Optimizing COPD Outcomes in Primary Care

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Learning Objectives

- Recognize the symptoms and risk factors for COPD, as well as the importance of early recognition and routine spirometry in at-risk patients.
- Explain the impact of disease severity and patient symptoms, needs, and preferences in providing individualized treatment with goals of slowing the decline of lung function, providing symptomatic relief, and managing disease-related exacerbations.
- Review the safety and efficacy of new and emerging therapeutic options for patients with COPD.
- Apply comprehensive knowledge to appropriately educate and counsel patients with COPD.
Chronic Obstructive Pulmonary Disease (COPD)

- Characterized by
  - Chronic airflow limitation
  - Increased inflammatory response of the airways
- Due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases

Low, Flattened Diaphragm

Air Trapping

Increased A-P Diameter

Used with permission from Fitzgerald Health Education Associates, 2007
COPD Symptoms

- Most common respiratory symptoms include:
  - Dyspnea
  - Cough and/or sputum production
  - Wheezing
  - Chest tightness
  - Chest congestion

- Patients tend to underreport these symptoms

COPD Mortality

- FOURTH leading cause of death in the U.S.
  - Worse in rural areas
  - Women
  - American Indian populations
- More than 3 million people died of COPD in 2012 accounting for 6% of all deaths globally
  - 120,000 deaths annually in U.S.
- Globally, the COPD burden is projected to increase in coming decades because of continued exposure to COPD risk factors and aging of the population

COPD Risk Factors

- Cigarette smoke
- Occupational dust and chemicals
- Environmental tobacco smoke (ETS)
- Indoor and outdoor air pollution

Genes
Infections
Socio-economic status

Aging Populations

COPD Economic Burden

- Direct costs of COPD are $32 billion
- Indirect costs $20.4 billion
- COPD exacerbations account for the greatest proportion of the total COPD burden
- Co-morbidities amplify health care costs and resource utilization

Early Diagnosis of COPD and Assessment Tools
Diagnosis and Initial Assessment

Key Points

- Consider COPD in any patient with:
  - Dyspnea
  - Chronic cough or sputum production
  - And/or a history of exposure to risk factors
- Spirometry is required to make the diagnosis
- Goals of COPD assessment to guide therapy are to determine the:
  - Level of airflow limitation
  - Impact of disease on the patient’s health status
  - And risk of future events (such as exacerbations, hospital admissions, or death)

Diagnosis of COPD

**SYMPTOMS**
- shortness of breath
- chronic cough
- sputum

**EXPOSURE TO RISK FACTORS**
- tobacco
- occupation
- indoor/outdoor pollution

**SPIROMETRY:**
Required to establish diagnosis

Assessment of Airflow Limitation: Spirometry

- Perform spirometry after administration of an adequate dose of a short-acting inhaled bronchodilator to minimize variability.
- A post-bronchodilator $FEV_1/FVC < 0.70$ confirms the presence of airflow limitation.
- Compare values to age-related normal values when possible to avoid overdiagnosis of COPD in the elderly.

A Quick Note:
Asthma-COPD Overlap Syndrome

- A subset of patients will have asthma-COPD overlap syndrome (ACOS)
- Has features of both asthma and COPD
- Represents persistent airflow limitation in patients >40 YO with either a history of asthma or large bronchodi¬lator reversibility
- Affects about a quarter of patients with COPD and almost a third of patients who previously had asthma

- Patients with ACOS have
  - significantly worse respiratory symptoms
  - poorer quality of life
  - increased risk of exacerbations and hospital admissions

- Using treatments developed for asthma or COPD that target eosinophilic, neutrophilic, or paucigranulocytic airway inflammation may help

Spirometry Testing

- CPT codes
  - 94010: $32.84 (FEV1/FVC)
  - 94060: $56.65 (spirometry before and after bronchodilator)
  - 94375: $36.81 (flow loop)
  - 94620: $64.59 (pulmonary stress test)
**CAPTURE Questionnaire**

