

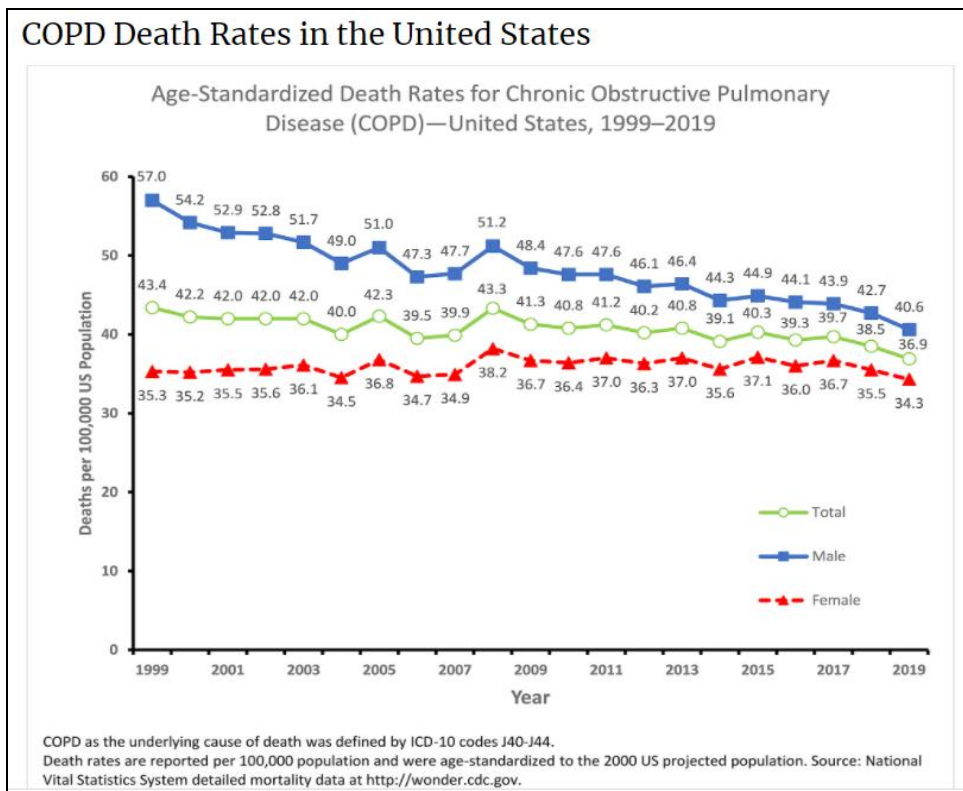


*Diagnosis and Management of COPD*  
Clinical Practice Guideline

MedStar Health

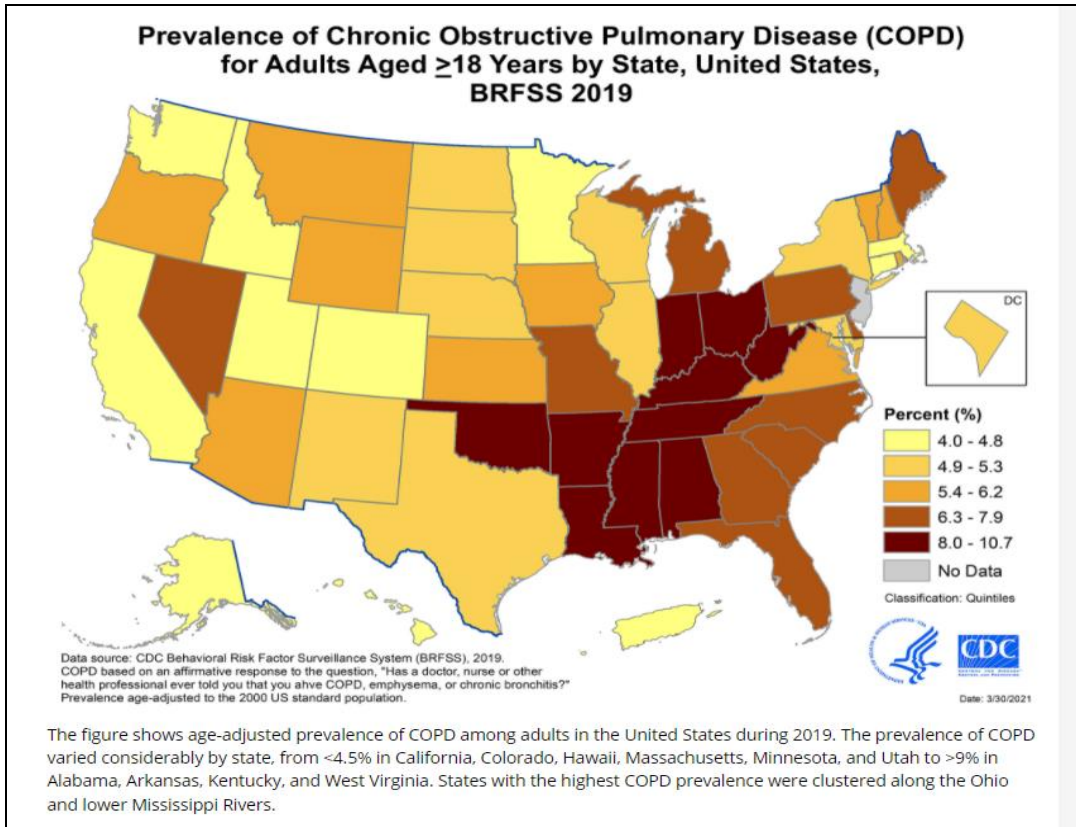
“These guidelines are provided to assist physicians and other clinicians in making decisions regarding the care of their patients. They are not a substitute for individual judgment brought to each clinical situation by the patient’s primary care provider-in collaboration with the patient. As with all clinical reference resources, they reflect the best understanding of the science of medicine at the time of publication but should be used with the clear understanding that continued research may result in new knowledge and recommendations”.

According to the CDC, COPD affects more than 15 million Americans.<sup>1</sup> While death rates have been improving (2), COPD still accounts for more than 150,000 deaths each year.



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Prevalance in our region is between 4.9% and 6.2% of adults.<sup>2</sup>



**The MedStar Health Ambulatory Best Practices Committee** endorses and accepts the recommendations for care in *Global Strategy for the Diagnosis, Management and Prevention of COPD*, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2022 Report and the accompanying 2022 GOLD Pocket Guide.<sup>3</sup> A complete copy of the documents can be downloaded at no charge for personal use at: <https://goldcopd.org/2022-gold-reports-2/>. Readers are encouraged to obtain copies of the entire document from the GOLD website. The excerpts included here are used with permission of GOLD, however, the copyright watermarks are left in place to remind the user that permission is required for uses beyond personal use.

