MedStar Health

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".

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) 2018. A complete copy of the document can be downloaded for personal use at: **http://goldcopd.org/wp-content/uploads/2017/11/GOLD-2018-v6.0-FINAL-revised-20-Nov_WMS.pdf**

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), a common preventable and treatable disease, 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.*
- *COPD is a leading cause of morbidity and mortality worldwide and results in an economic and social burden that is both substantial and increasing. COPD is currently the fourth leading cause of death in the word but is projected to be the third leading cause of death by 2020.*
- *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.*

KEY POINTS: Chapter 2: Diagnosis and Assessment

- *A clinical diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, 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 FEV_1/FVC < 0.70 confirms the presence of persistent airflow limitation and thus of COPD.*
- *The goals of COPD assessment are to determine the severity of the disease, including the severity of airflow limitation, the impact 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.*

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.

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

Table 2.4. Classification of airflow limitation severity in COPD (Based on post-bronchodilator FEV_1)

In patients with $FEV_1/FVC < 0.70$:		
GOLD 1:	Mild	$FEV_1 \geq 80\%$ predicted
GOLD 2:	Moderate	$50\% \leq FEV_1 < 80\%$ predicted
GOLD 3:	Severe	$30\% \leq FEV_1 < 50\%$ predicted
GOLD 4:	Very Severe	$FEV_1 < 30\%$ predicted

Spirometry should be performed post bronchodilator.

Assessment of symptoms can be measured using the MRC dyspnea scale (below)

Table 2.5. Modified MRC dyspnea scale[a]

PLEASE TICK IN THE BOX THAT APPLIES TO YOU (ONE BOX ONLY) (Grades 0-4)	
mMRC Grade 0. I only get breathless with strenuous exercise.	☐
mMRC Grade 1. I get short of breath when hurrying on the level or walking up a slight hill.	☐
mMRC Grade 2. 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.	☐
mMRC Grade 3. I stop for breath after walking about 100 meters or after a few minutes on the level.	☐
mMRC Grade 4. I am too breathless to leave the house or I am breathless when dressing or undressing.	☐

[a] Fletcher CM. BMJ 1960; 2: 1662.

Because patients may experience symptoms beyond dypsnea, however, a comprehensive assessment of symptoms using a tool such as the CAT (below) is preferred.

Your name:	Today's date:

COPD Assessment Test

How is your COPD? Take the COPD Assessment Test™ (CAT)

This questionnaire will help you and your healthcare professional measure the impact COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers, and test score, can be used by you and your healthcare professional to help improve the management of your COPD and get the greatest benefit from treatment.

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.

Example: I am very happy 0 X 2 3 4 5 I am very sad

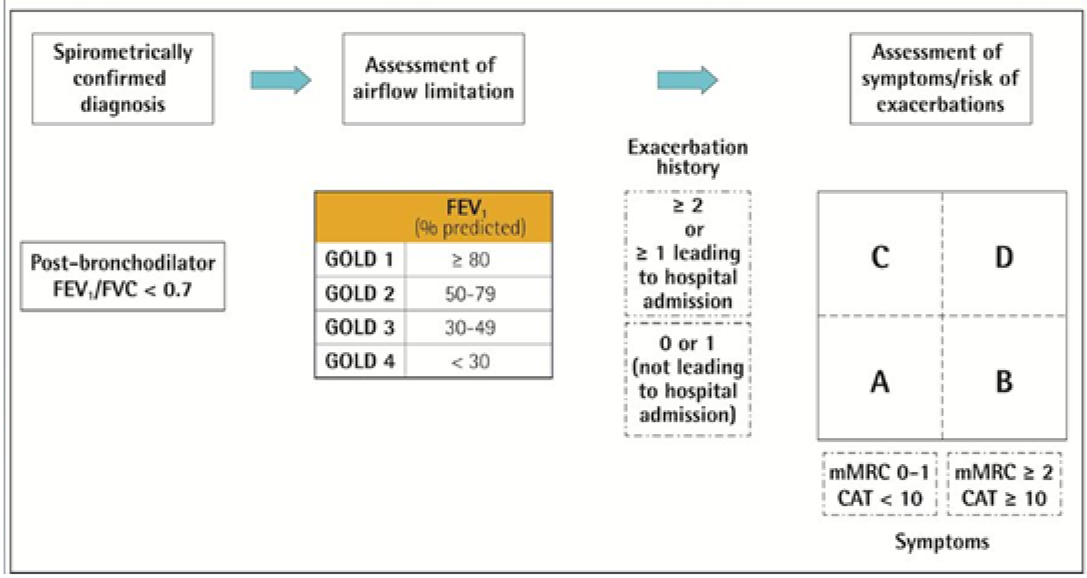
			SCORE
I never cough	0 1 2 3 4 5	**I cough all the time**	
I have no phlegm (mucus) in my chest at all	0 1 2 3 4 5	**My chest is completely full of phlegm (mucus)**	
My chest does not feel tight at all	0 1 2 3 4 5	**My chest feels very tight**	
When I walk up a hill or one flight of stairs I am not breathless	0 1 2 3 4 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	0 1 2 3 4 5	**I am very limited doing activities at home**	
I am confident leaving my home despite my lung condition	0 1 2 3 4 5	**I am not at all confident leaving my home because of my lung condition**	
I sleep soundly	0 1 2 3 4 5	**I don't sleep soundly because of my lung condition**	
I have lots of energy	0 1 2 3 4 5	**I have no energy at all**	