**COPD Assessment in Primary Care To Identify Undiagnosed Respiratory Disease and Exacerbation risk.**

<table>
<thead>
<tr>
<th>Please answer each question</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you ever lived or worked in a place with dirty or polluted air, smoke, second-hand smoke, or dust?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Does your breathing change with seasons, weather, or air quality?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Does your breathing make it difficult to do things such as carry heavy loads, shovel dirt or snow, jog, play tennis, or swim?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Compared to others your age, do you tire easily?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. In the past 12 months, how many times did you miss work, school, or other activities due to a cold, bronchitis, or pneumonia?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Assessment of COPD
Refined ABCD Assessment

Figure 2.4. The refined ABCD assessment tool

Spirometrically confirmed diagnosis → Assessment of airflow limitation → Assessment of symptoms/risk of exacerbations

Exacerbation history:
- ≥ 2 or ≥ 1 leading to hospital admission
- 0 or 1 (not leading to hospital admission)

Post-bronchodilator FEV₁/FVC < 0.7

| GOLD 1 | ≥ 80 |
| GOLD 2 | 50–79 |
| GOLD 3 | 30–49 |
| GOLD 4 | < 30 |

FEV₁ (% predicted)

C → D
A → B

mMRC 0–1
CAT < 10
mMRC ≥ 2
CAT ≥ 10

Symptoms

Used with permission from the Global Initiative for Chronic Obstructive Lung Disease (GOLD).
https://goldcopd.org
Assessment of COPD

Refined ABCD Assessment Tool

Global Strategy for Diagnosis, Management and Prevention of COPD

<table>
<thead>
<tr>
<th>Patient</th>
<th>Characteristic</th>
<th>Spirometric Classification</th>
<th>Exacerbations per year</th>
<th>mMRC</th>
<th>CAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Low Risk</td>
<td>GOLD 1-2</td>
<td>≤ 1</td>
<td>0-1</td>
<td>&lt; 10</td>
</tr>
<tr>
<td></td>
<td>Less Symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Low Risk</td>
<td>GOLD 1-2</td>
<td>≥ 2</td>
<td>≥ 2</td>
<td>≥ 10</td>
</tr>
<tr>
<td></td>
<td>More Symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>High Risk</td>
<td>GOLD 3-4</td>
<td>&gt; 2</td>
<td>0-1</td>
<td>&lt; 10</td>
</tr>
<tr>
<td></td>
<td>Less Symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
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When assessing risk always choose the HIGHEST risk according to GOLD grade or exacerbation history.
Assessment of COPD
Global Strategy for Diagnosis, Management and Prevention of COPD

- Assess symptoms with either:
  - COPD Assessment Test (CAT)
    - An 8-item health status impairment in COPD (http://catestonline.org)
  - mMRC Breathlessness Scale
    (Breathlessness Measurement using the Modified British Medical Research Council) (https://www.medcalc.com)
Classification of Severity of Airflow Limitation in COPD*

Global Strategy for Diagnosis, Management and Prevention of COPD

In patients with FEV₁/FVC < 0.70

<table>
<thead>
<tr>
<th>Spirometric Classification</th>
<th>FEV₁</th>
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<tbody>
<tr>
<td><strong>GOLD 1</strong></td>
<td>FEV₁ &gt; 80%</td>
</tr>
<tr>
<td>Mild predicted</td>
<td></td>
</tr>
<tr>
<td><strong>GOLD 2</strong></td>
<td>50% &lt; FEV₁ &lt; 80%</td>
</tr>
<tr>
<td>Moderate predicted</td>
<td></td>
</tr>
<tr>
<td><strong>GOLD 3</strong></td>
<td>30% &lt; FEV₁ &lt; 50%</td>
</tr>
<tr>
<td>Severe 50% predicted</td>
<td></td>
</tr>
<tr>
<td><strong>GOLD 4</strong></td>
<td>FEV₁ &lt; 30% predicted</td>
</tr>
<tr>
<td>Very Severe predicted</td>
<td></td>
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*Based on Post-Bronchodilator FEV₁
Case Study: David

