

Chronic Obstructive Pulmonary Disease (COPD) Clinical Guideline

These clinical guidelines are designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients. They are not intended to replace a clinician’s judgment or to establish a protocol for all patients with a particular condition. A guideline will rarely establish the only approach to a problem.

GUIDELINE HISTORY and APPROVAL

ACTION	SEED GUIDELINE and/or MAIN INFORMATION & GROUP SOURCE(S)	DATE	ORGANIZATION
Guideline reviewed, revised and approved	American Thoracic Society. Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1995;152(5, pt 2):S77-S121.	Jan. 04, 2001	Geisinger Health Plan/ Guideline Committee
Guideline reviewed, revised and approved	Same	Jan.25, 2001	Geisinger Health Plan/Quality Improvement Committee
Guideline reviewed, revised and approved	American Thoracic Society. Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1995;152(5, pt 2):S77-S121 Global Initiative for Chronic obstructive Lung Disease (GOLD) – Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease Meeting NHLBI/WHO Workshop Report Executive Summary based on April 1998 meeting	Jan. 21, 2003	Geisinger Health Plan/ Guideline Committee
Guideline reviewed, revised and approved	Same	Jan. 22, 2003	Geisinger Health Plan/Quality Improvement Committee
Guideline reviewed, revised and approved	Same	May 13, 2003	Geisinger Health Plan/ COPD Team
Guideline reviewed, revised and approved	Same	May 27, 2003	Geisinger Health Plan/ Guideline Committee
Guideline reviewed, revised and approved	Same	May 29, 2003	Geisinger Health Plan/Quality Improvement Committee
Guideline reviewed, revised and approved	Same	July 2, 2003	Geisinger Health Plan/Guideline Review Conference/ COPD Team

Guideline reviewed, revised and approved	Same	Sept. 19, 2003	Geisinger Health Plan/ Guideline Committee
Guideline reviewed, revised and approved	Same	Oct. 17, 2003	Geisinger Health Plan/Medical Management Administrative Committee
Guideline reviewed, revised and approved	Same	Oct. 22, 2003	Geisinger Health Plan/Quality Improvement Committee
Guideline reviewed, revised and approved	Same	Nov. 26, 2003	Geisinger Health Plan/ Medical Management Committee
Guideline reviewed, revised and approved	Same	June 22, 2005	Geisinger Health Plan/Medical Management Administrative Committee
Guideline reviewed, revised and approved	Same	July 27, 2005	Geisinger Health Plan/Quality Improvement Committee
Guideline reviewed	American Thoracic Society. Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. 2004 http://www.thoracic.org/sections/copd/resources/copddoc.pdf Global Initiative for Chronic obstructive Lung Disease (GOLD) – Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease Meeting NHLBI/WHO Workshop Report Executive Summary based on the 2006 meeting	Jan. 15, 2007	Geisinger Health Plan/ Guideline Committee
Guideline Reviewed	Same as above.	Feb 7 -28, 2007	Geisinger Health Plan Pharmacy Dept.
Guideline Reviewed	Same as above.	May 23 – Jun 4, 2007	Geisinger Health Plan Medical Directors
Guideline Reviewed	Same as above.	July 2, 2007	Geisinger Health Plan/ Medical Management Committee
Guideline Reviewed	Same as above.	July 25, 2007	Geisinger Health Plan/Quality Improvement Committee
Guideline reviewed,	Same as above	Oct 13, - 2008	Geisinger Health Plan/ Guideline Committee
Guideline reviewed,	Same as above	Feb 3 – 16, 2009	Geisinger Health Plan Pharmacy Dept.
Guideline reviewed,	Same as above	June 15, 2009	Medical Management Committee
Guideline Reviewed	Same as above	June 8-19, 2009	Geisinger Health Plan Medical Directors

Guideline Reviewed	Same as above	July 22, 2009	Geisinger Health Plan/Quality Improvement Committee
Guideline Reviewed	American Thoracic Society. Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. 2004 http://www.thoracic.org/sections/copd/resources/copddoc.pdf <i>Global Strategy for the Diagnosis, Management and Prevention of COPD</i> , Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2010. Available from: http://www.goldcopd.org .	May 2011	Geisinger Health Plan/ Guideline Committee
Guideline Approved	Same as above	July 27, 2011	Geisinger Health Plan/Quality Improvement Committee



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OVERVIEW

According to the American Lung Association's fact sheet* on Chronic Obstructive Pulmonary Disease (COPD), the disease includes emphysema and chronic bronchitis – diseases that are characterized by obstruction to airflow. Emphysema and chronic bronchitis frequently coexist. Thus physicians prefer the term COPD. It does not include other obstructive diseases such as asthma. Approximately 12 million Americans suffer from COPD, which is the fourth leading cause of death, claiming the lives of 130,933 Americans in 2005.

The annual cost to the nation for COPD is approximately \$37.2 billion, including health care expenditures of \$20.9 billion and \$16.3 billion in indirect costs such as lost wages.

