Chronic Obstructive Pulmonary Disease (COPD)

Clinician Guide

August 2018

Introduction

This Clinician Guide is based on the 2018 Kaiser Permanente (KP) National Chronic Obstructive Pulmonary Disease (COPD) Guideline. The guideline was developed to assist primary care physicians and other health care professionals in the outpatient diagnosis and management of stable COPD and COPD exacerbations. The KP National COPD Guideline has adopted recommendations from the Veteran Affairs/Department of Defense (VA/DoD), American College of Physicians (ACP), American College of Chest Physicians (ACCP), American Thoracic Society (ATS), European Respiratory Society (ERS), Canadian Thoracic Society (CTS), Global Initiative for Chronic Obstructive Lung Disease (GOLD), and the U.S. Preventive Services Task Force (USPSTF) guidelines, with modifications. This guideline is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners.

Definitions

- COPD is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms (e.g., dyspnea, cough and/or sputum production) and irreversible airflow limitation due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.
- A COPD exacerbation is an acute worsening of respiratory symptoms that often result in additional therapy.

Key Points

- Smoking cessation is the single most effective intervention to reduce a patient's risk of developing COPD and slow its progression.
- Spirometry is essential for diagnosis and classification of COPD severity.
- Offer pneumococcal vaccination and annual influenza vaccination for all patients with COPD.
- Offer inhaled long-acting bronchodilators to patients with confirmed, stable COPD who have respiratory symptoms.
- Offer long-term continuous supplemental oxygen for patients with severe resting hypoxemia.
- Prescribe antibiotics and corticosteroids for the treatment of exacerbations of COPD.
- Offer pulmonary rehabilitation to patients with stable COPD with exercise limitation despite pharmacologic treatment and to patients with COPD who have recently been hospitalized for an acute exacerbation

Screening

- In asymptomatic adults, do not screen for COPD.

Diagnosis and Classification

- Use spirometry with post-bronchodilator testing to confirm all initial diagnoses of COPD.
- Offer prevention and risk reduction efforts, including smoking cessation and vaccination. *Refer to the Lung Cancer National KP Guidelines.*
- Consider using the GOLD COPD classification to determine severity of airflow limitation (mild, moderate, severe, very severe) based on post-bronchodilator spirometry measurement.

TABLE 1. GOLD CLASSIFICATION OF SEVERITY OF AIRFLOW LIMITATION

	Severity	FEV_1 % Predicted
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

*FEV_1: Forced Expiratory Volume in 1 second

- In patients presenting with early onset COPD or a family history of early onset COPD, consider testing for alpha-1 antitrypsin (AAT) deficiency.
- In patients with AAT deficiency, refer to a pulmonologist for management of treatment.
- In patients with severe disease or refractory symptoms, discuss life care planning. *Refer to KP Life Care Planning.*