Spirometry Test Results*

- **FEV$_1$**
  - Pre-bronchodilator: 2.22 L (69%)
  - Postbronchodilator: 243 L (76%)
- **FVC**
  - Pre: 4.22 L (107%)
  - Post: 4.45 L (113%)
- **FEV1/FVC**
  - Pre: 53%
  - Post: 55%
- **CAT test:** 12

*Based on Post-Bronchodilator FEV$_1$

Change 9%

Change 5%
Assessment of COPD
Refined ABCD Assessment

Figure 2.4. The refined ABCD assessment tool

- Spirometrically confirmed diagnosis
- Assessment of airflow limitation
- Assessment of symptoms/risk of exacerbations

Exacerbation history
- \( \geq 2 \) or \( \geq 1 \) leading to hospital admission
- 0 or 1 (not leading to hospital admission)

| GOLD 1 | \( \geq 80 \) |
| GOLD 2 | 50–79 |
| GOLD 3 | 30–49 |
| GOLD 4 | \(< 30\) |

- Post-bronchodilator \( FEV_1/FVC < 0.7 \)

- mMRC 0–1
  - CAT < 10
- mMRC \( \geq 2 \)
  - CAT \( \geq 10 \)

Used with permission from the Global Initiative for Chronic Obstructive Lung Disease (GOLD)
https://goldcopd.org
### Assesment of COPD

#### Refined ABCD Assessment Tool

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<tr>
<td>D</td>
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When assessing risk always choose the HIGHEST risk according to GOLD grade or exacerbation history.
Individualizing Treatment in COPD
Evidence Supporting Prevention & Maintenance Therapy

OVERALL KEY POINTS (1 of 3):

- **Smoking cessation is key.** Pharmacotherapy and nicotine replacement reliably increase long-term smoking abstinence rates.

- The effectiveness and safety of **e-cigarettes as a smoking cessation aid is uncertain** at present.

- **Pharmacologic therapy can reduce COPD symptoms,** reduce the frequency and severity of exacerbations, and improve health status and exercise tolerance.

- **Each pharmacologic treatment regimen should be individualized** and guided by the severity of symptoms, risk of exacerbations, side-effects, comorbidities, drug availability and cost, and the patient’s response, preference and ability to use various drug delivery devices.

- **Inhaler technique needs to be assessed regularly.**
Evidence Supporting Prevention & Maintenance Therapy

OVERALL KEY POINTS (2 of 3):

- **Influenza vaccination** decreases the incidence of lower respiratory tract infections
- **Pneumococcal vaccination** decreases lower respiratory tract infections
- **Pulmonary rehabilitation** improves symptoms, quality of life, and physical and emotional participation in everyday activities
- **Long-term oxygen therapy** improves survival in patients with severe resting chronic hypoxemia
- In patients with stable COPD and resting or exercise-induced moderate desaturation, long-term oxygen treatment should not be prescribed routinely. However, individual patient factors must be considered when evaluating the patient’s need for supplemental oxygen
OVERALL KEY POINTS (3 of 3):

- In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, **long-term non-invasive ventilation may decrease mortality** and prevent re-hospitalization.

- In select patients with advanced emphysema refractory to optimized medical care, **surgical or bronchoscopic interventional treatments may be beneficial**.