Approximately 80 to 90 percent of COPD cases are caused by smoking. Female smokers are nearly 13 times as likely to die from COPD as women who have never smoked. Male smokers are nearly 12 times as likely to die from COPD as men who have never smoked. Other known causes are frequent lung infections, second hand smoke, heredity and exposure to certain industrial pollutants.

Chronic bronchitis is an inflammation and eventual scarring of the lining of the bronchial tubes. An estimated 9 million people suffer from chronic bronchitis, the seventh leading chronic condition in America.

Symptoms of bronchitis include chronic cough, increased mucus, frequent clearing of the throat and shortness of breath.

Emphysema causes irreversible lung damage. The walls between the air sacs within the lungs lose their ability to stretch and recoil. They become weakened and break. Elasticity of the lung tissue is lost, causing air to be trapped in the air sacs and impairing the exchange of oxygen and carbon dioxide.

An estimated 3.6 million Americans have emphysema. Of the emphysema sufferers, 54.8 percent are male, and 45.2 percent are female. While more men suffer from the disease than women, the condition is increasing among women. Between 1982 and 1995, the emphysema prevalence rate in women increased 14.8 percent.

Symptoms of emphysema include cough, shortness of breath, and a limited exercise tolerance. Diagnosis is made by pulmonary function tests, along with the patient's history, examination and other tests.

Alpha 1-antitrypsin deficiency-related (ATT) emphysema is caused by the inherited deficiency of a protein called alpha 1-antitrypsin (AAT) or alpha¹-protease inhibitor. ATT, produced by the liver, is a "lung protector". In the absence of ATT, emphysema is almost inevitable.

An estimated 50,000 to 100,000 Americans, primarily of northern European descent, have ATT deficiency emphysema.

The onset of ATT-deficiency emphysema, between 32 and 41 years of age is characterized by shortness of breath and decreased exercise capacity. Blood screening is used if the trait is suspected and can determine if a person is a carrier or ATT-deficient. If children are diagnosed as ATT-deficient through blood screening, they may undergo a liver transplant.

Smoking significantly increased the severity of emphysema in ATT-deficient individuals.

COPD Treatment

The quality of life for a person suffering from COPD diminishes as the disease progresses. At the onset, there is minimal shortness of breath. People with COPD may eventually require supplemental oxygen and may have to rely on mechanical respiratory assistance.

Depending on the severity of the disease, treatments include bronchodilators, which open up air passages in the lungs, antibiotics, exercise to strengthen muscles, oxygen therapy, and systematic glucocorticosteroids.

To reduce and control symptoms of chronic bronchitis, sufferers should live a health lifestyle by exercising, avoiding cigarette smoke and other air pollutants, and eating well.

Pulmonary rehabilitation is a preventive health care program provided by a team of health professionals to help people cope physically, psychologically and socially with COPD.

Lung transplantation is being performed in increasing numbers and may be an option for people suffer from severe emphysema. Additionally, a new procedure, lung volume reduction surgery, shows promise and is being performed with increased frequency.

Special treatments for ATT-deficiency emphysema include ATT replacement therapy.

Current research into COPD is focusing on gene therapy; it is hoped that clinical trials of this type of therapy will take place within the decade.

* American Lung Association web site at <http://www.lungusa.org>.

SEED GUIDELINE(S)

1. The Geisinger Health Plan clinical guideline was adapted from an American Thoracic Society Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1995; 152(5, pt 2): S77-S121.
2. Global Initiative for Chronic Obstructive Lung Disease (GOLD) – Global Strategy for the Diagnosis, management, and Prevention of Chronic Obstructive Pulmonary Disease Meeting NHLBI/WHO Workshop Report Executive Summary based on 2010 meeting.
3. American Thoracic Society. Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. 2004.

GOALS

Minimize the morbidity and mortality of members with COPD while achieving the highest possible quality of life. This is accomplished through:

1. Incorporation of COPD clinical guideline into a comprehensive disease management approach.
2. The promotion of a Tobacco Cessation Program for members identified with COPD who smoke; and
3. The encouragement of member's self-improvement in their own chronic disease management.

FAST FACTS

Chronic Obstructive Pulmonary Disease (COPD), includes emphysema and chronic bronchitis – diseases that are characterized by obstruction to airflow.

Approximately 16.4 million Americans suffer from COPD, which is the fourth leading cause of death, claiming the lives of 122,283 Americans in 2003.

Approximately 80 to 90 percent of COPD cases are caused by smoking. Female smokers are nearly 13 times as likely to die from COPD as women who have never smoked. Male smokers are nearly 12 times as likely to die from COPD as men who have never smoked.

Diagnosis of COPD is made by pulmonary function tests, along with the patient's history, examination and other tests.

Depending on the severity of the disease, treatments include bronchodilators, which open up air passages in the lungs, antibiotics, exercise to strengthen muscles, oxygen therapy, and systematic glucocorticosteroids.

Pulmonary rehabilitation is a preventive health care program provided by a team of health professionals to help people cope physically, psychologically and socially with COPD.