Of note in this era of the continuing COVID-19 pandemic, the CDC recognizes chronic lung disease including COPD as a risk factor for severe disease and the most recent GOLD Guideline includes a new chapter devoted to COVID-19 and COPD. Information is evolving rapidly in this area and the reader is encouraged to seek the most up-to-date information from a variety of other sources to supplement this guideline.


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*Below are the Key Points and key tables for each chapter of the GOLD guideline and are used with permission of the Global Initiative for Chronic Obstructive Lung Disease. The reader is referred to the complete document for expanded information and the references behind the key points.*

## **KEY POINTS: Chapter 1: Definition and Overview**

- *Chronic Obstructive Pulmonary Disease (COPD) is a common preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.*
- *The most common respiratory symptoms include dyspnea, cough and/or sputum production. These symptoms may be under-reported by patients*
- *The main risk factor for COPD is tobacco smoking but other environmental exposures such as biomass fuel exposure and air pollution may contribute. Besides exposures, host factors predispose individuals to develop COPD. These include genetic abnormalities, abnormal lung development and accelerated aging. COPD may be punctuated by periods of acute worsening of respiratory symptoms, called exacerbations.*
- *In most patients, COPD is associated with significant concomitant chronic diseases, which increase its morbidity and mortality.*

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 <b>KEY INDICATORS FOR CONSIDERING A DIAGNOSIS OF COPD</b>	
<p><i>Consider COPD, and perform spirometry, if any of these indicators are present in an individual over age 40. These indicators are not diagnostic themselves, but the presence of multiple key indicators increases the probability of a diagnosis of COPD. Spirometry is required to establish a diagnosis of COPD.</i></p>	
<b>Dyspnea that is:</b>	Progressive over time. Characteristically worse with exercise. Persistent.
<b>Chronic Cough:</b>	May be intermittent and may be unproductive. Recurrent wheeze.
<b>Chronic Sputum Production:</b>	Any pattern of chronic sputum production may indicate COPD.
<b>Recurrent Lower Respiratory Tract Infections</b>	
<b>History of Risk Factors:</b>	Host factors (such as genetic factors, congenital/developmental abnormalities etc.). Tobacco smoke (including popular local preparations). Smoke from home cooking and heating fuels. Occupational dusts, vapors, fumes, gases and other chemicals.
<b>Family History of COPD and/or Childhood Factors:</b>	For example low birthweight, childhood respiratory infections etc.
TABLE 2.1	

**KEY POINTS: Chapter 2: Diagnosis and Initial Assessment**

- *COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, a history of recurrent lower respiratory tract infections and/or a history of exposure to risk factors for the disease.*
- *Spirometry is required to make the diagnosis; the presence of a post-bronchodilator FEV1/FVC < 0.70 confirms the presence of persistent airflow limitation.*
- *The goals of COPD assessment are to determine the level of airflow limitation, the impact of disease on the patient’s health status, and the risk of future events (such as exacerbations, hospital admissions, or death), in order to guide therapy.*
- *Concomitant chronic diseases occur frequently in COPD patients, including cardiovascular disease, skeletal muscle dysfunction, metabolic syndrome, osteoporosis, depression, anxiety, and lung cancer. These comorbidities should be actively sought and treated appropriately when present as they can influence mortality and hospitalizations independently.*

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### **Key Indicators for Considering a Diagnosis of COPD**

- Dyspnea – persistent, progressive over time, worse with exercise
- Chronic cough – intermittent and maybe unproductive; recurrent wheezing
- Chronic sputum production
- Recurrent lower respiratory tract infection
- Risk factors – tobacco smoke, occupational exposures, indoor smoke, host factors such as genetics or congenital/developmental abnormalities

### **Differential Diagnosis**

A major differential diagnosis is asthma. Sometimes a clear distinction from COPD is not possible, in which case management is similar to that of asthma. Other conditions to consider include congestive heart failure, bronchiectasis, tuberculosis, obliterative bronchiolitis and diffuse panbronchiolitis and others.

The WHO recommends that all patients with a diagnosis of COPD should be screened once for alpha-1 antitrypsin deficiency (AATD), especially in areas with high prevalence.

### **Assessment**

COPD assessment must consider the following aspects of the disease:

- The presence and severity of the spirometric abnormality
- Current nature and magnitude of symptoms
- History of moderate and severe exacerbations and future risk
- Presence of comorbidities

The diagnosis should be confirmed with spirometry before treatment plan is made. Spirometry should be performed post bronchodilator. Additional investigations may include chest Xray, lung volumes and carbon monoxide diffusion capacity (DLCO), oximetry, arterial blood gas measurement and exercise testing.

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CLASSIFICATION OF AIRFLOW LIMITATION SEVERITY IN COPD (BASED ON POST-BRONCHODILATOR FEV <sub>1</sub> )		
In patients with FEV <sub>1</sub> /FVC < 0.70:		
<b>GOLD 1:</b>	Mild	FEV <sub>1</sub> ≥ 80% predicted
<b>GOLD 2:</b>	Moderate	50% ≤ FEV <sub>1</sub> < 80% predicted
<b>GOLD 3:</b>	Severe	30% ≤ FEV <sub>1</sub> < 50% predicted
<b>GOLD 4:</b>	Very Severe	FEV <sub>1</sub> < 30% predicted

TABLE 2.4

Assessment of symptoms can be measured using the modified MRC (mMRC) dyspnea scale.


MODIFIED MRC DYSPNEA SCALE <sup>a</sup>		
PLEASE TICK IN THE BOX THAT APPLIES TO YOU   ONE BOX ONLY   Grades 0 - 4		
<b>mMRC Grade 0.</b>	I only get breathless with strenuous exercise.	<input type="checkbox"/>
<b>mMRC Grade 1.</b>	I get short of breath when hurrying on the level or walking up a slight hill.	<input type="checkbox"/>
<b>mMRC Grade 2.</b>	I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level.	<input type="checkbox"/>
<b>mMRC Grade 3.</b>	I stop for breath after walking about 100 meters or after a few minutes on the level.	<input type="checkbox"/>
<b>mMRC Grade 4.</b>	I am too breathless to leave the house or I am breathless when dressing or undressing.	<input type="checkbox"/>

<sup>a</sup> Fletcher CM. BMJ 1960; 2: 1662.