- **Palliative approaches** are effective in controlling symptoms in advanced COPD.
# Manage Stable COPD: Non-pharmacologic

**Global Strategy for Diagnosis, Management and Prevention of COPD**

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Essential</th>
<th>Recommended</th>
<th>Depending on local guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Smoking cessation (can include pharmacologic treatment)</td>
<td>Physical activity</td>
<td>Flu vaccination, Pneumococcal vaccination</td>
</tr>
<tr>
<td>B, C, D</td>
<td>Smoking cessation (can include pharmacologic treatment) Pulmonary rehabilitation</td>
<td>Physical activity</td>
<td>Flu vaccination, Pneumococcal vaccination</td>
</tr>
</tbody>
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## Therapeutic Options: COPD Medications

### Global Strategy for Diagnosis, Management and Prevention of COPD

<table>
<thead>
<tr>
<th><strong>Beta&lt;sub&gt;2&lt;/sub&gt;-agonists</strong></th>
<th><strong>Methylxanthines</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-acting beta&lt;sub&gt;2&lt;/sub&gt;-agonists</td>
<td>Inhaled corticosteroids</td>
</tr>
<tr>
<td>Long-acting beta&lt;sub&gt;2&lt;/sub&gt;-agonists</td>
<td>Combination long-acting beta&lt;sub&gt;2&lt;/sub&gt;-agonists + corticosteroids in one inhaler</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Anticholinergics</strong></th>
<th><strong>Systemic corticosteroids</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-acting anticholinergics</td>
<td></td>
</tr>
<tr>
<td>Long-acting anticholinergics</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Combination short-acting beta&lt;sub&gt;2&lt;/sub&gt;-agonists + anticholinergic in one inhaler</strong></th>
<th><strong>Phosphodiesterase-4 inhibitors</strong></th>
</tr>
</thead>
</table>
Pharmacologic Treatment Algorithms
Global Strategy for Diagnosis, Management and Prevention of COPD

Figure 4.1. Pharmacologic treatment algorithms by GOLD Grade [highlighted boxes and arrows indicate preferred treatment pathways]

Group C
- LAMA + LABA
- LABA + ICS
  - Further exacerbation(s)
  - LAMA

Group D
- Consider roflumilast if FEV1 < 50% pred. and patient has chronic bronchitis
  - Consider macrolide (in former smokers)
  - LAMA + LABA + ICS
  - Further exacerbation(s)
  - Persistent symptoms/further exacerbation(s)
  - LAMA → LABA + ICS → LABA + ICS

Group A
- Continue, stop or try alternative class of bronchodilator
  - Evaluate effect
  - A bronchodilator

Group B
- LAMA + LABA
  - Persistent symptoms
- A long-acting bronchodilator (LABA or LAMA)

In patients with a major discrepancy between the perceived level of symptoms and severity of airflow limitation, further evaluation is warranted.
# Comparative Attributes of Inhalers Used for COPD: DPI’s

<table>
<thead>
<tr>
<th>Dry Powder Inhalers (DPI)</th>
<th>Brand</th>
<th>Generic</th>
<th>Clinical Pearls</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
|                           | Advair Diskus  | Fluticasone/Salmeterol| • Prefilled with dose counter  
• Twice daily dosing  
• One strength 250/50 | ✓ No breath and actuation coordination needed | × Need to be able to inhale deep with good force  
× Preparation steps could be challenging for patients with arthritis, low dexterity or poor grip strength |
|                           | Spiriva HandiHaler | Tiotropium Bromide  | • Need to insert capsule before each use  
• Once daily dosing |                                             |                                                |
|                           | ProAir Respliclick | Albuterol            |                                                      |                                             |                                                |
|                           | Arcapta Neohaler | Indacaterol          | • Need to insert capsule before each use.  
• Once daily dosing |                                             |                                                |
|                           | Tudorza Pressair | Acldinium Bromide    | Twice daily dosing                                  |                                             |                                                |
### Comparative Attributes of Inhalers Used for COPD: DPI’s (cont’d)