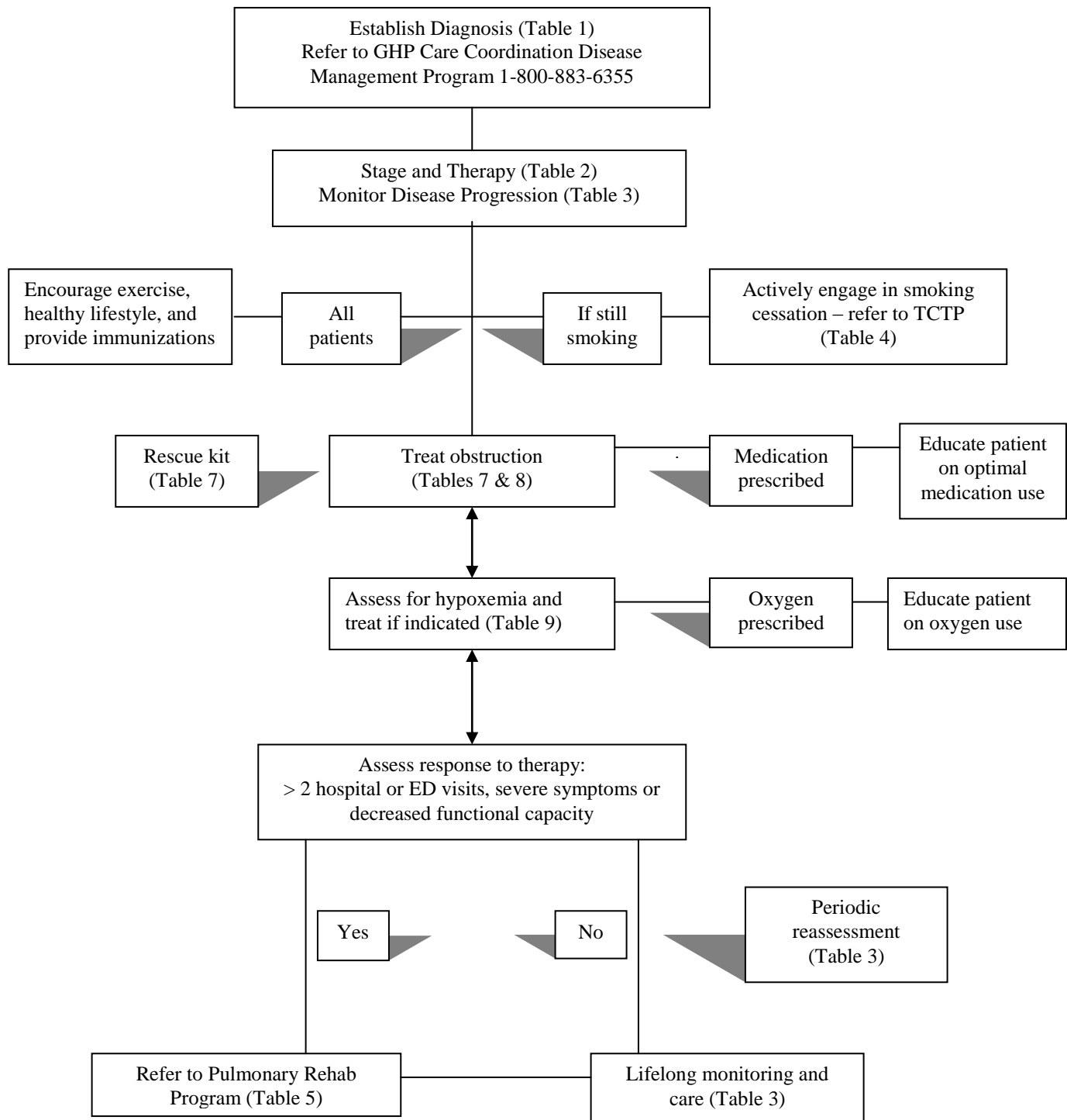
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American Thoracic Society Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 1995; 152(5, pt 2): S77-S121.

American Lung Association Fact Sheet on Chronic Obstructive Pulmonary Disease (COPD), American Lung Association web site at <http://www.lungusa.org>.

Global Initiative for Chronic Obstructive Lung Disease (GOLD) – Global Strategy for the Diagnosis, management, and Prevention of Chronic Obstructive Pulmonary Disease Meeting NHLBI/WHO Workshop Report Executive Summary based on 2006 meeting.

Outpatient Management of COPD



Adapted from: American Thoracic Society. Statement: Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1995; 152(5, pt 2): S77 – S121.

Outpatient Management of Chronic Obstructive Pulmonary Disease (COPD) Clinical Guideline Tables

Table 1: Diagnosis of COPD

Early Detection

1. Smoking cessation is the single most effective and cost-effective way to reduce the risk of developing COPD and stop progression.
2. Spirometry should be performed for: a) all smokers with dyspnea on exertion b) any patient with chronic cough, sputum production, and a history of risk factors consistent with COPD, even if they do not have dyspnea.