TABLE 2.5

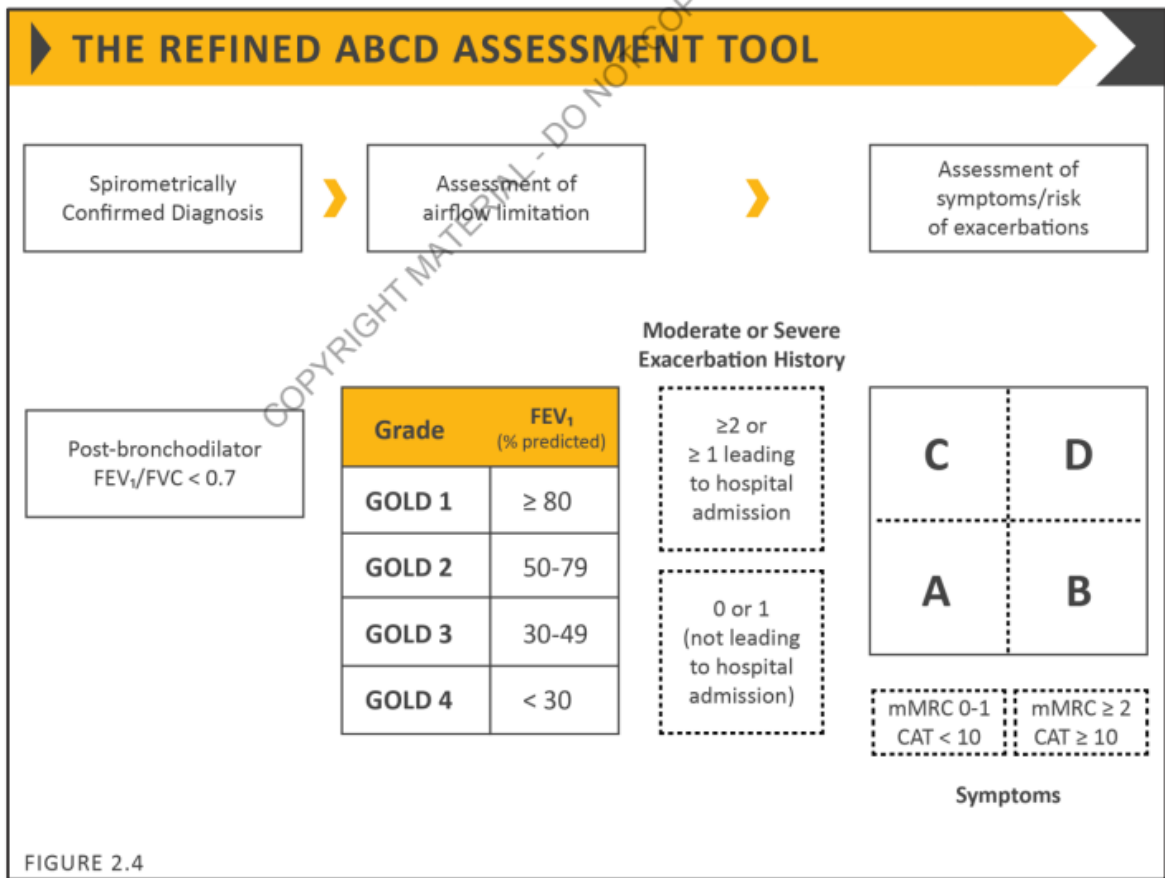
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Because patients may experience symptoms beyond dyspnea, a comprehensive assessment of symptoms using a tool such as the COPD Assessment Test CAT (below) is preferred.

			
<i>For each item below, place a mark (x) in the box that best describes you currently. Be sure to only select one response for each question.</i>			
EXAMPLE: I am very happy	<input type="radio"/> 0 <input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	I am very sad	SCORE
I never cough	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	I cough all the time	_____
I have no phlegm (mucus) in my chest at all	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	My chest is completely full of phlegm (mucus)	_____
My chest does not feel tight at all	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	My chest feels very tight	_____
When I walk up a hill or one flight of stairs I am not breathless	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	When I walk up a hill or one flight of stairs I am very breathless	_____
I am not limited doing any activities at home	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	I am very limited doing activities at home	_____
I am confident leaving my home despite my lung condition	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	I am not at all confident leaving my home because of my lung condition	_____
I sleep soundly	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	I don't sleep soundly because of my lung condition	_____
I have lots of energy	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	I have no energy at all	_____
Reference: Jones et al. ERJ 2009; 34 (3); 648-54. FIGURE 2.3			TOTAL SCORE: <input type="text"/>

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Combining spirometry, symptomatic assessment, and risk of exacerbation in the refined ABCD assessment tool may facilitate consideration of individual therapies for a specific patient.



### KEY POINTS: Chapter 3: Evidence Supporting Prevention and Maintenance Therapy

- *Smoking cessation is key. Pharmacotherapy and nicotine replacement reliably increase long-term smoking abstinence rates. Legislative smoking bans and counselling, delivered by healthcare professionals, improve quit rates.*
- *The effectiveness and safety of e-cigarettes as a smoking cessation aid is uncertain at present.*
- *Pharmacologic therapy can reduce COPD symptoms, reduce the frequency and severity of exacerbations, and improve health status and exercise tolerance. Recent data suggests beneficial effects on mortality.*
- *Each pharmacologic treatment regimen should be individualized and guided by the severity of symptoms, risk of exacerbations, side-effects, co-morbidities, drug availability*

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and cost, and the patient's response, preference and ability to use various drug delivery devices.

- *Inhaler technique needs to be assessed regularly.*
- *COVID-19 vaccines are highly effective against SARS-CoV-2 infection and people with COPD should have the COVID-19 vaccination in line with national recommendations.*
- *Influenza vaccination decreases the incidence of lower respiratory tract infections.*
- *Pneumococcal vaccination decreases lower respiratory tract infections.*
- *CDC recommends the Tdap vaccination (dTaP/dTPa) in COPD patients to protect against pertussis, tetanus and diphtheria, in those who were not vaccinated in adolescence and Zoster vaccine to protect against shingles for adults with COPD aged  $\geq$  50 years.*
- *Pulmonary rehabilitation with its core components, including exercise training combined with disease-specific education, improves exercise capacity, symptoms and quality of life across all grades of COPD severity.*
- *In patients with severe resting chronic hypoxemia, long-term oxygen therapy improves survival.*
- *In patients with stable COPD and resting or exercise-induced moderate desaturation, long-term oxygen treatment should not be prescribed routinely. However, individual patient factors must be considered when evaluating the patient's need for supplemental oxygen.*
- *In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, long-term non-invasive ventilation may decrease mortality and prevent re-hospitalization.*
- *In select patients with advanced emphysema refractory to optimized medical care, surgical or bronchoscopic interventional treatments may be beneficial.*
- *Palliative approaches are effective in controlling symptoms in advanced COPD.*

Smoking Cessation should be encouraged. Counseling, nicotine replacements and other pharmacological support should be provided.