<table>
<thead>
<tr>
<th>Brand</th>
<th>Generic</th>
<th>Clinical Pearls</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incruse Ellipta</td>
<td>Umeclidinium</td>
<td>Once daily dosing</td>
<td>✓ Preloaded inhalers with dose counter</td>
<td>✗ Hard to read information on the inhaler</td>
</tr>
<tr>
<td>Breo Ellipta</td>
<td>Fluticasone furoate and Vilanterol</td>
<td>Once daily dosing</td>
<td>✓ Single step for preparation making it easier for patients with poor grip strength or dexterity.</td>
<td></td>
</tr>
<tr>
<td>Anoro Ellipta</td>
<td>Umeclidinium and Vilanterol</td>
<td>Once daily dosing</td>
<td>✓ Has a unique ventilation system at the mouth piece which allows for a steadier inhalation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ Easy to read dose counter</td>
<td></td>
</tr>
</tbody>
</table>
## Comparative Attributes of Inhalers Used for COPD: Soft Mist

<table>
<thead>
<tr>
<th>Brand</th>
<th>Generic</th>
<th>Clinical Pearls</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiriva Respimat (2.5)</td>
<td>Tiotropium Bromide</td>
<td>One daily dosing</td>
<td>✓ Slow moving mist, can breathe slower and more normal</td>
<td>✗ Hard to turn canister</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ Better efficacy for drug administration</td>
<td>✗ Difficult to read dose counter</td>
</tr>
<tr>
<td>Striverdi Respimat</td>
<td>Olodaterol</td>
<td>Two inhalations once daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stiolto Respimat</td>
<td>Tiotropium Bromide and Olodaterol</td>
<td>Two inhalations once daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combivent Respimat</td>
<td>Ipratropium bromide and Albuterol Sulfate</td>
<td>• Only product for COPD exacerbation that uses Respimat technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• One inhalation 4 times daily</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bronchodilators

- Mainstay of pharmacological treatment
  - Short (albuterol) and long acting (formoterol, salmeterol, aformoterol)
  - Improve emptying of lungs, exercise tolerance and reduce hyperinflation

Anticholinergics

- Ipratropium bromide (Atrovent HFA)
  - 2 inhalations 4x per day
  - Contraindication: peanut allergy

- Tiotropium bromide (Spiriva)
  - 1 inhalation once daily
  - Indicated to reduce exacerbations

- Ipratropium bromide/albuterol (Combivent)
  - 2 puffs 4x per day

Aclidinium Bromide Inhalation Powder

- Brand name: Tudorza pressair
  - Anticholinergic
  - Long-acting antimuscarinic agent; inhibits M3 receptor at smooth muscle leading to bronchodilation
- Indications:
  - Long-term maintenance treatment of bronchospasm associated with COPD
  - One inhalation (400 mcg) BID

- Studies:
  - 3 pivotal trials
  - 3 and 6 month clinical trials

Statistically significant improvement in FEV1 over time over placebo

Tudorza (package insert). Wilmington, DE: AstraZeneca: June 2017
Fluticasone Furoate and Vilanterol

- **Brand name:** Breo Ellipta
- **Class:**
  - Inhaled corticosteroid (ICS)
  - Long-acting beta-2 agonist (LABA)
- **Indications:**
  - Once daily options for the maintenance of COPD and to reduce exacerbations
  - Now indicated for ASTHMA; age 12 and up
- **Efficacy:**
  - Statistical improvement in FEV\textsubscript{1}
  - Reduction in exacerbations

Fluticasone Furoate and Vilanterol

- One inhalation (100 mcg/25 mcg) once daily
- Contraindications:
  - Milk proteins
- Drug-drug interactions:
  - Strong CY3A4 inhibitors (ketoconazole)
    - Increased systemic corticosteroid and CV effects
  - MAOI’s, TCA’s (increased vilanterol)
  - BB’s (bronchospasm)
  - Diuretics (hypokalemia)

Brand name: Anoro Ellipta
Class: LAMA/LABA
  - First in this combination class
  - Two bronchodilators
Indications:
  - Adults with COPD
Dosage:
  - One inhalation (62.5 mcg/25 mcg) once daily

Precautions:
  - Paradoxical bronchospasm
  - Cardiovascular disease
  - Uncontrolled hypertension
  - Narrow angle glaucoma

