Best Practice Guideline

I. COPD

a. COPD - a preventable and treatable disease state that is characterized by airflow limitation that is not fully reversible. It encompasses both emphysema and chronic bronchitis. The airflow limitation is usually progressive and is associated with an abnormal inflammatory response of the lungs to noxious particles or gases. It is primarily caused by cigarette smoking. Although COPD affects the lungs, it also has significant systemic consequences.
    i. History Risk factors
        1. Family history
        2. Smoking history (Age at initiation, average amount smoked per day since initiation, date when stopped smoking or a current smoker)
        3. Environmental history
        4. Asthma
    ii. Symptoms:
        1. Dyspnea (amount of effort required to induce uncomfortable breathing, or reduced their activity levels)
        2. Cough (with or without sputum production should be an indication for spirometric testing)
        3. Wheezing (Wheezing or squeaky noises - indicate the presence of airflow obstruction)
        4. Acute chest illnesses (ask occurrence, frequency of episodes of increased cough and sputum with wheezing, dyspnea, or fevers)

II. Diagnosis and Screening

a. Physical examination:
    i. Chest:
        1. Severe emphysema (chest held near full inspiratory position at end of normal expiration, low diaphragmatic position), decreased intensity of breath and heart sounds, and prolonged expiratory phase
        2. Evidence of airflow obstruction (wheezes during auscultation on slow or forced breathing and prolongation of forced expiratory time
        3. Observed with severe disease: pursed-lip breathing, use of accessory respiratory muscles, retraction of lower interspaces
    ii. Other:
        1. Unusual positions to relieve dyspnea at rest
        2. Digital clubbing is NOT typical in COPD (even with associated hypoxemia) and suggests other diagnoses (eg, lung cancer, bronchiectasis, pulmonary fibrosis)
        3. Mild dependent edema may be seen in the absence of right heart failure

b. Classification of severity of airflow limitation in COPD:

i. In pulmonary function testing, a postbronchodilator FEV1/FVC ratio of <70% and an FEV1 of <80% is commonly considered diagnostic for COPD. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) system categorizes airflow limitation into stages
    1. Stage I - Mild: FEV1/FVC <70% and FEV1 ≥80% of predicted value, with or without symptoms
    2. Stage II - Moderate: FEV1/FVC <70% and FEV1 50% to 80% of predicted value, with or without symptoms
    3. Stage III - Severe: FEV1/FVC <70% and FEV1 30% to 50% of predicted value, with or without symptoms
    4. Stage IV - Very severe: FEV1/FVC <70% and FEV1 <30% of predicted value or FEV1 <50%, with chronic respiratory failure.

c. Labs- no labs diagnostic of COPD, some tests can be done to exclude other causes od sypnea: assessment of anemia, brain natriuretic peptide, electrolytes, LFT and renal function.
d. Pulse oximetry- part of vital signs, shows low oxygen saturation
e. *ABG*- pulse oximetry doesn't provide information about alveolar ventilation or hypercapnia (paCO2>45) and more accurate in acute exacerbation of COP
f. *CXR*- Seldom diagnostic, but useful in ruling out other pathologies. Increased anteroposterior ratio, flattened diaphragm, increased intercostal spaces, and hyperlucent lungs may be seen. May also demonstrate complications of COPD, such as pneumonia and pneumothorax
g. *CBC*- Elevated hematocrit may indicate long-term hypoxia. WBC count often unhelpful in acute exacerbation
h. Echocardiogram- To assess for cardiac dysfunction or disease, or pulmonary hypertension
i. *ECG*- signs of right ventricular hypertrophy, arrhythmia, ischemi
j. *Other tests to consider:*
    i. sputum culture (if empiric antibiotics fail
    ii. PFT (perioperative assessment, decrease in DLCO
    iii. chest CT (visualization of type and distribution of lung tissue damage, bulla formation, or to exclude other diseases
    iv. alpha-1 antitrypsin level emphysema in people≤45
    v. exercise testing- Can be of value in patients with a disproportional degree of dyspnea compared to spirometr
    vi. sleep study- may be indicated when hypoxemia or right heart failure develops in the presence of relatively mild airflow limitation
    vii. respiratory muscle function - if dyspnea or hypercapnia are disproportionally increased with respect to FEV1, as well as in patients with poor nutrition and those with corticosteroid myopathy\

