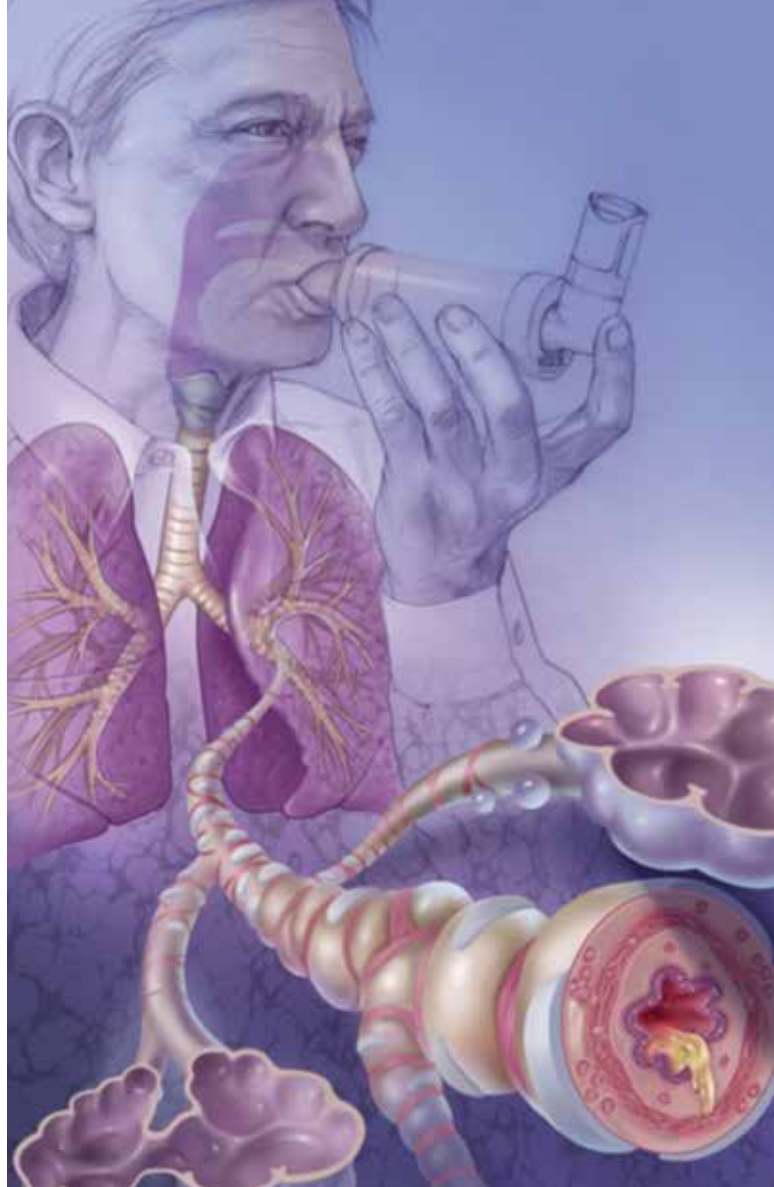
COMPETING INTERESTS: Dr Worsnop has presented talks on COPD drugs for AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Menarini and Novartis.

Inhaled medications in COPD

Devices and medications

VANESSA M. McDONALD DipHlthSci(Nurs), BNurs, PhD

The past few years have seen the introduction of many new inhaler devices and pharmacological agents for the treatment of COPD. The new devices and tools and strategies to improve inhaler management in COPD are discussed.



KEY POINTS

- Delivery of medication via the inhaled route is the mainstay of treatment in patients with chronic obstructive pulmonary disease (COPD).
- As many patients do not use their inhaler devices correctly, all patients require adequate instruction in inhaler use.
- Strategies to improve inhaler management in COPD include clinicians checking inhaler technique, ensuring effective techniques are taught and reinforcing the importance of this to patients and other health professionals.
- Efficacy, safety and the patient being able to use the inhaler correctly are the principal considerations when choosing an inhaler device.
- Many new inhaler devices and pharmacological agents have become available over the past few years.
- The release of new medications for COPD in the same inhaler device platform helps simplify treatment regimens.

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Inhaled medication therapy is integral to the management for patients with chronic obstructive pulmonary disease (COPD). This is because delivery of medication via the inhaled route offers the best balance between efficacy and safety – that is, maximising delivery of the drug to the airways while minimising systemic absorption and, therefore, systemic side effects.¹ However, poor inhalation technique is common and limits treatment efficacy. To achieve optimal benefit from their inhaled medications, patients must develop proficiency in the use of each of their prescribed devices. This is becoming increasingly difficult as many new inhaler devices and pharmacological agents are entering the COPD market. This article summarises the major issues involving inhaler therapy, describes the new devices now

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TABLE 1. COPD INHALER DEVICES AND RESPECTIVE MEDICATIONS

Devices	Medications available					
	SABA	SAMA	LAMA	LABA	LAMA/ LABA	LABA/ICS
Pressurised metered dose inhaler (pMDI)						
Inhaler Pressurised device delivering the drug by wet aerosol. Commonly used. Can be used with a spacer device to reduce side effects from inhaled corticosteroids and improve co-ordination and drug delivery. Requires good hand–inhalation co-ordination when used without a spacer, and good hand strength to activate the dose. The Airomir Autohaler is a breath-activated device	Salbutamol (Ventolin Inhaler, Asmol Inhaler, Airomir Autohaler, all PBS listed for COPD)	Ipratropium bromide (Atrovent Metered Aerosol, PBS listed for COPD)	–	–	–	Fluticasone propionate/salmeterol (Seretide MDI 250/25 PBS listed for COPD) Budesonide/eformoterol (Symbicort Rapihaler 200/6 PBS listed for COPD)
Dry powder inhaler (DPI) – Multidose*						
Turbuhaler Multidose dry powder device that is activated by twisting the base. It requires priming prior to first use. The device should not get wet. Requires generation of sufficient peak inspiratory flow to activate the device; older people and those with severe airflow limitation may not achieve this	Terbutaline (Bricanyl Turbuhaler, PBS listed for COPD)	–	–	–	–	Budesonide/eformoterol (Symbicort Turbuhaler 400/12 PBS listed for COPD)
Accuhaler Multidose dry powder device that is activated by opening the mouth-piece and lowering the lever. Should be held horizontal to activate. Requires generation of sufficient peak inspiratory flow to activate the device; older people and those with severe airflow limitation may not achieve this	–	–	–	Salmeterol (Serevent Accuhaler, TGA indicated but not PBS listed for COPD)	–	Fluticasone/salmeterol (Seretide Accuhaler 500/150 PBS listed for COPD)
Ellipta Multidose dry powder device that is activated by opening the mouth-piece. Easy to use, with large numbers on counter for visual impairment. Dose is lost if device inadvertently activated and not used before closing the mouth-piece. Requires generation of sufficient peak inspiratory flow to activate the device; older people and those with severe airflow limitation may not achieve this	–	–	Umeclidinium bromide (Incruse Ellipta, PBS listed for COPD)	–	Umeclidinium/vilanterol trifenate (Anoro Ellipta, PBS listed for COPD)	Fluticasone furoate/vilanterol trifenate (Breo Ellipta 110/25 PBS listed for COPD)
Genuair Multidose dry powder device that is activated by pressing the lever. Easy to use. Requires generation of sufficient peak inspiratory flow to activate the device; older people and those with severe airflow limitation may not achieve this	–	–	Aclidinium bromide (Bretaris Genuair, PBS listed for COPD)	–	Aclidinium bromide/eformoterol (Brimica Genuair, TGA indicated but not PBS listed for COPD)	–