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# Vaccinations for Stable COPD

## VACCINATION FOR STABLE COPD

- Influenza vaccination reduces serious illness and death in COPD patients (**Evidence B**).
- The WHO and CDC recommend SARS-Cov-2 (COVID-19) vaccination for people with COPD (**Evidence B**).
- The 23-valent pneumococcal polysaccharide vaccine (PPSV23) has been shown to reduce the incidence of community-acquired pneumonia in COPD patients aged < 65 years with an FEV<sub>1</sub> < 40% predicted and in those with comorbidities (**Evidence B**).
- In the general population of adults ≥ 65 years the 13-valent conjugated pneumococcal vaccine (PCV13) has demonstrated significant efficacy in reducing bacteremia & serious invasive pneumococcal disease (**Evidence B**).
- The CDC recommends Tdap (dTaP/dTPa) vaccination to protect against pertussis (whooping cough) for adults with COPD who were not vaccinated in adolescence (**Evidence B**) and Zoster vaccine to protect against shingles for adults with COPD aged ≥ 50 years (**Evidence B**).

TABLE 3.2

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# Pharmacological Therapy for Stable COPD

## ▶ BRONCHODILATORS IN STABLE COPD

- Inhaled bronchodilators in COPD are central to symptom management and commonly given on a regular basis to prevent or reduce symptoms (**Evidence A**).
- Regular and as-needed use of SABA or SAMA improves FEV<sub>1</sub> and symptoms (**Evidence A**).
- Combinations of SABA and SAMA are superior compared to either medication alone in improving FEV<sub>1</sub> and symptoms (**Evidence A**).
- LABAs and LAMAs significantly improve lung function, dyspnea, health status, and reduce exacerbation rates (**Evidence A**).
- LAMAs have a greater effect on exacerbation reduction compared with LABAs (**Evidence A**) and decrease hospitalizations (**Evidence B**).
- Combination treatment with a LABA and LAMA increases FEV<sub>1</sub> and reduces symptoms compared to monotherapy (**Evidence A**).
- Combination treatment with a LABA/LAMA reduces exacerbations compared to monotherapy (**Evidence B**).
- Tiotropium improves the effectiveness of pulmonary rehabilitation in increasing exercise performance (**Evidence B**).
- Theophylline exerts a small bronchodilator effect in stable COPD (**Evidence A**) and that is associated with modest symptomatic benefits (**Evidence B**).

TABLE 3.4

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## ANTI-INFLAMMATORY THERAPY IN STABLE COPD

### INHALED CORTICOSTEROIDS

- An ICS combined with a LABA is more effective than the individual components in improving lung function and health status and reducing exacerbations in patients with exacerbations and moderate to very severe COPD (**Evidence A**).
- Regular treatment with ICS increases the risk of pneumonia especially in those with severe disease (**Evidence A**).
- Triple inhaled therapy of LABA/LAMA/ICS improves lung function, symptoms and health status, and reduces exacerbations, compared to LABA/ICS, LABA/LAMA or LAMA monotherapy (**Evidence A**). Recent data suggest a beneficial effect versus fixed-dose LABA/LAMA combinations on mortality in symptomatic COPD patients with a history of frequent and/or severe exacerbations.

### ORAL GLUCOCORTICOIDS

- Long-term use of oral glucocorticoids has numerous side effects (**Evidence A**) with no evidence of benefits (**Evidence C**).

### PDE4 INHIBITORS

- In patients with chronic bronchitis, severe to very severe COPD and a history of exacerbations:
  - » A PDE4 inhibitor improves lung function and reduces moderate and severe exacerbations (**Evidence A**).
  - » A PDE4 inhibitor improves lung function and decreases exacerbations in patients who are on fixed-dose LABA/ICS combinations (**Evidence A**).

### ANTIBIOTICS

- Long-term azithromycin and erythromycin therapy reduces exacerbations over one year (**Evidence A**).
- Treatment with azithromycin is associated with an increased incidence of bacterial resistance (**Evidence A**) and hearing test impairments (**Evidence B**).

### MUCOREGULATORS AND ANTIOXIDANT AGENTS

- Regular treatment with mucolytics such as erdosteine, carbocysteine and NAC reduces the risk of exacerbations in select populations (**Evidence B**).

### OTHER ANTI-INFLAMMATORY AGENTS

- Simvastatin does not prevent exacerbations in COPD patients at increased risk of exacerbations and without indications for statin therapy (**Evidence A**). However, observational studies suggest that statins may have positive effects on some outcomes in patients with COPD who receive them for cardiovascular and metabolic indications (**Evidence C**).
- Leukotriene modifiers have not been tested adequately in COPD patients.

TABLE 3.5

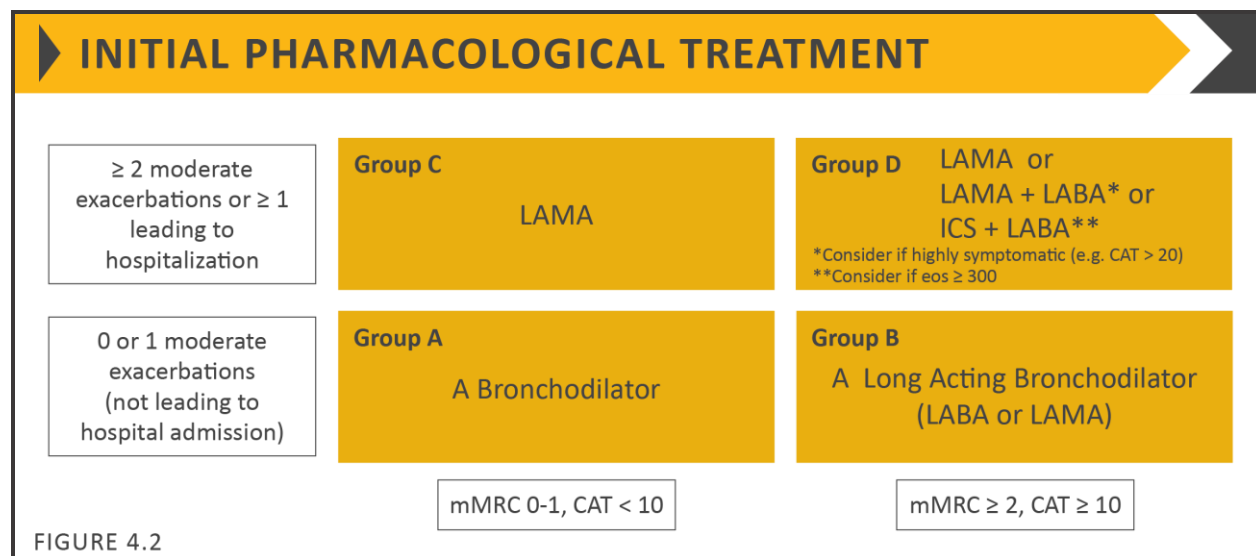
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## KEY POINTS: Chapter 4: Management of Stable COPD