TOTAL SCORE

RES/QST/09/43163/1 Date of preparation: September 2009.

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

Figure 2.4. The refined ABCD assessment tool



KEY POINTS: Chapter 3: Evidence Supporting Prevention and MaintenanceTherapy

- *Smoking cessation is key. Pharmacotherapy and nicotine replacement reliably increase long-term smoking abstinence 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.*
- *Each pharmacologic treatment regimen should be individualized and guided by the severity of symptoms, risk of exacerbations, side-effects, co-morbidities, drug availability and cost, and the patient's response, preference and ability to use various drug delivery devices.*
- *Inhaler technique needs to be assessed regularly.*
- *Influenza vaccination decreases the incidence of lower respiratory tract infections.*
- *Pneumococcal vaccination decreases lower respiratory tract infections.*
- *Pulmonary rehabilitation improves symptoms, quality of life, and physical and emotional participation in everyday activities.*
- *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.*

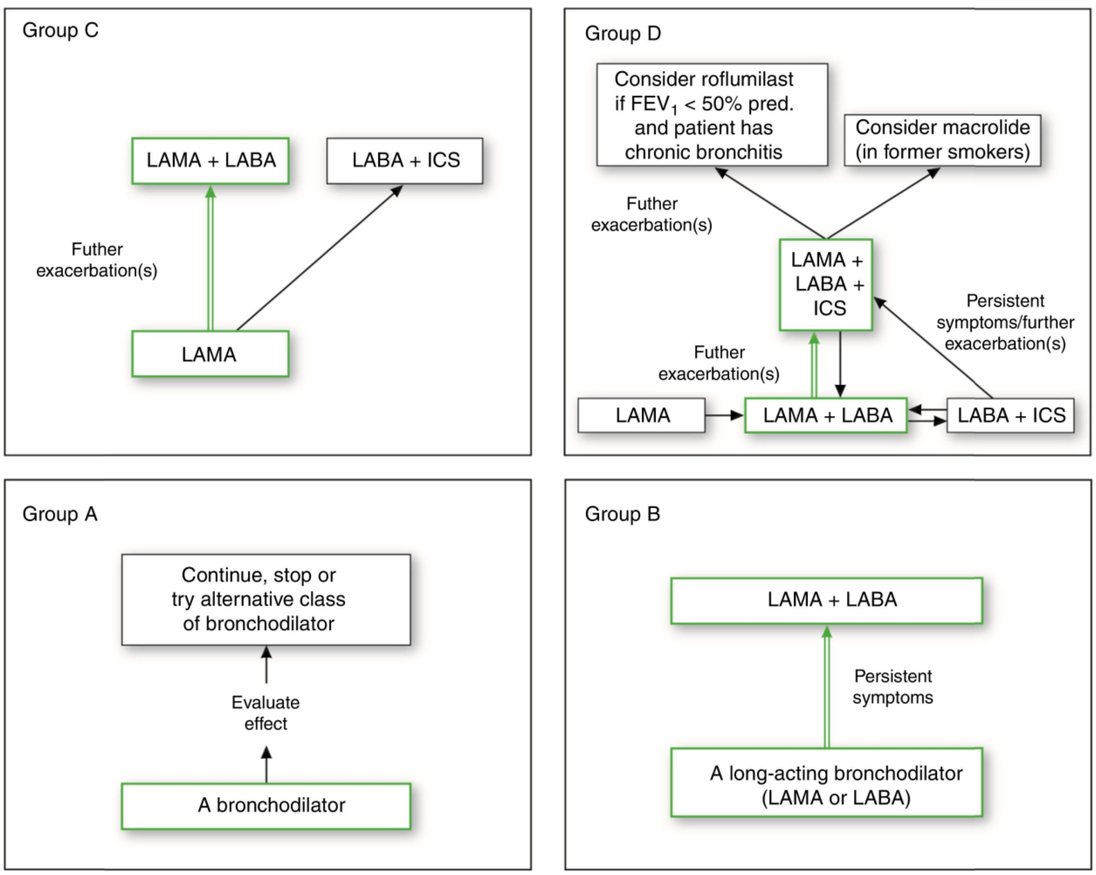
Table 3.4. Bronchodilators in Stable COPD
• Inhaled bronchodilators in COPD are central to symptom management and commonly given on a regular basis to prevent or reduce symptoms
• Regular and as-needed use of SABA or SAMA improves FEV1 and symptoms
• Combinations of SABA and SAMA are superior compared to either medication alone in improving FEV1 and symptoms
• LABAs and LAMAs significantly improve lung function, dyspnea, health status, and reduce exacerbation rates.
• LAMAs have a greater effect on exacerbation reduction compared with LABAs and decrease hospitalizations.
• Combination treatment with a LABA and LAMA increases FEV1 and reduces symptoms compared to monotherapy
• Combination treatment with a LABA and LAMA reduces exacerbations compared to monotherapy or ICS/LABA
• Tiotropium improves the effectiveness of pulmonary rehabilitation in increasing exercise performance
• Theophylline exerts a small bronchodilator effect in stable COPD and that is associated with modest symptomatic benefits.

