GOLD Objectives

► To provide a non-biased review of the current evidence for the assessment, diagnosis and treatment of patients with COPD.
► To highlight short-term and long-term treatment objectives organized into two groups:
  ➢ Relieving and reducing the impact of symptoms.
  ➢ Reducing the risk of adverse health events that may affect the patient in the future.
► To guide symptoms assessment and health status measurement.

GOLD 2019 Report: Chapters

1. Definition and Overview
2. Diagnosis and Initial Assessment
3. Evidence Supporting Prevention & Maintenance Therapy
4. Management of Stable COPD
5. Management of Exacerbations
6. COPD and Comorbidities
COPD Definition

► Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.

Overview

► The most common respiratory symptoms include dyspnea, cough and/or sputum production. These symptoms may be under-reported by patients.

► The main risk factor for COPD is tobacco smoking but other environmental exposures such as biomass fuel exposure and air pollution may contribute.

Overview

► Besides exposures, host factors predispose individuals to develop COPD. These include genetic abnormalities, abnormal lung development and accelerated aging.

► COPD may be punctuated by periods of acute worsening of respiratory symptoms, called exacerbations.

► In most patients, COPD is associated with significant concomitant chronic diseases, which increase its morbidity and mortality.
Chronic Obstructive Pulmonary Disease (COPD)

► COPD is currently the fourth leading cause of death in the world.¹
► COPD is projected to be the 3rd leading cause of death by 2020.²
► More than 3 million people died of COPD in 2012 accounting for 6% of all deaths globally.
► Globally, the COPD burden is projected to increase in coming decades because of continued exposure to COPD risk factors and aging of the population.

Medical History

► Patient’s exposure to risk factors
► Past medical history
► Family history of COPD or other chronic respiratory disease.
► Pattern of symptom development
► History of exacerbations or previous hospitalizations for respiratory disorder
► Presence of comorbidities
► Impact of disease on patient’s life
► Social and family support available to the patient.
► Possibilities for reducing risk factors, especially smoking cessation.

Diagnosis and Initial Assessment

► Pathways to the Diagnosis of COPD

Spirometry

► Spirometry - Normal Trace
► Spirometry - Obstructive Disease
Alpha-1 antitrypsin deficiency (AATD)

AATD screening

- The World Health Organization recommends that all patients with a diagnosis of COPD should be screened once especially in areas with high AATD prevalence.
- AATD patients are typically < 45 years with panlobular basal emphysema
- Delay in diagnosis in older AATD patients presents as more typical distribution of emphysema (centrilobular apical).
- A low concentration (< 20% normal) is highly suggestive of homozygous deficiency.
OVERALL KEY POINTS (1 of 3):

► Smoking cessation is key. Pharmacotherapy and nicotine replacement reliably increase long-term smoking abstinence rates. Legislative smoking bans and counseling, delivered by healthcare professionals improve quit 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.

OVERALL KEY POINTS (2 of 3):

► Inhaler technique needs to be assessed regularly.
► 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.
► In patients with severe resting chronic hypoxemia, long-term oxygen therapy improves survival.
OVERALL KEY POINTS (3 of 3):

► 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.

► 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.

Smoking Cessation

► Smoking cessation has the greatest capacity to influence the natural history of COPD.

► If effective resources and time are dedicated to smoking cessation, long-term quit success rates of up to 25% can be achieved.

1. BRIE STRATEGIES TO HELP THE PATIENT WANT TO QUIT

- ASK: Systematically identify all smokers at each visit. Specify that smoking is not a normal part of life; smoking can be stopped. Ask patients if they want to quit. Be persistent! (Encourage all smoking patients to consider smoking cessation at every visit.)

- ADVISE: Encourage regular contact with the provider. Be clear, strong, and personally committed to urging smokers to quit at each visit.

- REFER: Refer patients to smoking cessation services of their choice. Encourage patients to quit smoking with assistance. Do not interfere with patient decision; smoking cessation programs are not a substitute for medical care.

- ASSESS: Ask the patient inquiring about smoking history, willingness to quit, and barriers to quitting. Provide intervention when possible. Provide brief advice and support to patients who desire to quit.

- ARRANGE: Schedule follow-up contact. Arrange follow-up contact with patients who have quit.

Effect of Smoking on FEV1 (modified Peto)
Pharmacological therapy

Overview of the medications

► Pharmacological therapy for COPD is used to reduce symptoms, reduce the frequency and severity of exacerbations, and improve exercise tolerance and health status.

► To date, there is no conclusive clinical trial evidence that any existing medications for COPD modify the long-term decline in lung function.

► The choice within each class depends on the availability and cost of medication and favorable clinical response balanced against side effects.

