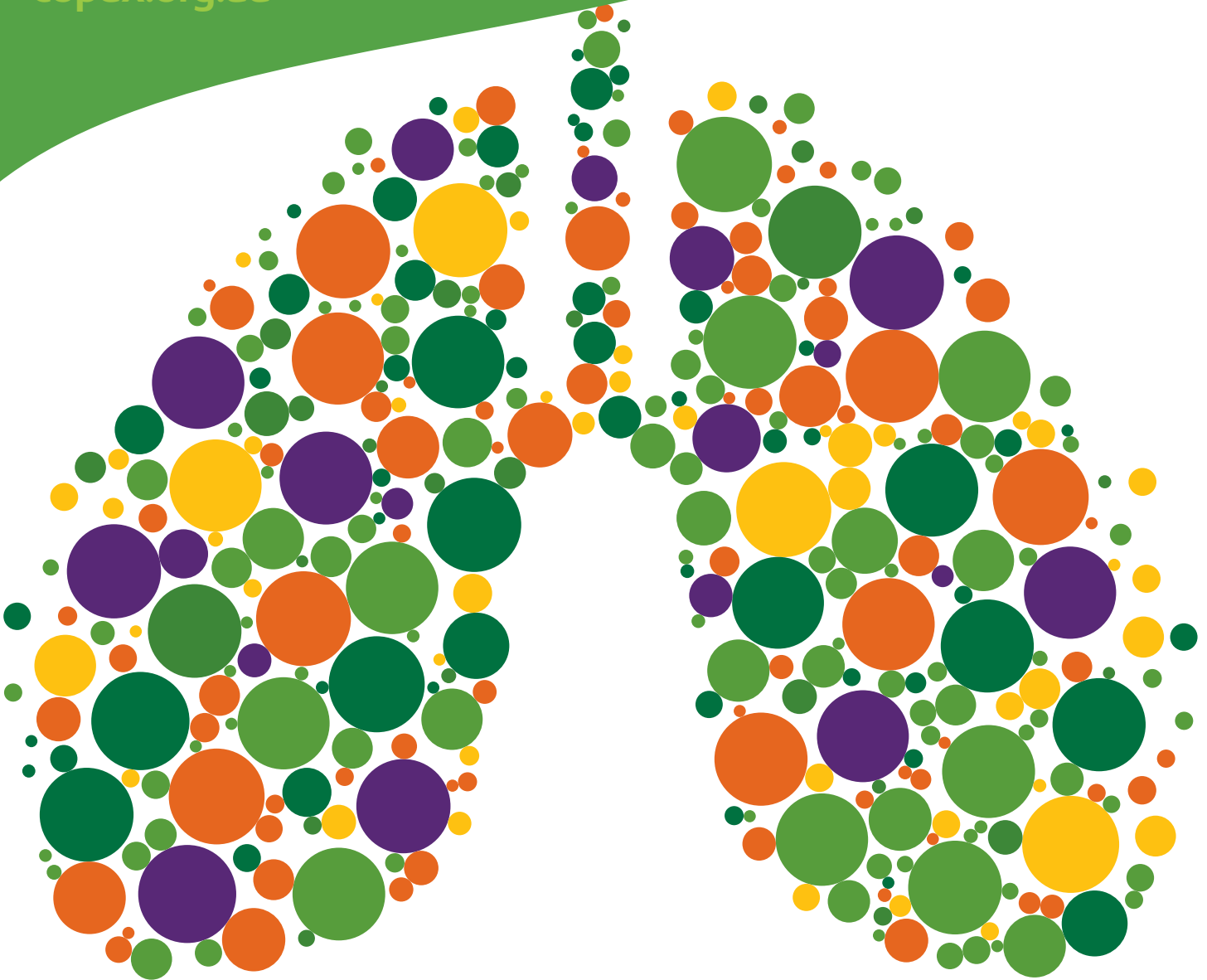


COPD-X

Concise Guide

This Guide aims to provide evidence-based practical recommendations for healthcare professionals on the diagnosis and management of Chronic Obstructive Pulmonary Disease (COPD).

copdx.org.au



Foreword

Lung Foundation Australia, a not for profit, non-government organisation for consumers and health professionals for lung health in Australia, published the first national guidelines for management of COPD (The COPD-X Plan) in 2003.

Since then the Guidelines Committee of Lung Foundation Australia's COPD National Program have diligently reviewed the literature four times a year and updated The COPD-X Plan and made it freely available via the dedicated website copdx.org.au.

As our Australian population ages, GPs and other primary care clinicians now, more than ever, require enhanced skills to manage an ever-increasing number of chronic diseases, including COPD, that would previously have been in the domain of secondary and tertiary care.

In 2014, with the 160-page COPD-X Plan becoming unwieldy as a clinical guideline for clinicians, a Writing Group overseen by the Guidelines Committee and represented by Lung Foundation Australia's General Practice Advisory Group, subsequently published a more pragmatic version, "COPD-X Concise Guide for Primary Care", particularly for those clinicians managing patients in non-specialist settings.

Over the last few years, the "COPD-X Concise Guide for Primary Care" has become the more accessible and clinically useful national guidance for COPD. There was a minor re-publication in 2017 and now, a more comprehensive update in this version with its credibility and content continuing to be enhanced by its parent document "The COPD-X Plan" and the knowledge that it is one of the most regularly updated guidelines for clinical care.

With the transition of the "Concise Guide" being more widely used beyond primary care, a change in title to "COPD-X Concise Guide" is timely in this new edition. The new edition retains its simple and easy to read format, its searchable functions, its grades of evidence and its ready reference tables and charts.

On behalf of my GP and primary care colleagues (which includes practice nurses and pharmacists), I commend the Lung Foundation Australia staff and committees in their initiatives to develop clinically relevant and useful resources. These include the Concise Guide and its companion resources - the COPD Action Plan (and "How to Write a COPD Action Plan"), Inhaler Medicine Charts, Inhaler Device Fact Sheets, Exacerbation Algorithm, and the very sought after Stepwise Management of Stable COPD (a one sheet summary) which includes a table on the reverse indicating which pharmacological therapies can be used together.

I would like to especially thank the COPD-X Guidelines Committee members for their tireless efforts in reviewing the evidence and ensuring we have access to the most up to date guidelines for assisting us in managing our patients with, or at risk of COPD.

I encourage you and your patients to access all the resources of Lung Foundation Australia at lungfoundation.com.au.

As clinicians, you can keep up-to-date with the latest news and information on the research, events and advocacy work from Lung Foundation Australia via the [website](#).

As the only national charity supporting people of all ages affected by lung disease across Australia, encourage your patients to consider Lung Foundation Australia membership to ensure the organisation can continue its work in support services, advocacy and research. Clinicians can also support Lung Foundation Australia in its work by a [professional membership](#).

Yours sincerely

Dr Kerry Hancock

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COPD

Burden

- 1 in 7 Australians over the age of 40 has COPD
- Second leading cause of avoidable hospitalisations in Australia
- Around 50% of people with COPD symptoms do not know they have it
- Indigenous Australians are 2.5 times more likely to have COPD than non-Indigenous Australians

Diagnosed by:

- Spirometry:
 - Essential for early staging of severity and treatment of COPD
 - $FEV_1/FVC < 0.7$ (indicative of airway obstruction)
 - $FEV_1 < 80\%$ predicted
- Symptoms:
 - Shortness of breath, especially on exertion
 - Persistent cough
 - Increased sputum production

Suspect COPD in people:

- >35 years of age with breathlessness, cough and/or sputum production
- All smokers/ex-smokers >35 years of age

Impact

- Exacerbations
- Symptoms
- Quality of life



Goals of Treatment

- Prevent exacerbations
- Reduce symptoms

Key Aspects of Management



Introduction

This COPD-X Concise Guide aims to provide evidence-based practical recommendations for healthcare professionals on the diagnosis and management of COPD.

The need for this Concise Guide emerged from an appreciation that a wide range of healthcare professionals require brief, concise guidance on COPD diagnosis and management during daily practice.

Care has been taken to ensure that the levels of evidence and statements regarding the strength of these recommendations are clear. Information has been organised and presented to allow this guide to be incorporated into clinical practice.

The development of this guide was initially undertaken by a specially convened multidisciplinary Writing Group in consultation with an Advisory Group. The full COPD-X guidelines (which are updated four times per year following a review of latest evidence) formed the basis of the evidence for this guide. Each recommendation from the COPD-X guideline was discussed by the committee and modified based on the latest evidence available and the need to provide practical recommendations. Submissions were also invited from key stakeholders and primary care representatives. The Lung Foundation's General Practice Advisory Group (GPAG) reviewed the guide to ensure it was

practical and useful in the primary care setting. Without significantly changing its approach, the COPD-X Concise Guide was updated in 2019 in conjunction with the most recent update of COPD-X, by members of the COPD-X Guidelines Committee in collaboration with GPAG.

Patients with COPD present at different stages of their disease process. In addition, COPD is typically a progressive disease marked by gradual decline in lung function and in many cases repeated exacerbations. Optimal chronic disease management should focus resources and educational activities on the individual needs of patients to enhance outcomes and encourage patients to actively participate in the management of their condition. Therefore, management must be reviewed regularly and tailored to the changing needs of patients. As much as possible, the recommendations contained in this guide accommodate the differences between individual patients in terms of disease severity, functional status, and suitability for different treatment options. Where relevant, the suitability of a recommendation for a particular group of patients is made clear.

Evidence levels in this Concise Guide refer to National Health and Medical Research (NHMRC) levels as outlined in the table below.

NHMRC level	Basis of evidence
I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly designed and conducted randomised controlled trial.
III-1	Evidence obtained from well-designed pseudorandomised controlled trials (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies (including systematic reviews of such studies) with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.
III-3	Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel group.
IV	Evidence obtained from case series, either post-test or pre-test / post-test.