- The management strategy for stable COPD should be predominantly based on the individualized assessment of symptoms and future risk of exacerbations.
- All individuals who smoke should be strongly encouraged and supported to quit.
- The main treatment goals are reduction of symptoms and future risk of exacerbations.
- Management strategies include pharmacologic and non-pharmacologic interventions.



**KEY POINTS FOR THE USE OF BRONCHODILATORS**

- LABAs and LAMAs are preferred over short-acting agents except for patients with only occasional dyspnea (**Evidence A**), and for immediate relief of symptoms in patients already on long-acting bronchodilators for maintenance therapy.
- Patients may be started on single long-acting bronchodilator therapy or dual long-acting bronchodilator therapy. In patients with persistent dyspnea on one bronchodilator treatment should be escalated to two (**Evidence A**).
- Inhaled bronchodilators are recommended over oral bronchodilators (**Evidence A**).
- Theophylline is not recommended unless other long-term treatment bronchodilators are unavailable or unaffordable (**Evidence B**).

TABLE 4.5

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## KEY POINTS FOR THE USE OF ANTI-INFLAMMATORY AGENTS

- Long-term monotherapy with ICS is not recommended (**Evidence A**).
- Long-term treatment with ICS may be considered in association with LABAs for patients with a history of exacerbations despite appropriate treatment with long-acting bronchodilators (**Evidence A**).
- Long-term therapy with oral corticosteroids is not recommended (**Evidence A**).
- In patients with severe to very severe airflow limitation, chronic bronchitis and exacerbations the addition of a PDE4 inhibitor to a treatment with long acting bronchodilators with/without ICS can be considered (**Evidence B**).
- Preferentially, but not only in former smokers with exacerbations despite appropriate therapy, macrolides, in particular azithromycin, can be considered (**Evidence B**).
- Statin therapy is not recommended for prevention of exacerbations (**Evidence A**).
- Antioxidant mucolytics are recommended only in selected patients (**Evidence A**).

TABLE 4.6

## FACTORS TO CONSIDER WHEN INITIATING ICS TREATMENT

Factors to consider when initiating ICS treatment in combination with one or two long-acting bronchodilators (note the scenario is different when considering ICS withdrawal):

· STRONG SUPPORT ·	· CONSIDER USE ·	· AGAINST USE ·
<ul style="list-style-type: none"> <li>• History of hospitalization(s) for exacerbations of COPD#</li> <li>• ≥ 2 moderate exacerbations of COPD per year#</li> <li>• Blood eosinophils ≥ 300 cells/μL</li> <li>• History of, or concomitant, asthma</li> </ul>	<ul style="list-style-type: none"> <li>• 1 moderate exacerbation of COPD per year#</li> <li>• Blood eosinophils ≥ 100 to &lt; 300 cells/μL</li> </ul>	<ul style="list-style-type: none"> <li>• Repeated pneumonia events</li> <li>• Blood eosinophils &lt;100 cells/μL</li> <li>• History of mycobacterial infection</li> </ul>

#despite appropriate long-acting bronchodilator maintenance therapy (see Table 3.4 and Figure 4.3 for recommendations);

\*note that blood eosinophils should be seen as a continuum; quoted values represent approximate cut-points; eosinophil counts are likely to fluctuate.

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# ▶ FOLLOW-UP PHARMACOLOGICAL TREATMENT

1. IF RESPONSE TO INITIAL TREATMENT IS APPROPRIATE, MAINTAIN IT.
2. IF NOT:
  - ✓ Consider the predominant treatable trait to target (dyspnea or exacerbations)
  - Use exacerbation pathway if both exacerbations and dyspnea need to be targeted
  - ✓ Place patient in box corresponding to current treatment & follow indications
  - ✓ Assess response, adjust and review
  - ✓ These recommendations do not depend on the ABCD assessment at diagnosis

