Confronting the Challenges of COPD

What is New in The Approaches to Diagnosis, Treatment, and Patient Outcomes
COPD Definition

GOLD: Global Initiative for Chronic Obstructive Lung Disease

- Common, preventable, treatable – partially reversible
- Characterized by persistent airflow limitation; usually progressive and disabling; associated with chronic inflammatory response in airways/lung to noxious particles or gases
  - Chronic bronchitis
  - Emphysema

Exacerbations and comorbidities contribute to overall severity

Burden of COPD in the United States

- Total costs from hospitalization and absenteeism estimated at $36 billion
- COPD exacerbations account for >70% of total costs
- ≈13 million office visits/year due to exacerbations
- Disproportionately affects individuals of lower socioeconomic status

Reprinted from The Lancet Respiratory Medicine, 4(6), Han MK et al, Meeting the challenge of COPD care delivery in the USA: a multiprovider perspective, 473-526, Copyright 2016, with permission from Elsevier.
COPD Is Underdiagnosed

- Roughly half of those in the United States with COPD are undiagnosed ~15 million Americans

Reprinted from *The Lancet Respiratory Medicine*, 4(6), Han MK et al, Meeting the challenge of COPD care delivery in the USA: a multiprovider perspective, 473-526, Copyright 2016, with permission from Elsevier.
Screening for Chronic Obstructive Pulmonary Disease

US Preventive Services Task Force Recommendation Statement

- Similar to 2008, the USPSTF did not find evidence that screening for COPD in asymptomatic persons improves health-related quality of life, morbidity, or mortality. The USPSTF determined that early detection of COPD, before the development of symptoms, does not alter the course of the disease or improve patient outcomes. The USPSTF concludes with moderate certainty that screening for COPD in asymptomatic persons has no net benefit.
Screening vs Case Finding

- Many individuals at increased risk for COPD self-restrict activity to minimize symptoms
- USPSTF recommendation is based on lack of evidence, not negative evidence
- GOLD recommends case-finding in symptomatic patients, but does not recommend screening in asymptomatic populations
- Future trials are needed to better assess the effects of screening and treatment of at-risk individuals in primary care on long-term health outcomes

Case Finding: A New Approach

- Joint partnership between NHLBI and COPD Foundation
- 5-item questionnaire plus Peak Expiratory Flow
- Designed to identify individuals who are symptomatic or have history of exacerbations
- In a case-control study, CAPTURE exhibited a sensitivity of 95.7% and a specificity of 67.8% for differentiating cases from no-COPD control subjects

NHLBI=National Heart, Lung, and Blood Institute.
Consider COPD in patients with **any** symptoms and history of exposure to risk factors.

**SYMPTOMS**
- Persistent shortness of breath
- Chronic cough
- Chronic sputum production
- Wheezing

**RISK FACTORS**
- Tobacco smoke
- Indoor/Outdoor air pollution
- Occupational pollutants
- Family history
- Age >40 years

Spirometry is **required** to make diagnosis.

*Postbronchodilator FEV$_1$/FVC measured 10 to 15 minutes after 2 to 4 puffs of a short-acting bronchodilator. FEV$_1$=forced expired volume in 1 second; FVC=forced vital capacity.

Spirometry Required for Diagnosis

- Uses of spirometry in COPD include:
  - Confirm an FEV1/FVC ratio <0.7 after bronchodilator
  - Assess disease severity
  - Differentiate COPD from other diseases
  - Monitor disease progression
  - Assess response to therapy

Case Finding: A New Approach

- Joint partnership between NHLBI and COPD Foundation
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- Designed to identify individuals who are symptomatic or have history of exacerbations
- In a case-control study, CAPTURE exhibited a sensitivity of 95.7% and a specificity of 67.8% for differentiating cases from no-COPD control subjects

NHLBI=National Heart, Lung, and Blood Institute.
GOLD Grading System: FEV1 Airflow Limitation

Postbronchodilator FEV₁/FVC <.70
- Confirms presence of persistent airflow limitation
- Supports diagnosis of COPD

GOLD Combined Assessment: Symptoms/Exacerbation Risk

Symptoms (mMRC or CAT score)

CAT=COPD Assessment Test; mMRC=Modified Medical Research Council.