TABLE 1. COPD INHALER DEVICES AND RESPECTIVE MEDICATIONS continued

Devices	Medications available					
	SABA	SAMA	LAMA	LABA	LAMA/ LABA	LABA/ICS
Dry powder inhaler (DPI) – Single dose						
Breezhaler Single dose device that is activated by loading a capsule into the device. Requires good cognition and dexterity. Requires the generation of sufficient peak inspiratory flow to activate the device; older people and those with severe airflow limitation may not achieve this	–	–	Glycopyrronium bromide (Seebri Breezhaler, PBS listed for COPD)	Indacaterol maleate (Onbrez Breezhaler, PBS listed for COPD)	Glycopyrronium bromide/indacaterol (Ultibro Breezhaler, PBS listed for COPD)	–
Handihaler Single dose device that is activated by loading a capsule into the device. Requires good cognition and dexterity. Requires the generation of sufficient peak inspiratory flow to activate the device; older people and those with severe airflow limitation may not achieve this	–	–	Tiotropium bromide (Spiriva Handihaler, PBS listed for COPD)	–	–	–
Soft mist inhaler (SMI)						
Respimat Hybrid design that includes a multidose inhaler and a ‘one-shot’ nebuliser. ¹² The device slowly delivers the drug as a soft mist. The first-time preparation of the device may be considered complex	–	–	Tiotropium bromide (Spiriva Respimat, TGA indicated for COPD but not currently available)	Olodaterol (Striverdi Respimat, TGA indicated for COPD but not currently available)	Tiotropium/olodaterol (Spiolto Respimat, TGA indicated for COPD but not currently available)	–
Abbreviations: ICS = inhaled corticosteroid; LABA = long-acting β_2 -agonist; LAMA = long-acting muscarinic antagonist; SABA = short-acting β_2 -agonist; SAMA = short-acting muscarinic antagonist. * The Aerolizer device for the delivery of the LABA eformoterol (Foradile Aerolizer) is another multidose DPI. Foradile Aerolizer is TGA indicated but not PBS listed for bronchoconstriction in COPD and is infrequently used.						

available (Table 1) and provides tools and strategies to improve inhaler management in COPD.

Inhaled medication therapy

Despite effective inhaled pharmacological therapies, the control of symptoms in COPD remains poor.^{2,3} The reasons for this are multifactorial but the ability of patients to use their inhaler devices correctly remains a central feature.⁴ A large proportion of patients with COPD use their devices incorrectly. In a cohort of patients with obstructive airways disease who were over the age of 55 years and recruited from a tertiary care respiratory clinic, about half of the patients were found to be using at least one of their devices inadequately.⁵ Other studies have reported much higher rates of poor technique, one reporting that 82.3% of patients with asthma or COPD made at least one error using their prescribed device.^{6,7}

Poor inhalation technique compromises the expected outcomes for patients with airways disease.^{2,8,9} To maximise the benefits for patients with COPD, it is therefore essential for clinicians to check inhaler technique, ensure effective techniques

are taught and reinforce the importance of this to patients and other health professionals.

Achieving these aims is complicated, however, as the knowledge and skills of healthcare professionals in the use of devices are also frequently poor. A study performed in 2008 found that a large proportion of pharmacists were not proficient in the use of inhaler devices, and these data are similar for doctors and nurses.^{10,11} With the advent of multiple new devices this situation is likely to worsen. Improving clinician knowledge and skills in inhaler therapy is an important objective.

Available devices

Over the past several years a large number of new inhaler devices have been introduced for the management of COPD. This increase in inhalers is expected to continue as new treatments become available. The devices currently available include:

- pressurised metered dose inhalers (pMDIs)
- single and multidose dry powder devices (DPIs)
- soft mist inhalers (SMIs).

The COPD therapies delivered via these devices are:



Figure. Inhalers available for COPD treatment.*

Abbreviations: ICS = inhaled corticosteroid; LABA = long-acting β_2 -agonist; LAMA = long-acting muscarinic antagonist; SABA = short-acting β_2 -agonist; SAMA = short-acting muscarinic antagonist.

Reproduced with permission from Lung Foundation Australia from the COPD Action Plan (see pages 41 to 43 of this supplement).

* Oxis Turbuhaler is not TGA-indicated for COPD.

- bronchodilators:
 - short-acting β_2 -agonists (SABAs)
 - short-acting muscarinic antagonists (SAMAs)
 - long-acting β_2 -agonists (LABAs)
 - long-acting muscarinic antagonists (LAMAs)
- inhaled corticosteroids (ICSs).

Each of the devices delivers a range of treatments and has both advantages and disadvantages. Table 1 details the different devices available, the medications TGA-indicated for COPD available in each

device and the advantages and disadvantages of each device. Figure 1 shows the available inhaler devices, grouped in their medication classes.

Small and large volume spacer devices (holding chambers) are available for use with pMDIs. Of note, they should be used by all patients prescribed an ICS via a pMDI, to reduce the oral pharyngeal deposition and consequent oral candidiasis and voice hoarseness that may occur. Using a spacer device with a pMDI can significantly improve the pulmonary

deposition of the drug and assist in achieving improved delivery for patients who have poor co-ordination.¹² Spacers are only used in conjunction with pMDIs, and not with other devices.

SABAs, SAMAs and, in some, situations ICSs may also be delivered by nebulisers. However, the use of nebulisers is decreasing and discouraged in the treatment of both asthma and COPD outside of life-threatening situations and in patients with a forced expiratory flow in 1 second (FEV₁) below 30% of predicted.¹³

A meta-analysis of randomised controlled trials has demonstrated that the use of pMDIs together with large volume spacers to deliver bronchodilator medication achieves equivalent bronchodilation to that when a nebuliser is used.¹⁴ This, together with the infection risk, increased cost and limits placed on the patient in terms of portability of nebulisation, supports the preferred use of inhaler devices over nebulisers.¹⁴

Although the many new medications and devices provides greater choice for both clinicians treating patients with COPD and patients receiving treatment, it may also lead to confusion, overtreatment, ineffective delivery and nonadherence. It is important that clinicians are familiar with the devices available in terms of how they are used and the medications available to use in them as well as the effects and side effects of these medications (Table 1). Step-by-step instructions for each of the devices are available from NPS Medicinewise (www.nps.org.au/topics/how-to-be-medicinewise/managing-your-medicines/inhaler-devices-for-respiratory-medicines) and a video ('Living with COPD') is available from Lung Foundation Australia that is suitable for use by both clinicians and patients (<http://shop.lungfoundation.com.au/shop/living-with-copd/>).

Choosing a device

Clinicians tend to base the choice of inhaler device on their prior experiences and prescribe the inhalers they have always prescribed, rather than using an evidence-based approach.¹⁵ With new drug classes and devices becoming increasingly available, this approach limits practice and consequently could lead to patients missing out on the most effective treatments.

When choosing a device for prescription, several factors should be taken into consideration to achieve the desired outcome of treatment. Efficacy and safety should be principal considerations but there are few, if any, randomised controlled trials comparing the efficacy and safety of the current inhaler devices in patients with

COPD.¹² Of equal importance is the patient's ability to use the device correctly. In addition to efficacy, safety and proficiency, other factors important in choosing the device are listed in Box 1.

COPD is frequently diagnosed in older people. This is an important consideration when prescribing inhaler devices because the error rates for technique increase with age as well as with the severity of airflow limitation.¹⁶ Peak inspiratory flow also influences a patient's ability to use certain devices and this may affect the individual's outcome. For instance, the key to successful therapy with DPIs is the patient's ability to generate sufficient inspiratory flow to achieve optimal pulmonary deposition.¹⁷ A study of the use of dry powder inhalers has shown that in older people an important proportion (30% for Turbuhaler and 20% for Accuhaler) were unable to generate sufficient inspiratory flow across the inhaler to achieve effective therapy.¹⁸ This study found no significant difference in inspiratory flow rates among people with COPD and healthy age-matched controls, indicating that this is a problem related to ageing rather than disease or airflow limitation alone. The important practice point here is to be cognisant that impaired inspiratory flow can impact treatment efficacy; this should be considered when teaching and assessing technique and assessing efficacy irrespective of the device used.

Other factors that lead to inadequate inhalation technique in older people include learning difficulties from impaired cognitive function, impaired vision and impaired fine-motor skills.¹⁹⁻²² In a patient with cognitive impairment, a device with the least number of steps may be the best option. Similarly, in patients with early peripheral neuropathic changes and vision impairment, devices that do not require loading and that have large numbers on the display would be preferred. Further, it has been demonstrated that in addition to these factors, advancing age itself is associated with poorer techniques.²¹

The factors discussed above emphasise the importance of assessment, instruction

1. SELECTING AN INHALER FOR A PATIENT WITH COPD

Principal considerations

- Efficacy
- Safety
- Ability to use the device correctly

Other considerations

- Age of patient
- Peak inspiratory flow
- Dexterity, co-ordination and handling capacity
- Comorbidities, including cognitive and vision impairment
- Prior experience and preferences
- Complexity of the regimen
- Adherence to treatment
- Cost

and reinforcement of inhaler device technique in people with COPD.¹⁸ If during assessment patients have repeated difficulty with one device, alternatives should be trialled. Table 2 provides a guide for inhaler selection taking into consideration the problems faced by older people with COPD.