Further Information boxes are included with hyperlinks to the associated section of the Concise Guide or the full COPD-X guidelines or to a relevant external resource/ website.



Practice Tips New evidence is constantly emerging and is systematically reviewed by the COPD-X Guidelines Committee, and following appropriate approval processes, the evidence is added to copdx.org.au. As this can be a lengthy process, Practice Tips have been included to highlight areas where evidence has not yet been reviewed or consensus to make a recommendation agreed, however the committee was satisfied that the Practice Tip could benefit diagnosis and management of COPD.



Recommendations were assessed using GRADE. The following legend should be referenced:



Strong Recommendation



Weak Recommendation



High Quality Evidence



Moderate Quality Evidence



Low Quality Evidence

Case finding and confirm diagnosis



Practice Tips:

- Consider case finding to target those patients who should have spirometry testing. For more information about case finding, see Lung Foundation Australia's [COPD case finding position paper](#).
- In primary care, a trained practice nurse could assist the GP by undertaking spirometry.
- People with COPD can present with recurrent chest infections requiring antibiotics. Therefore, this can be flagged as a means of case finding.



Further Information

- For detail on causes, pathophysiology and clinical features of COPD, see [C1. Aetiology and natural history](#) in the COPD-X guidelines
- For detail on smoking cessation, see:
 - section [P: Prevent deterioration](#) of this guide
 - [P1. Risk factor reduction](#) in the COPD-X guidelines
 - [RACGP guidelines on smoking cessation](#)
- For case finding in the community, visit lungfoundation.com.au

What risk factors contribute to COPD?

- Smoking is the most important risk factor in COPD development.
- A close relationship exists in people with COPD between the amount of tobacco smoked and the rate of decline in forced expiratory volume in one second (FEV₁), although individual susceptibility to tobacco smoke varies greatly [III-2]. (Fletcher 1977)
- Smoking cessation can slow the rate of decline in lung function, delay the onset of disability, and preserve remaining lung function [III-2]. (Fletcher 1977, Anthonisen 2002, Tashkin 1996)
- Other COPD risk factors include prenatal and postnatal factors including parental smoking, genetic factors, asthma, socioeconomic, nutritional, and environmental factors (e.g. dusty occupations, air pollution).
- Widespread population screening for COPD is not recommended. (Guirguis-Blake 2016)

✓ Recommendation

- Consider COPD in:
 - patients > 35 years of age with symptoms such as breathlessness, cough, and / or sputum production. **SR ME**
 - all smokers / ex-smokers > 35 years of age. **SR ME**
- Document smoking history, current smoking status, and work history including occupational exposure in all patients with suspected COPD. **SR LE**

What is the first step in the diagnosis of COPD?

- A thorough history should be taken for all people with suspected COPD. This includes documenting any history of prematurity or childhood respiratory problems including asthma, age of onset of symptoms, triggers, occupational and environmental exposures, smoking history, and family history. Asthma is a known risk factor for COPD.









✓ Recommendation

- Document a thorough history in all patients with suspected COPD. **SR LE**

How is COPD confirmed?

- The diagnosis of COPD requires spirometry to confirm the presence of persistent airflow limitation (post-bronchodilator $FEV_1 / FVC < 0.7$) [III-2] (NHLBI/WHO Workshop Report April 2001) since spirometry is the most reproducible and objective measurement of airflow limitation available.
- COPD cannot be diagnosed on clinical features and / or chest x-ray findings alone.
- Emphysema may be present in the absence of airflow limitation. Complex lung function tests will aid this diagnosis.
- Many patients with COPD have some reversibility of airflow limitation (mainly FEV_1) with bronchodilators. However, reversibility alone does not equate to a clinical diagnosis of asthma because the clinical features and pathophysiology of COPD and asthma overlap and both conditions can coexist in some patients.

Recommendation

- Spirometry should be performed using standardised techniques.  
- Perform pre- and post-bronchodilator spirometry to confirm COPD, which is characterised by airflow limitation that is not fully reversible (post-bronchodilator FEV_1 / FVC ratio < 0.7 and $FEV_1 < 80\%$ predicted).  
- Interpret borderline spirometry results with caution, particularly in older (> 65 years of age) and younger patients (< 45 years of age), or those without a history of smoking or exposure to occupational / environmental pollutants or dust.  
- In patients with borderline spirometry, consider alternative diagnoses and investigate appropriately. Follow-up spirometry is also recommended.  



Practice Tips:

- All patients with a diagnosis of COPD should have a post-bronchodilator spirometry test documented in their clinical record.
- There is some risk with spirometry of over diagnosis in older people or under diagnosis in younger people, especially when the FEV_1 / FVC is close to 0.7. Consider referral for lung function testing at an accredited lung function testing laboratory if there is uncertainty, or the patient has difficulty performing the test.



Further Information

- For detail on the interpretation of lung function tests, see [C4. Assessing acute response to bronchodilators](#) in the COPD-X guidelines.
- For detail on the diagnosis of asthma in adults, see the National Asthma Council's [Australian Asthma Handbook](#).



Further Information

- For detail on other investigations in a patient with COPD, see [C4.1 Confirm or exclude asthma](#) in the COPD-X guidelines.

Is it COPD or asthma?

- An FEV₁ increase $\geq 12\%$ and ≥ 200 mL constitutes a positive bronchodilator response. An FEV₁ increase ≥ 400 mL may suggest underlying asthma or co-existent asthma and COPD [III-2]. (Global Initiative for Asthma 2019)
- Asthma and COPD may co-exist. While a larger bronchodilator response may point to concurrent asthma or asthma-COPD overlap, a thorough history and further investigations may be needed to confirm this.



Recommendation

- If the FEV₁ response to bronchodilator is:
 - ≥ 400 mL, consider asthma or asthma-COPD overlap. **SR** **ME**
 - < 400 mL (but ≥ 200 mL and $\geq 12\%$), consider asthma-COPD overlap or an asthma component depending on history and pattern of symptoms. **WR** **LE**

Is it COPD or another condition?

- Investigations to confirm or exclude other conditions with a similar presentation to COPD may include chest x-ray, haematology / biochemistry, complex lung function tests, exercise stress testing, and electrocardiography (ECG) / echocardiography.



Recommendation

- Perform further investigations to:
 - confirm or exclude conditions with a similar presentation to COPD. **SR** **LE**

How is severity of COPD confirmed?

- In addition to spirometry, investigations to assess the impact of COPD include oximetry, arterial blood gas measurement (if $SpO_2 < 92\%$ when stable or if hypercapnia is suspected), and cardiopulmonary exercise testing and cardiac stress testing (for prescribing exercise regimens, assessing safety of the patient for exercising, and monitoring outcomes).
- Severity of COPD should take into account lung function, effect of COPD symptoms on daily activities, level of breathlessness, and the presence of complications and / or comorbidities such as exacerbations, hypoxaemia, pulmonary hypertension, heart failure, or polycythaemia.
- The COPD Assessment Test (CAT) is useful for determining the impact of COPD symptoms on wellbeing and daily life.
- Symptom severity may not correlate with spirometry criteria for severity. History of previous exacerbations may be the strongest predictor of future exacerbations and possible decline in lung function. (Agusti 2010).
- While frequency of exacerbations may increase with severity, exacerbations can occur at any stage of COPD.

Recommendation





- Perform further investigations to identify patients with severe COPD based on lung function as well as a careful assessment of symptoms and signs of hypoxaemia, hypercapnia, pulmonary hypertension, heart failure or polycythaemia.  
- To guide ongoing management, assess COPD severity based on lung function and a careful assessment of symptoms and signs. Note: severity of symptoms may not correlate with spirometric criteria for severity. History of previous exacerbations may be the strongest predictor of future exacerbations.  

Table 1. Guide to the severity of COPD

	Typical FEV ₁	Typical symptoms	History of exacerbations	Comorbid conditions*
COPD SEVERITY	Mild ≈ 60 - 80% predicted	<ul style="list-style-type: none"> • few symptoms • breathless on moderate exertion • little or no effect on daily activities • cough and sputum production 	Frequency may increase with severity	Present across all severity groups
	Moderate ≈ 40 - 59% predicted	<ul style="list-style-type: none"> • breathless walking on level ground • increasing limitation of daily activities • recurrent chest infections • exacerbations requiring oral corticosteroids and / or antibiotics 		
	Severe < 40% predicted	<ul style="list-style-type: none"> • breathless on minimal exertion • daily activities severely curtailed • exacerbations of increasing frequency and severity 		

*The five most prevalent comorbidities are hyperglycaemia, atherosclerosis, hypertension, dyslipidaemia and osteoporosis (Vanfleteren 2013)



Practice Tips:

- Consider arranging for a practice nurse to assist the patient in completing the CAT in readiness for review with the managing GP. The CAT can be completed online or downloaded for free at catestonline.org.

Optimise function



Practice Tips:

- Physical activity:
 - physical activity includes normal daily activity as well as formal programs such as pulmonary rehabilitation and Lung Foundation Australia's [Lungs in Action](#) program (entry criteria apply).
 - based on exercise guidelines, patients should aim to walk for at least 150 minutes / week (30 minutes / day, 5 days / week). Instruct patients to walk until they feel too breathless to continue, at which point they should take a short rest then resume walking [III-2]. (Garber 2011)



Further Information

- For detail on smoking cessation, including pharmacotherapy see:
 - section [P: Prevent deterioration](#) of this guide.
 - [P1. Risk factor reduction](#) in the COPD-X guidelines.
 - [RACGP guidelines on smoking cessation](#).
- Details of pulmonary rehabilitation services throughout Australia are available through [Lung Foundation Australia](#) (1800 654 301).
- A [pulmonary rehabilitation fact sheet](#) for patients can be downloaded from the Lung Foundation Australia website.
- The [Pulmonary Rehabilitation Toolkit](#) is an online resource for health professionals to design and deliver an evidence-based pulmonary rehabilitation program.
- For detail on physical activity, see Lung Foundation Australia's [Better Living with COPD: A Patient Guide](#) and [Better Living with Exercise](#).

