Optimizing Care of Hospitalized Patients with COPD: Evaluation, Treatment, and Discharge

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  - Research: AstraZeneca, Genentech, Novartis
  - Speakers Bureau: AstraZeneca, Genentech, GlaxoSmithKline, Merck, Novartis, Sunovion

- Joshua LaBrin, MD
  - No real or apparent conflicts of interest to disclose
Learning Objectives

Upon completion of this activity, participants should be able to:

- Implement guideline-recommended strategies to accurately evaluate and triage patients who present with acute exacerbations of chronic obstructive pulmonary disease (COPD)
- Describe evidence-based treatment strategies for the management of hospitalized patients with COPD
- Develop discharge orders that incorporate patient education, patient-specific treatment selection, and appropriate follow-up for community care
COPD Remains a Big Problem
COPD Is Underdiagnosed

- 2011: 15 million people in the US ≥18 years of age were estimated to have COPD
- Lung function tests show that up to twice as many may have COPD, but are undiagnosed

Burden of COPD

- Third leading cause of death
  - 133,575 deaths from COPD in 2010
- Total economic cost estimate in 2010 was $50 billion
  - $30 billion in direct healthcare costs
  - $20 billion in indirect costs
- Annual visits for COPD to:
  - Physician: 16 million
  - ED: 2.3 million
  - Hospital: 1 million

ED, emergency department.
Efforts to Improve Diagnosis and Management of COPD

- Healthy People 2020: US DHHS effort to promote respiratory health
- Goals of Healthy People 2020
  - Increase the rate of COPD diagnosis
  - Improve activity of adults with COPD
  - Reduce ED visits, hospitalizations, and deaths from COPD
- CMS Readmissions Reduction Program
  - Beginning in 2015, CMS reduces payments to hospitals for COPD readmissions within 30 days

DHHS, Department of Health and Human Services;
CMS, Centers for Medicaid & Medicare Services.

Pathophysiological Features of Airflow Obstruction in COPD

**Normal**

Airway held open by alveolar attachments

**COPD**

- Disrupted alveolar attachments (emphysema)
- Mucosal inflammation, fibrosis
- Mucus hypersecretion

Airway obstructed by:
- Loss of attachments
- Mucosal inflammation + fibrosis
- Mucus obstruction of lumen

## COPD Phenotypes

<table>
<thead>
<tr>
<th>Phenotype</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed COPD-asthma</td>
<td>Mixed phenotype in COPD is defined as an airflow obstruction that is not completely reversible, accompanied by symptoms or signs of increased obstruction reversibility.</td>
</tr>
<tr>
<td>Emphysema-hyperinflation</td>
<td>Patients who present with dyspnea and intolerance to exercise as the predominating symptoms, which are frequently accompanied by signs of hyperinflation. Patients with emphysema phenotype present a tendency towards a lower BMI.</td>
</tr>
<tr>
<td>Frequent exacerbator</td>
<td>Patients reporting two or more exacerbations per year that are &gt;4 weeks apart. Patients may appear stable over time.</td>
</tr>
</tbody>
</table>

Recently Updated Guidelines for COPD
<table>
<thead>
<tr>
<th>Category</th>
<th>Severity</th>
<th>Spirometry (% predicted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLD 1</td>
<td>Mild</td>
<td>$\text{FEV}_1 \geq 80%$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\text{FEV}_1/\text{FVC} &lt; 0.70$</td>
</tr>
<tr>
<td>GOLD 2</td>
<td>Moderate</td>
<td>$50% \leq \text{FEV}_1 &lt; 80%$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\text{FEV}_1/\text{FVC} &lt; 0.70$</td>
</tr>
<tr>
<td>GOLD 3</td>
<td>Severe</td>
<td>$30% \leq \text{FEV}_1 &lt; 50%$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\text{FEV}_1/\text{FVC} &lt; 0.70$</td>
</tr>
<tr>
<td>GOLD 4</td>
<td>Very severe</td>
<td>$\text{FEV}_1 &lt; 30%$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\text{FEV}_1/\text{FVC} &lt; 0.70$</td>
</tr>
</tbody>
</table>

GOLD, Global Initiative for Chronic Obstructive Lung Disease; FEV$_1$, forced expiratory volume in one second; FVC, forced vital capacity.