Goals for Treatment of Stable COPD

Table 4.1. Goals for treatment of stable COPD

- Relieve symptoms
- Improve exercise tolerance
- Improve health status

and

- Prevent disease progression
- Prevent and treat exacerbations
- Reduce mortality

REDUCE SYMPTOMS

REDUCE RISK

Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report GOLD Executive Summary

Key Points

- Smoking cessation is key. Pharmacotherapy and nicotine replacement increase long-term smoking abstinence rates.
- The effectiveness and safety of e-cigarettes as a smoking cessation aid is uncertain.
- 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.
- Influenza and pneumococcal vaccinations decrease the incidence of lower respiratory tract infections.

- 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.

- 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.

A Modification of Therapeutic Recommendations

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

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

Group C
- LAMA + LABA
- LABA + ICS
- LAMA

Group D
- LAMA + LABA + ICS
- Consider roflumilast if FEV₁ < 50% pred and patient has chronic bronchitis
- Consider macrolide
- Persistent Symptoms/Further Exacerbations
Symptomatic Response to Dual Bronchodilators Is Dependent On Baseline Symptom Burden

*Least squared mean difference (95% CI) in change in baseline in SGRQ at Week 24. Pooled data from PINNACLE-1 and PINNACLE-2. The primary endpoint was change from baseline in morning pre-dose trough FEV₁.

FF=formoterol fumarate; GFF=glycopyrrolate/formoterol fumarate; GP=glycopyrrolate; LSM=least squares mean; MCID=minimum clinically important difference; MDI=metered-dose inhaler; SGRQ=St George Respiratory Questionnaire; T=tiotropium.

A Modification of Therapeutic Recommendations

Group C

- **LAMA + LABA**
- **LABA + ICS**
- **LAMA**

Further Exacerbation(s)

Group A

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

Group B

- **LAMA + LABA**
- **A long-acting bronchodilator (LABA or LAMA)**

Group D

- **Consider roflumilast if FEV<sub>1</sub> < 50% pred and patient has chronic bronchitis**
- **Consider macrolide**
- **Persistent Symptoms/Further Exacerbations**
- **Further Exacerbation(s)**
- **LAMA**
- **LAMA + LABA**
- **LABA + ICS**
LAMA Reduces Exacerbations Compared With a LABA

Hazard ratio, 0.83 (95% CI, 0.77–0.90)
P<0.001 by log-rank test

Reprinted from The Lancet Respiratory Medicine, 1(7), Decramer ML et al; INVIGORATE investigators, Once-daily indacaterol versus tiotropium for patients with severe chronic obstructive pulmonary disease (INVIGORATE): a randomised, blinded, parallel-group study, 524-533, Copyright 2013, with permission from Elsevier.

A Modification of Therapeutic Recommendations

Group A

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

A bronchodilator

Group B

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Group C

- LAMA + LABA
- LABA + ICS

Group D

- Consider roflumilast if FEV₁ < 50% pred and patient has chronic bronchitis

Further Exacerbation(s)

Considers macrolide

Persistent Symptoms/Further Exacerbations

Further Exacerbation(s)

LAMA + LABA

LAMA

LABA + ICS

LAMA + LABA

LAMA + LABA + ICS

LABA + ICS

LABA/LAMA vs ICS/LABA for Exacerbations


ICS/LABA Decreased Exacerbations Compared With ‘Usual Care’


Rate of Decline in FEV$_1$ is Tempered by ICS
FF/VI Showed the Greatest Benefit Over VI in Exacerbation Prevention in Patients With ≥2% Blood Eosinophils (Post Hoc Analysis)

Reprinted from The Lancet Respiratory Medicine, 3(6), Pascoe S et al, Blood eosinophil counts, exacerbations, and response to the addition of inhaled fluticasone furoate to vilanterol in patients with chronic obstructive pulmonary disease: a secondary analysis of data from two parallel randomised controlled trials, 435-442, Copyright 2015, with permission from Elsevier.