Inhaler device polypharmacy

Inhaler device polypharmacy is defined as the use of two or more different devices in any individual. A study in patients with asthma has shown that as the number of devices used increases, the proportion of patients using their devices inadequately also increases.²³ This highlights the need to simplify inhaler regimens, using the least number of devices possible. In practice, however, multiple device use is continuing, with a study published in 2011 reporting inhaler device polypharmacy in 50% of patients with COPD.⁵

As new medications and devices are entering the market, pharmaceutical companies appear to be recognising the concern of device polypharmacy and many are releasing their drugs via a single inhaler platform, which will enable the minimisation of different device use in a patient. Conversely, this also has the potential to

TABLE 2. CHOOSING INHALER DEVICES FOR OLDER PEOPLE WITH COPD^{1*}

Potential problems with technique in older people	pMDI	pMDI + spacer	DPI	SMI
Decreased peak inspiratory flow	✓	✓	✗	✓
Impaired cognition	?	?	?	?
Decreased manual dexterity	✗	?	?	?
Decreased press and breath co-ordination	✗	✓	✓	✓

Regardless of device selection, the correct inhaler technique must be demonstrated to the patient, and regular reassessment and instruction provided
 Minimisation of inhaler device polypharmacy recommended

Abbreviations: pMDI = pressurised metered dose inhaler; DPI = dry powder inhaler; SMI = soft mist inhaler.

Key:

✓ The patient should be able to master technique in the presence of the impairment

? The patient may possibly master the technique in the presence of the impairment

✗ The device is not recommended when the impairment is present.

* Adapted and reproduced with permission from: Gibson PG, McDonald VM, Marks GB. Asthma in the older adult. *Lancet* 2010; 374: 803-813.¹

2. TEACHER – A MNEMONIC TO AID IN INHALER TECHNIQUE EDUCATION³⁰

- T Tailor – individualise the device to the patient’s needs
- E Educate – demonstrate the correct technique
- A Assess – assess the patient’s ability using the device
- C Correct – correct the technique
- H Have another go – after correction reassess
- E Evaluate – is this the correct device for this patient?
- R Reduce – minimise the number of devices prescribed

cause confusion among patients and clinicians, with a single device type delivering either a single drug or a combination of drugs.

Educating patients about inhaler technique

Many patients with COPD use their inhaler devices incorrectly, leading to decreased lung deposition of the drug, decreased control of symptoms and poor health outcomes.^{2,5,8,9,24} Reassuringly, however, many randomised controlled trials have demonstrated that inhaler device technique can be improved following education provided by clinicians.²⁵⁻²⁷ Despite this, one study found that about 25% of patients with asthma or COPD had not received instruction in the use of their devices, and another found that even fewer (14%) received a follow-up assessment and education.^{28,29}

Irrespective of the chosen device, patients require adequate instruction in inhaler use. This should be provided orally, with written reinforcement and a visual demonstration showing the correct technique. Once instruction has been provided, clinicians should then ask patients to demonstrate their proficiency.

A memory mnemonic to assist with assessment of and instruction in inhaler technique is shown in Box 2.³⁰

In patients with COPD, reassessment of inhaler technique is recommended each time the patient’s COPD is reviewed because inhaler technique proficiency will wane with time irrespective of the length of time the patient has used the device.¹² The same instructions for inhaler technique should be used by both the clinician and patient (for example, those available on the previously mentioned NPS Medicinewise website <http://www.nps.org.au/topics/how-to-be-medicinewise/managing-your-medicines-inhaler-devices-for-respiratory-medicines>).

Personalised medicine is an approach that is receiving a great deal of attention in COPD.³¹⁻³³ Also known as precision medicine, it is defined as ‘treatments targeted to the needs of individual patients on the basis of genetic, biomarker, phenotypic, or psychosocial characteristics that distinguish a given patient from other patients with similar clinical presentations’.³⁴ Personalised medicine can be applied in the setting of inhaled therapy, due to the impact that clinical phenotypes involving comorbidities, psychosocial aspects and

behaviours, as well as patient preferences, have on optimal device use. Patient preferences should be taken into consideration when commencing and continually reassessing inhaler technique. This is becoming easier with the increased choice of devices and the release of multiple drug classes using the same inhaler platform.

Treatment adherence in COPD is an ongoing problem, and has a deleterious impact on health outcomes.^{4,35,36} Up to 40 to 60% of patients with COPD do not adhere to their prescribed inhaler therapy.⁶ Moreover, patients with COPD rate the importance of good inhaler technique much lower than other factors related to their disease and lower than this is rated by their treating physicians.³⁷ Involving patients in the decisions relating to inhaler choice and emphasising the importance of optimal technique is encouraged and may improve adherence to treatment and health outcomes for patients with COPD.^{37,38}

Conclusion

There have been rapid increases in the number and types of inhalers available for the management of COPD in the past few years. New drug classes are now available and these medications are being released in the same inhaler device platform. This helps in simplifying treatment regimens for patients but may lead to confusion among clinicians and patients. Simplifying regimens, providing effective inhaler

device education and regularly assessing and reinforcing correct technique are important strategies for improving outcomes for patients with COPD. Tools and strategies are also available to assist clinicians in managing inhaled therapy in patients with COPD. **MT**

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Partners in COPD management in the primary care setting

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The development, integration and training of a team of partners in COPD care can reduce a patient's behavioural risk factors and optimise positive behaviour change.

KEY POINTS

- Primary care is the most appropriate setting to co-ordinate care for patients with COPD because it is widely accessible, person-centred and addresses both physical and emotional health needs.
- An estimated 50% of patients with chronic disease do not adhere to recommended medications, and similar high rates of nonadherence have been reported in studies of patients with COPD.
- Practitioners should be aware of the significant impact of anxiety and depression on patients with COPD and encourage and facilitate patient engagement with effective treatments.
- Incorporating in practice the concepts of assessing readiness, tailoring information, assessing health literacy, motivational interviewing and goal setting to improve the outcomes of patients with COPD is encouraged.
- Although patients' symptoms need to be well managed when end of life is approaching, it is also important to ensure personal, social and psychological support is in place.
- Carers of patients with COPD report that they would feel better equipped to perform their duties with education, inclusion and skills training.



Chronic obstructive pulmonary disease (COPD) is a progressive and disabling respiratory disease affecting millions of people worldwide.¹ Whereas no medical treatment can reverse COPD, multiple interventions are available that can reduce symptoms and functional impairments in daily life and increase (social) wellbeing and quality of life.¹ Treatment choices depend not only on how the disease progresses, the presence of symptoms, the functional impairment and the diminished quality of life, but also on comorbidities and the capability of the patient to self-manage.²

Primary care practitioners are often confronted with patients with multimorbid chronic disease, and understand that the high prevalence of comorbidities such as cardiovascular diseases, diabetes, anxiety and depression in those with COPD demands a broader view than that of COPD alone. Primary care is the

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most appropriate setting to co-ordinate care for patients with COPD because it is widely accessible, person-centred and addresses both physical and emotional health needs.³ The primary care interface not only provides the most logical opportunity for managing the progression of COPD in patients, from early diagnosis to end-of-life care, but also an appreciation of this illness in the context of other comorbidities and their psychosocial circumstances.