Spirometry Overview

- A. Spirometry confirms a diagnosis of COPD, stages COPD severity, and guides treatment.
- B. Spirometry measurements used for the diagnosis of COPD include: a) FVC (forced exhaled capacity: maximum volume of air that can be exhaled during a normal forced maneuver; b) FEV₁ (forced expiratory volume in one second): volume expired in the first second of maximal expiration after a maximal inspiration. This is a measure of how quickly the lungs can be emptied; c) FEV₁/FVC: FEV₁ expressed as a percentage of FVC gives a clinically useful index of airflow limitation.
- C. To order spirometry, indicate FVC Screen Spirometry with Interpretation. Consider ordering FVC Screen Spirometry Post-Bronchodilator for FEV₁/FVC < 70% predicted. If obstruction with bronchodilator does not produce reversibility, usually indicates COPD.
- D. After a baseline spirometry is obtained, repeat testing with bronchodilator is indicated if symptoms worsen or the patient is symptomatic. The intervals between spirometry measurements should be at least twelve (12) months apart to monitor disease progression.
- E. FVC Screen Spirometry takes ten (10) to forty (40) minutes. Up to eight (8) breathing tests may be needed (with adequate rest in between) in order to obtain accurate results.
- F. Cost for spirometry testing varies between \$30 and \$60/test based on the time spent.

See Next Page for Interpreting Spirometry Test Flow Chart

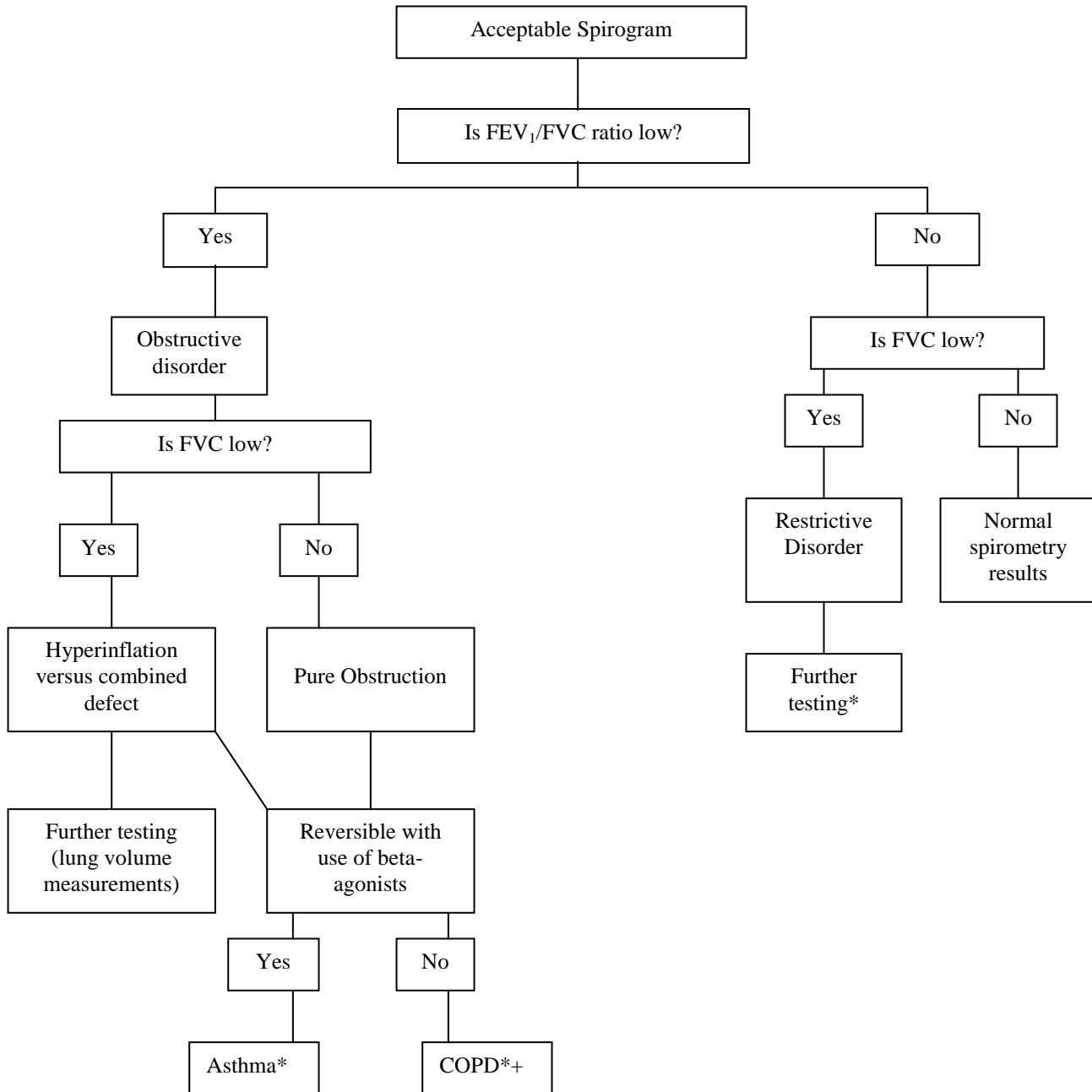


Figure 1: A spirometer interpretation algorithm with 2 variables

* If clinical correlation is present

+ Some chronic obstructive pulmonary disease (COPD) may have a reversible component.

FEV₁ = Forced expiratory volume in 1 second; FVC = Forced vital capacity

Source: Petty TL. Testing patients' lung spirometry as part of the physical examination.