IND/GLY Reduced the Rate of Moderate or Severe Exacerbations vs SFC Over 52 Weeks in Patients With <2 and ≥2% Blood Eosinophils at Randomization (pre-specified analysis)

IND/GLY=indacaterol-glycopyrronium; RR=rate ratio; SFC=salmeterol-fluticasone.

A Modification of Therapeutic Recommendations

Group A

Continue, stop, or try alternative class of bronchodilator

Evaluate effect

A bronchodilator

Group B

LABA + ICS

LAMA

Group C

LAMA + LABA

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Further Exacerbation(s)

LAMA

Group D

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Further Exacerbation(s)

Persistent Symptoms/Further Exacerbations

LAMA

LAMA + LABA

LABA + ICS

Further Exacerbation(s)

LAMA

LAMA + LABA

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Further Exacerbation(s)

LAMA

LAMA + LABA + ICS

A long-acting bronchodilator (LABA or LAMA)

A Modification of Therapeutic Recommendations

- **Group D**
  - Consider roflumilast if $\text{FEV}_1 < 50\% \text{ pred}$ and patient has chronic bronchitis
  - Further Exacerbation(s)

- **LAMA + LABA + ICS**
  - Consider a macrolide
  - Persistent Symptoms/Further Exacerbations

- **LAMA + LABA**
  - Further Exacerbation(s)

- **LABA + ICS**

Triple Therapy for Exacerbations

Additional effect of a LAMA added to an ICS/LABA

BDP=beclomethasone dipropionate; GB=glycopyrronium bromide.
FULFIL Trial: Once-Daily Triple Therapy for Patients with Chronic Obstructive Pulmonary Disease

BUD/FOR=budesonide/formoterol; E-RS=EXACT-Respiratory Symptoms; LS=least squares; UMEC=umeclidinium.

A Modification of Therapeutic Recommendations

Group D

Consider roflumilast if FEV₁ < 50% pred and patient has chronic bronchitis

Consider macrolide

Further Exacerbation(s)

LAMA + LABA + ICS

Persistent Symptoms/Further Exacerbations

LAMA

LAMA + LABA

LABA + ICS

Azithromycin Effect Noted Across a Wide Variety of Patients

<table>
<thead>
<tr>
<th>Subgroup (n)</th>
<th>HR</th>
<th>95% CI for HR</th>
<th>P Value*</th>
<th>P Value for Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (1,113)</td>
<td>0.71</td>
<td>0.61–0.83</td>
<td>&lt;0.0001</td>
<td>0.75</td>
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<tr>
<td>Women (455)</td>
<td>0.69</td>
<td>0.55–0.87</td>
<td>0.001</td>
<td>0.04</td>
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<tr>
<td>Men (668)</td>
<td>0.72</td>
<td>0.59–0.89</td>
<td>0.002</td>
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<tr>
<td>GOLD II (292)</td>
<td>0.55</td>
<td>0.40–0.75</td>
<td>0.0002</td>
<td>0.04</td>
</tr>
<tr>
<td>GOLD III (451)</td>
<td>0.71</td>
<td>0.56–0.90</td>
<td>0.004</td>
<td></td>
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<tr>
<td>GOLD IV (870)</td>
<td>0.84</td>
<td>0.65–1.08</td>
<td>0.18</td>
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<tr>
<td>Ex-smoker (857)</td>
<td>0.85</td>
<td>0.55–0.77</td>
<td>&lt;0.0001</td>
<td>0.09</td>
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<tr>
<td>Smoker (246)</td>
<td>0.99</td>
<td>0.71–1.38</td>
<td>0.95</td>
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<tr>
<td>Chronic bronchitis symptoms</td>
<td>0.76</td>
<td>0.62–0.94</td>
<td>0.01</td>
<td>0.25</td>
</tr>
<tr>
<td>present (526)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Chronic bronchitis symptoms</td>
<td>0.64</td>
<td>0.52–0.80</td>
<td>0.0001</td>
<td>0.29</td>
</tr>
<tr>
<td>absent (581)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>No ICS, LAMA, LABA (100)</td>
<td>0.42</td>
<td>0.23–0.77</td>
<td>0.005</td>
<td>0.29</td>
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<tr>
<td>ICS only (57)</td>
<td>0.65</td>
<td>0.31–1.38</td>
<td>0.26</td>
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<tr>
<td>LAMA only (77)</td>
<td>0.60</td>
<td>0.33–1.11</td>
<td>0.10</td>
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<tr>
<td>LABA only (21)</td>
<td>0.42</td>
<td>0.15–1.18</td>
<td>0.10</td>
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<tr>
<td>ICS and LAMA (51)</td>
<td>1.19</td>
<td>0.63–2.23</td>
<td>0.59</td>
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<tr>
<td>ICS and LABA (229)</td>
<td>0.74</td>
<td>0.52–1.05</td>
<td>0.09</td>
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<tr>
<td>LAMA and LABA (53)</td>
<td>0.47</td>
<td>0.23–0.98</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>ICS, LAMA, and LABA (525)</td>
<td>0.76</td>
<td>0.62–0.94</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>No long-term oxygen use (454)</td>
<td>0.80</td>
<td>0.62–1.03</td>
<td>0.08</td>
<td>0.23</td>
</tr>
<tr>
<td>Long-term oxygen use (659)</td>
<td>0.66</td>
<td>0.55–0.80</td>
<td>&lt;0.0001</td>
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<tr>
<td>Age ≤ 65 (551)</td>
<td>0.84</td>
<td>0.68–1.04</td>
<td>0.1101</td>
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<tr>
<td>Age &gt; 65 (542)</td>
<td>0.59</td>
<td>0.47–0.74</td>
<td>&lt;0.0001</td>
<td></td>
</tr>
</tbody>
</table>