Optimising function: Where to start?

- Assessment is the first step to optimising function.
- A validated assessment tool is a convenient way to measure baseline functional status and to measure response to treatment.

✓ Recommendation

- Assess functional status and impact of COPD regularly either via traditional history taking / symptom checklists or using validated assessment tools such as the [COPD Assessment Test](#) (CAT) and the Modified Medical Research Council (mMRC) Dyspnoea scale. SR ME

What non-pharmacological strategies are recommended?

- All patients with COPD can benefit from non-pharmacological strategies, including smoking cessation strategies [I], pulmonary rehabilitation [I], which includes exercise training as an essential component [I] and regular physical activity [III-2]. (Fletcher 1977, Anthonisen 2002, Tashkin 1996, McCarthy 2015).
- Pulmonary rehabilitation has good evidence for multiple benefits (e.g. reduced dyspnoea and fatigue, decreased hospitalisation, improved exercise capacity, and quality of life) [I], with few adverse effects [I], and good cost-effectiveness [II]. (McCarthy 2015, Spruit 2013, Alison 2017)
- Other important non-pharmacological strategies, such as self-management and support groups, are covered in [D: Develop a plan of care](#).

✓ Recommendation

- Offer brief smoking cessation counselling and details for Quitline (13 QUIT or 13 78 48) as a minimum intervention at every visit to all smokers. SR HE
- Refer all symptomatic patients to pulmonary rehabilitation. SR HE
- Re-assess and consider re-referral to pulmonary rehabilitation for patients who have stopped being active. SR ME
- Encourage regular physical activity for all patients with COPD. SR ME

What is the recommended approach to prescribing pharmacological therapies?

- The two core aims of pharmacological treatment are to (i) treat symptoms and (ii) reduce risk of severe exacerbations or deterioration.
- Choice of pharmacotherapy should take into account potential benefits, side-effects, cost of treatment and patient preference.
- Medicines should be introduced using a stepwise approach - this usually means beginning with a single long-acting bronchodilator (see **Figure 1**, page 12).
- Treatment goals, against which response can be evaluated, need to be determined in consultation with the patient / carer. These may include reduction of troublesome symptoms such as breathlessness and / or reduction of exacerbations.
- In meeting these aims, good evidence exists that:
 - short-acting beta₂-agonists (salbutamol, terbutaline) or short-acting muscarinic antagonists (ipratropium) provide short-term relief of breathlessness [I]. (Appleton 2006, Ram 2003) Patients often benefit symptomatically from such inhaled bronchodilator therapy even if they do not demonstrate a short-term increase in FEV₁.
 - long-acting muscarinic antagonists (tiotropium, glycopyrronium, umeclidinium or aclidinium) or long-acting beta₂-agonists (indacaterol, salmeterol or formoterol) may improve lung function, symptoms, quality of life, and exacerbation frequency [I-II]. (Barr 2005, Vogelmeier 2011, Donohue 2013)
 - inhaled corticosteroids combined with long-acting beta₂-agonists (fluticasone propionate / salmeterol, budesonide / formoterol, fluticasone furoate / vilanterol) may reduce exacerbation frequency (Nannini 2013, Dransfield 2013) and improve quality of life [I]. (Dransfield 2013)
- A long-acting muscarinic antagonist and long-acting beta₂-agonist in combination is better than either monotherapy [II]. (Bateman 2013, Wedzicha 2013, Wedzicha 2016)
- Triple therapy (ICS / LABA / LAMA) results in a lower rate of moderate or severe COPD exacerbations, and better lung function and health-related quality of life than dual therapies. (Calzetta 2019, Zheng 2018) Triple therapy may be most useful for patients with repeated exacerbations.
- The decision to alter pharmacotherapy should consider:
 - exertional dyspnoea
 - functional status
 - history of exacerbations
 - complexity of medicines or devices
 - patient preference
 - occurrence of adverse effects.
- There is no fixed timeframe for assessment following alteration of pharmacotherapy. Approximately 6 weeks may be reasonable to assess symptoms such as dyspnoea although considerably longer may be required to assess quality of life and the frequency of exacerbations.
- There is evidence for an increased risk of pneumonia for patients treated with inhaled corticosteroids, however safety concerns should be balanced against the benefits of reduced exacerbations and reduced decline in quality of life [I]. (Zheng 2018)
- Non-pharmacological options for symptom management include handheld fans, and use of breathlessness recovery positions e.g. forward lean.



Practice Tips:

- High dose ICS may be associated with increased risk of pneumonia.
- Inhaled medicines acronyms:
 - ICS = inhaled corticosteroid
 - SABA = short-acting beta₂-agonist
 - SAMA = short-acting muscarinic antagonist
 - LABA = long-acting beta₂-agonist
 - LAMA = long-acting muscarinic antagonist (formerly known as anticholinergic).
- Tailor medicines based on the patient's:
 - symptoms
 - exacerbation history
 - response to treatment
 - risk of side effects



Practice Tips:

- There are many new inhalers now available. Ensure medicine classes are not duplicated when adding or changing medicines. Keep knowledge up to date by regularly referring to:
 - [Stepwise Management of Stable COPD](#) (see below)
 - [O. Optimise function](#) in the COPD-X guidelines



Further Information

- For detail on pharmacological treatment options for COPD, see the COPD-X guidelines sections:
 - 01. [Inhaled bronchodilators](#)
 - 02. [Oral bronchodilators](#)
 - 03. [Oral corticosteroids](#)
 - 04. [Inhaled combination therapy](#)

Recommendation (see Figure 1)







- For all symptomatic patients with COPD:
 - follow a stepwise approach to pharmacological treatment until adequate control of breathlessness, improved functional capacity, and control of exacerbation frequency is achieved. **SR ME**
 - use short-acting inhaled bronchodilator therapy for short-term relief of breathlessness. **SR HE**
- For patients receiving short-acting bronchodilators who have persistent troublesome dyspnoea, add a long-acting muscarinic antagonist or long-acting beta₂-agonist (or both in combination if monotherapy is not adequate) for regular use. **SR HE**
- LAMA / LABA fixed dose combinations in a single inhaler (glycopyrronium / indacaterol, umeclidinium / vilanterol, tiotropium / olodaterol, aclidinium / formoterol) are available for patients who remain symptomatic despite monotherapy with either alone.
- Triple therapy (ICS / LABA / LAMA) should be limited to patients with repeated exacerbations and more severe COPD symptoms that cannot be adequately managed by dual therapy. **SR HE**
- Avoid long-term (> 2 weeks) use of systemic corticosteroids. **SR LE**

Figure 1. Stepwise Management of Stable COPD table (See page 31 to view a full page version)

When should inhaler technique and adherence be reviewed?

- Adherence with COPD management strategies involves patients' knowledge of their non-pharmacological and pharmacological treatment strategies, motivation, skill and physical ability with inhaler technique, health literacy, cost of medicines, willingness to pay, use of multiple inhalers and treatment for comorbidities.

Recommendation

- For all patients, check:
 - adherence with non-pharmacological (e.g. smoking cessation, immunisation, exercise and oxygen therapy) and pharmacological treatment strategies regularly, preferably at each visit.  
 - inhaler technique at each visit, especially in older, frail and cognitively impaired patients.  
- Consider a home medicines review by a consultant pharmacist.  
- Videos of correct inhaler technique and factsheets for a range of devices can be found on the [Lung Foundation Australia website](#) and the [National Asthma Council website](#).
- Information about inhaler devices is available on the [NPS Medicinewise website](#).

How should treatment of comorbidities be optimised?

- Most patients with COPD have comorbidities. The five most prevalent comorbidities are hyperglycaemia, atherosclerosis, hypertension, dyslipidaemia and osteoporosis. (Vanfleteren 2013)
- Some of these comorbid conditions may also influence the outcome of COPD.
- COPD may increase the overall morbidity and mortality in excess of that related to the primary diagnosis.



Practice Tips:

- Before stepping up treatment, check medicine adherence and inhaler technique. A nurse or a pharmacist can assist.
- Minimise inhaler device polypharmacy.



Practice Tips:

- Be alert to common comorbidities, including cardiovascular disease, anxiety/depression, osteoporosis, lung cancer and obstructive sleep apnoea that may also impact on COPD and manage appropriately.



Further Information

- Comorbidities and their management, see [07. Comorbidities](#) in the COPD-X guidelines
- Cardiovascular disease, see [Stroke Foundation](#)
- Lung cancer, see [Cancer Council Australia](#)
- Osteoporosis, see [RACGP Osteoporosis guidelines](#)
- Other GP guidelines, see [RACGP Guidelines](#)



Practice Tips:

- In rural areas or other situations where specialist respiratory services are not available, referral to a general physician may be appropriate.
- Patients with a suspected sleep disorder (history of symptoms of snoring, witnessed apnoeas or excessive daytime sleepiness) should be referred to a specialist.

When should referral to specialist respiratory services be made?

✔ Recommendation



- Refer patients to specialist respiratory services if there is diagnostic uncertainty or for particular indications such as assessment for oxygen therapy (see **Table 2** below).  