Pharmacologic Treatment for Stable COPD

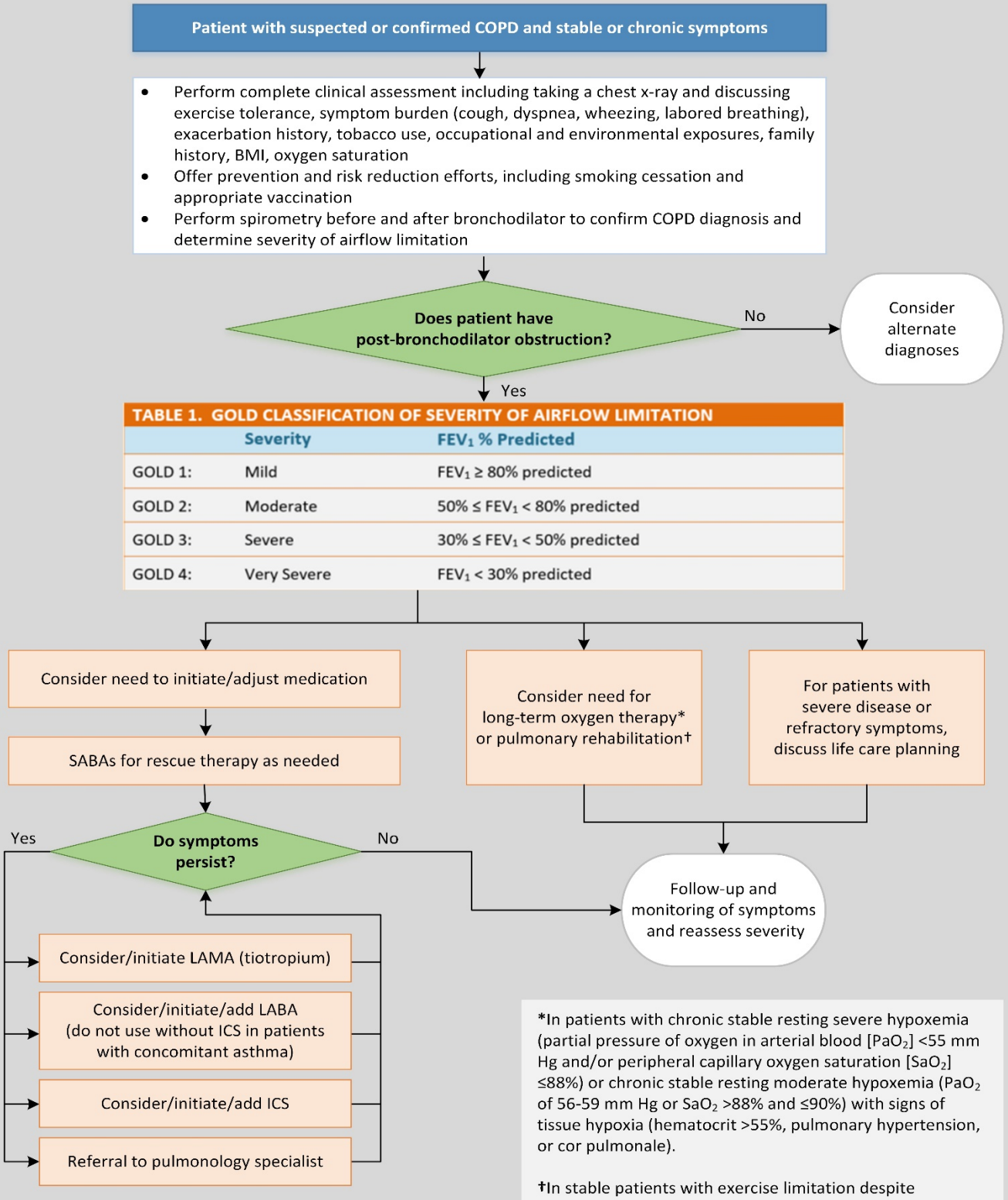
- In patients with confirmed COPD, prescribe inhaled short-acting $beta_2$-agonists (SABAs) for rescue therapy as needed.
- In patients who have difficulty actuating and coordinating drug delivery with metered-dose inhalers (MDIs), consider using spacers
- In patients with confirmed, stable COPD who continue to have respiratory symptoms (e.g., dyspnea, cough), offer long-acting bronchodilators (i.e., long-acting muscarinic antagonists [LAMAs] or long-acting $beta_2$-agonists [LABAs]).
- In patients with confirmed, stable COPD who continue to have respiratory symptoms (e.g., dyspnea, cough), consider offering inhaled LAMAs as first-line maintenance therapy
  - In patients treated with a short-acting antimuscarinic agents (SAMA) who are started on a LAMA, discontinue SAMA.
- In patients with confirmed, stable COPD who continue to have respiratory symptoms (e.g., dyspnea, cough) and severe airflow obstruction (i.e., post-bronchodilator forced expiratory volume measured during the first second [FEV_1]<50%) or a history of COPD exacerbations, prescribe inhaled LAMAs as first-line therapy.

- In symptomatic patients with confirmed stable COPD, do not offer an inhaled corticosteroid (ICS) as a first-line monotherapy.
- In patients with COPD who may have concomitant asthma, do not use inhaled LABAs without an ICS.
- In patients with confirmed, stable COPD who are on inhaled LAMAs (e.g. tiotropium) or inhaled LABAs alone and have persistent dyspnea on monotherapy, use combination therapy with both classes of drugs.
- In patients with confirmed, stable COPD who are on combination therapy with LAMAs (e.g. tiotropium) and LABAs and have persistent dyspnea or COPD exacerbations, consider adding ICS as a third medication.
- In patients with confirmed COPD who have a cardiovascular indication for beta-blockers, consider not withholding cardio-selective beta-blockers.