Efficacy trials:
  - Statistical improvement in FEV$_1$
  - No indication to reduce exacerbations at present

Long-Acting $B_2$-Adrenergic Agonist

- Olodaterol (Striverdi Respimat)
- Indication: COPD
  - NOT indicated for asthma
- Dosage: two inhalations once daily
- Competing with: vilanterol, formoterol, salmeterol

LABA/LAMA

- Tiotropium bromide & olodaterol (Stiolto Respimat)
- Indication: Once daily for COPD
- Combination: LAMA and LABA
- 2 puffs once daily
- Not indicated for asthma or for acute exacerbations

Emerging Treatments

- Potential therapeutic targets including COPD-related proinflammatory mediators and signaling pathways
  
- Some investigational compounds target
  - mucus hypersecretion
  - pulmonary hypertension
  - glucocorticoid sensitivity

- Large retrospective cohort study of COPD patients with diabetes found that the peroxisome proliferator-activated receptor γ (PPARγ) agonists rosiglitazone and pioglitazone with reduced COPD exacerbation rates

- Remember Asthma-COPD Overlap Syndrome: Subgroup identification may become more important

Long-term Oxygen Therapy

- **Goal:** Ensure adequate oxygen delivery to the vital organs by increasing the baseline PaO$_2$ at rest to $\geq 60$ mm Hg at sea level and/or producing a SaO$_2$ $\geq 90%$

- **Indications to initiate long-term (> 15 hours/day) oxygen therapy:**
  - PaO$_2$ $< 55$ mm Hg or SaO$_2$ $< 88%$ with or without hypercapnia
  - PaO$_2$ 55-59 mm Hg or SaO$_2$ $= 89\%$ in the presence of:
    - cor pulmonale
    - right heart failure
    - polycythemia (hct $> 56\%$)

Pulmonary Rehabilitation

- Exercise training
- Nutrition counseling
- Education
- Conducted over 6 weeks
- Improves exercise performance and reduces dyspnea (no improvement on FEV$_1$)

Surgery

- Bullectomy
- Lung Volume Reduction Surgery
- Lung Transplant Surgery

An exacerbation of COPD is:

“The 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.”

- Classified as:
  - **Mild** (treated with short acting bronchodilators only, SABDs)
  - **Moderate** (treated with SABDs plus antibiotics and/or oral corticosteroids) or
  - **Severe** (patient requires hospitalization or visits the emergency room)

Severe exacerbations may also be associated with acute respiratory failure.

Exacerbations
Global Strategy for Diagnosis, Management and Prevention of COPD

- Most common causes
  - Viral upper respiratory tract infections
  - Infection of the tracheobronchial tree
- Diagnosis relies exclusively on the patient’s clinical presentation (complaint of acute change of symptoms beyond normal day-to-day variation)
- Treatment goals:
  - Minimize the impact of the current exacerbation
  - Prevent the development of subsequent exacerbations

Management of Exacerbations
Global Strategy for Diagnosis, Management and Prevention of COPD

- **Oxygen** Titrate to improve the patient’s hypoxemia with a target saturation of 88-92%

- **Broncodilators** Short-acting inhaled beta$_2$-agonists with or without short-acting anticholinergics are usually preferred

- **Systemic corticosteroids and antibiotics can**
  - Shorten recovery time
  - Improve lung function (FEV$_1$) and arterial hypoxemia (PaO2)
  - Reduce the risk of early relapse, treatment failure, and length of hospital stay
  - A dose of 30-40 mg prednisolone per day for 5-7 days is recommended; antibiotics for no more than 5-7 days

Antibiotics should be given to patients with three cardinal symptoms:

1. Increased dyspnea
2. Increased sputum volume and
3. Increased sputum purulence

Who require mechanical ventilation

Prescribe antimicrobials to

- Patients with 3 cardinal symptoms:
  1. Increased dyspnea
  2. Increased sputum volume and
  3. Increased sputum purulence