Assessment Tools to Measure COPD Symptoms

- Modified Medical Research Council (mMRC) Dyspnea Scale
  - Assesses severity of patient breathlessness
  - 5 grades: 0 (no breathlessness) to 4 (very severe)

- COPD Assessment Test (CAT)
  - 8-question assessment that assigns each question a score of 1 to 5
  - Measures frequency of symptoms
  - Higher score denotes a more severe impact of COPD on a patient’s life


COPD Assessment Test and the CAT logo are trademarks of the GlaxoSmithKline group of companies.

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## Risk in COPD

<table>
<thead>
<tr>
<th>Category</th>
<th>Exacerbations per Year</th>
<th>Hospitalizations per Year</th>
<th>3-year Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLD 1</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>GOLD 2</td>
<td>0.7 - 0.9</td>
<td>0.11 - 0.2</td>
<td>11%</td>
</tr>
<tr>
<td>GOLD 3</td>
<td>1.1 - 1.3</td>
<td>0.25 - 0.3</td>
<td>15%</td>
</tr>
<tr>
<td>GOLD 4</td>
<td>1.2 - 2.0</td>
<td>0.4 - 0.54</td>
<td>24%</td>
</tr>
</tbody>
</table>

Updated GOLD Risk Classification for COPD

## GOLD Recommendations for Initial Pharmacotherapy

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Recommended First Choice</th>
<th>Alternative Choice</th>
<th>Other Possible Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SAMA prn or SABA prn</td>
<td>LABA or LAMA or SABA + SAMA</td>
<td>Theophylline</td>
</tr>
<tr>
<td>B</td>
<td>LAMA or LABA</td>
<td>LAMA + LABA</td>
<td>SABA and/or SAMA Theophylline</td>
</tr>
<tr>
<td>C</td>
<td>ICS + LABA or LAMA</td>
<td>LAMA + LABA or LAMA + PDE4 or LABA + PDE4</td>
<td>SABA and/or SAMA Theophylline</td>
</tr>
<tr>
<td>D</td>
<td>ICS + LABA and/or LAMA</td>
<td>ICS + LABA + LAMA or ICS + LABA + PDE4 or LABA + LAMA or LAMA + PDE4</td>
<td>Carbocysteine SABA and/or SAMA Theophylline</td>
</tr>
</tbody>
</table>

SAMA, short-acting anticholinergic; prn, as needed; SABA, short-acting beta$_2$-agonist; LAMA, long-acting anticholinergic; LABA, long-acting beta$_2$-agonist; ICS, inhaled corticosteroid; PDE4, phosphodiesterase type 4 inhibitor.

# Available Long-acting Bronchodilator Monotherapies

<table>
<thead>
<tr>
<th>Agent</th>
<th>Type</th>
<th>Delivery</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arformoterol</td>
<td>LABA</td>
<td>Nebulizer</td>
<td>Sunovion</td>
</tr>
<tr>
<td>Formoterol</td>
<td>LABA</td>
<td>Nebulizer</td>
<td>Mylan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry powder inhaler (DPI)</td>
<td>Merck</td>
</tr>
<tr>
<td>Indacaterol</td>
<td>LABA</td>
<td>DPI</td>
<td>Novartis</td>
</tr>
<tr>
<td>Salmeterol</td>
<td>LABA</td>
<td>DPI</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>Aclidinium</td>
<td>LAMA</td>
<td>DPI</td>
<td>Forest</td>
</tr>
<tr>
<td>Tiotropium</td>
<td>LAMA</td>
<td>DPI</td>
<td>Pfizer/Boehringer Ingelheim</td>
</tr>
<tr>
<td>Olodaterol*</td>
<td>LABA</td>
<td>Soft mist inhaler (SMI)</td>
<td>Boehringer Ingelheim</td>
</tr>
</tbody>
</table>

*Not yet available.
### Available Long-acting Bronchodilator Therapies in Combination with ICS