Table 3.5 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
• Regular treatment with ICS increases the risk of pneumonia especially in those with severe disease
• Triple inhaled therapy of ICS/LAMA/LABA improves lung function, symptoms and health status and reduces exacerbations compared to ICS/LABA or LAMA monotherapy
Oral glucocorticoids
• Long-term use of oral glucocorticoids has numerous side effects with no evidence of benefits
PDE4 inhibitors
• In patients with chronic bronchitis, severe to very severe COPD and a history of exacerbations: A PDE 4 inhibitor improves lung function and reduces moderate and severe exacerbations A PDE 4 inhibitor improves lung function and decreases exacerbations in patients who are on fixed-dose LABA/ICS combinations
Antibiotics
• Long-term azithromycin and erythromycin therapy reduces exacerbations over one year
• Treatment with azithromycin is associated with an increased incidence of bacterial resistance and hearing test impairments
Mucolytics/antioxidants
• Regular use of NAC and carbocysteine reduces the risk of exacerbations in select populations
Other anti-inflammatory agents
• Simvastatin does not prevent exacerbations in COPD patients at increased risk of exacerbations and without indications for statin therapy. 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
• Leukotriene modifiers have not been tested adequately in COPD patients

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 are not limited to pharmacological treatments, and should be complemented by appropriate non-pharmacological interventions.*

Figure 4.1 Pharmacologic treatment algorithms by GOLD grade



Preferred treatment =

In patients with a major discrepancy between the perceived level of symptoms and severity of airflow limitation, further evaluation is warranted.

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.*
- *Exacerbations of COPD can be precipitated by several factors. The most common causes are respiratory tract infections.*
- *The goal for treatment in COPD exacerbations is to minimize the negative impact of the current exacerbation and to prevent subsequent exacerbations.*

- *Short-acting inhaled beta$_2$-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 (FEV_1), 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.*

Table 5.1 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 comorbiditi4es (e.g., heart failure, newly occurring arrhythmias, etc.)
• Insufficient home support

Table 5.2 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:
o Increase doses and/or frequency of short-acting bronchodilators
o Combine short-acting beta 2-agonists and anticholinergics
o Consider use of long-active bronchodilators when patient becomes stable

o Use spacers or air-driven nebulizers when appropriate
• Consider oral corticosteroids
• Consider antibiotics (oral) when signs of bacterial infection are present
• At all times:
o Monitor fluid balance
o Consider subcutaneous heparin or low molecular weight heparin for thromboembolism prophylaxis
o Identify and treat associated conditions (e.g. heart failure, arrhythmias, pulmonary embolism, etc).

