

10.8 COPD Clinical Practice Guideline

This guideline is intended to assist the practitioner in clinical decision-making and attempt to define clinical practices that apply to most patients in most circumstances. The treating practitioner should make the ultimate decision regarding the care of a particular patient.

Scope and Target Population

All Adults greater than 18 years of age.

Priority Aims

1. Increase the use of spirometry in the diagnosis of patients with COPD.
2. Increase the number of patients with COPD who receive information on the options for tobacco cessation and information on the risks of continued smoking.
3. Increase the appropriate use of pharmacotherapy prescribed for patients with COPD.
4. Increase education and management skills for patients with COPD.
5. Reduce COPD exacerbation requiring Emergency Department (ED) evaluation or hospital admission.
6. Increase the number of patients with COPD presenting with an acute exacerbation that have an oxymetric evaluation.

Clinical Recommendations

A. Establish diagnosis and severity of COPD through spirometry, pre- and post- bronchodilator and chest radiograph in addition to history and physical examination.

COPD is a preventable and treatable disease with some significant extra pulmonary effects that may contribute to the severity in individual patients. Its pulmonary component is characterized by airflow limitation that is not fully reversible. The airflow limitation is usually both progressive and associated with an abnormal inflammation response of the lungs to noxious particles or gases.

Chronic bronchitis is defined as the presence of chronic productive cough for 3 months in each of two successive years in a patient in whom other causes of chronic cough have been excluded.

Emphysema is defined as an abnormal permanent enlargement of the air spaces distal to the terminal bronchioles, accompanied by destruction of their walls and without obvious fibrosis.

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. The diagnosis should be confirmed by spirometry.

Signs/symptoms for which COPD may be suspected:

- Wheezing, prolonged expiratory phase of respiration, rhonchi, and cough
- Dyspnea (exertional or at rest)
- Chronic cough (duration greater than 3 months) with or without sputum production.
- Hyperinflation of the chest with increased anterior-posterior (A-P) diameter
- Use of accessory muscles of respiration
- Pursed-lip breathing
- Signs of cor pulmonale
- Increased pulmonic component of the second heart sound
- Neck vein distention
- Lower extremity edema
- Hepatomegaly

Differential Diagnosis

Possible diagnoses for symptoms that are not COPD include asthma, bronchiectasis, cystic fibrosis, obliterative bronchiolitis, congestive heart failure, and upper airway lesions.

NOTE: Finger clubbing is NOT characteristic of COPD and should alert the clinician to another condition such as idiopathic pulmonary fibrosis (IPF), cystic fibrosis, lung cancer, or asbestosis.

Spirometry

Spirometry is an established and important method of measuring lung function for the diagnosis of patients with COPD. It is recommended for symptomatic patients at risk of COPD, particularly smokers greater than 40 years of age, and for regular follow-up of patients with documented COPD.

Pre- and Post-bronchodilator FEV₁

Measurement of pre- and post-bronchodilator FEV₁ is important to distinguish COPD from asthma, as treatment and prognosis differ. Factors commonly used to distinguish COPD from asthma include:

- Age of onset
- Smoking history
- Triggering factors
- Occupational history

Chest Radiograph

A chest radiograph is recommended at the time of diagnosis to exclude other causes. The chest radiograph in COPD is often normal but may show signs of hyperinflation, a flattened diaphragm, or bullae.

- B. After establishing severity, assess patient needs for pharmacological and non-pharmacological treatment to help improve and prevent symptoms, reduce frequency and severity of exacerbations, improve health status, and improve exercise tolerance.

Stage and Severity of COPD may be categorized according to the following table:

STAGE	Category of COPD	Typical Symptoms and Signs
I	Mild	No abnormal signs Cough ± sputum Little or no dyspnea
II	Moderate	Breathlessness (± wheeze on moderate exertion) Cough (± sputum) Variable abnormal signs (general reduction in breath sounds, presence of wheezes) Hypoxemia may be present
III	Severe	Dyspnea with any exertion or at rest Wheeze and cough often prominent
IV	Very Severe	Lung hyperinflation usual; Cyanosis, peripheral edema and polycythemia in advanced disease Hypoxemia and hypercapnia are common