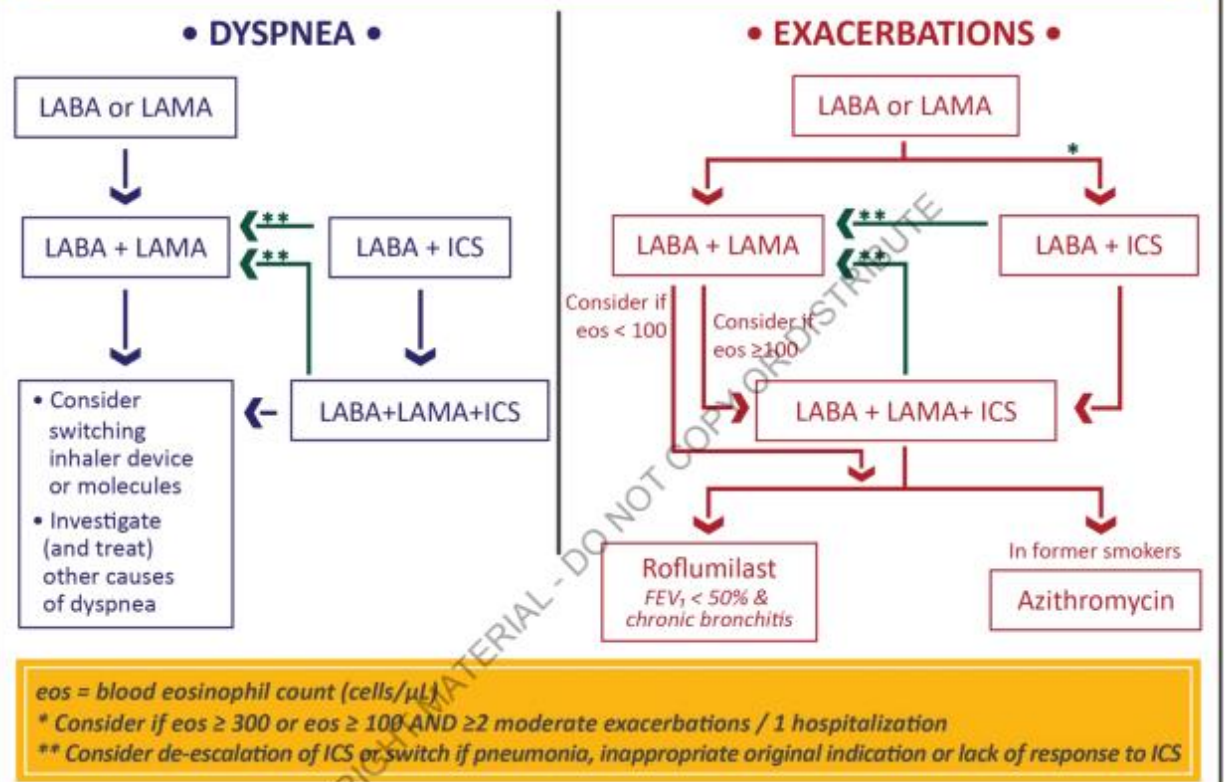


FIGURE 4.4

Figure 4.4 suggests escalation and de-escalation strategies based on available efficacy as well as safety data. The response to treatment escalation should always be reviewed, and de-escalation should be considered if there is a lack of clinical benefit and/or side effects occur. De-escalation may also be considered in COPD patients receiving treatment who return with resolution of some symptoms that subsequently may require less therapy. Patients, in whom treatment modification is considered, in particular de-escalation, should be undertaken under close medical supervision. We are fully aware that treatment escalation has not been systematically tested; trials of de-escalation are also limited and only include ICS.

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## PRESCRIPTION OF SUPPLEMENTAL OXYGEN TO COPD PATIENTS

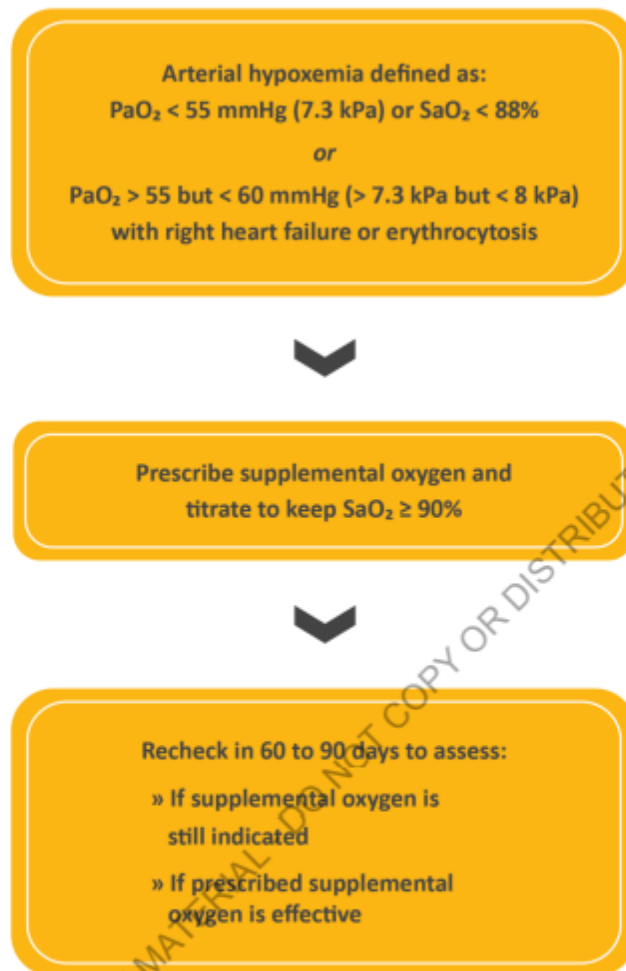


FIGURE 4.5

### Ventilatory support

NIV is occasionally used in patients with stable very severe COPD. NIV may be considered of some use in a selected group of patients, particularly in those with pronounced daytime hypercapnia and recent hospitalization, although systematic review is unable to support or refute this.<sup>(92)</sup> However, in patients with both COPD and obstructive sleep apnea there are clear indications for continuous positive airway pressure (CPAP).<sup>(93)</sup>

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## KEY POINTS: Chapter 5: Management of Exacerbations

- An exacerbation of COPD is defined as an acute worsening of respiratory symptoms that results in additional therapy.
- As the symptoms are not specific to COPD relevant differential diagnoses should be considered.
- Exacerbations of COPD can be precipitated by several factors. The most common causes are respiratory tract infections.
- The goal for treatment of COPD exacerbations is to minimize the negative impact of the current exacerbation and to prevent subsequent events.
- Short-acting inhaled beta2-agonists with or without short-acting anticholinergics are recommended as the initial bronchodilators to treat an acute exacerbation.
- Maintenance therapy with long-acting bronchodilators should be initiated as soon as possible before hospital discharge.
- Systemic corticosteroids can improve lung function (FEV1), oxygenation and shorten recovery time and hospitalization duration. Duration of therapy should not be more than 5-7 days.
- Antibiotics, when indicated, can shorten recovery time, reduce the risk of early relapse, treatment failure, and hospitalization duration. Duration of therapy should be 5-7 days.
- Methylxanthines are not recommended due to increased side effect profiles.
- Non-invasive mechanical ventilation should be the first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication because it improves gas exchange, reduces work of breathing and the need for intubation, decreases hospitalization duration and improves survival.
- Following an exacerbation, appropriate measures for exacerbation prevention should be initiated.

### POTENTIAL INDICATIONS FOR HOSPITALIZATION ASSESSMENT\*

- Severe symptoms such as sudden worsening of resting dyspnea, high respiratory rate, decreased oxygen saturation, confusion, drowsiness.
- Acute respiratory failure.
- Onset of new physical signs (e.g., cyanosis, peripheral edema).
- Failure of an exacerbation to respond to initial medical management.
- Presence of serious comorbidities (e.g., heart failure, newly occurring arrhythmias, etc.).
- Insufficient home support.

\*Local resources need to be considered.