Comorbidities are the rule rather than the exception in COPD,^{4,5} so specific interventions like smoking cessation, respiratory medications, oxygen therapy and pulmonary rehabilitation need to be supplemented with attention to other diseases as well as more generic and psychological support. The outcomes of respiratory and activity/exercise assessments together with mental health and other screening questionnaires can all guide the GP to make these treatment decisions.¹ However, in this decision process consideration of the patient's beliefs and motivations as well as knowledge and health literacy is important. If a patient is unwilling to start a certain therapy or does not know why it is recommended or how best to use it, starting this treatment will most likely end in nonadherence and thus risk treatment failure.⁶ Instead, efforts should be made to explore treatment barriers and, if possible, remove them. It is of utmost importance to make the patient a partner in care.⁷

With COPD, as with other chronic diseases, it is preferable that patients take responsibility for their lifestyle and at least part of their day-to-day treatment. Whereas some patients may have adapted adequately to their disease (e.g. made positive lifestyle changes), often this does not occur.⁸ Making lifestyle changes and taking responsibility for day-to-day treatment (e.g. proper inhalation of medication and self-treatment of exacerbations), as well as planning and enacting responses to both acute flare-ups (exacerbations) and advancing disablement, require patients to make behavioural changes.² The use of behavioural change techniques becomes critical in increasing a patient's responsibility for their own health,⁹ and is an area in which an appropriately skilled practice nurse could have a key role.

In this article we discuss, in the context of COPD:

- how the patient can be motivated and trained to be a partner in their own care
- facilitators and barriers to patient adherence, using the example of mental health problems to elucidate the complexity of the relationship
- the role of behaviour change methods and identification of opportunities to apply these strategies in primary care
- practical measures for improving adherence and collaborative management
- the role of a team of health professionals and the carer in optimising effective partnerships at differing stages of care.

Adherence

Optimal management of COPD incorporates the regular performance of health-related behaviours such as smoking cessation, appropriate use of medication, physical exercise, maintenance of a healthy diet and recognition of signs of exacerbation.¹ Adherence to such management steps is a worldwide problem among those with chronic disease(s). A WHO study estimated that in developed countries about 50% of patients with chronic disease(s) do not adhere to recommended medications,¹⁰ and a large meta-analysis evaluating data from 1948 to 1998 reported that approximately one in four patients were nonadherent.¹¹ Similar high rates of nonadherence have been reported in studies in patients with COPD. It is useful to consider contributing factors as those relating to the disease, the treatment, the patient and the relationship between healthcare provider and patient, as noted below.

- Disease characteristics acting as barriers to adherence include the progressive nature of the illness, poorer prognosis and a perceived absence of clinical symptoms.¹²⁻¹⁶
- Treatment characteristics such as polypharmacy, higher dosing frequency, higher medication costs and side effects decrease adherence, whereas orally administered medication facilitates adherence.¹²⁻¹⁶
- In terms of patient characteristics, older age and better social support increase adherence, whereas better quality



Figure. Primary care is the most appropriate setting to co-ordinate care for patients with COPD as it is widely accessible, person-centred and addresses both physical and emotional health needs.

of life, fewer clinical symptoms and the presence of psychiatric problems contribute to nonadherence.¹²⁻¹⁶

- Aspects of the health provider–patient relationship that facilitate adherence include higher quality communication, hospitalisation, patient perception of clinician expertise, specialist care and closer follow up.¹²⁻¹⁶

Hence, clinician partners in care should be aware of the factors or strategies that may facilitate or hinder the required behaviour change associated with treatment adherence. The influence of partners in care in facilitating adherence also extends beyond the clinic, as shown in a recent study that found positive associations between the presence of a carer and adherence to medication, as well as success in smoking cessation.¹⁷

Effects of anxiety and depression on adherence

The mental health status of the patient with COPD is a predictor of nonadherence as well as health outcomes.^{18,19} The prevalence rates of anxiety and depression in patients with COPD are high. A recent review estimates that approximately 40% of patients with COPD experience clinical levels of anxiety and depression,²⁰ much higher than the global rate of less than 10% in the general population²¹ and greater than in many other chronic diseases.²²

Patients with COPD have a relative risk of 1.69 of developing depression.²³ This risk increases with COPD severity, with patients classified as having the most severe disease being twice as likely to be depressed than those with mild COPD.²⁴ It is not surprising, therefore, that depression is especially high among patients with COPD requiring oxygen²⁵ and at end-stage.²² The relative risk of patients with COPD developing anxiety is 1.85.²⁶ This risk is elevated further with an increase in disease severity, and dyspnoea in particular.²⁶ Furthermore, anxiety and depression often occur

together in both the general population and those with COPD, compounding the negative impact.^{27,28}

Recent literature has focused on the negative impact of the comorbidities of anxiety and depression on the management of COPD. The presence of clinically significant symptoms of anxiety and/or depression is associated with reductions in adherence to treatment,^{18,19} quality of life,²⁹ exercise capacity³⁰ and productivity,³¹ while also increasing the risk of exacerbation,³² healthcare utilisation,^{31,33} disability and mortality.^{34,35}

Despite the major impact of mental health problems on prognosis and adherence to management strategies by patients with COPD, anxiety and depression remain underdiagnosed and undertreated in this population.³⁶ Opportunities exist in the primary care setting to address these problems. To achieve better outcomes, doctors, nurses, allied health professionals and patients should be trained to recognise anxiety and depression symptoms. More routine screening for mental health issues may help to address the underdiagnosis of these problems among patients with COPD. Psychological distress screening tools such as the K10, Depression Anxiety Stress Scales (DASS), SPHERE and Patient Health Questionnaire-9 (PHQ-9) are recommended by peak primary and mental healthcare bodies and are brief and readily available for use in the primary care setting.^{37,38}

Providers should be aware of the significant impact of anxiety and depression on patients with COPD and encourage and facilitate patient engagement with effective treatments such as psychiatric medication, cognitive behavioural therapy, pulmonary rehabilitation and self-management approaches.³⁶ Since there is not always the capacity in general practice to implement such treatments, a concomitant increase in services from other primary or secondary care providers may be required. These include those available through the MBS (Better Access) initiative (access to psychiatrists, psychologists and mental health trained GPs) and some chronic disease management and mental health programs administered by the Primary Health Networks.

Changing behaviour

Readiness for change

Numerous opportunities exist within the clinic to enable positive behaviour change. Primary care clinicians can assess 'readiness for change', a concept based on the Transtheoretical Stages of Change Model.^{39,40} Health information and communication strategies can then be linked with tailored health intervention, which in turn can be customised to the readiness of the patient with COPD for change. Developers of the model propose that behaviour change interventions are more effective if stage-matched and suggest the use of 'processes of change' (Table), a group of strategies to facilitate progression through the stages.⁴⁰ Readiness assists the uptake or reduction of target behaviours and is already widely used in smoking cessation and physical activity interventions.⁴¹

Motivation

Although there is increased acknowledgement of the integral role of patient self-management, it is also known that the motivation of patients with COPD is associated with the success of these interventions.⁴² Accordingly, recent approaches to behaviour change in COPD have used the strategy of motivational interviewing,⁴³ an evidence-based, collaborative, person-centred method familiar to GPs that elicits and increases motivation for change.⁴⁴⁻⁴⁶ In COPD this approach has been linked with an improved therapeutic relationship between patient and interventionist, subsequently facilitating an increase in quality of life and patient acceptance.⁴³

Health literacy

An additional factor in the quality of the therapeutic relationship is the patient's level of health literacy, defined as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions.⁴⁷ It includes a set of skills that influences the patient's motivation and ability to find, understand and effectively use health information.⁴⁸ Low health literacy may lead to misunderstanding of instructions, which can impact on adherence to medical interventions.⁴⁹ Screening allows evaluation of the patient's health literacy as an asset to be used or a clinical risk to be addressed.⁴⁸ This assessment informs the tailoring of core messages and management strategies.⁴⁸

5As framework

Primary healthcare practitioners are already familiar with the concepts of assessing readiness, tailoring information, assessing health literacy, motivational interviewing and goal setting as key components of the 5As framework for addressing behavioural risk factors (ask, advise, assess, assist and arrange),⁵⁰ especially for cigarette smoking and assessing alcohol consumption. Incorporating