Table 2. Reasons to refer to specialist respiratory services

Reason prompting referral	Purpose of referral
Diagnostic uncertainty and exclusion of asthma.	Establish diagnosis and optimise treatment Obtain more detailed lung function testing.
Unusual symptoms such as haemoptysis.	Investigate cause urgently including exclusion of malignancy.
Rapid decline in functional performance.	Optimise management and exclude other conditions.
Persistent symptoms.	Optimise management and exclude other conditions.
Frequent chest infections (i.e. more than annually).	Assess preventable factors and rule out co-existing bronchiectasis, optimise treatment.
Onset of ankle oedema.	Assess for cor pulmonale and optimise treatment.
Oxygen saturation, SpO ₂ < 92% when stable (refer for assessment for long-term oxygen therapy: see page 18 for further details).	Optimise management, measure arterial blood gases and prescribe oxygen therapy if needed.
Assessing suitability for pulmonary rehabilitation, if uncertain.	Optimise treatment and refer to specialist or community-based rehabilitation service.
Bullous lung disease on CXR or CT.	Confirm diagnosis and refer to medical or surgical units for bullectomy if needed.
COPD < 40 years of age.	Establish diagnosis and exclude alpha-antitrypsin deficiency.
Persistent dyspnoea, marked hyperinflation, severe airflow limitation or emphysema (refer for assessment for lung transplantation, or bronchoscopic or surgical lung volume reduction procedures).	Identify criteria for referral to lung transplant, thoracic surgery or interventional bronchoscopy centres.
Dyspnoea associated with chest tightness, anxiety or dizziness (refer for consideration of dysfunctional breathing*).	Establish diagnosis and refer for further investigation to exclude other causes of these symptoms.
Daytime sleepiness, complaints by partner of heavy snoring.	Assess for sleep disordered breathing and refer for sleep studies if needed





* imprecise term covering breathlessness, hyperventilation, chest tightness, paraesthesiae, anxiety, or dizziness.

Prevent deterioration

Why give smoking cessation advice?

- Smoking cessation is the most important intervention to prevent worsening of COPD. (RACGP 2019)
- Smoking cessation reduces the rate of decline in lung function [I]. (Fletcher 1977, Anthonisen 2002, Tashkin 1996)
- Smoking cessation advice from health professionals can increase quit rates [II]. The major effect is to help motivate a quit attempt. (Zwar 2014)
- Personalising smoking cessation advice based on lung age and the lung age calculator may increase cessation rates [III]. (Parkes 2008)
- Anxiety and depression are associated with high rates of smoking and reduce the likelihood of success of smoking cessation [III-2]. (Jimenez-Ruiz 2015)
- Counselling combined with nicotine replacement therapy, bupropion, or varenicline is more effective than counselling alone [I-II]. (Tashkin 2011)
- In more nicotine dependent smokers, the combination of a nicotine patch with a rapid delivery form of nicotine replacement (e.g. gum) is more effective than one form alone [I]. (Stead 2012)
- Based on a small number of trials, varenicline is more effective than nicotine replacement monotherapy but equally effective as a nicotine replacement combination therapy. (Cahill 2016)

Recommendation

- For all smokers, offer brief counselling and details for Quitline (13 QUIT or 13 7848) as a minimum intervention at every visit [I]. (Fiore 2008, Lancaster 2017)  
- For smokers who continue to smoke, offer both counselling and nicotine dependence treatment, provided there are no contraindications [I]. (van Eerd 2016)  



Practice Tips:

- Ensure the smoking status of each patient is recorded and up-to-date.
- Flag current smokers for brief smoking cessation advice or referral to local programs.
- Refer to best practice for brief smoking cessation counselling which is summarised in the 5-A strategy:
 - Ask and identify smokers at every visit.
 - Assess nicotine dependence and motivation to quit.
 - Advise about the risks of smoking and benefits of quitting.
 - Assist cessation by offering behavioural counselling and pharmacotherapy.
 - Arrange follow-up within a week of the quit date and one month after.
- A combination of pharmacological interventions and non-pharmacological strategies such as counselling and exercise improve effect.

Further Information

- Smoking Cessation Guidelines for Australian General Practice are available from [RACGP](#).
- A Lung Age Estimator that may help motivate smokers to quit is available as part of Lung Foundation Australia's [Primary Care Respiratory Toolkit](#).



Further Information







- For the definition of an exacerbation and specific advice on managing exacerbations, refer to section [X: Manage eXacerbations](#) of this guide. Further information regarding the effects of exacerbations on prognosis can be found in [X: Manage eXacerbations](#) of the COPD-X guidelines.

How can exacerbation risk be reduced?

- A recent history of an exacerbation (within the last 12 months) is the greatest risk factor for a further exacerbation. (Hurst 2010)
- Frequent exacerbations lead to faster decline in FEV₁, impaired health status, and increased mortality [III-2]. (Anzueto 2010)
- Prompt intervention for exacerbations improves recovery / quality of life and reduces hospitalisation [III-2]. (Wilkinson 2004)



Recommendation

- Optimise pharmacotherapy and refer to pulmonary rehabilitation to reduce the risk of exacerbations.  
- Identify and treat patients with exacerbation symptoms early using increased doses of bronchodilators, antibiotics if infection is evident, and oral corticosteroids for moderate to severe exacerbations.  
- Implement written action plans to treat exacerbations early.  

Why immunise against influenza and pneumococcal infection?

- Vaccination reduces the risks associated with influenza and pneumococcal infection.
- Influenza vaccination reduces the risk of exacerbations but not hospitalisation for COPD [1]. (Kopsaftis 2018)
- Pneumococcal vaccination reduces the risk of exacerbations but not hospitalisation, with no difference between vaccine types. (Walters 2017)

Recommendation







- Ensure all patients with COPD receive influenza vaccine immunisation.  
 - annual immunisation is strongly recommended and should be actively promoted in patients with COPD.
- Pneumococcal vaccine (23vPPV) (see **Table 3**) [III] (Walters 2017):
 - for those with newly diagnosed COPD who have never received pneumococcal immunisation: a first dose of 23vPPV is recommended at diagnosis followed by up to two additional doses. For older adults who have already received an age-based first dose of 23vPPV at age 65 years (non-Indigenous) or 50 years (Indigenous), a single revaccination dose of 23vPPV is recommended a minimum of 5 years after the previous dose.  
 - for those with pre-existing COPD: the first revaccination dose of 23vPPV is recommended at a minimum of 5 years after the most recent dose of 23vPPV, followed by a third dose at 65 years of age or five years after the previous dose, whichever is the later.  

Table 3. Pneumococcal vaccinations

		Initial 23vPPV dose (First dose)	First revaccination (Second dose)	Second revaccination (Third dose)
Not at increased risk of IPD*, non-smoker	Non- Indigenous	At 65yrs	No	
	Indigenous	At 50yrs	Yes, 5 years after first dose	
Smokers, newly diagnosed COPD, existing COPD, who have never received age-based dose	Non-Indigenous < 65yrs	At diagnosis	Yes, 5 years after first dose	Yes, at 65yrs or 5 years after second dose (whichever is later)
	Indigenous < 50yrs	At diagnosis	Yes, 5 years after first dose	Yes, at 50yrs or 5 years after second dose (whichever is later)
Smokers, newly diagnosed COPD, existing COPD, who have already received age-based dose	Non-Indigenous ≥ 65yrs		Yes, 5 years after first dose	No
	Indigenous ≥ 50yrs		Yes, 5 years after first dose	No

*invasive pneumococcal disease



Practice Tips:

- Practice nurses may assist by using recalls and reminders to ensure patient immunisations are up to date.



Further Information

- Refer to the [Australian Immunisation Handbook](#).



Further Information

- Intermittent and nocturnal oxygen therapy, see [P10. Oxygen therapy](#) in the COPD-X guidelines.
- Pulse oximetry, see [Clinical Use of Pulse Oximetry Pocket Reference](#).

Should mucolytics be used?



- Mucolytics including N-acetylcysteine, erdosteine, carbocysteine or ambroxol have been shown to reduce exacerbations in moderate to severe COPD [1]. (Cazzola 2018, Poole 2019) However, none are currently available in Australia.

Who benefits from long-term oxygen therapy?

- Long-term oxygen therapy has survival benefits for COPD patients with hypoxaemia.
- Hypoxaemia is defined by $\text{PaO}_2 \leq 55$ mmHg or by $\text{PaO}_2 \leq 59$ mmHg plus evidence of polycythaemia, pulmonary hypertension or right heart failure [I, III-3]. (Gorecka 1997, Siafakas 1995, Tarpay 1995, Weitzenblum 1985, Zielinski 1998)



Recommendation

- For stable patients with possible persisting hypoxaemia (suggested by $\text{SpO}_2 < 92\%$ measured using a pulse oximeter), refer to specialist respiratory services to assess the need for oxygen therapy. (McDonald 2016)  

Develop a plan of care





What is good chronic disease care and what are the benefits?

- Good chronic disease care anticipates the wide range of needs in patients with COPD.
- COPD imposes burdens for both patients and carers.
- For patients, disability increases with COPD severity and is worsened by numerous complications and comorbid conditions.
- COPD multidisciplinary care incorporating elements such as exercise, self-management education and use of a COPD action plan for exacerbation management can improve exercise capacity and health-related quality of life, and reduce hospitalisation [1]. (Jolly 2016, Jonkman 2016, Zwerink 2014)
- Implement systems to enable structured care, regular recall and clinical review of patients with COPD.
- Good chronic disease care involves considering if the person is near the end of life, and planning accordingly. Goals of care should include end of life considerations.

How can health professionals improve quality of life and reduce disability?

- Clinical support teams working with the primary healthcare team can help enhance quality of life and reduce disability for patients with COPD.
- A clinical support team including healthcare professionals from a range of disciplines should be involved in comprehensive management of patients with COPD and their comorbid conditions.
- The available members of the clinical support team depend on the context of practice (e.g. rural versus urban).
- A GP Management Plan (GPMP) and Team Care Arrangement (TCA) based on the agreed management goals of the patient and that includes a written COPD action plan is a practical method of enlisting this clinical support team.
- Patients, carers, and other family or friends should be engaged in the activities of the clinical support team.

Recommendation

- Consider developing a GP Management Plan (GPMP, Item 721) and a Team Care Arrangement (TCA, Item 723) in addition to organising a home medicines review with a consultant pharmacist (HMR, Item 900).  
- Encourage all patients to involve carers and family members in their management (e.g. by attending consultations).  