Non-pharmacologic Treatment for Stable COPD

- In patients with stable COPD with exercise limitation despite pharmacologic treatment and patients with COPD who have recently been hospitalized for an acute exacerbation, offer pulmonary rehabilitation.
- In symptomatic patients with an FEV_1<50% predicted or who have recently been hospitalized for an acute exacerbation, offer pulmonary rehabilitation.
- In symptomatic or exercise-limited patients with an FEV_1>50% predicted, consider pulmonary rehabilitation.
- In patients with chronic stable resting severe hypoxemia (partial pressure of oxygen in arterial blood [PaO_2] <55 mm Hg and/or peripheral capillary oxygen saturation [SaO_2] ≤88%) or chronic stable resting moderate hypoxemia (PaO_2 of 56-59 mm Hg or SaO_2 >88% and ≤90%) with signs of tissue hypoxia (hematocrit >55%, pulmonary hypertension, or cor pulmonale), offer long-term oxygen therapy.

FIGURE. CLASSIFICATION AND TREATMENT OF COPD



Abbreviations: BMI = body mass index; COPD = chronic obstructive pulmonary disease; GOLD = Global Initiative for Chronic Obstructive Lung Disease; FEV_1 = forced expiratory volume in 1 second; ICS = inhaled corticosteroid; LABA = long-acting beta$_2$-agonist; LAMA = long-acting antimuscarinic agent; SABA = short-acting beta$_2$-agonist

*In patients with chronic stable resting severe hypoxemia (partial pressure of oxygen in arterial blood [PaO_2] <55 mm Hg and/or peripheral capillary oxygen saturation [SaO_2] ≤88%) or chronic stable resting moderate hypoxemia (PaO_2 of 56-59 mm Hg or SaO_2 >88% and ≤90%) with signs of tissue hypoxia (hematocrit >55%, pulmonary hypertension, or cor pulmonale).

†In stable patients with exercise limitation despite pharmacologic treatment and to patients who have recently been hospitalized for an acute exacerbation, or symptomatic patients with an FEV_1<50% predicted or who have recently been hospitalized for an acute exacerbation.

Prevention of Acute Exacerbation

- Do not give oral or intravenous systemic corticosteroids beyond the first 30 days following an acute exacerbation of COPD for the sole purpose of preventing hospitalization due to subsequent exacerbations.
- In patients on optimal inhaled regimens with moderate to severe COPD and a history of acute exacerbations, consider using long term macrolide therapy, oral theophylline (methylxanthine), roflumilast (phosphodiesterase-4 [PDE-4] inhibitor), or oral N-acetylcysteine (mucolytic), in consultation with pulmonary specialists.

Treatment of Acute Exacerbation

- In patients with COPD exacerbations who have increased dyspnea and increased sputum purulence (change in sputum color) or volume, prescribe antibiotics.
- In patients with acute COPD exacerbations, prescribe a course of systemic corticosteroids (oral preferred) of 30-40 milligrams (mg) prednisone equivalent daily for 5-7 days.
- In patients with acute COPD exacerbations, use early non-invasive ventilation (NIV) to reduce intubation, mortality, and length of hospital stay.