TABLE. 'PROCESSES OF CHANGE' AND THEIR RELATIONSHIP TO THE 'STAGES OF CHANGE' MODEL*

Stage of change	Characteristics of patients with COPD	Processes of change (in bold) with examples of use
Precontemplation	Not considering change	<p>Consciousness raising</p> <ul style="list-style-type: none"> Personalise risk and encourage self-exploration and re-evaluation of behaviour <p>Dramatic relief</p> <ul style="list-style-type: none"> Explore issues of grief, loss and role changes from COPD Encourage the expression of feelings and solutions to reduce negative emotions Assess mental health <p>Environmental re-evaluation</p> <ul style="list-style-type: none"> Discuss the impact on valued others
Contemplation	Ambivalent regarding change	<p>Self re-evaluation</p> <ul style="list-style-type: none"> Assess personal model of COPD/illness perception Encourage evaluation of pros and cons of behaviour change Identify and promote new, positive outcome expectancies
Preparation	Planning to act	<p>Self and social liberation</p> <ul style="list-style-type: none"> Encourage belief that one can change; create conditions for change Identify and assist in problem-solving obstacles Identify social support Verify that the patient has the skills for behaviour change Encourage small initial steps
Action	Practising new behaviour	<p>Use and foster social support and helping relationships</p> <ul style="list-style-type: none"> Boost self-efficacy to enable contingency management Provide reinforcement for positive steps <p>Counter-conditioning</p> <ul style="list-style-type: none"> Discuss substituting problem behaviours with positive ones <p>Stimulus control</p> <ul style="list-style-type: none"> Discuss removing triggers/cues for unhealthy behaviours
Maintenance	Sustaining new behaviour	<p>Continue positive reinforcement and social support</p> <ul style="list-style-type: none"> Reinforce internal rewards Plan for follow-up support – institutional and social <p>Stimulus control</p> <ul style="list-style-type: none"> Discuss removing triggers/cues for unhealthy behaviours Discuss relapse prevention <p>Maintain self-efficacy</p>

*Adapted from Prochaska & Velicer (1997).⁴⁰

these concepts to improve outcomes for patients with COPD (such as improved adherence to physical activity recommendations) is to be encouraged and supported.

Patient–provider communication

Health practitioners may further facilitate patient adjustment by using principles drawn from psychological theories concerning behaviour change. Although there are numerous models (e.g. Social-Cognitive Theory, Health-Belief Model), good quality patient–provider communication is an essential key to the practical application of each of their principles. This communication facilitates model commonalities such as knowledge and understanding, personalisation, perceived susceptibility, beliefs, self-efficacy, intention, perceived resources and motivation. For example, patient concerns about COPD medications independently predicted nonadherence in a recent study.⁵¹

Illness perception is another prudent factor to consider in the communication process as it concerns how patients assess living with a disease.⁵² It incorporates cognitive and emotional responses to perceived threat to one's health as well as cause, timeline, consequences, control and identity.^{53,54} These perceptions can be modified by interactions with health practitioners, potentially restructuring the personal models of illness of the patient with COPD⁵² and influencing adherence,⁵¹ self-management and health-promoting behaviours such as attendance, and response to pulmonary rehabilitation.⁵⁵⁻⁵⁷

Further examples can be seen in the personalisation of risk communication, which leads to more accurate risk perception, improved knowledge, increased uptake of screening tests and more informed patient decision making.⁵⁸

Clinical guidelines for general practice have incorporated numerous practical applications of behaviour change models such as highlighting the benefits and costs of prevention and treatment strategies, patient involvement in decision making and emphasising the positive impact of effective doctor–patient interaction.⁵⁹

End-of-life considerations

Possibilities for positive influence on behaviour change remain relevant in the later stages of a patient's illness. Although a patient's symptoms need to be well managed when end of life is approaching, it is also important to ensure that personal, social and psychological support is in place.^{60,61} Unfortunately, dying is often not discussed and, therefore, preparations for a 'good' death are not initiated,⁶² or start too late.⁶⁰ Four reforms have been proposed to facilitate a comfortable death:

- there is more public discussion about the limits of health-care as death approaches, and what we want for end of life
- personal wishes are defined
- assurances are made that personal wishes are respected
- services for those dying focus more on dying at home.⁶⁰

End-of-life care does not attempt to lengthen or shorten the

patient's life, but aims to optimise quality of life for the patient.⁶³ Consequently, topics such as prevention, cure and rehabilitation acquire less importance.⁶⁰ Discussion of end-of-life wishes could be initiated:

- during health assessments for people aged over 75 years
- as part of assessment and care planning for people in aged-care facilities and those receiving home-based care packages
- during hospital admissions of people who are assessed as likely to die in the next 12 months.⁶⁰

Hospitalisations may be used as a screening tool for transition to palliative approaches in the community for patients late in the clinical course of COPD.⁶⁴ A simple tool, the Karnofsky Performance Status (KPS) scale, is often and effectively used in cancer care and palliative care, since progressively worsening scores on this scale are indicative of poorer prognosis. This tool can be easily applied to people with severe chronic disease; the Australian adaptation (AKPS) has been validated in the community setting in patients with various chronic diseases.⁶⁵

GPs and their practice staff may find it useful to become familiar with the providers of their local palliative care services and find out what they can offer, in particular for their patients with end-stage COPD.

The importance of carers

A central partner in the management of COPD is the patient's carer. Family members and friends are the main providers of home care, with one study indicating that more than 70% of patients with COPD have at least one informal carer.⁶⁶ The presence of a carer has been linked with better treatment adherence, decreased smoking and fewer emergency visits by patients with COPD.^{17,67}

Although the burden of this supportive role is significant and often neglected,⁶⁸ carers themselves report that they would feel better equipped to perform their duties with education, inclusion and skill training.⁶⁹ Specifically, carers of patients with COPD have expressed the need for better understanding and training concerning the management of anxiety and panic, helpful and safe activities, quality of life facilitation and clarification regarding expectations for the future.⁶⁹ Older carers in particular have lower health literacy and less knowledge regarding COPD, and, therefore, they require more education on symptom management and pharmacological support.⁷⁰

Carers' lack of understanding of the disease and prognostic uncertainty are impediments to symptom recognition and management in end-stage COPD.⁷¹ Appropriate carer involvement and training may potentially address each of these needs and facilitate better patient management in the home. To this end, the COPD-X guidelines include carers at numerous points of management, such as discharge planning when assessing the patient's readiness to go home should involve an evaluation of whether a carer is available as well as the carer's understanding and ability to administer medications.⁷² It is at this point especially that

communication between hospital care providers and the primary care team assumes even greater importance. This should not be seen as a one-way information street (from hospital staff to GP), but timely discussion among hospital and primary care staff as well as the carer and patient should be the invariable goal. Similar evaluation and integration of the carer can also occur in the primary care setting and clinicians may also assist carers with local support services, given the burden and distress often accompanying this role.⁶⁸

Conclusion

The development, integration and training of a team of partners in COPD care can reduce behavioural risk factors and optimise positive behaviour change. Opportunities within primary care will expand as practitioners within this setting recognise and value their potential role as behaviour-change agents. Teamwork with the patient, their carers and across providers and services allows further integration and consolidation of positive COPD management behaviours.

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COMPETING INTERESTS. Mr Cafarella and Dr Effing: None. Dr Hancock has received honoraria for educational and advisory board work for pharmaceutical companies (Novartis, Menarini, Mundipharma, GlaxoSmithKline, AstraZeneca, Boehringer Ingelheim) who undertake research, develop and/or market medicines to treat people with respiratory disorders. Professor Frith has received honoraria for educational and advisory board work with AstraZeneca, Boehringer Ingelheim, Nycomed-Takeda, Menarini, Mundipharma, GlaxoSmithKline, Novartis and Remedy Healthcare. He also provides honorary service on Boards of Directors of Lung Foundation Australia and the Global Initiative for Chronic Obstructive Lung Disease (GOLD).

COPD resources available from Lung Foundation Australia

ELIZABETH HARPER BAppSc - AppChem

A range of clinical and patient resources and training opportunities to support the diagnosis and management of patients with COPD is available from Lung Foundation Australia.

Lung Foundation Australia is a national not-for-profit organisation dedicated to making lung health a priority for all in Australia and working across five areas:

- community awareness
- patient support through education and resources
- clinical training and resource development
- research support
- advocacy.