Clinical Therapeutics 1999; 21(11):1999-22.

TABLE 1: DIAGNOSIS OF COPD continued**Laboratory**

- Chest x-ray: diagnostic only in severe emphysema but essential to exclude other lung diseases
- Spirometry
- Pulse oximetry
- Consider arterial blood gas to assess severity of an exacerbation (Stage IIA, Stage IIB, Stage III)

Consider Referral to Geisinger Health Plan's Care Coordination (CC) COPD Disease Management Program and/or Tobacco Cessation Program – CC Nurses will assist your patient in the management of symptoms with education and regular monitoring.

* Contact the Care Coordination office at 1-800-883-6355 to coordinate a referral to the appropriate CC Nurse. Care Coordination business hours are 8:00 am – 4:30 pm

TABLE 2: STAGING AND THERAPY OF COPD

Stage	Characteristics	Affect on Health Related Quality of Life	Recommended Treatment
All			<ul style="list-style-type: none"> Avoidance of risk factor(s) Pneumovax Influenza vaccine
At Risk	Normal Chronic symptoms (cough, sputum) Exposure to risk factor(s) Normal spirometry	Minimal	<ul style="list-style-type: none"> Advise patient not to use Primatene Mist
I: Mild	FEV ₁ /FVC <70% predicted FEV ₁ >80% predicted With or without symptoms	Patient may not be aware that lung function is abnormal	<ul style="list-style-type: none"> Short-acting bronchodilator and an anticholinergic* (Ipratropium) when needed Advise patient not to use Primatene mist
IIA: Moderate	FEV ₁ /FVC <70% predicted FEV ₁ 79%-50% predicted With or without symptoms	Patients typically seek medical attention	<ul style="list-style-type: none"> Regular treatment with one or more bronchodilator and an anticholinergic* (Ipratropium) Referral to GHP COPD Disease Management Program and/or Pulmonary Rehabilitation Advise patient not to use Primatene mist Inhaled glucocorticosteroids if significant symptoms and lung function response or if repeated exacerbations
IIB: Moderate	FEV ₁ /FVC <70% predicted FEV ₁ 49% - 30% predicted With or without symptoms	Patients typically seek medical attention	<ul style="list-style-type: none"> Regular treatment with one or more bronchodilators Inhaled glucocorticosteroids if significant symptoms and lung function response or if repeated exacerbations Oral methylxanthine as indicated (Table 7) Treatment of complications Advise patient not to use Primatene mist Pulmonary rehabilitation
III: Severe	FEV ₁ /FVC <70% predicted FEV ₁ <30% predicted and/or FEV ₁ <50% plus chronic respiratory failure or right heart failure	Quality of life is appreciably impaired	<ul style="list-style-type: none"> Regular treatment with one or more bronchodilators Inhaled glucocorticosteroids if significant symptoms and lung function response or if repeated exacerbations Oral methylxanthine as indicated (Table 7) Treatment of complications Advise patient not to use Primatene mist Pulmonary rehabilitation Long-term oxygen therapy if respiratory failure Consider surgical treatments

*Combining drugs with different mechanisms and durations of action might increase the degree of bronchodilation for equivalent or less side effects. A combination of short-acting B2-agonist and the anticholinergic drug Ipratropium in stable COPD produces greater and more sustained improvements in FEV₁ than either alone and does not produce evidence of tachyphylaxis over 90 days of treatment.

TABLE 3: MONITOR DISEASE PROGRESSION

- Follow-up visits to include telephone follow-up
- Patient education and early self-treatment
- Repeat spirometry with bronchodilator if patient is symptomatic or symptoms worsen
- ABG's in all patients with FEV₁ < 40%
- Assess right heart failure in presence of pitting ankle edema or chronic hypoxemia
- Nocturnal oximetry if sleep pattern disrupted or patient has resting desaturation, secondary erythrocytosis, or right heart failure.
- Titrate therapy – see Table 7 “Step –by-Step Pharmacologic Therapy for COPD”
- Monitor exacerbations for frequency and severity
- Monitor co-morbid disease – bronchial cancer, tuberculosis, CAD, CHF, depression (assess at least once per year, or more often as needed).

TABLE 4: SMOKING CESSATION

ASK	Has the patient thought about quitting? Does the patient think he/she will quit within the next 6 months?
ADVISE	Advise the patient to quit smoking.
ASSESS	Assess user's willingness to make a quit attempt.
ASSIST	Provide the patient with literature. Provide the patient with information about available programs and methods to quit. Refer to tobacco cessation program. Utilize nicotine replacement therapy and/or Zyban or Chantix per GHP Formulary
ARRANGE	Facilitate referral of the patient to the appropriate smoking cessation services.

Note: Pharmaceutical coverage is dependent upon individual pharmacy benefit design and certain drugs may require prior authorization. Providers are encouraged to review the GHP formulary at <http://www.thehealthplan.com> , or contact the GHP Pharmacy Department at 1-800-988-4861.