Practice Tips:

- Family members also experience significant psychological and physical consequences from the large 'burden of care' for patients with COPD. Anxiety and depression have been shown to reduce quality of life in these carers.
- Within clinical software programs, customise the basic GPMP / TCA to incorporate the relevant goals and tasks for the patient with COPD.
- Develop a written action plan to recognise and self-manage exacerbations where appropriate.
- Using the completed GPMP for COPD, develop a written and patient-centric COPD action plan to support your patient in monitoring their baseline symptoms and self-managing exacerbations where appropriate.



Further Information

- For details of a clinical support team, see [D1. Support team](#) in the COPD-X guidelines
- Sample forms for GPMP (Item 721) and TCA (Item 723) are available from the [Department of Health](#)



Practice Tips:

- Ensure regular medical review of patients who undertake self-management activities.
- Patients who self-manage well have improved quality of life and reduced hospitalisations.







Further Information

- Lung Foundation Australia provides a [COPD action plan kit](#) in editable pdf format.

What is self-management support and how can patients benefit?

- ‘Self-management support’ is described as the healthcare and social-care services provided to individuals to enable them to take better care of themselves.
- Patient self-management programs include a range of initiatives (education programs and comprehensive multicomponent interventions) involving patients and health professionals and are delivered via different modalities (e.g. face-to-face consultation, internet, TV, telephone) aimed at enabling patients to enhance the management of their health.
- In COPD, patient self-management programs incorporating multicomponent interventions such as self-management education, exercise training and psychosocial support can improve health outcomes and reduce healthcare costs [II, III-2]. (Lorig 1999, Zwerink 2014)
- COPD action plans can aid recognition of and response to exacerbations [I] (Howcroft 2016) and should be included as part of a comprehensive self-management program. (Lenferink 2017) When action plans are incorporated into self-management programs, exacerbations are reduced.
- Whilst self-management is effective, the types of patients for whom it is beneficial, and the essential components of the intervention remain unclear.
- When selecting patients for self-management support, consideration should be given to the patient’s self-management ability. Only patients who adhere to self-management plans receive benefits such as decreased exacerbation recovery time [III-2].

Recommendation

- Provide self-management support to assist patients to set and achieve realistic goals.  
- Within the context of a self-management program, develop a written action plan in partnership with patients and significant others which indicates medicines, doses and actions to take for maintenance therapy and for exacerbations.  

What other services can benefit patients?

- Support groups provide education and psychological support and are one aspect of patient self-management support.
 - Lung Foundation Australia provides access to an Australia-wide network of affiliated patient support groups, including in rural and remote areas.
- Lungs in Action is the community-based exercise maintenance program for patients with stable chronic lung disease and stable chronic heart failure post-rehabilitation. Click [here](#) for a list of Lungs in Action locations.

When and how should palliative care be considered?

- For patients and / or their caregivers with unmet needs, a palliative or supportive approach should be offered at any stage in the illness concurrently with optimal, disease-directed care.
- For patients, unmet needs may include poorly controlled physical symptoms (such as breathlessness), psychosocial or spiritual issues, and information needs.
- The palliative approach should be provided by the usual treating team, together with specialist palliative care services if required.
- Advance care planning supports individuals to discuss their beliefs, values, future treatment wishes and goals of care early in their illness. This includes discussing treatment limitations regarding resuscitation and ventilation.



Further Information

- For information on community support services, see Lung Foundation Australia's [Better Living with COPD: A Patient Guide](#).



Practice Tips:

- Include end of life considerations in goals of care



Further Information

- For further information on palliative care, see [O10. Palliative and Supportive care](#) in the COPD-X guidelines.
- Advance care planning and power of attorney information by state: [Palliative Care Australia](#) or [Advance Care Planning Australia](#).

Manage eXacerbations

How is a COPD exacerbation defined?

- A COPD exacerbation is characterised by a change in the patient's baseline dyspnoea, cough and / or sputum that is beyond normal day-to-day variations, is acute in onset and may warrant a change in regular medicine or hospital admission.
- The greatest predictor of an exacerbation is a history of exacerbations as these events cluster in time and become more frequent as the severity of COPD worsens [I, III-3]. (Hurst 2010, Hoogendoorn 2010)
- Exacerbations become more frequent in those with a history of prior exacerbations, more severe disease (based on FEV₁) and other predictors (including history of heartburn, poorer quality of life and elevated white cell count) [I]. (Hurst 2010, Hoogendoorn 2010)
- Triggers for exacerbations include viral or bacterial respiratory infection, left ventricular failure, psychosocial stressors and air pollution [III-2]. (Seemungal 2001)
- Pulmonary embolism should be considered in patients who require hospitalisation for an acute exacerbation [I]. (Aleva 2017)

✔ Recommendation

- Recognise the possibility of an exacerbation in all patients who experience an increase in symptoms, especially patients at increased likelihood of these events (prior exacerbation, more severe disease). **SR ME**

What are the benefits of early diagnosis and treatment of exacerbations?

- Early diagnosis and treatment of exacerbations may prevent hospital admission and delay COPD progression [III-2]. (Wilkinson 2004)
- Hospital admissions are indicators of failed prevention and are highly expensive to health care systems. Hospitalisations are increasingly being included as an outcome measure in randomised controlled trials of a range of interventions. **Figure 2** below summarises the interventions that have been demonstrated, in such randomised controlled trials to significantly reduce hospitalisations.
- A delay (≥ 24 hours) in presentation for and initiation of treatment of an exacerbation doubles the chance of hospital admission [III-2]. (Chandra 2009)
- In contrast, early diagnosis and prompt management of exacerbations improve recovery / quality of life, reduce hospitalisation, and may prevent progressive functional deterioration [II, III-2]. (Lorig 1999, Shepperd 1998)
- Preventing COPD exacerbations is important as mortality increases with the frequency of exacerbations, especially if these require hospitalisation. (Guerro 2016)
- Education of the patient, carers and significant others may aid in the early recognition of exacerbations and avoid the need for hospitalisation.
- A COPD action plan can aid the recognition of, and response to, an exacerbation. When prescribed and delivered within a single short educational program, with ongoing support directed at their use, COPD action plans reduce in-hospital health care use and increase the initiation of corticosteroids and antibiotic treatment for COPD exacerbations [I]. (Howcroft 2016)

Recommendation



- Diagnose and manage exacerbations promptly. 
- Educate patients and carers on how to recognise and respond to exacerbations by combining action plans with self-management education and integrated care based on shared care arrangements. 

Figure 2. Reducing hospital utilisation: current level I and II evidence from COPD-X

(See page 33 to view a full page version)

Intervention	Demonstrated Impact	Effect estimate	Where to find it
LEVEL I			
LAMAs	"...LAMAs had reduced exacerbation rates ... and exacerbation-related hospitalisations, compared to LABAs" "All most participants in this analysis had tiotropium as their LAMA"	22% Improvement (OR 0.78, 95% CI 0.69 to 0.87)	01.21 Hsu 2007
Tiotropium	"... tiotropium reduced the odds of a COPD exacerbation ... and related hospitalisations compared to placebo or glycopyrronium"	36% Improvement (OR 0.64, 95% CI 0.51 to 0.82) (NNT 10)	05.1 Dav 2005
	"... Tiotropium was more effective in preventing COPD exacerbations leading to hospitalisation (compared to a range of other LABAs)"	66% Improvement (OR 0.34, 95% CI 0.19 to 0.63)	05.2 Cheng 2012
Acetaminophen	"... Acetaminophen resulted in marginal improvements in quality of life and FEV ₁ , and reduced the number of patients with exacerbations requiring hospitalisation"	16% Improvement (OR 0.84, 95% CI 0.79 to 0.89)	01.21 Hsu 2007
Systemic corticosteroids	"... systemic corticosteroids reduce treatment failure (defined as additional treatment, hospital admission or admission for further episode, return to emergency department, unscheduled physician visit for the index episode), improve lung function, shorten recovery and reduce the severity of exacerbations of COPD, reduced the risk of treatment failure by over half compared with placebo ... median treatment duration 7h days"	43% Improvement (OR 0.57, 95% CI 0.35 to 0.87) (NNT 6)	02.2.2 Walker 2016a
Non-invasive ventilation	"The use of NIV reduces hospital length of stay"	40-3.3% days (95% CI -0.93 to -0.85)	02.2 Choudhry 2017
Hospital at home	"... compared to standard care, participants allocated to hospital in the home were significantly less likely to be readmitted to hospital within the next 110 days"	24% Improvement (RR 0.76, 95% CI 0.59 to 0.97)	01 Japane 2017
Multi-faceted care plans	"... integrated disease management programs (defined as a group of coherent interventions designed to prevent or manage one or more chronic conditions using a systemic, multidisciplinary approach and potentially employing multiple treatment modalities ... found positive effects on disease-specific QoL ... exercise tolerance, hospital admissions and hospital days per person..."	32% Improvement (OR 0.68, 95% CI 0.47 to 0.99) (NNT 10)	01 Kruis 2013
Pulmonary rehabilitation	"Pulmonary rehabilitation also reduced hospital readmissions"	56% Improvement (OR 0.44, 95% CI 0.23 to 0.81)	03.6 Albon 2017 04.6n 2016



Practice Tips:

- An action plan provides documentation and reminders of what medicines are taken for stable disease and then what the patient should do for escalating symptoms (see section [D: Develop a plan of care](#) of this guide).
- As early initiation of treatment is crucially important, provide antibiotics and oral corticosteroids to selected patients with written action plans who have received self-management education. They can then commence additional treatment promptly, while at the same time arranging for early medical review.
- Refer to Lung Foundation Australia's [COPD action plan](#) available in editable PDF format.



Practice Tips:

- Some patients with an exacerbation of COPD who are being managed outside the hospital may benefit from a multidisciplinary team approach including the use of community-based respiratory nurses.
- When selecting patients for home management, look for the following:
 - presence of ability to cope, good level of activity / general condition, social support, normal level of consciousness.
 - absence of cyanosis, rapid onset, worsening peripheral oedema, significant comorbidity, evidence of respiratory failure (e.g. pH \leq 7.35, SpO₂ < 90%).