The Lung Foundation represents all lung diseases, collaborating with other lung organisations to provide a valuable link to community services. One of the largest programs provided by the Lung Foundation is the COPD National Program. A selection of some of the resources that have been developed by Lung Foundation Australia and in particular its COPD National Program are described below, and website addresses for those available online are listed in the Box.

Guidelines and summaries

COPD-X Plan

Lung Foundation Australia and the Thoracic Society of Australia and New Zealand's *The COPD-X Plan: Australian and New Zealand Guidelines for the Management of Chronic Obstructive*

Medicine Today 2015; 16(7 Suppl): 36-44

Ms Harper is Director of the COPD National Program, Lung Foundation Australia, Brisbane, Qld.



Pulmonary Disease 2015 is available online (see Box 1). The COPD-X Guidelines Committee meets four times each year to review the current literature. Recommended updates are then made to the full guidelines as required. The latest update reflects the published evidence on COPD up to May 2015. The guidelines summarise current evidence on optimal management of people with COPD and are intended to be a decision support aid for GPs, other primary health care clinicians, hospital-based clinicians and specialists working in respiratory health.

COPD-X Concise Guide for Primary Care

The Royal Australian College of General Practitioner-endorsed *COPD-X Concise Guide for Primary Care* is a 40-page document available to download as a pdf (Figure 1). Published jointly by Lung Foundation Australia and the Thoracic Society of Australia and New Zealand, it includes 22 pages of guidelines, with the remainder comprising references and structural components. It provides primary care practitioners with 50 clear recommendations (graded according to strength of the recommendation and the quality of the evidence) for diagnosis and management of COPD. It also contains additional practice tips and links to additional services and/or information in an easy to read layout.

Stepwise Management of Stable COPD

The *Stepwise Management of Stable COPD* is a single page translation of the COPD-X guidelines, dividing the interventions into nonpharmacological and pharmacological interventions for patients with mild, moderate and severe COPD. On the reverse side of the stepwise management is a guide to the addition of therapies, highlighting classes of medicines that should not be used together. Images of the individual medicines, grouped in their classes, are also included in this document, which is reproduced on pages 39-40.

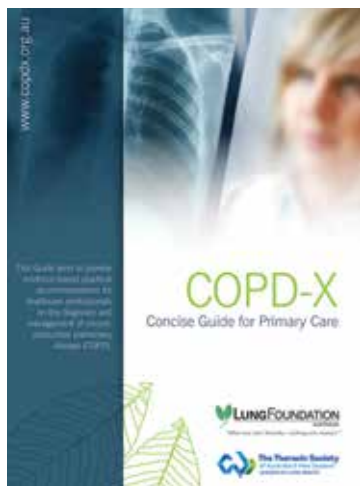


Figure 1. COPD-X Concise Guide for Primary Care.

Reproduced with permission from Lung Foundation Australia.



Figures 2a and b. Lung Foundation Australia's COPD and Lung Health Checklist posters and flyers. Reproduced with permission from Lung Foundation Australia.



Decision support tools

Primary Care Respiratory Toolkit

The online Primary Care Respiratory Toolkit steps the primary care practitioner through each of the key areas of the COPD-X guidelines, with useful calculators to aid consultations. It has been developed to help promote the early diagnosis and best practice management of COPD. It includes a lung age estimator (an interactive motivational tool for smoking cessation), cigarette pack-year calculator, spirometry calculator and management of exacerbation algorithm.

Education and training

A number of COPD clinical resources and education and training opportunities aimed specifically at GPs or nurses are available from Lung Foundation Australia, including the following.

GP resources

- An active learning module being delivered in September in Melbourne. This module covers the aetiology, pathophysiology, epidemiology, risk assessment and screening, case-finding, diagnosis with spirometry, assessment of severity, optimising nonpharmacotherapy interventions and pharmacological interventions, inhaler devices and technique, preventing deterioration, development of care plans and self-management support, and management of exacerbations.
- COPD-X guidelines presentation video.
- Face-to-face workshops.

Nursing resources

- COPD Nurse Training and Support Program, an online interactive training program providing all the necessary

education to help primary care nurses support patients with COPD to self-manage their condition.

- Face-to-face workshops.

Clinical resources

Clinical resources for health professionals available from Lung Foundation Australia cover disease management, risk assessment and screening and health promotion.

Disease management

- COPD Action Plan. This is available as an electronic editable pdf, or in rich text format that can be downloaded to widely used medical software. It should be completed in collaboration with the patient and their carer (if appropriate) to provide guidance on the daily medication regimen and action to take if the patient becomes unwell. Written instructions on how to develop an action plan are provided at the end of the COPD Action Plan (see pages 41-43).
- Algorithm – Managing a COPD Exacerbation in Primary Care. Available electronically, this guides health practitioners in the stepping up and stepping down of treatment in patients having a COPD exacerbation (see page 44). It is currently being trialled in participating general practices located across six regions as part of a pilot program called 'Have the CHAT' (which aims to help patients recognise symptoms of an exacerbation earlier).

Risk assessment and screening

- Lung Health Checklist flyers and posters are available, highlighting risk factors and symptoms of lung disease and encouraging patients to check their lung health (Figures 2a and b).

ONLINE COPD RESOURCES FROM LUNG FOUNDATION AUSTRALIA**COPD-X guidelines**<http://copdx.org.au>**Concise Guide for Primary Care**<http://copdx.org.au>**Stepwise Management of Stable COPD**<http://copdx.org.au>**Primary Care Respiratory Toolkit**<http://lungfoundation.com.au/health-professionals/clinical-resources/copd/primary-care-respiratory-toolkit>**COPD Action Plan**<http://copdx.org.au>**Managing a COPD Exacerbation in Primary Care**<http://copdx.org.au>**COPD Nurse Training and Support Program**<http://lungfoundation.com.au/health-professionals/training-and-education/copd-nurse-training-and-support-program>**COPD screening devices**<http://lungfoundation.com.au/health-professionals/clinical-resources/copd/targeted-copd-case-finding-using-copd-screening-devices-in-the-community>**World COPD Day**<http://worldcopdday.lungfoundation.com.au>**Airwaves Clinical Update**<http://lungfoundation.com.au/news-media/airwaves-clinical-update>**Lung Diseases & Fact Sheets**<http://lungfoundation.com.au/patient-area/lung-diseases>**C.O.P.E. – COPD. Online. Patient. Education**<http://www.cope.lungfoundation.com.au>**Patient inhaler device technique handouts**<http://lungfoundation.com.au/patient-area/resources/inhaler-technique-fact-sheets>**LungNet News**<http://lungfoundation.com.au/news-media/lungnet>**Check in with your lungs – interactive Lung Health Checklist**<http://lungfoundation.com.au/patient-area/checklist>

- COPD screening device resources. Position statements and instructional videos on the use of COPD screening devices and templates for recording screening results are available on Lung Foundation Australia's website.

Health promotion

- World COPD Day, held annually in November (on November 18 in 2015), focuses on raising awareness of

COPD risk factors and symptoms to promote earlier diagnosis. Lung Foundation Australia provides a website (www.worldcopdday.lungfoundation.com.au) where health professionals can register to participate in activities such as setting up a static display, risk assessment and screening, spirometry testing and fundraising 'walks for COPD'. A map locator shows interested members of the public where they can participate in an event. The activities are linked to media opportunities. Lung Health Checklist flyers and posters, T-shirts (What is COPD?) and balloons are available from Lung Foundation Australia to promote the day.

Clinical newsletter

- Airwaves Clinical Update is a clinical e-newsletter for health professionals with links to resources, articles of interest, research awards and news of upcoming events.

Patient resources

Lung Foundation Australia has developed and provides numerous resources to support patients with COPD and their carers, including those listed below.