I: Mild	II: Moderate	III: Severe	IV: Very Severe
<ul style="list-style-type: none"> • FEV₁/FVC < 0.70 • FEV₁ > 80% predicted 	<ul style="list-style-type: none"> • FEV₁/FVC < 0.70 • 50% < FEV₁/ 80% predicted 	<ul style="list-style-type: none"> • FEV₁/FVC < 0.70 • 30% < FEV₁ 50% predicted 	<ul style="list-style-type: none"> • FEV₁/FVC < 0.70 • 30% < FEV₁ 50% predicted plus respiratory failure
Active reduction of risk factor(s): influenza vaccination ----->			
Add short-acting bronchodilator (when needed) ----->			
Add regular treatment with one or more long-acting bronchodilators (when needed), Add rehabilitation			
Add inhaled Glucocorticosteroids if repeated exacerbations *			
Add long-term oxygen if chronic respiratory failure. Consider surgical treatments			

* Long-term treatment with oral glucocorticosteroids is not recommended. The most appropriate dosing is the clinician's judgment of the patient's response to therapy. Once control of COPD is achieved, the dose of medication should be carefully titrated to the minimum dose required to maintain control.

Bronchodilators

Albuterol is the preferred bronchodilator in the setting of an acute exacerbation of COPD because of its rapid onset of action.

Ipratropium may be added to produce additive bronchodilation and allow the use of lower doses of albuterol.

Albuterol and ipratropium are equipotent as bronchodilators, improving dyspnea and exercise tolerance equally well.

Salmeterol is a long-acting bronchodilator, which is a suitable agent for scheduled administration. As a scheduled bronchodilator, salmeterol has the main advantage of requiring only twice-daily dosing, and therefore may improve compliance.

Other Pharmacologic Treatment

Anticholinergics and Beta-2 Agonists

Regular use of a long-acting Beta-2 agonist or anticholinergic can improve health status. Combining drugs with different mechanisms and durations of action might increase the degree of bronchodilation for equivalent or lesser side effects.

Antibiotics

The use of antibiotics is not recommended except for treatment of bacterial exacerbations of COPD.

Antitussives

Regular use of antitussives is not recommended in COPD since cough can have a significant protective effect.

Antiviral Agents

Treatments other than vaccination are available to treat influenza, but are not a substitute for vaccination unless it is contraindicated.

Leukotriene Modifiers

This drug class has not been adequately tested in COPD patients and its use cannot be recommended until additional evidence relative to its efficacy is available.

Mucolytics

In theory, reducing mucus viscosity and enhancing cough clearance or mucociliary clearance of mucus could improve pulmonary function and reduce the incidence of respiratory infections in individuals with COPD. Ideally, treatment would result in both objective (increase in FEV₁) and subjective (better sense of well-being) improvement for those individuals.

Oral Beta-Agonists

Inhaled bronchodilator therapy is preferred.

C. Management of COPD should include an education plan suited to the patient's specific needs, encouragement of exercise, tobacco use cessation and other behavioral changes, and monitoring of immunization status.

COPD should be considered if the patient has one or more of the following risk factors:

- History of tobacco use or prolonged exposure to second-hand or environmental smoke
- Asthma
- Environmental exposure to occupational dust and chemicals (e.g., cadmium)
- Alpha I – antitrypsin deficiency
- Chronic respiratory infections

Non-Pharmacologic Treatment

Rehabilitation

The principal goals of pulmonary rehabilitation are to reduce symptoms, improve quality of life, and increase physical and emotional participation in everyday activities. Benefit does wane after a rehabilitation program ends, but if exercise training is maintained at home the patient's health status remains above pre-rehabilitation levels.

Benefits of Pulmonary Rehabilitation in COPD include:

- Improves exercise capacity
- Reduces the perceived intensity of breathlessness
- Improves health-related quality of life
- Reduces the number of hospitalizations and days in the hospital
- Reduces anxiety and depression associated with COPD
- Strength and endurance training of the upper limbs improves arm function
- Benefits extend well beyond the immediate point of training
- Improves survival
- Respiratory muscle training is beneficial, especially when combined with general exercise training
- Psychosocial intervention is helpful

Important points to consider in choosing patients:

- Functional Status
- Severity of dyspnea

- Motivation
- Smoking status

Comprehensive Pulmonary rehabilitation program components:

- Exercise Training ranges in frequency from daily to weekly, in duration from 10 minutes to 45 minutes per session, and in intensity from 50% peak oxygen consumption (VO₂ Max) to maximum tolerated. The minimum length of an effective pulmonary rehabilitation program is 6 weeks.
- Nutritional Counseling is important to nutritional state, which is an important determinant of symptoms, disability, and prognosis in COPD; both overweight and underweight can be a problem. Health care workers should identify and correct the reasons for reduced calorie intake in COPD patients.
- Education methods aimed at continuous improvement should be incorporated into educational strategies that take the long-term relationships between patients and health care professionals into account. It is important to develop a plan that includes the educator, patient, and family. Learning assessment and feedback tools should:
 - Incorporate COPD needs and interventions within a conceptual behavior change model.
 - Be flexible enough to fit the various office practice models (step-care model with stages of change).
 - Include Core Learning needs/objectives:
 - Knowledge of Basic facts about COPD
 - Skills
 - Attitude
 - Partnership in Care

Tobacco

Tobacco cessation and oxygen therapy are the only interventions proven to prolong survival of patients with COPD.

The National Cancer Institute, which is the primary federal agency for tobacco control, states that the keys to patient awareness and education about tobacco cessation in a clinical setting are:

1.	ASK	about tobacco use at every visit
2.	ADVISE	all users to stop
3.	ASSESS	users' willingness to make an attempt to quit
4.	ASSIST	users' efforts to quit
5.	ARRANGE	follow-up

Consider prescription nicotine agents with a plan for smoking cessation.

Vaccines

Influenza and pneumococcal pneumonia together are the 6th leading cause of death in the U.S. among persons 65 years of age and older. Immunization with **Pneumococcal** and **influenza vaccines** are recommended by the U.S. Public Health Service's Advisory Committee on Immunization Practices to reduce infectious complications involving the respiratory tract.

D. A trial of inhaled steroids is indicated for symptoms not controlled by scheduled bronchodilators.

Method of Drug Delivery

Metered Dose Inhaler (MDI) with spacer
Some studies support the use of spacers to obtain effective MDI drug delivery. The increased distance slows the velocity of the fine particles, increasing their chances of reaching the bronchial tree. It is of utmost importance to train and re-train patients, nurses, physicians, and pharmacists in proper inhaler techniques for optimal drug delivery. Evidence of the effectiveness of one type of spacer over another is variable and controversial.
Dry Powder Inhaler (DPI)
DPIs are an alternative to MDIs that are strongly supported by study data. DPIs deliver drugs in dry-powder form without the use of propellants. In addition, DPIs are breath-activated, eliminating the need to synchronize inhalation with actuation. Newer DPI products deliver pure drug from self-enclosed, multiple-dose devices that help avoid the potential adverse effects of additives used in MDIs.
Nebulizers
Aerosol particle diameters range from 1-5um in SVN (small volume nebulizer), which are comparable with MDI or DPI. Studies have shown no difference in the efficacy of the delivery methods. Reports suggest that between 47% and 89% of adults may have unacceptable inhaler technique. Clinical studies in which nebulized therapy is preferable to either MDI or DPI include: – Patients incapable of performing MDI or DPI maneuver – Adults who have a vital capacity less than 1.5 times their predicted tidal volume (7mL/kg)

E. A course of systemic steroids is beneficial for acute COPD exacerbations.

Doses of oral prednisone 30-60 mg per day should be used for 10 to 14 days. If longer durations are needed, consider a tapering schedule. There is no need to discontinue inhaled steroids while the patient is taking oral prednisone. In fact, the inhaled steroid may serve as a “systemic-steroid-sparing-agent” and the concomitant use may minimize the dose of systemic steroids needed to diminish airway inflammation.

F. Patients should be regularly assessed for hypoxemia; appropriate oxygen therapy should be prescribed accordingly. Consider assessment for hypercapnia.

Hypoxemia

Progressive hypoxemia is commonly associated with COPD patients. Hypoxemia can rapidly lead to clinical deterioration. By preventing or correcting cellular hypoxemia, the treatment of hypoxemia can be life preserving. Long-term oxygen supplementation has been demonstrated to improve survival in hypoxemic patients with COPD. However, tissue hypoxemia may not always be adequately prevented or treated by simply addressing the hypoxemia. Rather, the physician must carefully evaluate the full scope of the oxygen transport and delivery.