When should a patient with COPD be hospitalised?

- Marked increase in intensity of symptoms.
- Exacerbation characterised by increased dyspnoea, cough or sputum production, plus one or more of the following:
 - 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 non-pulmonary)
 - altered mental status suggestive of hypercapnia
 - worsening hypoxaemia or cor pulmonale
 - newly occurring arrhythmia
 - worsening or new hypoxaemia measured with pulse oximetry.

Can patients with an exacerbation be treated at home?

- Some evidence suggests that multidisciplinary teams (where available) assisting GPs can safely and successfully treat carefully selected patients with COPD presenting with exacerbations of COPD, at home with support from respiratory nurses [11]. (Jeppesen 2012)
- Assessment for suitability of home management should be made in consultation with the patient, general practice services, and hospital staff, if necessary.
- Contact your relevant [Primary Health Network](#) or your local hospital to determine what resources are available in your area to support management of patients at home.

Are inhaled bronchodilators effective for treatment of exacerbations?

- Inhaled bronchodilators are effective for initial treatment of acute exacerbations.
- Adequate doses of bronchodilator delivered by metered dose inhalers (MDI) with a spacer are as effective as nebulisers [1]. (Cates 2006)

✓ Recommendation

- In patients with exacerbations, prescribe increased doses of inhaled bronchodilator, such as:
 - salbutamol (400 - 800 mcg), 4 - 8 puffs via MDI and spacer every 3 - 4 hours, titrated to response. **SR** **ME**
- Check that the patient can use the delivery device properly considering factors such as cognition, manual dexterity, and press and breathe coordination between actuation and inhalation. **SR** **LE**

Are oral corticosteroids effective for treating exacerbations?

- Oral corticosteroids reduce the severity of, and shorten recovery from exacerbations [1]. (Walters 2014)
- Compared with intravenous corticosteroids, oral corticosteroids are more convenient, appear to be as rapid acting and are possibly more effective.

✓ Recommendation

- In patients with exacerbations, prescribe oral corticosteroids (prednisolone 30 - 50 mg or equivalent, taken in the morning with or immediately after food) for 5 days and then stop; tapering the dose after a short course is generally not required. (Walters 2014) **SR** **HE**



Practice Tips:

- For salbutamol, 4 - 8 puffs via MDI + spacer is equivalent to 2.5 mg by nebuliser.
- Advise patients to clean spacers according to [National Asthma Council](#) guidance
- If short-acting inhaled bronchodilators are required more than 3-hourly, patients should be advised to seek medical attention.



Practice Tips:

- Long-term oral corticosteroids should be avoided.



Practice Tips:

- A chest x-ray is not usually required in community-based management of exacerbations for most patients.
- Intravenous antibiotics are generally not required.
- Sputum culture is not recommended routinely unless there is lack of response or repeated bacterial infections within several months.



Practice Tips:

- Patients with severe hypoxaemia will likely achieve a mortality benefit from home oxygen (ideally at least 18 hours per day). Oxygen is not indicated as a treatment for breathlessness in the absence of hypoxaemia.

When are antibiotics beneficial in treating a patient with an exacerbation?

- Exacerbations with clinical features of infection (increased volume and change in colour of sputum and / or fever) benefit from antibiotic therapy [II, III-2]. (Seemungal 2001, Patel 2002)
- The benefit of antibiotic therapy is mainly seen in patients requiring hospitalisation and antibiotic therapy is not always needed for patients managed in the community. (Vollenweider 2018)

✓ Recommendation

- In patients with exacerbations and clinical features of infection, prescribe oral amoxicillin (500 mg every 8 hours or 1 g every 12 hours), or doxycycline (100 mg daily for 5 days). If the response to initial antibiotic therapy is inadequate, optimise bronchodilators and oral corticosteroid therapy and reassess the diagnosis. If the patient is not improving and the sputum culture grows a resistant organism, a change in antibiotics should be considered. **SR HE**
- In patients with pneumonia, manage according to pneumonia-specific guidelines in the [Therapeutic Guidelines, Antibiotic](#). **SR ME**

Is oxygen beneficial in treating a patient with an exacerbation?

- Controlled oxygen delivery targeting the SpO₂ goal 88 - 92% is indicated for hypoxaemia in patients with exacerbations [II]. (Beasley 2015)

✓ Recommendation

- In patients with COPD and hypoxaemia, administer oxygen via nasal cannula aiming for a SpO₂ of 88 - 92%. **SR ME**
- Avoid over-oxygenation / high concentrations of oxygen in patients with COPD as this may lead to acute respiratory failure and death. (Austin 2010) **SR ME**

When is non-invasive ventilation (NIV) effective?

- Non-invasive ventilation (NIV) is effective for patients with acute respiratory acidosis indicated by elevated PaCO₂ levels and pH < 7.35 [1]. (Osadnik 2017)
- NIV can reduce mortality, length of stay in hospital and the need for endotracheal intubation [1]. (Osadnik 2017)

Recommendation

- In patients with an acute exacerbation, the following are indications for non-invasive ventilation:
 - hypercapnia (PaCO₂ > 45mmHg) and respiratory acidosis (blood pH < 7.35).

SR HE

Following an exacerbation, how soon can pulmonary rehabilitation be commenced?

- Pulmonary rehabilitation that includes supervised exercise training commenced immediately following an exacerbation improves exercise tolerance and quality of life, reduces COPD-related hospital admissions and mortality in the short-term and has been shown to be safe [1]. (Alison 2017, Ryrso 2018)

Recommendation

- In patients who have had an exacerbation, refer to pulmonary rehabilitation as soon as acute instability has resolved. SR ME



Practice Tips:

- Clinical features that suggest respiratory failure include confusion, drowsiness, restlessness, and cyanosis.



Further Information

- For detail on pulmonary rehabilitation, see section [O. Optimise function](#) of this guide and [O6.1 Pulmonary rehabilitation](#) in the COPD-X guidelines.



Practice Tips:

- Post-discharge review items:
 - level of physical activity
 - referral for pulmonary rehabilitation
 - measure spirometry (if not recently performed)
 - medicine adherence and ability to use inhalation devices
 - optimise inhaled medicine as per [Stepwise Management of Stable COPD](#)
 - influenza and pneumococcal vaccination status
 - smoking cessation
 - any persistent chest x-ray abnormality should be reviewed 4 - 6 weeks post-discharge
 - assess future risk and prompt management of exacerbations
 - review COPD action plan
 - need for long-term oxygen therapy (see section [P: Prevent deterioration](#) of this guide and [P10. Oxygen therapy](#) of the COPD-X guidelines) should be reviewed 4 - 6 weeks post discharge.

What is the best approach to post-hospital care after an exacerbation?

- Patients with COPD discharged from hospital following an exacerbation should receive comprehensive follow-up led by the primary healthcare team.
- Individualised discharge plans / clinical handovers may reduce hospital length of stay and readmission rates [11]. (Shepperd 2013)
- Integrated care approaches involving a discharge plan / clinical summary shared with the primary care team, case management, and self-management education reduce re-admissions for COPD exacerbations compared with usual care [11]. (Casas 2006)

Recommendation

- Hospital discharge plans / clinical summaries should be shared with the primary care team in a timely manner (preferably within 24 hours of discharge). **SR LE**
 - Patients with COPD discharged from hospital should be reviewed by a member of the primary healthcare team within 7 days of discharge. **SR LE**
 - Patients discharged with chronic cough and ongoing sputum production should be monitored closely and taught airway clearance techniques by a respiratory physiotherapist if they have difficulties clearing secretions. **SR LE**
- Lung Foundation Australia has developed the [Managing a COPD Exacerbation Checklist](#) which provides guidance on managing a patient in hospital; prior to leaving hospital; and on an ongoing basis 1-4 weeks post-discharge.

Figure 3. Managing a COPD Exacerbation Checklist

(See page 35 to view a full page version)

MANAGING A COPD EXACERBATION CHECKLIST

IN HOSPITAL

- Inhaled bronchodilators** Use short-acting bronchodilators as appropriate to improve symptoms.
- Oral corticosteroids** Consider use of oral corticosteroids (5 days, oral course, short course, no tapering) to reduce medication length of stay. Prescribe if clinical features of infection are present. Oral antibiotics are preferred over IV antibiotics.
- Oxygen therapy** Aim for oxygen saturation of 88-92% in hypoxaemic patients.
- Non-invasive ventilation (NIV)** Consider for to reduce length of stay and mortality due to hypercapnic respiratory failure.
- Physiotherapy** Encourage physical activity and introduce the most appropriate airway clearance techniques for patients who have difficulty clearing sputum.
- Smoking status** Review current status and implement smoking cessation strategies including referral to Quitline (13 78 43).

PRIOR TO LEAVING HOSPITAL

- Smoking cessation support** Ensure smoking cessation strategies are in place.
- Spirometry** Perform and/or arrange spirometry.
- Inhaler technique** Check technique and ensure patient is able to use each inhaler correctly.
- COPD Action Plan** Provide or update where one already exists.
- Pulmonary rehabilitation** Refer to pulmonary rehabilitation, discuss benefits and encourage attendance.
- General Practitioner** Arrange follow-up appointment with nominated GP. Progress and provide summary of inpatient treatment to nominated GP.
- Medication** Reassess adherence and stop up therapy as appropriate e.g. consider need for inhaled corticosteroids and adding second long-acting bronchodilator.
- Support services** Establish support required in terms of place of residence.
- COPD Information Pack** Provide patient with Lung Foundation Australia COPD Information Pack.