KEY POINTS: Chapter 6: COPD and Co-morbidities

- *COPD often coexists with other diseases (co-morbidities) that may have a significant impact on prognosis.*
- *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.*
- *Cardiovascular Diseases are common and important co-morbidities in COPD.*
- *Osteoporosis and depression/anxiety, and obstructive sleep apnea 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.*2602959740
- *When COPD is part of a multimorbidity care plan, attention should be directed to ensure simplicity of treatment and to minimize polypharmacy.*

****

Please reference this document as follows:
From the *Global Strategy for the Diagnosis, Management and Prevention of COPD*, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2018. Available from: http://www.goldcopd.org/.

Appendix: Medications for COPD

Inhalers for COPD		
Medication[c]	**Dosing Frequency[a]**	**Cost[b]**
Short-acting Bronchodilators		
Beta-2 agonists		
Albuterol (Salbutamol) (*ProAir HFA*, *Proventil HFA*, *Ventolin HFA*	Four times daily, and/or as- needed	*ProAir HFA* $67 *Proventil HFA* $90 *Ventolin HFA* $25
Levalbuterol (*Xopenex HFA)*	Three to four times daily	$82
Anticholinergic		
Ipratropium (*Atrovent HFA*)	Four times daily	*Atrovent HFA* $400
Combination Beta-2 agonist/ Anticholinergic		
Albuterol/ipratropium (*Combivent Respimat*)	Four times daily (in place of long- acting bronchodilator), and/or as- needed	*Combivent Respimat* $414
Long-Acting Beta-2 agonists (LABAs)		
Indacaterol (*Arcapta Neohaler)*	Once daily	*Acrapta Neohaler* $30
Olodaterol (*Striverdi Respimat*)	Once daily (two inhalations at once)	*Striverdie Respimat* $218
Salmeterol (*Serevent Diskus*)	Twice daily	*Serevent Diskus* $249
Long-Acting Antimuscarinc agents (LAMAs)		
Aclidinium (*Tudorza Pressair)*	Twice daily	*Tudorza Pressair* $193
Glycopyrrolate (*Seebri Neohaler*)	Twice daily	$474
Tiotropium (*Spiriva HandiHaler*, *Spiriva Respimat*)	Once daily (two inhalations at once)	*Spiriva HandiHaler* $442; *Respimat* $442
Umeclidinium (*Incruse Ellipta*)	Once daily	$330
Combination LABA/LAMA		
Indacaterol/Glycopyrrolate (*Utibron Neohaler*)	Twice daily.	$440
Olodaterol/Tiotropium (*Stiolto Respimat*)	Once daily (two inhalations at once)	$442
Vilanterol/Umeclidinium (*Anoro Ellipta*)	Once daily	$345

Combination LABA/ Corticosteroid		
Formoterol/Budesonide (*Symbicort)*	Twice daily (two inhalations at a time)	$267
Salmeterol/Fluticasone propionate (*Advair Diskus, Advair HFA)*	Twice daily	$182
Vilanterol/Fluticasone furoate (*Breo Ellipta*)	Once daily	$158
Combination LABA/Corticosteroid/Anticholinergic		
Fluticasone/Umeclidium/Vilanterol (*Trelegy Ellipta)*	Once daily	$296
Other Agents		
Methylxanthines		
Theophylline	Variable depending on formulation Toxicity is dose related; drug levels should be monitored	$36 dollars (generic twice daily product)
Systemic Corticosteroids		
Prednisone	Once daily by mouth (usually 40mg once daily for 5 days)	($0.50 per day – therapy duration varies)
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)
Phosphodiesterase-4 Inhibitor		
Roflumilast (*Darliresp*)	250 mcg once daily by mouth for 4 weeks followed by 500mcg once daily	$421

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.

Inhalers for COPD adapted from Detail Document #310107. Pharmacist's Letter / Prescriber's Letter, January 2016.

Ease of use of Some Bronchodilator Inhalers				
Inhaler Type	Assembly	Indicator showing remaining doses	Breath-Hand Coordination Needed	Dependence on Strength of breath intake
Aerosphere Inhaler	Easy	Yes	Yes	No
Ellipta Inhalers	None	Yes		Yes
Respimat Inhalers	Difficult for some	Yes		No
Neohaler Inhalers	Difficult for some to remove capsules from packaging			Yes
Pressair Inhaler	None			Yes
Handihaler Inhaler	Inserting capsules into device may be difficult			Yes
Diskus Inhalers	None	Yes		Yes

(Adapted from The Medical Letter Vol 59, Issue 1518. April 10, 2017