III. Treatment: (Any COPD patient – avoidance of risk factors, influenza vaccination, pneumococcal vaccination)
a. Mild COPD (FEV1/FVC <70%, FEV1 ≥80 percent predicted) With or without symptoms
    i. Short-acting bronchodilator when needed (ex. *Albuterol HFA (90 mcg) 2 inhalations every 4–6 hours as needed)* Provides symptomatic relief. Failure to respond to short-acting bronchodilator may signify an acute exacerbation. Patients should not take short-acting anticholinergic agents if they have already been started on tiotropium

b. Moderate COPD (FEV1/FVC <70%, FEV1 50% to 80%, dyspnea with exertion, with or without cough and sputum production)
    i. Short-acting bronchodilator when needed (ex *Albuterol HFA (90 mcg) 2 inhalations every 4–6 hours as needed)*
    ii. Regular treatment with one or more long-acting bronchodilators ex *(Long-acting anticholinergic (LAAC) Tiotropium 18mcg QD, Long-acting beta2-agonist (LABA) (Ex. Salmeterol or formoterol) q12 hour)s, or combination LAAC and LABA)*
    iii. Rehabilitation
c. Severe COPD (FEV1/FVC <70%, FEV1 30% to 50%, increased dyspnea, reduced exercise capacity, fatigue, and repeated exacerbations)
    i. Short-acting bronchodilator when needed (*Albuterol HFA (90 mcg) 2 inhalations every 4–6 hours as needed)*
    ii. Regular treatment with one or more long-acting bronchodilators and inhaled corticosteroids *(LAAC, Combination inhaled corticosteroid (ICS)/LABA twice daily or LAAC and LABA)*
    iii. Rehabilitation
    iv. Add on Inhaled glucocorticoids if significant symptoms, lung function response, or if repeated exacerbations *(beclomethasone, budesonide, fluticasone etc)*
d. Very severe COPD (FEV1/FVC <70%, FEV1 <30% predicted or <50% +respiratory failure)
    i. Short-acting bronchodilator when needed
    ii. Regular treatment with one or more long-acting bronchodilators
    iii. Inhaled glucocorticoids if significant symptoms, lung function response, or if repeated exacerbations
    iv. Treatment of complications
    v. Rehabilitation
    vi. Long-term oxygen therapy if chronic respiratory failure (PaO2 55 mm Hg or lower and/or SaO2 88% or lower. PaO2 56–59 mm Hg and/or SaO2 89% or lower, and signs of tissue hypoxia (hematocrit higher than 55%, pulmonary hypertension, or cor pulmonale) or SaO2 88% or lower on exertion.
    vii. Consider surgical treatments (Criteria for consideration of lung transplantation include FEV1 of ≤25% predicted value (without reversibility); and/or resting, room air PaCO2 >55 mmHg; and/or elevated PaCO2 with progressive deterioration requiring long-term oxygen therapy; or elevated pulmonary artery pressure with progressive deterioration.
    viii. Lung volume reduction surgery (LVRS) is indicated also in stage IV disease and especially in patients with localized upper lobe disease and lower than normal exercise capacity. Bullectomy is an option in COPD patients with dyspnea in whom CT reveals huge bullae occupying at least 30% of the hemithorax. Severely poor functional status and severe decrease in FEV1 (<500 mL) make these options less favorable. Lung transplantation has been shown to improve quality of life and functional capacity. However, lung transplantation does not appear to confer a survival benefit

IV. Follow-up and Monitoring
a. To optimize treatment and prevent complications, periodic monitoring is advised.
b. Repeat spirometry is recommended for those patients with a change in symptoms or to assess response to a new treatment.

c. For patients on medications, monitor: Symptoms at each visit, pulmonary function using peak flow and/or other tests, FEV1 at least annually.

V. References

a. Guidelines compiled from American College of Physicians, American College of Chest Physicians, American Thoracic Society, and European Respiratory Society guidelines