- Information and Support Centre, accessed via a toll-free number (1800 654 301) or email (enquiries@lungfoundation.com.au), which provides contacts to pulmonary rehabilitation programs and patient support groups among other services.
- Fact sheets, brochures and booklets, available to download from its website.
- *Better Living with COPD: A Patient Guide*.
- DVDs to support patient self-management of COPD.
- A lung care nurse, who by appointment will call back patients.
- C.O.P.E. – COPD. Online. Patient. Education. Developed in partnership with BUPA Health Foundation, this online interactive program for patients delivers the educational component of pulmonary rehabilitation from the comfort of a patient's home in five one-hour modules.
- Patient inhaler device technique handouts, available to download.
- Patient education seminars, held in each capital city.
- LungNet News, a newsletter published in February, May, August and November providing information for patients.
- Lung Health Checklist, a short questionnaire, available in an interactive online format or downloadable as a pdf, for members of the public to check the health of their lungs. **MT**

COMPETING INTERESTS: The COPD National Program receives sponsorship monies from the following pharmaceutical companies: Boehringer Ingelheim, Menarini Australia, Air Liquide Healthcare, Novartis Pharmaceuticals, AstraZeneca and GlaxoSmithKline, in addition to monies from the sales of educational resources, donations and bequests and miscellaneous competitive grants.

Stepwise Management of Stable COPD

	MILD	MODERATE	SEVERE
Typical Symptoms	<ul style="list-style-type: none"> few symptoms breathless on moderate exertion recurrent chest infections little or no effect on daily activities 	<ul style="list-style-type: none"> increasing dyspnoea breathless walking on level ground increasing limitation of daily activities cough and sputum production exacerbations requiring oral corticosteroids and/or antibiotics 	<ul style="list-style-type: none"> dyspnoea on minimal exertion daily activities severely curtailed experiencing regular sputum production chronic cough exacerbations of increasing frequency and severity
Lung Function	FEV ₁ ≈ 60-80% predicted	FEV ₁ ≈ 40 -59% predicted	FEV ₁ < 40% predicted
Non-Pharmacological Interventions	<p>RISK REDUCTION Check smoking status, support smoking cessation, recommend annual influenza and pneumococcal vaccine according to immunisation handbook</p> <p>OPTIMISE FUNCTION Encourage physical activity, review nutrition, provide education, develop GP management plan and initiate regular review</p> <p>CONSIDER CO-MORBIDITIES especially osteoporosis, coronary disease, lung cancer, anxiety and depression</p> <p>REFER TO PULMONARY REHABILITATION and consider psychosocial needs, agree written action plan</p> <p>Consider oxygen therapy, surgery, palliative care and advanced care directives</p>		
Pharmacological Interventions	<p>CHECK DEVICE USAGE TECHNIQUE AND ADHERENCE AT EACH VISIT - Up to 90% of patients don't use devices correctly</p> <p>SHORT-ACTING RELIEVER MEDICATION: Short-acting beta₂-agonist (SABA) or short-acting muscarinic antagonist (SAMA).</p> <p>Refer to Table 1 overleaf.</p> <p>SYMPTOM RELIEF: Long-acting muscarinic antagonist (LAMA) and/or long-acting beta₂-agonist (LABA). Refer to Table 1 overleaf. These medicines may also help to prevent exacerbations. **SEE PRECAUTIONS 1-3**</p> <p>EXACERBATION PREVENTION: When FEV₁ <50% predicted AND 2 or more exacerbations in the previous 12 months, commence inhaled corticosteroid (ICS)/LABA combination therapy. **SEE PRECAUTIONS4**</p> <p>Consider low dose theophylline</p>		

Based on COPD-X Plan: Australian and New Zealand Guidelines for the Management of COPD; Australian Therapeutic Guidelines.

FEBRUARY 2015

- PRECAUTIONS:**
- 1 An assessment should be undertaken to exclude asthma or Asthma-COPD Overlap before initiating LABA monotherapy. LABA monotherapy should not be used in asthma or Asthma-COPD Overlap.
 - 2 Once a LAMA is commenced, ipratropium bromide (a SAMA) should be discontinued.
 - 3 If starting a fixed dose LAMA/LABA combination inhaler, discontinue existing inhalers containing a LAMA or LABA. Refer to Table 1 overleaf.
 - 4 If starting an ICS/LABA combination inhaler, discontinue existing inhalers containing a LABA. Refer to Table 1 overleaf.

✉ Lung Foundation Australia
PO Box 1949
Milton Qld 4064
📞 Free call: 1800 654 301
🌐 Website: www.lungfoundation.com.au

Advocacy • Awareness • Education • Support • Research

Table 1: Guide to addition of therapies*

*Red boxes with crosses indicate classes of therapies that should not be used together.

	SABA	SAMA	LAMA	LABA	LABA/LAMA	ICS/LABA
SABA	X					
<ul style="list-style-type: none"> Salbutamol (Ventolin™, Airomir™, Asmol™) Terbutaline (Bricanyl™) 						
SAMA		X			X	
<ul style="list-style-type: none"> Ipratropium bromide (Atrovent™) 						
LAMA		X	X		X	
<ul style="list-style-type: none"> Tiotropium bromide (Spiriva™) Glycopyrronium bromide (Seebri™) 						
LABA				X	X	X
<ul style="list-style-type: none"> Salmeterol (Serevent™) Eformoterol (Oxis™, Foradile™) 						
LABA/LAMA		X	X	X	X	X
<ul style="list-style-type: none"> Indacaterol (Glycopyrronium bromide (Ultibro™)) 						
ICS/LABA				X	X	X
<ul style="list-style-type: none"> Fluticasone propionate/Salmeterol (Seretide™) Budesonide/Eformoterol (Symbicort™) 						
ICS/LABA				X	X	X
<ul style="list-style-type: none"> Fluticasone furoate/Vilanterol (Breo™) 						

Relievers

Spacers are recommended to be used with puffers



Ventolin® Inhaler

Airomir™ Inhaler



Spiriva® HandiHaler®



Seebri® Breezhaler®



Ultibro® Breezhaler®



Symbicort® Turbuhaler®



Symbicort® Rapihaler™



Airomir™ Autohaler®



QVAR® Inhaler



Flixotide® Accuhaler®



Brearis® Genuair®



Incruse® Ellipta®



Anoro® Ellipta®



Seretide® Accuhaler®



Seretide® MDI



Bricanyl® Turbuhaler® (not used with spacer)

Atrovent® Metered Aerosol



Alvesco® Inhaler



Onbrez® Breezhaler®



Foradil® Aerolizer®



Oxis® Turbuhaler®



Serevent® Accuhaler®



Breco® Ellipta®

Maintenance

ICS (For patients with COPD and Asthma)



Flixotide® Accuhaler®



Spiriva® HandiHaler®



Seebri® Breezhaler®



Ultibro® Breezhaler®



Symbicort® Turbuhaler®



Seretide® Accuhaler®



Seretide® MDI



Alvesco® Inhaler



Onbrez® Breezhaler®



Foradil® Aerolizer®



Oxis® Turbuhaler®



Serevent® Accuhaler®



Breco® Ellipta®

Flare Up Medicines

1. Antibiotics
2. Oral steroids (Prednisone, Prednisolone)

Notes: • Handihaler, Breezhaler and Aerolizer devices require a capsule to be loaded into the device. All other devices are preloaded.
• LABA monotherapy unsuitable for patients with Asthma or Asthma-COPD Overlap.

Visit www.lungfoundation.com.au and click on Health Professional to find out more or call us on 1800 654 301 to order copies.

COPD ACTION PLAN

(Chronic Obstructive Pulmonary Disease)

For more information refer to 'Writing a COPD Action Plan'



LUNG FOUNDATION

AUSTRALIA

"When you can't breathe... nothing else matters"

Date: _____ (Ask your doctor to review each year with your care plan)

Patient Name: _____ Date of Birth: _____

GP Name: _____ GP Phone: _____ A/H: _____

Health Worker Name: _____ Health Worker Phone: _____

Feeling your usual self

- I can do my usual daily activities
- Sleeping as usual

- Taking usual medicine
- Usual amount of phlegm

My FEV₁ is: _____
CO₂ Retainer: Yes No Unknown

ACTION: Continue taking your usual medicines as listed below.

Annual Influenza Immunisation - Date: _____

Last Pneumococcal Immunisation - Date: _____

My usual medicines	Colour of device	How many puffs or tablets	How often
Oxygen:	Yes/No:	Setting or l/min:	hrs/day:

Feeling harder to breathe/Feeling sick

FEELING HARDER TO BREATHE THAN USUAL

- More phlegm or thicker than usual
- More coughing
- Not sleeping well
- Loss of appetite
- Not much energy

ACTION: Follow plan below for extra medicines. Plan your day, get rest, relax, use breathing techniques, huff and cough to clear phlegm as required.