ONGOING CARE 1-4 WEEKS POST DISCHARGE

- Smoking status** Review status and implement smoking cessation strategies.
- Medication** Reassess adherence and review inhaler technique.
- COPD Action Plan** Review and discuss as appropriate.
- Vaccinations** Ensure influenza and pneumococcal vaccinations are up to date.
- Pulmonary rehabilitation** Ask about attendance and re-referral if necessary.
- Oxygen therapy** Review need for long-term oxygen therapy (LTO) in patients discharged from hospital on oxygen.
- Referral** Consider need for referral for additional services including peer support.

MANAGE COMORBIDITIES
Especially Cardiovascular disease, anxiety, depression, lung cancer and osteoporosis.

Refer patients to Lung Foundation Australia for information and support. **FREECALL 1800 654 301**

Lung Foundation Australia has a range of resources to provide understanding of conditions, contact details of local primary rehabilitation programs and support groups are also available.

It is recommended that you consult the suite of COPD Guidelines for further information. For further information see the [COPD-X Plan](#), Australia and New Zealand Centre for the Management of COPD, COPD Centre of Excellence, Management of Stable COPD. Visit [www.lungfoundation.org.au](#) for further details.

Lung Foundation Australia
1800 654 301 | [Lungfoundation.com.au](#)

Refer to [STEPWISE MANAGEMENT OF STABLE COPD](#) resource available at [www.lungfoundation.com.au/stepwise](#).

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Lung Foundation Australia - COPD-X Guidelines Committee Conflicts of Interest

Visit copdx.org.au/copd-x-plan/copd-guidelines-committee-past-and-present/conflicts-of-interest/ for Conflicts of Interest

Glossary

- **Action plan:** a written document to remind patients of their management in the stable phase, how to recognise that their condition has changed and what action to take if this occurs.
- **Chronic disease care:** a term to describe the activities and education carried out by healthcare professionals to help patients with chronic diseases including COPD better understand and live with their condition.
- **Clinical support team:** multidisciplinary team that can provide comprehensive management of COPD and comorbid conditions.
- **COPD Assessment Test (CAT):** questionnaire designed to measure the impact of COPD on a person's life, and how this changes over time.
- **Dyspnoea (also known as breathlessness or shortness of breath):** a subjective experience of breathing discomfort.
- **FEV₁:** forced expiratory volume in one second. The volume of air that can forcibly be blown out in one second, after full inspiration. Predicted values are based on gender, height, age and ethnicity.
- **FEV₁ / FVC:** ratio of FEV₁ to FVC, can be expressed as a decimal fraction (e.g. 0.7) or a percentage. Ratio is decreased in obstructive diseases such as asthma and COPD due to increased airway resistance during expiration.
- **FVC:** forced vital capacity. The volume of air that can forcibly be blown out after full inspiration.
- **GP Management Plan:** a written plan of management for one or more chronic diseases developed by the patient's usual GP in consultation with the patient (and / or their carer) that describes the patient's health problems and needs, treatment goals, and additional healthcare services required for optimal management.
- **Modified Medical Research Council Dyspnoea Scale:** the modified Medical Research Council breathlessness scale enables patients to choose a phrase that best describes their breathlessness. All the questions relate to everyday activities and are generally easily understood by patients.
- **Non-invasive ventilation (NIV):** a form of mechanical ventilation via a face or nasal mask that can safely and effectively treat ventilatory failure while allowing preservation of cough, physiological air warming and humidification, and normal swallowing, feeding and speech.
- **PaO₂:** partial pressure of oxygen in arterial blood. A low PaO₂ indicates hypoxaemia.
- **Pulmonary rehabilitation:** a multidisciplinary and comprehensive intervention for patients with chronic respiratory disease designed to improve symptoms and functional status.
- **SaO₂:** saturation level of oxygen in arterial haemoglobin measured by arterial sampling and used as an indication of hypoxaemia.
- **SpO₂ (pulse oximeter oxygen saturation):** an indirect or non-invasive measure of arterial oxyhaemoglobin saturation. SpO₂ may be an unreliable measure of SaO₂ if there is poor circulation, or nail polish is used.
- **Self-management:** describes the various activities that patients carry out themselves to manage their condition.
- **Self-management support:** the systematic provision of education and supportive interventions by healthcare staff to increase patients' skills and confidence in managing their health problems.
- **Team Care Arrangement:** provides care from a multidisciplinary team of a GP and at least two other healthcare providers for patients with at least one chronic or terminal medical condition. Medicare rebates are available to the patient for up to a total of 5 services per calendar year provided by the allied health team members if the team care arrangement is organised as part of a GP management plan.

Modified Medical Research Council Dyspnoea Scale

Grade	
0	"I only get breathless with strenuous exercise"
1	"I get short of breath when hurrying on the level or walking up a slight hill"
2	"I walk slower than people of the same age on the level because of breathlessness or have to stop for breath when walking at my own pace on the level"
3	"I stop for breath after walking about 100 yards or after a few minutes on the level"
4	"I am too breathless to leave the house" or "I am breathless when dressing"

NB: This is the modified MRC scale that uses the same descriptors as the original MRC scale in which the descriptors are numbered 1-5.

STEPWISE MANAGEMENT OF STABLE COPD

		Increasing COPD severity		
		MILD	MODERATE	SEVERE
Typical symptoms	<ul style="list-style-type: none"> few symptoms breathless on moderate exertion little or no effect on daily activities cough and sputum production 	<ul style="list-style-type: none"> breathless walking on level ground increasing limitation of daily activities recurrent chest infections exacerbations requiring oral corticosteroids and/or antibiotics 	<ul style="list-style-type: none"> breathless on minimal exertion daily activities severely curtailed exacerbations of increasing frequency and severity 	
Typical lung function	FEV₁ ≈ 60-80% predicted	FEV₁ ≈ 40-59% predicted	FEV₁ < 40% predicted	
CONFIRM diagnosis. Confirm post-bronchodilator airflow limitation (FEV ₁ /FVC < 0.70) using spirometry . Any pattern of cough with or without chronic sputum production may indicate COPD.				
OPTIMISE function. PREVENT deterioration. DEVELOP a plan of care.				
Non-pharmacological interventions	REDUCE RISK FACTORS Avoid exposure to risk factors including tobacco smoke and air pollution, support smoking cessation, recommend annual influenza vaccine and pneumococcal vaccine according to immunisation handbook			
	OPTIMISE FUNCTION Encourage regular exercise and physical activity, review nutrition, provide education, develop GP management plan and written COPD action plan (and initiate regular review)			
	OPTIMISE TREATMENT OF CO-MORBIDITIES especially cardiovascular disease, anxiety, depression, lung cancer and osteoporosis			
	REFER symptomatic patients to pulmonary rehabilitation			
		INITIATE advanced care planning		
			MANAGE advanced lung disease with domiciliary oxygen therapy, long-term non-invasive ventilation, surgery and bronchoscopic interventions, if indicated	
Pharmacological interventions (inhaled medicines)**	START with short-acting relievers: (used as needed): SABA (short-acting beta ₂ -agonist) OR SAMA (short-acting muscarinic antagonist)			
	ADD long-acting bronchodilators: LAMA (long-acting muscarinic antagonist) OR LABA (long-acting beta ₂ -agonist) Consider need for combination LAMA/LABA depending on symptomatic response			
		CONSIDER adding ICS (inhaled corticosteroids): Single inhaler triple therapy (ICS/LABA/LAMA) may be suitable*		
*in patients with ≥1 severe exacerbation requiring hospitalisation or ≥2 moderate exacerbations in the previous 12 months, AND significant symptoms despite LAMA/LABA or ICS/LABA therapy; OR in patients stabilised on a combination of LAMA, LABA and ICS.				
Assess and optimise inhaler device technique at each visit. Minimise inhaler device polypharmacy				

REFER PATIENTS TO LUNG FOUNDATION AUSTRALIA FOR INFORMATION AND SUPPORT - FREECALL 1800 654 301

Lung Foundation Australia has a range of resources to promote understanding of COPD and assist with management.

Based on The COPD-X Plan: Australian and New Zealand Guidelines for the Management of COPD and COPD-X Concise Guide

**Refer to PBS criteria: www.pbs.gov.au

Register at copdx.org.au to receive an alert when the COPD-X Guidelines are updated



1800 654 301 | Lungfoundation.com.au

Green tick indicates therapies that can be used together

		SABA	SAMA	LAMA	LABA	LABA/LAMA	ICS/LABA	ICS/LABA/LAMA
SABA	• salbutamol (Ventolin™, Airomir™, Asmol™) • terbutaline (Bricanyl™)	✓	✓	✓	✓	✓	✓	✓
SAMA	• ipratropium (Atrovent™)	✓	✓	✓	✓	✓	✓	✓
LAMA	• tiotropium (Spiriva™/Braltus™) • glycopyrronium (Seebri™)	✓	✓	✓	✓	✓	✓	✓
LABA	• salmeterol (Serevent™) • formoterol (Oxis™, Foradile™)	✓	✓	✓	✓	✓	✓	✓
LABA/LAMA	• indacaterol/glycopyrronium (Ultibro™) • umeclidinium/vilanterol (Anoro™)	✓	✓	✓	✓	✓	✓	✓
ICS/LABA	• fluticasone propionate/salmeterol (Seretide™/Salplus™/Cipla™) • budesonide/formoterol (Symbicort™/DuoResp™)	✓	✓	✓	✓	✓	✓	✓
ICS/LAMA/LABA	• fluticasone furoate/umeclidinium/vilanterol (Trelegy™)	✓	✓	✓	✓	✓	✓	✓