TABLE 5: INDICATIONS FOR PULMONARY REHABILITATION REFERRAL

- A patient who is experiencing impairment secondary to COPD and **any** of the following:
- Need for comprehensive COPD education
- Alteration in occupational performance
- Chronic illness impacting quality of life
- Impairment in activities of daily living (ADL) and functional abilities
- Increased use of health care resources
 - 2 or more ED visits per year
 - 2 or more hospitalizations per year
- Decreased exercise tolerance

TABLE 6: PULMONARY SPECIALIST REFERRAL

“Yes” to either = consider referral to **pulmonary specialist**:

- | | | |
|-----------------------------|------------------------------|--|
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Severe (Stage III) COPD patients |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Moderate (Stage IIA or IIB) with significant impact on quality of life or cost of care |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | ≥ 2 ED visits or hospitalizations/yr for COPD exacerbation |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Any patient with a life-threatening COPD exacerbation |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Continuous oral corticosteroid therapy |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Comorbid conditions complicating COPD care |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Atypical signs/symptoms associated with COPD or difficulties in differential diagnosis |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Failure to meet goals of therapy after 3 months of treatment |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Knowledge deficit exceeds basic education |

Despite optimal medical therapy, patients who...

- | | | |
|-----------------------------|------------------------------|--|
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Continue to display severe respiratory symptoms |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Demonstrate significant limitations in functional status interfering with ADL's |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Have significant anxiety/depression associated with COPD |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Have severe symptoms or severe decrease in functional status regardless of staging |

TABLE 7: STEP-BY-STEP PHARMACOLOGIC THERAPY FOR COPD

Note: Pharmaceutical coverage is dependent upon individual pharmacy benefit design and certain drugs may require prior authorization. Providers are encouraged to review the GHP formulary at <http://www.thehealthplan.com> , or contact the GHP Pharmacy Department at 1-800-988-4861.

1. FOR MILD, VARIABLE SYMPTOMS:

- Selective short-acting B2-agonist MDI (metered dose inhaler)^{1, 2}
 - 1-2 puffs q 2-6 h PRN, not to exceed 8-12 puffs per 24h

2. FOR MILD TO MODERATE CONTINUING SYMPTOMS COMBINE TREATMENT WITH:

- Anticholinergic MDI (ie Spiriva, Atrovent)^{1,2}
 - *2-6 puffs q 6-8 h; not to be used more frequently

PLUS

- Selective short-acting B2-agonist MDI^{1,2}
 - 1-2 puffs QID for rapid relief PRN, or as a regular supplement

3. IF RESPONSE TO STEP 2 IS UNSATISFACTORY OR THERE IS A MILD TO MODERATE INCREASE OF SYMPTOMS:

- Consider use of long-acting B2-agonist (salmeterol, formoterol) MDI or DPI (dry powder inhaler)^{1,2,3}
 - *Provides long term effect – use only BID, or at HS only for nocturnal symptoms
 - *Serevent[®] Diskus[®] DPI dose = 1 inhalation
 - Foradil Aeolizer[™] 12mcg dose = 1 inhalation
- Add sustained release theophylline
 - *200 – 400mg q 12 h or 400 – 800mg @ HS for nocturnal bronchospasm

AND/OR

4. If CONTROL OF SYMPTOMS IS SUBOPTIMAL⁴:

- a. Consider prescribing “Rescue Kit” – a kit with Prednisone and antibiotics for patients to keep at home in the event of an exacerbation. A Care Coordination Nurse will assist you with the coordination of this intervention.**
- Trial of oral steroids (e.g. Prednisone)
 - Up to 40mg /d for 10-14 days
 - If no improvement occurs (based on 15% or 200cc improvement in FEV1 or FVC), wean to low daily or alternate-day dose, e.g. 7.5 mg
 - If still no improvement occurs, stop abruptly
 - If steroid appears to help, consider possible use of aerosolized steroid, particularly if patient has evidence of bronchial hyperactivity
- b. Aerosolized steroids have been demonstrated to reduce exacerbations, cough, sputum, and improve breathlessness. Should be considered:**
- In patients with more advanced COPD (FEV1 <30%) with a history of repeated exacerbations
 - In patients with demonstrated reversibility after a trial of oral steroids, or after a three (3) month trial of aerosolized steroids as evidenced by improved FEV1, resolved hyperinflation, improved exercise tolerance, resolved exacerbation/cough/sputum
 - For prolonged use consider measures to reduce bone loss (calcium, Vitamin D, biphosphates)

TABLE 7: STEP-BY-STEP PHARMACOLOGIC THERAPY FOR COPD, Continued**5. FOR SEVERE EXACERBATION: (SEE ALSO: TABLE 10 – INDICATIONS FOR HOSPITAL ASSESSMENT AND TABLE 11 MANAGEMENT OF SEVERE EXACERBATION)⁵**

Increase short-acting B2-agonist dosage

*e.g. MDI with spacer 6-8 puffs q 1-2 h or inhalant solution, unit dose q 1-2 h

AND

Increase Ipratropium dosage

*e.g. MDI with spacer 6-8 puffs q 3-4 h or inhalant solution of Ipratropium 0.5 mg q 4-8 h

AND

10 day course of tapering Prednisone. Doses in excess of 60mg/day have not increased efficacy and increase risk of side effects.