► Each treatment regimen needs to be individualized as the relationship between severity of symptoms, airflow limitation, and severity of exacerbations can differ between patients.
**BRONchodilATORS IN STABLE COPD**

- Most bronchodilators in COPD are oral or inhaled and commonly given on a regular basis to prevent or reduce symptoms (Evidence A).
- Regular and as-needed use of LABA or SAMA improves FEV₁ and symptoms (Evidence A).
- Combinations of ICS and LABA are superior compared to either medication alone in improving FEV₁ and symptoms (Evidence A).
- LABAs and SAMA significantly improve lung function, dyspnea, health status, and reduce exacerbation rates (Evidence A).
- LABAs have a greater effect on exacerbation reduction compared with ICSs (Evidence A) and decrease hospitalization (Evidence B).
- Combination treatment with a LABA and ICSA increases FEV₁ and reduces symptoms compared to monotherapies (Evidence A).
- Combination treatment with a LABA/ICS reduces exacerbation compared to monotherapy (Evidence B).
- Exacerbations impair the effectiveness of pulmonary rehabilitation in increasing exercise performance (Evidence B).
- Pulmonary rehabilitation improves health-related quality of life in stable COPD (Evidence A) and is associated with modest symptomatic benefits (Evidence B).

**ART: INFLAMMATORY THERAPY IN STABLE COPD**

**Monoclonal antibodies**

- Monoclonal antibodies to tumor necrosis factor (TNF) are effective in improving lung function and symptoms in patients with exacerbations and moderate to severe COPD (Evidence A).
- Regular treatments with TNF inhibitors are effective in patients with exacerbations and moderate to severe COPD (Evidence B).
- TNF inhibitors can be effective in patients with sputum production greater than 50 mL per day (Evidence A).

**Inhaled corticosteroids (ICSs)**

- ICSs are recommended for maintenance treatment in patients with moderate to severe COPD (Evidence B).
- ICSs are recommended for maintenance treatment in patients with severe exacerbations (Evidence B).
- ICSs are recommended for maintenance treatment in patients with frequent exacerbations (Evidence B).

**OTHER PHARMACOLOGICAL TREATMENTS**

**Hormonal augmentation therapy** may slow the progression of emphysema (Evidence B).

**Antithrombin**

- There is no conclusive evidence of a beneficial role of antithrombins in patients with COPD (Evidence C).

**Lung volume reduction surgery**

- Vascular dilators do not improve outcomes and may worsen dyspnea (Evidence B).

TABLE 3.4

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Non-pharmacological therapy

**OXYGEN THERAPY AND VENTILATORY SUPPORT IN STABLE COPD**

**OXYGEN THERAPY**
- The long-term administration of oxygen increases survival in patients with severe chronic respiratory insufficiency (Evidence A).
- In patients with stable COPD and moderate resting or exercise-induced arterial desaturation, prescription of long-term oxygen does not lengthen time to death or first hospitalization or provide sustained benefit in health status, lung function and 6-minute walk distance (Evidence A).
- Resting desaturation at 80%/70% does not exclude the development of severe hypoxemia when triggered by an exercise.

**VENTILATORY SUPPORT**
- NPPV may improve hospitalization-free survival in selected patients after recent hospitalization, particularly in those with severe daytime persistent hypoxemia (PaO2 < 55 mmHg) (Evidence B).

**TABLE 3.10**

Non-pharmacological therapy

**PULMONARY REHABILITATION, SELF-MANAGEMENT AND INTEGRATIVE CARE IN COPD**

**PULMONARY REHABILITATION**
- Pulmonary rehabilitation improves dyspnea, health status and exercise tolerance in stable patients (Evidence A).
- Pulmonary rehabilitation reduces hospitalization among patients who have had a recent exacerbation (6 weeks from prior hospitalization) (Evidence B).

**EDUCATION AND SELF-MANAGEMENT**
- Education alone has not been shown to be effective (Evidence C).
- Self-management intervention with communication with a healthcare professional improves health status and decreases hospitalizations and emergency department visits (Evidence B).

**INTEGRATIVE CARE AND PROGRAMS**
- Integrated care andtelehealth have demonstrated benefit at this time (Evidence B).

**TABLE 3.8**

INTERVENTIONAL THERAPY IN STABLE COPD

**LUNG VOLUME REDUCTION SURGERY**
- Lung volume reduction surgery improves survival in severe emphysema patients with an upper-lobe emphysema and low post-rehabilitation exercise capacity (Evidence B).

**TRANSPLENTATION**
- In appropriately selected patients with very severe COPD, lung transplantation has been shown to improve quality of life and functional capacity (Evidence C).

**BRONCHOLOGIC INTERVENTIONS**
- In select patients with advanced emphysema, bronchoscopic interventions reduce end-expiratory lung volume and improve exercise tolerance, health status and lung function at 8-12 months following treatment.

**ENDOTRACHEAL VALVES (Evidence B), LUNG CLOKS (Evidence B), VAPOR ABLATION (Evidence B).**
Once COPD has been diagnosed, effective management should be based on an individualized assessment to reduce both current symptoms and future risks of exacerbations.