- Individuals with 2 cardinal symptoms of COPD if one of the symptoms is increased purulence of sputum

- Individuals requiring hospitalization
Management of Exacerbations: Ventilation
Global Strategy for Diagnosis, Management and Prevention of COPD

- Non-invasive mechanical ventilation should be used first in COPD patients with acute respiratory failure who have no absolute contraindication
  - Improves gas exchange
  - Reduces work of breathing and the need for intubation
  - Decreases hospitalization duration
  - Improves survival

- Following an exacerbation, appropriate measures for exacerbation prevention should be initiated (see GOLD 2018 Chapter 3 and Chapter 4)
# Antimicrobial Therapy

## Mild to Moderate Exacerbations

**Antimicrobial therapy may not be indicated.**

If prescribed, consider spectrum of antimicrobial activity and side effects.

<table>
<thead>
<tr>
<th>Option</th>
<th>Dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Amoxicillin</td>
<td>875 mg BID × 5</td>
<td>7 days</td>
</tr>
<tr>
<td>2. TMP-SMX DS</td>
<td>BID × 5</td>
<td>7 days</td>
</tr>
<tr>
<td>3. Doxycycline</td>
<td>100 mg BID × 5</td>
<td>7 days</td>
</tr>
<tr>
<td>4. Cephalosporin (cefdinir, cefpodoxime, cefuroxime)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## More Moderate - Severe Exacerbations

**Severe: hospital admission**

Use one of the following:

1. Amoxicillin-clavulanate 875 mg BID × 5 – 7 days
2. Cephalosporin: 2nd – 3rd generation
3. Azithromycin or clarithromycin
4. Respiratory fluoroquinolone (moxifloxacin or levofloxacin)
Manage Exacerbations: Indications for Hospital Admission

- Marked increase in symptom intensity
- Severe underlying COPD
- Onset of new physical signs
- Failure of an exacerbation to respond to initial medical management
- Presence of serious comorbidities
- Frequent exacerbations
- Older age
- Insufficient home support
Importance of Patient Education and Counseling in COPD Management
Unmet Patient Needs

- Understanding of disease
- Symptoms
- Physical limitations
- Emotional distress
- Social isolation
- Concerns about the future
Patient Education

- Comorbidities are common
  - Assess and educate
  - Watch for anxiety, depression, and isolation
- Proper inhaler technique
  - Evaluate with EVERY office visit
- Consider switching treatment modalities
  - Inhalers vs. nebulizers
Patient Lifestyle Modifications

- Smoking cessation
  - Couple with disease education
  - Individualize approach
    - Motivations
    - Treatment options
- Vaping
  - Is it better than smoking?
- Pulmonary Rehab
  - Improves lung function
  - May decrease $O_2$ necessity
Concerns About the Future

- People who have COPD understandably worry about their future, suffering, loss of independence, missing family milestones, and death.

- Patients find comfort in and appreciate many different things, including good doctors, belief in God, medical advancements, having made plans for death, and family.

- Many patients actively look for ways to improve their situations.
  - Help patients connect to resources including psychological counseling.
  
- Take a 360°, multidisciplinary approach to COPD, and ensure that patients have community linkages and receive constant, repetitive reinforcement of important messages.
COPD is a major cause of mortality and morbidity around the world

Exacerbations and comorbidities contribute to the overall severity in individual patients. COPD is a highly symptomatic disease.

Patients are plagued with progressive fatigue, dyspnea, depression, anxiety, insomnia that eventually require symptom-based palliative treatments.

Inhalers have been widely used in COPD for more than 60 years. They remain the cornerstone of treatment.

COPD patients reap considerable benefit from pulmonary rehabilitation (which is the most effective therapeutic strategy to improve shortness of breath, health status and exercise tolerance).

Clinicians must educate and re-educate patients about their COPD and its management at every opportunity.