AND

An antibiotic (if sputum is colored or pneumonia is present)

6. ANTIBIOTIC SELECTION

- Antibiotic selection depends on severity of illness, co-morbid conditions, local sensitivity patterns, residence in nursing home or hospital >24 hours, risk of DRSP, aspiration, or enteric gram negative infection.⁶
- COPD with mild disease and no significant risk factors (consider erythromycin or doxycycline).
- COPD with more severe disease and other risk factors – consider need to treat enterobacter, pseudomonas, or anaerobes. In most circumstances: Bactrim plus a macrocid or doxycycline or anti-pseudomonal fluorquinolone (levofloxacin) may suffice.

7. OTHER MEDICATIONS

- Xopenex HFA 1-2 inhalations every 4-6 hours
- Advair discus 250/50 1 inhalation twice a day

¹ Beta agonists or ipratropium may improve exercise tolerance by reducing hyperinflation with little or no evidence of improvement in FEV₁.

² A spacer device, i.e. Aerochamber® is recommended for use with MDI's

³ DPI's may be easier to use than MDI's for some patients

⁴ See also Attachments A&B – **Rescue Kit Protocol and Rescue Kit Supply Form**

⁵ Refer to Global Initiative for Chronic Obstructive Lung Disease (GOLD) – Global Strategy for the Diagnosis, Management, and Prevention of COPD

⁶ American J Respir Crit Care Med 2000; 163: 1730-1754

Table 8: PRECAUTIONS IN DRUG USE**PRECAUTIONS WHEN USING BETA-AGONISTS**

- Watch for no improvement or paradoxical deterioration with aerosol use
- Use spacers to improve compliance and reduce systemic side effects
- Avoid overuse; check number of MDI's used per month against number of puffs per MDI (200-300 + depending on brand)
- Instruct member on maximum number of puffs per day (usually 8-12) and on number allowed during exacerbation (e.g. 12-24 over 3-4 h) before additional intervention is required
- If a long acting agent is used, caution patient that frequent use must be avoided
- Home updraft nebulizers with inhalent solutions that provide large dosages are rarely needed, but may be beneficial in weak, uncoordinated patients with Stage III COPD

PRECAUTIONS WHEN USING THEOPHYLLINE

- Initiate treatment with low dose (e.g. 400mg/d) and adjust after a few days
- Reduce dosage if drug clearance is likely to be impaired because of illness, liver malfunction, or concomitant drugs
- Do not allow additional theophylline preparation to be taken
- Drug must be taken at the same time each day with respect to meals
- When symptoms change, acute illness develops, new drugs are added, or symptoms suggestive of toxicity develop, check serum level of theophylline
- Aim for a serum level of 8-12ug/ml; adjust dosage and follow serum level when indicated

PRECAUTIONS WHEN USING IPRATROPIUM

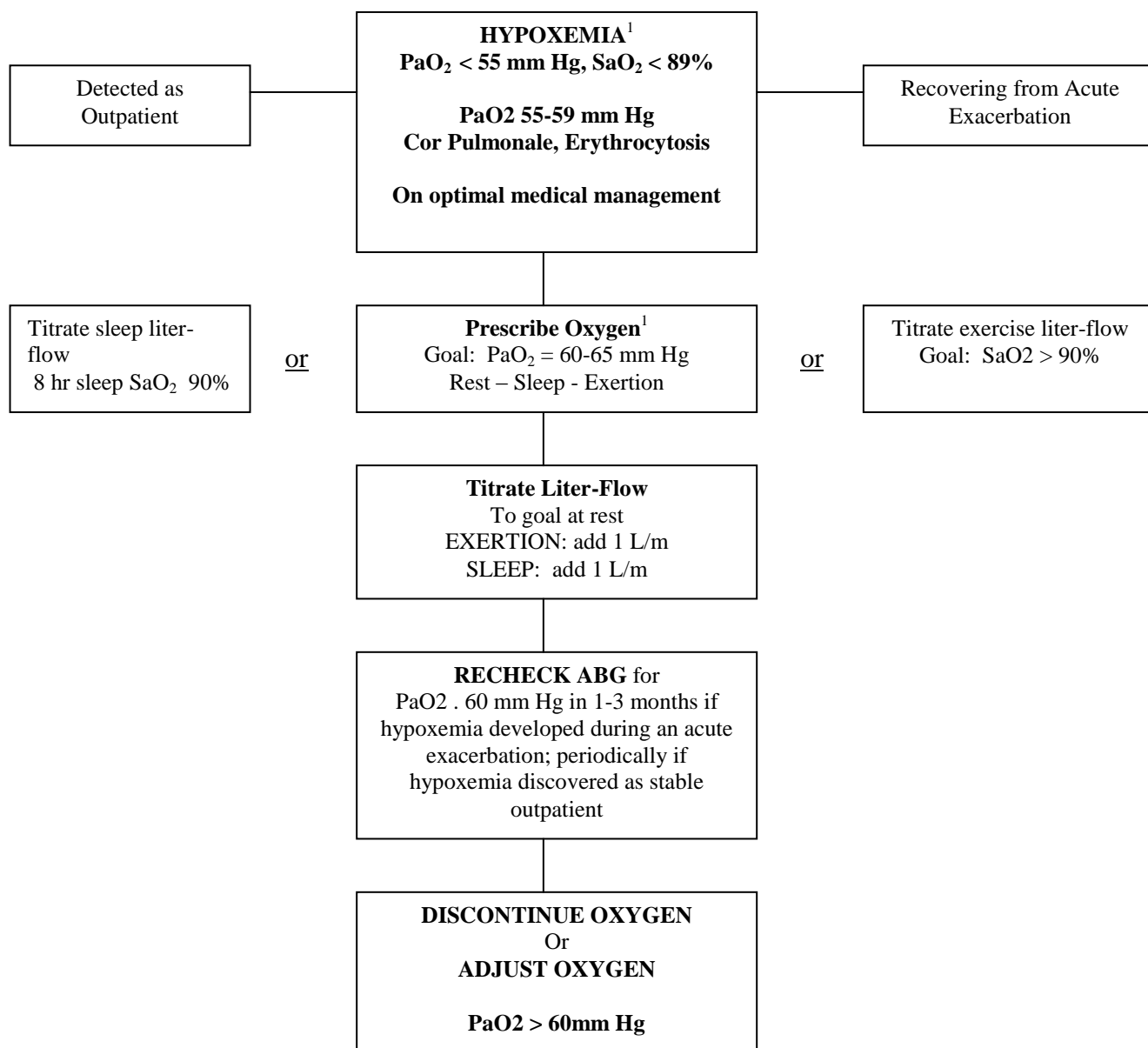
- Patients should generally use a spacer and should avoid spraying into eyes
- Be prepared to increase dose if necessary from 2-3 puffs 3-4 times a day to 6-8 puffs 3-4 times a day, if tolerated
- Caution patient that onset of effect is relatively slow; additional doses should not be taken for acute symptom relief
- Monitor for side effects, e.g. tachycardia, dry mouth, glaucoma, prostatism, or bladder neck obstruction