**GOALS FOR TREATMENT OF STABLE COPD**

- Reduce symptoms
- Improve Exercise Tolerance
- Improve Health Status
- Reduce Risk
- Prevent Disease Progression
- Prevent and Treat Exacerbations
- Reduce Mortality

**INITIAL PHARMACOLOGICAL TREATMENT**

<table>
<thead>
<tr>
<th>Group C</th>
<th>LABA</th>
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<tbody>
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<td>Ever 2 moderate exacerbations or 3 severe exacerbations</td>
<td></td>
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</tbody>
</table>

| Group A | A long-acting 
Bracehaler |
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>nMRC 2</td>
<td>≤ 30</td>
</tr>
</tbody>
</table>

| Group B | A long-acting 
Bracehaler (LABA or LAMA) |
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</thead>
<tbody>
<tr>
<td>nMRC 1-2</td>
<td>≤ 30</td>
</tr>
</tbody>
</table>

Definition of abbreviations: nMRC: modified Medical Research Council dyspnea questionnaire; ICF: International Classification of Functioning, Disability and Health; COPD: Chronic Obstructive Pulmonary Disease.
Treatment of stable COPD

► Following implementation of therapy, patients should be reassessed for attainment of treatment goals and identification of any barriers for successful treatment (Figure 4.2).

► Following review of the patient response to treatment initiation, adjustments in pharmacological treatment may be needed.

FOLLOW-UP pharmacological treatment

Exacerbations

► If patients treated with LABA/LAMA/ICS who still have exacerbations the following options may be considered:

► Add roflumilast. This may be considered in patients with an FEV1 < 50% predicted and chronic bronchitis, particularly if they have experienced at least one hospitalization for an exacerbation in the previous year.

► Add a macrolide. The best available evidence exists for the use of azithromycin, especially in those who are not current smokers. Consideration to the development of resistant organisms should be factored into decision-making.

► Stopping ICS. This can be considered if there are adverse effects (such as pneumonia) or a reported lack of efficacy. However, a blood eosinophil count ≥ 300 cells/µL identifies patients with the greatest likelihood of experiencing more exacerbations after ICS withdrawal and who subsequently should be followed closely for relapse of exacerbations.

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Management of Exacerbations

COPD exacerbations are defined as an acute worsening of respiratory symptoms that result in additional therapy.

- They are classified as:
  - **Mild** (treated with short acting bronchodilators only, SABDs)
  - **Moderate** (treated with SABDs plus antibiotics and/or oral corticosteroids)
  - **Severe** (patient requires hospitalization or visits the emergency room). Severe exacerbations may also be associated with acute respiratory failure.

Exacerbations of COPD can be precipitated by several factors. The most common causes are respiratory tract infections.

- The goal for treatment of COPD exacerbations is to minimize the negative impact of the current exacerbation and to prevent subsequent events.
- Short-acting inhaled beta2-agonists, with or without short-acting anticholinergics, are recommended as the initial bronchodilators to treat an acute exacerbation.

Maintenance therapy with long-acting bronchodilators should be initiated as soon as possible before hospital discharge.

- Systemic corticosteroids can improve lung function (FEV1), oxygenation and shorten recovery time and hospitalization duration. Duration of therapy should not be more than 5-7 days.
- Antibiotics, when indicated, can shorten recovery time, reduce the risk of early relapse, treatment failure, and hospitalization duration. Duration of therapy should be 5-7 days.
- Methylxanthines are not recommended due to increased side effect profiles.
Management of Exacerbations

► Non-invasive mechanical ventilation should be the first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication because it improves gas exchange, reduces work of breathing and the need for intubation, decreases hospitalization duration and improves survival.

► Following an exacerbation, appropriate measures for exacerbation prevention should be initiated.

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COPD and Comorbidities

Some common comorbidities occurring in patients with COPD with stable disease include:

► Cardiovascular disease (CVD)
► Heart failure
► Ischaemic heart disease (IHD)
► Arrhythmias
► Peripheral vascular disease
► Hypertension
► Osteoporosis
► Anxiety and depression
► COPD and lung cancer
► Metabolic syndrome and diabetes
► Gastroesophageal reflux (GERD)
► Bronchiectasis
► Obstructive sleep apnea

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COPD and Comorbidities

► COPD often coexists with other diseases (comorbidities) that may have a significant impact on disease course.

► In general, the presence of comorbidities should not alter COPD treatment and comorbidities should be treated per usual standards regardless of the presence of COPD.

► Lung cancer is frequently seen in patients with COPD and is a main cause of death. Evaluate for lung cancer screening with annual low radiation lung CT scan.

► Cardiovascular diseases are common and important comorbidities in COPD.

► Osteoporosis and depression/anxiety are frequent, important comorbidities in COPD, are often under-diagnosed, and are associated with poor health status and prognosis.

► Gastroesophageal reflux (GERD) is associated with an increased risk of exacerbations and poorer health status.

► When COPD is part of a multimorbidity care plan, attention should be directed to ensure simplicity of treatment and to minimize polypharmacy.

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