<table>
<thead>
<tr>
<th>Agent</th>
<th>Type</th>
<th>Delivery</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formoterol + budesonide</td>
<td>LABA + ICS</td>
<td>Metered dose inhaler (MDI)</td>
<td>AstraZeneca</td>
</tr>
<tr>
<td>Salmeterol + fluticasone</td>
<td>LABA + ICS</td>
<td>MDI/DPI</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>Vilanterol + fluticasone</td>
<td>LABA + ICS</td>
<td>DPI</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>Formoterol + mometasone*</td>
<td>LABA + ICS</td>
<td>MDI</td>
<td>Merck</td>
</tr>
</tbody>
</table>

*Off-label use. Not indicated for the treatment of patients with COPD.*
May inhibit fibroblast-mediated contraction and the formation of fibrotic tissues, which can disrupt lung function

Inhibitors have more adverse effects and inhaled medications are preferred

Roflumilast
- Oral, selective, long-acting inhibitor of an enzyme called PDE4
- Indicated for treatment to reduce the risk of exacerbations in patients with severe COPD associated with chronic bronchitis and a history of exacerbations

## Future of COPD Treatment

<table>
<thead>
<tr>
<th>Agent</th>
<th>Type</th>
<th>Delivery</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycopyrronium bromide</td>
<td>LAMA</td>
<td>Nebulizer</td>
<td>Sunovion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DPI</td>
<td>Vectura, Sosei/Novartis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MDI</td>
<td>Pearl</td>
</tr>
<tr>
<td>Indacaterol + glycopyrronium bromide</td>
<td>LABA + LAMA</td>
<td>DPI</td>
<td>Vectura, Sosei/Novartis</td>
</tr>
<tr>
<td>Umeclidinium + vilanterol</td>
<td>LABA + LAMA</td>
<td>DPI</td>
<td>GSK/Theravance</td>
</tr>
<tr>
<td>Olodaterol + tiotropium</td>
<td>LABA + LAMA</td>
<td>SMI</td>
<td>Boehringer Ingelheim</td>
</tr>
<tr>
<td>Aclidinium + formoterol</td>
<td>LABA + LAMA</td>
<td>DPI</td>
<td>Almirall/Forest</td>
</tr>
</tbody>
</table>
COPD Exacerbations Overview
An exacerbation of COPD is an acute event characterized by a worsening of the patient’s respiratory symptoms that is beyond normal day-to-day variations and leads to a change in medication.

Impact of COPD Exacerbations

- Exacerbations of COPD are associated with:
  - Reduced lung function, health status, and physical activity
  - Increased risk of subsequent exacerbations and death
  - Development of complications
  - Worsening of comorbid conditions

- Frequent exacerbations associated with ↑ airway inflammation in the stable state

- Mortality from COPD exacerbations
  - In hospital for a hypercapnic exacerbation with acidosis is ~10%
  - All cause mortality 3 years after hospitalization as high as 49%
  - Higher than mortality observed at 12 months following hospitalization for myocardial infarction

High Mortality Following ED Visit for COPD Exacerbation

Risk Factors for Exacerbations

- Continued exposure to:
  - Cigarette smoke
  - Industrial particulates
  - Indoor/outdoor pollution
- Worsening symptoms (dyspnea and cough)
- Declining lung function
- Medical comorbidities (eg, CHF)
- Viral upper respiratory infections
- Previous exacerbation/hospitalization
- Increase in rescue medication use
- Maintenance medication nonadherence
- Poor device technique and inadequate medication administration

CHF, congestive heart failure.
Case Study #1: Jane, 47-year-old Female
Case Study #1: 47-year-old Female

- **History**
  - Current smoker with 30 pack-year history
  - Current diagnosis of GOLD Group B

- **Current medications**
  - LAMA maintenance therapy
  - SABA prn

- **Current presentation**
  - Presents to ED with coughing and dyspnea lasting for past ~2 hours despite repeat SABA treatments by inhaler
Case Study #1: Jane, 47-year-old Female Exam and Test Results

- **Symptoms**
  - Persistent productive cough with clear, white sputum
  - Shortness of breath at rest
  - Complains of fatigue