The evaluation of gas exchange status by arterial blood gas (ABG) measurement is recommended for initiation of oxygen therapy as well as determines PCO_2 and acid-base status. Assessment for long-term oxygen needs by ABG analysis should be considered for stable outpatients with:

- Severe airflow obstruction
- Symptomatic dyspnea with polycythemia, pulmonary hypertension (by ECG or echo), or altered mental status
- Problematic heart failure
- Severe symptoms out of proportion to the degree of airway obstruction

Nocturnal Hypoxia

During sleep, even in individuals without COPD, minute ventilation decreases. In patients with COPD whose O₂ saturation is already low or borderline, this hypoventilation resulting in hypoxia or sleep apnea can induce daytime hypersomnolence and may worsen symptoms of COPD.

Risk factors for Hypoxia During Sleep:

- Severe COPD, especially with resting O₂ Sat < 88% or exercise-induced hypoxia
- Evidence of cor pulmonale
- Daytime hypersomnolence in the absence of sleep deprivation
- Polycythemia

Screening for Nocturnal Hypoxia

Screening can be done easily and inexpensively with overnight pulse oximetry in the home. The oximeter is returned to the clinic, where the overnight oximetry and heart rate are downloaded.

Hypercapnia

In an ambulatory, stable patient with COPD, assessment for hypercapnia by arterial blood gases (ABGs) should be considered in the following circumstances:

- Clinical suspicion of hypercapnia (asterixis, headache, hypersomnolence, altered mental status)
- FEV₁ less than 1.0
- Upon initiation of oxygen
- Morbid obesity
- Excessive daytime somnolence
- Problematic right heart failure/cor pulmonale
- Severe airflow obstruction

Oxygen Therapy

- Long Term Oxygen therapy (more than 15 hours per day) improves survival and quality of life in hypoxemic patients.
- ABG measurement is recommended for initiation of oxygen therapy as well as to determine PaCO₂ and acid-base status.
- Pulse Oximetry is a good method for monitoring oxygen saturation and can be used in adjusting the oxygen flow setting.
- Medicare has adopted indications for long-term oxygen therapy as reimbursement criteria.
- Patients considered for long-term therapy may benefit from assessment by a pulmonologist.
- Supplemental long-term oxygen therapy should be provided at a flow rate sufficient to produce a resting PaCO₂ of >55 mm Hg, or SaO₂ greater than 89%.
- Titrate liter-flow to goal at rest: add 1 L/min during exercise or sleep or titrate during exercise to goal of SaO₂ greater than 89%. Titrate sleep liter-flow to 8-hour sleep of SaO₂ greater than 89%.
- Consider referral for sleep evaluation if patient experiences cyclic desaturation during sleep but is normoxemic at rest.
- Recheck SaO₂ in 1-3 months if hypoxia developed during an acute exacerbation. Rechecks should be performed annually if hypoxia is discovered in an outpatient with stable COPD.

G. For patients with severe symptoms, despite maximal medical therapy, lung volume reduction surgery (LVRS) and transplantation may be an option.

LVRS

The goal of LVRS is to relieve disabling dyspnea in patients in whom emphysema has limited activities of daily living (ADLs) and has proved refractory to optimal medical management. Following LVRS improvement has been noted in:

- Lung elastic recoil
- Respiratory function
- Ventilation/perfusion matching
- Cardiovascular function

Lung Transplantation

Unilateral and bilateral lung transplantation is a treatment option in highly selected patients with severe COPD. A few studies show improvement in quality of life parameters but no increase of survivability.

H. Physicians should discuss advance directives/health care directives and goals as early as possible.

For the patient with moderate to severe COPD, at a routine office visit ask the question,

“Do you have a living will?”

If the answer is **“yes”** ask:

- What it consists of
- Whether there is a designated power of attorney
- Request a copy to place in the patient’s chart.

If the answer is **“no”**:

- Offer the patient written information on health care directives.
- Encourage the patient to fill it out and include the power of attorney
- Offer to discuss any questions at the next office visit

For a patient with severe COPD, at a routine office visit ask,

“What are your treatment preferences in regards to hospitalization, life support (including CPR, endotracheal intubation and non-invasive ventilation), and end-of-life care?”

- Encourage the patient to discuss these options with family or health care surrogate and record them in a health care directive.
- Document the treatment preferences in the patients medical record
- Place a copy of the health care directive in the patient’s chart.

Based on Global Initiative for Chronic Obstructive Lung Disease, Executive Summary, Updated 2006 and Institute for Clinical Systems Improvement, Chronic Obstructive Pulmonary Disease, Sixth Edition January 2007.

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