Relievers

SABA: Short-acting beta₂-agonists



Ventolin® MDI salbutamol



Asmol® MDI salbutamol



Airomir™ Autohaler® salbutamol



Bricanyl® Turbuhaler® terbutaline

SAMA: Short-acting muscarinic antagonist



Atrovent® MDI ipratropium

Maintenance

LAMAs: Long-acting muscarinic antagonists



Incruse® Ellipta® umeclidinium



Braltus® Zonda® tiotropium



Spiriva® Respimat® tiotropium



Spiriva® HandiHaler® tiotropium



Seebri® Breezhaler® glycopyrronium

LAMA/LABA combinations



Ultibro® Breezhaler® indacaterol/glycopyrronium



Spiolto® Respimat® tiotropium/olodaterol



Anoro® Ellipta® umeclidinium/vilanterol



Brimica® Genuair® acclidinium/formoterol

LABAs: Long-acting beta₂-agonists



Onbrez® Breezhaler® indacaterol



Foradil® Aerolizer® formoterol



Oxis® Turbuhaler® formoterol



Serevent® Accuhaler® salmeterol

ICS/LABA combinations



Bretaris® Genuair® acclidinium



Symbicort® Rapihaler® budesonide/formoterol



Symbicort® Turbuhaler® budesonide/formoterol



Seretide® Accuhaler® fluticasone propionate/salmeterol



Seretide® MDI fluticasone propionate/salmeterol



DuoResp® Spiromax® budesonide/formoterol

ICS: Inhaled corticosteroids (for patients with COPD and Asthma)



Fluticasone Cipla MDI fluticasone propionate



Flixotide® MDI fluticasone propionate



Arnuity® Ellipta® fluticasone furoate



QVAR® MDI beclomethasone



Breo® Ellipta® fluticasone furoate/vilanterol



Fluticasone + Salmeterol Cipla®/Salplus® MDI fluticasone propionate/salmeterol

ICS/LABA/LAMA



Trelegy® Ellipta® fluticasone furoate/umeclidinium/vilanterol

Flare Up Medicines

1. Antibiotics (Refer to Therapeutic Guidelines: Antibiotic: www.tg.org.au)
2. Oral steroids (prednisone, prednisolone)

Notes

- Handihaler, Breezhaler, Zonda and Aerolizer devices require a capsule to be loaded into the device. All other devices are preloaded.
- Where possible, metered dose inhalers (MDI) should be used with a spacer
- ICS monotherapy is not indicated for COPD without co-existing asthma
- **Shaded = PBS listed for asthma only**

Watch inhaler device technique videos on your device through ZAPPAR

1. Download **ZAPPAR** from Google Play or iTunes app store.
2. Open the app.
3. Scan this page.
4. Choose the inhaler device video.



Reducing Hospital Utilisation: Current level I evidence from COPD-X

Intervention	Demonstrated impact	Effect estimate	Where to find it
LEVEL I			
LAMAs	"...LAMAs had reduced exacerbation rates ...and exacerbation-related hospitalisations ... compared to LABAs" NB: most participants in this analysis had Tiotropium as their LAMA	22% improvement (RR 0.78, 95% CI 0.69 to 0.87)	O1.2.1 <i>Maia 2017</i>
Tiotropium	"... tiotropium reduced the odds of a COPD exacerbation ... and related hospitalisations compared to placebo or ipratropium." "... tiotropium was more effective in preventing COPD exacerbations leading to hospitalisation [compared to a range of other LABAs]"	36% improvement (OR 0.64, 95% CI 0.51 to 0.82 NNT 30, 95% CI 22 to 61) 14% improvement (OR 0.86, 95% CI 0.79 to 0.93)	P5.1 <i>Barr 2005</i> P5.2 <i>Chong 2012</i>
Acclidinium	"...Acclidinium resulted in marginal improvements in quality of life and FEV ₁ , and reduced the number of patients with exacerbations requiring hospitalisation "	NNT 77 , 95% CI 51 to 233	O1.2.1 <i>Ni 2014</i>
Systemic corticosteroids	"... systemic corticosteroids reduce treatment failure (defined as additional treatment, hospital admission/re-admission for index episode, return to emergency department, unscheduled physician visit for the index episode) , improve lung function, shorten recovery and reduce the severity of exacerbations of COPD ... reduced the risk of treatment failure by over half compared with placebo in ... median treatment duration 14 days"	52% improvement (OR 0.48, 95% CI 0.35 to 0.67 NNT 9)	X2.2.2 <i>Walters 2014a</i>
Non-invasive ventilation	"The use of NIV reduces hospital length of stay. "	MD -3.39 days , 95% CI -5.93 to -0.85	X3.2 <i>Osadnik 2017</i>
Hospital at home	"... compared to standard care, participants allocated to hospital in the home were significantly less likely to be readmitted to hospital within the next 1 to 6 months."	24% improvement (RR 0.76, 95% CI 0.59 to 0.99)	X1 <i>Jeppesen 2012</i>
Multi-faceted care plans	"... integrated disease management programs defined as 'a group of coherent interventions designed to prevent or manage one or more chronic conditions using a systematic, multidisciplinary approach and potentially employing multiple treatment modalities.' ... found positive effects on disease-specific QoL ... exercise tolerance, hospital admissions and hospital days per person... "	Admissions: 32% improvement (OR 0.68, 95% CI 0.47 to 0.99 NNT 15) Length of stay: MD -3.78 days , 95% CI -5.90 to -1.67	D <i>Kruis 2013</i>
Pulmonary rehabilitation	"Pulmonary rehabilitation also reduced hospital readmissions. "	56% improvement OR 0.44, 95% CI 0.21 to 0.91	X3.6 <i>Alison 2017</i> <i>Puhan 2016</i>

Reducing Hospital Utilisation: Current level II evidence from COPD-X

Intervention	Demonstrated impact	Effect estimate	Where to find it
LEVEL II			
ICS/LABA/ LAMA (umeclidinium/ vilanterol/ fluticasone furoate)	“In selected COPD patients with a history of exacerbations there was a 34% reduction in admissions with triple therapy using a single inhaler (fluticasone [ICS], vilanterol, umeclidinium - IMPACT study), as well as other benefits, regardless of baseline bronchodilator responsiveness, compared to dual therapy (no ICS), and with even greater benefits in some outcomes demonstrated in those with high eosinophil counts (>150 cells/ microlitre).”	34% improvement (RR 0.66, 95% CI 0.56 to 0.78)	O4.2 <i>Lipson</i> 2018
Airway clearance techniques	“The use of ACTs was associated with a significant short-term reduction in the need for increased ventilatory assistance ... duration of ventilatory assistance ...and hospital length of stay. ”	MD - 0.75 days , 95% CI -1.38 to -0.11	X3.4 <i>Osadnik</i> 2012
Discharge bundles	“... the use of COPD discharge bundles reduced hospital readmissions ... ”	20% improvement (RR 0.80, 95% CI 0.65 to 0.99)	X3.7 <i>Ospina</i> 2017
Supported discharge programs & medication adherence	“...has been shown to reduce re-admissions for COPD exacerbations compared to usual care ...” “Adherence to inhaled medications regimes is associated with reduced risk of death and admissions to hospital due to exacerbations in COPD...”	45% improvement (HR 0.55, 95% CI 0.35 to 0.88) 44% improvement (RR 0.56, 95% CI 0.48 to 0.65)	O <i>Vestbo</i> 2009

MANAGING A COPD EXACERBATION CHECKLIST

This Checklist is supported by the use of **STEPWISE MANAGEMENT OF STABLE COPD** available at www.lungfoundation.com.au/stepwise.

IN HOSPITAL



- Inhaled bronchodilators** Use short-acting bronchodilators as appropriate to improve symptoms.
- Oral corticosteroids** Consider use of oral corticosteroids (5 days, oral route, short course, no tapering) to reduce readmission and length of stay.
- Oral antibiotics** Prescribe if clinical features of infection are present. Oral antibiotics are preferred over IV antibiotics.
- Oxygen therapy** Aim for oxygen saturation of 88-92% in hypoxaemic patients.
- Non-invasive ventilation (NIV)** Consider NIV to reduce length of stay and mortality due to hypercapnic respiratory failure.
- Physiotherapy** Encourage physical activity and introduce the most appropriate airway clearance technique for patients who have difficulty clearing sputum.
- Smoking status** Review current status and implement smoking cessation strategies including referral to Quitline (13 78 48).

PRIOR TO LEAVING HOSPITAL



- Smoking cessation support** Ensure smoking cessation strategies are in place.
- Spirometry** Perform and/or arrange spirometry.
- Inhaler technique** Check technique and ensure patient is able to use each inhaler correctly.
- COPD Action Plan** Provide or update where one already exists.
- Pulmonary rehabilitation** Refer to pulmonary rehabilitation, discuss benefits and encourage attendance.
- General Practitioner** Arrange follow-up appointment with nominated GP. Prepare and provide summary of inpatient treatment to nominated GP.
- Medication** Reassess adherence and step up therapy as appropriate e.g. *consider need for inhaled corticosteroids and adding second long-acting bronchodilator.*
- Support services** Establish support required at home or place of residence.
- COPD Information Pack** Provide patient with Lung Foundation Australia COPD Information Pack.

ONGOING CARE 1-4 WEEKS POST DISCHARGE



- Smoking status** Review status and implement smoking cessation strategies.
- Medication** Reassess adherence and review inhaler technique.
- COPD Action Plan** Review and discuss as appropriate.
- Vaccinations** Ensure influenza and pneumococcal vaccinations are up to date.
- Pulmonary rehabilitation** Ask about attendance and re-refer if necessary.
- Oxygen therapy** Review need for long term oxygen therapy (LTOT) in patients discharged from hospital on oxygen.
- Referral** Consider need for referral for additional services including peer support.

Refer to **STEPWISE MANAGEMENT OF STABLE COPD** resource available at www.lungfoundation.com.au/stepwise.

MANAGE COMORBIDITIES

especially cardiovascular disease, anxiety, depression, lung cancer and osteoporosis.

Refer patients to Lung Foundation Australia for information and support
FREECALL
1800 654 301

Lung Foundation Australia has a range of resources to promote understanding of COPD and assist with management. Contact details of local pulmonary rehabilitation programs and Support Groups are also available.

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



Lung Foundation Australia

1800 654 301 | Lungfoundation.com.au

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