- **Physical exam**
  - Wheezing and decreased breath sounds on lung exam
  - Temperature: 99.7
  - HR: 72
  - BP: 123/81

- **SpO₂**: 89% on room air

- Laboratory testing negative for pneumonia

- Poor response to initial dose of short-acting bronchodilators via nebulizer

HR, heart rate; BP, blood pressure; SpO₂, oxygen saturation.
Hospital Assessment of COPD Exacerbations
Assessing Exacerbations

<table>
<thead>
<tr>
<th>Medical History</th>
<th>Signs of Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Severity of COPD based on degree of airflow limitation</td>
<td>• Use of accessory muscles</td>
</tr>
<tr>
<td>• Duration of symptoms</td>
<td>• Paradoxical chest wall movements</td>
</tr>
<tr>
<td>• Number of previous episodes (total/hospitalizations)</td>
<td>• Worsening or new onset of central cyanosis</td>
</tr>
<tr>
<td>• Comorbidities</td>
<td>• Development of peripheral edema</td>
</tr>
<tr>
<td>• Present treatment regimen</td>
<td>• Hemodynamic instability</td>
</tr>
<tr>
<td>• Present use of mechanical ventilation</td>
<td>• Deteriorated mental status</td>
</tr>
</tbody>
</table>

Assessing Exacerbations: Tests to Consider

- Pulse oximetry
- Chest X-ray
- Electrocardiograph
- Complete blood count
- Detection of purulent sputum
- Labs to determine electrolyte balance, hyperglycemia, other

Indications for Hospital Assessment or Admission

- Marked increase in intensity of symptoms
- Severe underlying COPD
- Onset of new physical signs (eg, cyanosis, peripheral edema)
- Failure to respond to initial medical management
- Presence of serious medical comorbidities (eg, CHF or new arrhythmias)
- Frequent exacerbations
- Older age
- Insufficient home support
Indications for Noninvasive Mechanical Ventilation (NIV)

- At least one of the following:
  - Severe dyspnea with signs of respiratory muscle fatigue or increased work for breathing, including:
    - Use of respiratory accessory muscles
    - Paradoxical motion of the abdomen
    - Retraction of the intercostal spaces
  - Respiratory acidosis
Indications for Invasive Mechanical Ventilation

- Unable to tolerate NIV or NIV failure
- Respiratory or cardiac arrest
- Respiratory pauses with loss of consciousness or gasping for air
- Diminished consciousness
- Psychomotor agitation not controlled by sedation
- Massive aspiration

Indications for Invasive Mechanical Ventilation (cont’d)

- Persistent inability to remove respiratory secretions
- HR <50 bpm with loss of alertness
- Severe hemodynamic instability without response to fluids/vasoactive drugs
- Severe ventricular arrhythmias
- Life-threatening hypoxemia in patients unable to tolerate NIV

bpm, beats per minute.

Indications for ICU Admission

- Severe dyspnea that responds inadequately to initial emergency therapy
- Changes in mental status
- Persistent or worsening hypoxemia and/or severe/worsening respiratory acidosis despite supplemental $O_2$ and NIV
- Need for invasive mechanical ventilation
- Hemodynamic instability; need for vasopressors

ICU, intensive care unit.

Hospital Management of COPD
Goals of the Hospital Stay for Patients With COPD

- Control exacerbation/restore patient function
- Address:
  - Smoking status
  - Medication/device issues
- Question home care environment
- Assess future risk
- Implement discharge plan to keep patients out of the hospital
- Ensure appropriate follow-up
Management of Exacerbations

- Provide O₂ and obtain serial arterial blood gases
- Bronchodilation
  - Increase doses/frequency of short-acting bronchodilators
  - Combine SABAs with anticholinergics
  - Use spacers or air-driven nebulizers
- Corticosteroids: oral preferred
- Consider antibiotics, oseltamivir phosphate, NIV, SC heparin, or low-molecular-weight heparin
- Identify and treat associated conditions

SC, subcutaneous.

Corticosteroids to Prevent Relapse of Exacerbations

Prednisone vs PBO: Probability of Remaining Relapse Free for 30 Days

Tick marks represent censored data. \( P = .04 \) by the log-rank test.