TABLE 2. COMMON MEDICATIONS FOR MANAGEMENT OF COPD (ALPHABETICAL ORDER)*
Short-acting Beta$_2$-Agonist (SABA)
Albuterol 90 mcg MDI (ProAir HFA, Proventil HFA, Ventolin HFA*) 2 puffs every 4-6 hours PRN
Albuterol inhalation solution 2.5 mg/3 mL (0.083%) 2.5 mg nebulized every 4-6 hours PRN
Short-acting Muscarinic Antagonist (SAMA)
Ipratropium 17 mcg MDI (Atrovent HFA) 2 puffs 4 times per day
Ipratropium inhalation solution 0.5 mg/2.5 mL (0.02%) 0.5 mg nebulized every 6 hours
Combination SAMA + SABA
Ipratropium 20 mcg + albuterol (base) 100 mcg (Combivent Respimat) 1 inhalation 4 times per day
Ipratropium 0.5 mg + albuterol (base) 2.5 mg/3 mL (DuoNeb) 1 vial (3 mL) nebulized every 6 hours
Long-acting Muscarinic Antagonist (LAMA)
Glycopyrrolate inhalation solution 25 mcg/mL (Lonhala Magnair) 25 mcg nebulized twice daily
Tiotropium 2.5 mcg (Spiriva Respimat) 2 inhalations once daily*
Tiotropium 18 mcg/cap DPI (Spiriva HandiHaler) Two inhalations of the powder contents of a single capsule (18 mcg) once daily
Umeclidinium 62.5 mcg DPI (Incruse Ellipta) 1 inhalation once daily
Long-acting Beta$_2$-Agonist (LABA)
Arformoterol inhalation solution 15 mcg/2 mL (Brovana) 15 mcg nebulized twice daily
Formoterol inhalation solution 20 mcg/2 mL (Perforomist) 20 mcg nebulized twice daily
Olodaterol 2.5 mcg (Striverdi Respimat) 2 inhalations once daily*
Salmeterol 50 mcg DPI (Serevent Diskus) 1 inhalation twice daily
Combination LAMA + LABA
Glycopyrrolate 9 mcg + formoterol 4.8 mcg MDI (Bevespi Aerosphere) 2 puffs twice daily
Tiotropium 2.5 mcg + olodaterol 2.5 mcg (Stiolto Respimat) 2 inhalations once daily*
Umeclidinium 62.5 mcg + vilanterol 25 mcg DPI (Anoro Ellipta) 1 inhalation once daily
Inhaled Corticosteroid (ICS)
Beclomethasone 80 mcg (QVAR RediHaler) 80-320 mcg twice daily
Budesonide 180 mcg DPI (Pulmicort Flexhaler) 180-720 mcg twice daily
Budesonide inhalation solution 0.25 mg & 0.5 mg & 1 mg/2 mL (Pulmicort Respules) 0.5 to 1 mg per day as a single dose or divided twice daily
Ciclesonide 80 mcg & 160 mcg MDI (Alvesco) 80-320 mcg twice daily*
Fluticasone propionate 110 mcg & 220 mcg MDI (Flovent HFA) 110-880 mcg twice daily
Fluticasone propionate 55 mcg & 113 mcg & 232 mcg DPI (ArmonAir RespiClick) 55 to 232 mcg twice daily
Mometasone 220 mcg DPI (Asmanex Twisthaler) 220-440 mcg once daily in the evening or 220-440 mcg twice daily
Mometasone 100 mcg & 200 mcg MDI (Asmanex HFA) 200-400 mcg twice daily
Combination ICS + LABA
Budesonide 80 mcg & 160 mcg + formoterol 4.5 mcg MDI (Symbicort) 2 puffs twice daily
Fluticasone furoate 100 mcg & 200 mcg + vilanterol 25 mcg DPI (Breo Ellipta) 1 inhalation once daily
Fluticasone propionate 100 mcg & 250 mcg & 500 mcg + salmeterol 50 mcg DPI (Advair Diskus) 1 inhalation twice daily*
Fluticasone propionate 45 mcg & 115 mcg & 230 mcg + salmeterol 21 mcg (Advair HFA) 2 puffs twice daily
Fluticasone propionate 55 mcg & 113 mcg & 232 mcg + salmeterol 14 mcg (AirDuo Respiclick) 1 inhalation twice daily†
Mometasone 100 mcg & 200 mcg + formoterol 5 mcg MDI (Dulera) 2 puffs twice daily
Triple Combination ICS + LAMA + LABA
Fluticasone furoate 100 mcg + umeclidinium 62.5 mcg + vilanterol 25 mcg DPI (Trelegy Ellipta) 1 inhalation once daily

***Some of the drugs and/or doses listed in this table may be off-label for COPD; preferred drugs are noted with an asterisk
†Available as both a brand and generic
Abbreviations: DPI = dry powder inhaler; MDI = metered-dose inhaler

TERMINOLOGY

Recommendation Language	Strength*	Action
Start, initiate, prescribe, treat, etc.	Strong affirmative	Provide the intervention. Most individuals should receive the intervention; only a small proportion will not want the intervention.
Consider starting, etc.	Conditional affirmative	Assist each patient in making a management decision consistent with personal values and preferences. The majority of individuals in this situation will want the intervention, but many will not. Different choices will be appropriate for different patients.
No recommendation for or against	None	Given that the balance between desirable and undesirable effects, the evidence quality, the values & preferences, and the resource allocation implications of an intervention do not drive a recommendation in one particular direction, recommendations will be made at the discretion of the individual clinician.
Consider stopping, etc.	Conditional negative	Assist each patient in making a management decision consistent with personal values and preferences. The majority of individuals in this situation will not want the intervention, but many will. Different choices will be appropriate for different patients.
Stop, do not start, etc.	Strong negative	Do not provide the intervention. Most individuals should not receive the intervention; only a small proportion will want the intervention.

*Refers to the extent to which one can be confident that the desirable effects of an intervention outweigh its undesirable effects.

DISCLAIMER

This guideline is informational only. It is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners, considering each patient's needs on an individual basis. Guideline recommendations apply to populations of patients. Clinical judgment is necessary to design treatment plans for individual patients.