My extra medicine	Colour of device	How many puffs or tablets	How often

FEELING SICK

- Taking reliever medicine 3-4 hourly, but not getting adequate relief

ACTION: Start taking prednisolone. Contact your Health Worker/Nurse or Doctor.

- A change in colour and/or volume of phlegm
- Fever

ACTION: Start taking antibiotics as well as prednisolone. Contact your Health Worker/Nurse or Doctor.

Prednisolone*			Antibiotics*		
Strength	Tablets each day	No. of days	Strength	Tablets each day	No. of days

* GP to fill in if prescribed.

Not feeling good (trouble breathing and/or wheezing)

- Difficulty sleeping/woken easily
- Blood in your phlegm
- Swollen ankles
- ACTION:** Contact Doctor

- Very short of breath at rest
- High fever
- Chest pain
- Confused, slurring of speech
- Drowsy
- Afraid/scared
- ACTION:** Phone an Ambulance 000

CAUTION! Ambulance/Paramedics: Oxygen supplementation to maintain SpO₂ 92% max (exceeding 92% risks hypercapnia)

Show them this plan.

Know your baseline...

Your baseline is when you are feeling your usual self

- How breathless are you?
- How far can you walk?
- How well do you sleep and eat?
- What is the colour of your phlegm?
- How much phlegm do you cough up?

Relievers



Ventolin® Inhaler



Asma® Inhaler



AiroMir™ Inhaler



AiroMir™ Autohaler®



Bricanyl® Turbuhaler® (not used with spacer)



Atrovent® Metered Aerosol



Maintenance

ICS (For patients with COPD and Asthma)



Flixotide® Inhaler



Flixotide® Accuhaler®



QVAR® Inhaler



Pulmicort® Turbuhaler®



Alvesco® Inhaler

LAMA



Spiriva® HandiHaler®



Bretaris® Genuair®



Seebri® Breezhaler®



Incruse® Ellipta™

LAMA/LABA



Ultibro® Breezhaler®



Anoro® Ellipta®

ICS/LABA



Symbicort® Turbuhaler®



Symbicort® Rapihaler™



Seretide® Accuhaler®



Seretide® MDI

LABA



Onbrez® Breezhaler®



Foradil® Aerolizer®



Oxis® Turbuhaler®



Serevent® Accuhaler®



Breo® Ellipta®

Flare Up Medicines

1. Antibiotics
2. Oral steroids (Prednisone, prednisolone)

What you do to stay well

- Don't smoke
- Check your inhaler technique regularly
- Walk daily/keep active
- Attend lung rehab
- Get flu and pneumonia immunisations

Notes: • Handihaler, Breezhaler and Aerolizer devices require a capsule to be loaded into the device. All other devices are preloaded. • LABA monotherapy unsuitable for patients with Asthma or Asthma-COPD Overlap.

RESOURCES

Lung Foundation Australia | 1800 654 301 | www.lungfoundation.com.au

Better Living with COPD – Patient Guide



LUNG FOUNDATION
AUSTRALIA

"When you can't breathe... nothing else matters"™

Your nearest Support Group contact person: _____

Your nearest Pulmonary Rehabilitation Program: _____

Your nearest Lungs in Action class: _____

Writing a COPD Action Plan



Suggested steps for developing a COPD Action Plan

STEP 1

In the green section of the action plan, **complete the details about the patient's prescribed maintenance medication** including inhalers, oral medications, and oxygen. It is also helpful to include the patient's lung function results in this section (*most recent FEV₁ and date*). Make a note on the plan to **indicate if the patient retains CO₂**.

STEP 2

Involve the patient in the development of the plan asking them about their previous experiences with exacerbations and action plan use. Consider and identify their symptoms (*infective/non-infective*), treatment and outcomes.

STEP 3

When completing the COPD Action Plan **consider the increased reliever dose, frequency and delivery method, antibiotic choice and steroid regime**. Include specific instructions to individualise the plan (e.g. *antibiotic "Use if mucus turns green"*). *Identify if a reducing schedule is required*.

STEP 4

In partnership with the patient and medical officer **discuss the possible actions that the patient and carer can safely do prior to urgent medical review** (e.g. *Start steroids and/or start antibiotics*). **NOTE: This should be seriously considered if the patient has frequent severe exacerbations as they are at higher risk of further episodes and faster deterioration in their lung function.**

STEP 5

Liaise with the **medical officer to review, sign and date the plan**. Have the medical officer provide prescriptions for the medications recommended in the action plan and to reinforce the plan to the patient.

STEP 6

Explain the plan to the patient and carer including signs to watch for and actions to take. Talk about worsening signs that would indicate an exacerbation, such as an increased use of reliever medication due to increased breathlessness, increased cough, change in colour and/or volume of sputum production, etc. Encourage them to keep a symptom diary on a daily basis to monitor changes in symptoms.

STEP 7

Ask the **patient to sign the plan and keep it somewhere visible at home**. For example, both the COPD Action Plan and symptom diary could be put on the fridge for ease of reference.

STEP 8

Consider using editable pdfs, save and import or print and scan to the patients electronic clinical file. Give the patient a copy to bring with them to their next appointment for review and reinforcement. Explain to them that bringing the COPD Action Plan and symptom diary to follow-up appointments will assist in managing their COPD.

Adapted from 'Suggested strategy for developing a COPD Action Plan', developed by Statewide Respiratory Clinical Network, Queensland Health

COPD Online, an interactive training program for primary care nurses.

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Algorithm – Managing a COPD Exacerbation in Primary Care



Patient is feeling unwell

and finding it harder to breathe than usual or experiencing any of the following:

- More coughing
- More phlegm
- Thicker phlegm than usual.

Recommend they start using more short-acting bronchodilator (SABA) e.g. *salbutamol* 4-8 puffs (400-800 mcg), via MDI and spacer every 3-4 hours, titrated to response.



Patient is feeling worse

- 3-4 hourly SABA not relieving symptoms adequately

Recommend: Commence oral prednisolone 30-50mg daily for 5 days, then stop.

If clinical features of infection are present:

- A change in colour and/or volume of phlegm
- With or without fever

Recommend: Also commence oral antibiotics (amoxicillin or doxycycline) for 5 days.



Patient still unwell

2-5 days after treatment commenced

Recommend:

- Review by GP or specialist.
- Review and reinforce the use of the COPD Action Plan.

When the patient is feeling better

Recommend:

- Step down short-acting bronchodilator use
- Return to usual daily prescribed medicines
- Write or review and reinforce the use of the COPD Action Plan.

If patient has frequent exacerbations (2 or more in last 12 months) they are at higher risk of further exacerbation and mortality.

Recommend: Early review to:

- Optimise pharmacotherapy following “Stepwise Management of Stable COPD”
- Check immunisation status
- Check smoking status
- Refer to pulmonary rehabilitation
- Arrange a follow-up review when stable

When to send to hospital

if any of the following:

- Marked increased intensity of symptoms
- New or worsening peripheral oedema
- Worsening of hypoxaemia from usual (*if known*)
SpO₂ <92% if not on home oxygen
- Shortness of breath that is worsening and/or at rest
- High fever
- Altered mental state (confusion, slurred speech, drowsiness)
- Chest pain
- Worsening of co-morbidities (e.g. *heart failure, ischaemic heart disease, diabetes*)
- Inability to perform daily activities
- Increased anxiety (feeling scared/afraid)

It is recommended that you consult the suite of COPD-X Guidelines for further information when using this algorithm (COPD-X Plan; Australian and New Zealand Guidelines for the Management of COPD; COPD-X Concise Guide for Primary Care; Stepwise Management of Stable COPD). Visit www.copdx.org.au for further details.

Also see Australian Therapeutic Guidelines Respiratory version 5 (<http://www.tg.org.au/?sectionid=49>) and Antibiotic version 15 Guidelines (<http://www.tg.org.au/?sectionid=41>)

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Reproduced with permission from Lung Foundation Australia. This algorithm is currently being trialled in participating general practices located across six regions as part of a pilot initiative called 'Have the CHAT', which aims to help patients recognise symptoms of an exacerbation earlier.