PBO, placebo.
- 2013 trial of 341 patients with COPD exacerbations
  - Patients had GOLD Stage 3-4 COPD
  - Average FEV₁ of 31% predicted
- Randomized to 5 or 14 days of prednisone (40 mg)
- No difference noted in time to exacerbation within 180 days (primary end point)
- Lung function, mortality, need for mechanical ventilation, and symptom scores were all similar between groups
- Adverse events were rare and occurred equally in both groups
- Hospital stays averaged 1 day shorter with 5-day regimen

Association of Antibiotic Therapy and Outcomes of Patients with COPD Exacerbation

- Retrospective study of patients >40 years old hospitalized for a COPD exacerbation and treated with systemic corticosteroids (N=53,900)
- Addition of antibiotics was associated with:
  - 40% reduction in in-hospital mortality
  - 13% reduction in 30-day readmission for COPD

Preventing Exacerbations and Hospitalizations for COPD

- Limited evidence to suggest a particular management strategy is more or less effective at preventing COPD exacerbations/hospitalizations
  - Long-term antibiotic therapy reduces rate of exacerbations
  - LABA/LAMA therapy reduces hospitalizations (vs PBO)
  - Some evidence to suggest triple therapy (LABA + LAMA + ICS) reduces hospitalizations (vs PBO)
  - Structured disease management also reduces hospitalizations

- Future clinical research needs to be focused on determining which management strategy may be best for reducing exacerbations/hospitalizations

Retrospective study compared 812 nebulized arformoterol patients and 1,651 nebulized SABA patients discharged from COPD hospital admission.

Observed readmission rate was lower for arformoterol patients than for nebulized SABA patients (8.7% vs 11.9%, \( P=0.017 \)).

All-cause 30-day readmission rates were lower (31% reduction) for arformoterol patients than nebulized SABA patients.
Discharge Planning
Updated GOLD Risk Classification for COPD

Group A – Low Risk, Less Symptoms
- mMRC 0-1
- CAT <10

Group B – Low Risk, More Symptoms
- mMRC ≥2
- CAT ≥10

Group C – High Risk, Less Symptoms
- mMRC ≥2
- CAT <10

Group D – High Risk, More Symptoms
- mMRC ≥2
- CAT ≥10

The use of maintenance bronchodilator therapy for COPD is low

At discharge following exacerbation:
- 45% of patients with COPD were prescribed maintenance bronchodilators
- 23% of patients with COPD were not prescribed an inhaled therapy at all

The use of long-acting maintenance bronchodilators are recommended for all patients in GOLD Group B and above

Criteria for Patient Discharge

- Inhaled SABA is required no more than every 4 hours
- Able to:
  - Use long-acting bronchodilators
  - Walk across room
  - Eat and sleep without frequent awakening by dyspnea
- Clinically stable for 12 to 24 hours
- Patient understands correct use of all medications
- Follow-up and home care arrangements completed
- Confident that the patient can manage successfully at home

Key Considerations for Discharge and Follow-up

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Assurance of effective maintenance treatment</td>
<td>- Ability to cope in usual environment</td>
</tr>
<tr>
<td>- Consider device selection</td>
<td>- Lung function (FEV₁, FVC)</td>
</tr>
<tr>
<td>- Reassess inhaler technique</td>
<td>- Inhaler technique and adherence</td>
</tr>
<tr>
<td>- Provide patient education</td>
<td>- Need for long-term oxygen therapy and/or home nebulizer</td>
</tr>
<tr>
<td>- Assess need for long-term oxygen therapy</td>
<td>- Physical activity CAT or mMRC</td>
</tr>
<tr>
<td>- Assure follow-up visit in 4 to 6 weeks</td>
<td>- Status of comorbidities</td>
</tr>
<tr>
<td>- Provide a plan for comorbidities</td>
<td></td>
</tr>
</tbody>
</table>

Case Study #2: Harry, 68-year-old Male
Case Study #2: 68-year-old Male

- Medical history
  - 45 pack-year smoker who recently quit, but family is not convinced
  - Refuses to follow up with primary care physician
  - Previous lung function test in community office shows FEV$_1$ <40% predicted
  - GOLD Group D