PRECAUTIONS WHEN USING ORAL STEROIDS

- Reduce dosage to lowest effective daily dose or to alternate-day dosing as quickly as symptoms allow
- Monitor for hypertension, diabetes, weight gain, mental changes, infections, central polar cataracts, skin thinning, purpura, osteoporosis, and osteonecrosis
- Administer prophylactic calcium therapy to women; treat osteoporosis appropriately
- Steroid-dependent patients require steroid coverage during any crisis for many months after stopping steroids
- Repeatedly evaluate patient to determine if steroid therapy can be discontinued

PRECAUTIONS WHEN USING AEROSOLIZED STEROIDS

- Use a **spacer**; perform mouth care after each use; monitor for oral thrush and laryngeal dysfunction
- Be aware that aerosol steroid side effects may reduce bone density, increase risk of glaucoma
- When introducing aerosol steroids in a patient on an oral steroid, wean slowly off the oral drug

TABLE 9: LONG TERM OXYGEN THERAPY FOR THE COPD PATIENT

¹ Oxygenation assessment by:

- **ABG** – invasive; particularly important with clinical suspicion of hypoxemia, acidosis, carbon monoxide poisoning, hypercarbia, and stages II and III COPD
- **Oximetry** – noninvasive; only valid in non-smoker with normal respiratory rate; may be used to adjust oxygen flow settings over time

² If patient is normoxemic at rest but desaturates during exercise or sleep (PaO₂ 55 mmHg without cor pulmonale or erythrocytosis), individualized recommendations should be made based on these indications.

TABLE 10: INDICATIONS FOR HOSPITAL ASSESSMENT

- Marked increase in intensity of symptoms, such as sudden development of resting dyspnea
- Severe background COPD
- Onset of new physical signs (e.g., cyanosis, peripheral edema)
- Failure of exacerbation to respond to initial medical management
- Significant comorbidities
- Newly occurring arrhythmias
- Diagnostic uncertainty
- Older age
- Insufficient home support

TABLE 11: MANAGEMENT OF SEVERE EXACERBATIONS (but not life threatening) OF COPD IN THE EMERGENCY DEPARTMENT OR THE HOSPITAL

- Assess severity of symptoms, blood gases, chest x-ray
- Administer controlled oxygen therapy and repeat arterial blood gas measurement after thirty (30) minutes
- Bronchodilators:
 - _____ Increase doses or frequency
 - _____ Combine B₂-agonists and anticholinergics
 - _____ Use spacers or air-driven nebulizers
 - _____ Consider adding intravenous methylxanthene, if needed
- Add glucocorticosteroids _____ Oral or intravenous
- Consider antibiotics _____ When signs of bacterial infection, oral or occasionally intravenous
- Consider non-invasive Mechanical ventilation
- At all times _____ Monitor fluid balance and nutrition

MEASURES

- Percent of members on anticholinergic and beta agonist
 - Percent of members with PFT
- Percent of members that quit tobacco at one year
 - Admits/1000
 - Inpatient days/1000
 - ER days/1000