TABLE 5.2

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## MANAGEMENT OF SEVERE BUT NOT LIFE-THREATENING EXACERBATIONS\*

- Assess severity of symptoms, blood gases, chest radiograph.
- Administer supplemental oxygen therapy, obtain serial arterial blood gas, venous blood gas and pulse oximetry measurements.
- Bronchodilators:
  - » Increase doses and/or frequency of short-acting bronchodilators.
  - » Combine short-acting beta 2-agonists and anticholinergics.
  - » Consider use of long-active bronchodilators when patient becomes stable.
  - » Use spacers or air-driven nebulizers when appropriate.
- Consider oral corticosteroids.
- Consider antibiotics (oral) when signs of bacterial infection are present.
- Consider noninvasive mechanical ventilation (NIV).
- At all times:
  - » Monitor fluid balance.
  - » Consider subcutaneous heparin or low molecular weight heparin for thromboembolism prophylaxis.
  - » Identify and treat associated conditions (e.g., heart failure, arrhythmias, pulmonary embolism etc.).

\*Local resources need to be considered.

TABLE 5.3

## KEY POINTS FOR THE MANAGEMENT OF EXACERBATIONS

- Short-acting inhaled beta<sub>2</sub>-agonists, with or without short-acting anticholinergics, are recommended as the initial bronchodilators to treat an acute exacerbation (**Evidence C**).
- Systemic corticosteroids can improve lung function (FEV<sub>1</sub>), oxygenation and shorten recovery time and hospitalization duration. Duration of therapy should not be more than 5-7 days (**Evidence A**).
- Antibiotics, when indicated, can shorten recovery time, reduce the risk of early relapse, treatment failure, and hospitalization duration. Duration of therapy should be 5-7 days (**Evidence B**).
- Methylxanthines are not recommended due to increased side effect profiles (**Evidence B**).
- Non-invasive mechanical ventilation should be the first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication because it improves gas exchange, reduces work of breathing and the need for intubation, decreases hospitalization duration and improves survival (**Evidence A**).

TABLE 5.4

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## KEY POINTS: Chapter 6: COPD and Co-morbidities

- COPD often coexists with other diseases (co-morbidities) that may have a significant impact on disease course.
- In general, the presence of co-morbidities should not alter COPD treatment and co-morbidities should be treated per usual standards regardless of the presence of COPD.
- Lung cancer is frequently seen in patients with COPD and is a main cause of death.
  - Annual low-dose CT (LDCT) is recommended for lung cancer screening in patients with COPD due to smoking according to recommendations for the general population
  - Annual LDCT is not recommended for lung cancer screening in patients with COPD not due to smoking due to insufficient data to establish benefit over harm
- Cardiovascular diseases are common and important co-morbidities in COPD.
- Osteoporosis and depression/anxiety are frequent, important co-morbidities in COPD, are often under-diagnosed, and are associated with poor health status and prognosis.
- Gastroesophageal reflux (GERD) is associated with an increased risk of exacerbations and poorer health status.
- When COPD is part of a multimorbidity care plan, attention should be directed to ensure simplicity of treatment and to minimize polypharmacy.

See the Guideline for recommendations on treating the following comorbidities with COPD

• Heart failure	• Osteoporosis
• Ischemic heart disease	• Anxiety and depression
• Arrhythmias	• Metabolic syndrome and diabetes
• Peripheral vascular disease	• Gastroesophageal reflux
• Hypertension	• Bronchiectasis
• Lung cancer	• Obstruct sleep apnea
• Cognitive impairment	

## KEY POINTS: Chapter 7: COVID-19 and COPD

- Patients with COPD presenting with new or worsening respiratory symptoms, fever, and/or any other symptoms that could be COVID-19 related, even if these are mild, should be tested for possible infection with SARS-CoV-2.
- Patients should keep taking their oral and inhaled respiratory medication for COPD as directed as there is no evidence that COPD medication should be changed during this COVID-19 pandemic.

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- *During periods of high prevalence of COVID-19 in the community, spirometry should be restricted to patients requiring urgent or essential tests for the diagnosis of COPD, and/or to assess lung function status for interventional procedures or surgery.*
- *Physical distancing and shielding, or sheltering-in-place, should not lead to social isolation and inactivity. Patients should stay in contact with their friends and families by telecommunications and continue to keep active. They should also ensure they have enough medication.*
- *Patients should be encouraged to use reputable resources for medical information regarding COVID-19 and its management.*
- *Guidance for remote (phone/virtual/online) COPD patient follow-up and printable checklist are provided [and can be found in the Guideline document].*

▶ KEY POINTS FOR THE MANAGEMENT OF PATIENTS WITH COPD AND SUSPECTED OR PROVEN COVID-19
<b>SARS-CoV-2 TESTING</b>
<ul style="list-style-type: none"> <li>• Swab/Saliva PCR if new or worsening respiratory symptoms, fever, and/or any other symptoms that could be COVID related</li> </ul>
<b>OTHER INVESTIGATIONS</b>
<ul style="list-style-type: none"> <li>• Avoid spirometry unless essential</li> <li>• Consider CT for COVID pneumonia and to exclude other diagnoses e.g. PE</li> <li>• Avoid bronchoscopy unless essential</li> <li>• Assess for co-infection</li> </ul>
<b>COPD PHARMACOTHERAPY</b>
<ul style="list-style-type: none"> <li>• Ensure adequate supplies of medication</li> <li>• Continue maintenance therapy unchanged including ICS</li> <li>• Use antibiotics and oral steroids in line with recommendations for exacerbations</li> <li>• Avoid nebulization when possible</li> </ul>
<b>COPD NON-PHARMACOLOGICAL THERAPY</b>
<ul style="list-style-type: none"> <li>• Maintain physical activity as able</li> </ul>
<b>PROTECTIVE STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Follow basic infection control measures</li> <li>• Maintain physical distancing</li> <li>• Wear a face covering</li> </ul>
<b>COVID-19 THERAPY</b>
<ul style="list-style-type: none"> <li>• Use systemic steroids and remdesivir as recommended for patients with COVID-19</li> <li>• Use HFNT or NIV for respiratory failure if possible</li> <li>• Use invasive mechanical ventilation if HFNT or NIV fails</li> <li>• Post COVID-19 rehabilitation</li> <li>• Ensure appropriate post COVID-19 follow-up</li> </ul>
TABLE 7.2

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## Appendix: Medications for COPD

- a. May differ from product labeling.
- b. Wholesale cost for 30-day supply of highest strength, of generic if available unless otherwise specified. For short-acting agents, cost is for 200 inhalations.
- c. Only long-acting inhalers specifically approved for COPD are included.