- Current medications
  - LAMA MDI
  - SABA via nebulizer prn

- Patient presents to ED in acute distress
Case Study #2: 68-year-old Male (cont’d)

- Recent history
  - Admitted and discharged from hospital 13 days ago for COPD exacerbation
  - Family states he is not adherent to prescribed therapy
  - Back again due to another exacerbation
  - Recent chest X-ray and laboratory results reveal no abnormalities

- After assessment, patient is readmitted to hospital

- Treated with:
  - Oxygen
  - Multiple doses of SABA and SAMA
  - Oral corticosteroids

- Patient is now stable
Case Study #2: 68-year-old Male

- **Smoking status**
  - Patient admits to continuing to smoke, but cutting down
  - Expresses no interest in stopping completely

- **Respiratory therapist finds patient has trouble with actuation of maintenance inhaler**

- **A long-acting bronchodilator is initiated under the guidance of a respiratory therapist while in the hospital**
Preventing Repeated Acute Care Utilization
Patient Education to Provide

- General information about COPD
- Guidance on how to stop smoking
- Instruction on inhaler technique/use of nebulizer
- Strategies for:
  - Recognizing an exacerbation
  - Preventing future attacks
  - Minimizing dyspnea
- Need for pulmonary rehabilitation and regular exercise

COPD patient population is diverse with various levels of functioning.

Handheld devices assume patient is able to use correctly.

FP/SAL, fluticasone propionate/salmeterol.

Mishandling of Inhaler Devices by Elderly in a Primary Care Setting

Frequency of Critical Errors by Device According to Age Class

N=3,811

*No longer available. CFC, chlorofluorocarbon.

Satisfaction With Nebulized Therapy

- Overall, patients with mild-to-moderate COPD were/had:
  - “Highly satisfied with their current nebulized treatment” (89%)
  - “Easier breathing” (68%)
- Patients agreed that nebulization provided:
  - “Better control of symptoms” (85%)
  - “Greater confidence that the right amount of medication was being delivered” (84%)
- Caregivers of patients with COPD reported nebulization:
  - “Made it easier to care for their friend/family member” (86%)
Risk Reduction

- Smoking cessation and oxygen therapy are the only interventions shown to reduce COPD risk and positively affect the decline in pulmonary function.
- Evidence shows that treatments like brief clinical interventions are clinically effective and cost effective.
- Smoking cessation aids:
  - Nicotine replacement gum, patch, inhaler
  - Bupropion
  - Varenicline

# The 5 A’s of Smoking Cessation

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASK</strong></td>
<td>Ask about tobacco use with all clients (eg, have you used any form of tobacco in the past 6 months?) and assess readiness to quit. If time allows, assess the person’s level of motivation to change behavior, using motivational interviewing techniques. Document tobacco use status.</td>
</tr>
<tr>
<td><strong>ADVISE</strong></td>
<td>Advise every tobacco user of the importance of quitting in a nonjudgmental and unambiguous manner.</td>
</tr>
<tr>
<td><strong>ASSESS</strong></td>
<td>Assess how ready the patient currently is to quit tobacco use.</td>
</tr>
<tr>
<td><strong>ASSIST</strong></td>
<td>Assist by providing minimal intervention. Refer to support and self-help resources, community clinics and services, other healthcare providers.</td>
</tr>
<tr>
<td><strong>ARRANGE</strong></td>
<td>Arrange follow-up or referral.</td>
</tr>
</tbody>
</table>

Summary

- No universal road map for the clinical care pathway in the hospital for a patient with COPD
- Recognize severity of patient’s disease and the nature of their support system to provide better care
- Bronchodilators are the cornerstone of therapy for COPD
- Understanding individual patient needs is critical to effective COPD treatment
Additional Resources

- COPD Foundation
  - www.copdfoundation.org
- Global Initiative for Chronic Obstructive Lung Diseases
  - www.goldcopd.org
- SHM Project BOOST
  - www.hospitalmedicine.org/boost
- Smoking cessation
  - www.smokefree.gov
  - www.lung.org/stopsmoking