<b>Inhalers for COPD</b>			
Medication <sup>c</sup>	Dosing Frequency <sup>a</sup>	Cost <sup>b</sup>	Adverse Reactions of Note
<b>Short-acting Bronchodilators</b>			
<b>Beta-2 agonists</b>			
Albuterol (Salbutamol)  <i>(ProAir HFA, ProAir Digihaler, ProAir RespiClick, Proventil HFA, Ventolin HFA)</i>	2 inhalations every 4-6 hours as needed	\$78	Tachycardia, excitement/nervousness, tremors, paradoxical bronchospasm
Levalbuterol  <i>(Xopenex HFA)</i>	2 inhalations every 4-6 hours as needed	\$74	Headache, rhinitis
<b>Anticholinergic</b>			
Ipratropium  <i>(Atrovent HFA)</i>	2 inhalations every 6 hours	<i>Atrovent HFA</i> \$513	Bronchitis
<b>Combination Beta-2 agonist/Anticholinergic</b>			
Albuterol/ipratropium  <i>(Combivent Respimat)</i>	1 inhalation four times daily;  May take up to 2 additional inhalations daily as needed	<i>Combivent Respimat</i> \$532	

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Long-Acting Beta-2 agonists (LABAs)			
Olodaterol ( <i>Striverdi Respimat</i> )	2 inhalations once daily	<i>Striverdi Respimat</i> \$280	Nasopharyngitis
Salmeterol ( <i>Serevent Diskus</i> )	One inhalation twice daily	<i>Serevent Diskus</i> \$493	Headache
Long-Acting Antimuscarinic agents (LAMAs)			
Aclidinium ( <i>Tudorza Pressair</i> )	1 inhalation twice daily	<i>Tudorza Pressair</i> \$343	
Glycopyrrolate ( <i>Seebri Neohaler</i> )	1 capsule inhaled twice daily	\$473	
Tiotropium  ( <i>Spiriva HandiHaler, Spiriva Respimat</i> )	HandiHaler: 1 capsule inhaled once daily; each capsule should be inhaled twice  <i>Respimat</i> : 2 inhalations once daily	<i>Spiriva HandiHaler</i> \$540  <i>Respimat</i> \$572	Xerostomia, pharyngitis, upper respiratory tract infections
Umeclidinium ( <i>Incruse Ellipta</i> )	1 inhalation once daily	\$386	

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<b>Combination LABA/LAMA</b>			
Olodaterol/Tiotropium ( <i>Stiolto Respimat</i> )	2 inhalations once daily	<i>Stiolto Respimat</i> \$90	Nasopharyngitis
Vilanterol/Umeclidinium ( <i>Anoro Ellipta</i> )	1 inhalation once daily	<i>Anoro Ellipta</i> \$269	
Formoterol/Aclidinium ( <i>Duaklir Pressair</i> )	1 inhalation twice daily	<i>Duaklir Pressair</i> \$1194	
Formoterol/Glycopyrrolate ( <i>Bevespi Aerosphere</i> )	2 inhalations twice daily	<i>Bevespi Aerosphere</i> \$261-474	
<b>Combination LABA/ Corticosteroid</b>			
Formoterol/Budesonide ( <i>Symbicort</i> )	2 inhalations twice daily	\$352-403	Headache, nasopharyngitis, upper respiratory tract infections
Salmeterol/Fluticasone propionate ( <i>Advair Diskus, Advair HFA, AirDuo Digihaler, AirDuo RespiClick, Wixela Inhub</i> )	1 inhalation twice daily	\$120	Headache, upper respiratory tract infections
Vilanterol/Fluticasone furoate ( <i>Breo Ellipta</i> )	1 inhalation once daily	\$369	

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<b>Combination LABA/Corticosteroid/Anticholinergic</b>			
Fluticasone/Umeclidium/ Vilanterol ( <i>Trelegy Ellipta</i> )	1 inhalation once daily	\$361	Pharyngitis
<b>Other Agents</b>			
<b>Methylxanthines</b>			
Theophylline	Variable depending on formulation Toxicity is dose related; drug levels should be monitored	\$362 dollars (generic twice daily product)	Tachycardia, headache, tremor, nausea
<b>Systemic Corticosteroids</b>			
Prednisone	Once daily by mouth  (usually, 40mg once daily for 5 days)	\$0.50 per day – therapy duration varies)	Increased appetite, fluid retention, electrolyte changes, weight gain, hypertension
Methylprednisolone	60-125 mg 1-4 times daily IV followed by oral therapy (prednisone preferred for oral route)	\$4 -\$8 per day – therapy duration varies	Hypertension, fluid retention, electrolyte changes
<b>Phosphodiesterase-4 Inhibitor</b>			
Roflumilast ( <i>Daliresp</i> )	250 mcg once daily by mouth for 4 weeks followed by 500mcg once daily	\$488	Weight loss, diarrhea

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**Patient Education:**

<https://www.cdc.gov/copd/infographics/copd-awareness.html>

<https://www.cdc.gov/copd/basics-about.html>

[https://www.uptodate.com/contents/chronic-obstructive-pulmonary-disease-copd-the-basics?search=COPD&source=search\\_result&selectedTitle=1~150&usage\\_type=default&display\\_rank=1](https://www.uptodate.com/contents/chronic-obstructive-pulmonary-disease-copd-the-basics?search=COPD&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1)

[https://www.uptodate.com/contents/medicines-for-chronic-obstructive-pulmonary-disease-copd-the-basics?search=COPD&topicRef=4649&source=see\\_link](https://www.uptodate.com/contents/medicines-for-chronic-obstructive-pulmonary-disease-copd-the-basics?search=COPD&topicRef=4649&source=see_link)

Patient education videos (in English and in Spanish) on proper use of metered dose inhalers with and without spacers can be found at:

[https://www.cdc.gov/asthma/inhaler\\_video/default.htm](https://www.cdc.gov/asthma/inhaler_video/default.htm)

**References:**

- 1) <https://www.cdc.gov/copd/data.html>
- 2) <https://www.cdc.gov/dotw/copd/index.html#:~:text=COPD%20affects%20more%20than%2015,smoke%20and%20other%20air%20pollutants.>
- 3) From the *Global Strategy for the Diagnosis, Management and Prevention of COPD*, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2022. Available from: <http://www.goldcopd.org/>.
- 4) Drugs for COPD. *Med Lett Drugs Ther.* 2017 Apr 10;59(1518):57-62
- 5) Drug Information Articles on <https://www.uptodate.com/contents/table-of-contents/drug-information/general-drug-information> (accessed February 16, 2022)

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