Definition of abbreviations: CI = confidence interval; GOLD = Global Initiative for Chronic Obstructive Lung Disease; HR = hazard ratio; ICS = inhaled corticosteroids; LABA = long-acting β-agonists; LAMA = long-acting muscarinic agents.

All models included age, sex, clinic, smoking status at baseline, FEV₁% predicted at baseline, concomitant medications for COPD, and oxygen use except GOLD status models that used GOLD category instead of FEV₁%.

The primary endpoint was the annual rate of moderate (requiring treatment with SCS and/or antibiotics) and severe (necessitating hospitalization or leading to death) exacerbations.

ROF = roflumilast 500 μg qd.

A Modification of Therapeutic Recommendations – *Step Down Is Possible*...Structure for Follow-up Is Suggested

**Group D**

- Consider roflumilast if FEV$_1$ < 50% pred and patient has chronic bronchitis
- Consider macrolide

**Further Exacerbation(s)**

- LAMA + LABA + ICS
- Persistent Symptoms/Further Exacerbations

ICS Can Be Withdrawn

Withdrawal of Inhaled Glucocorticoids

IGC=inhaled glucocorticoids.
ICS Can Be Withdrawn

Withdrawal of Inhaled Glucocorticoids


IGC=inhaled glucocorticoids.
WISDOM Study: Stepwise Withdrawal of ICS in COPD: Role of Eosinophils at Baseline

Factors | Number of Patients | Rate Ratio | P value
--- | --- | --- | ---
Baseline eosinophils (mutually exclusive subgroups)
<150 cells per µL | 1067 | 1.08 (0.88-1.32) | 0.44
150 to <300 cells per µL | 724 | 1.00 (0.80-1.27) | 0.97
300 to <400 cells per µL | 201 | 1.30 (0.80-2.11) | 0.28
≥400 cells per µL | 247 | 1.73 (1.15-2.62) | 0.0089

Decreased rate ratio with ICS withdrawal
Increased rate ratio with ICS withdrawal

A Modification of Therapeutic Recommendations – Step Down Is Possible...Structure for Follow-up Is Suggested

Consider roflumilast if FEV₁ < 50% pred and patient has chronic bronchitis

Group D

Consider macrolide

Further Exacerbation(s)

LAMA + LABA + ICS

Persistent Symptoms/Further Exacerbations

LAMA

LAMA + LABA

LABA + ICS

Further Exacerbation(s)

ISSUES OF INHALER DEVICES
Issues of Inhaler DEVICES

- No single inhaler will satisfy the needs of all patients
  - 28% to 68% of patients do not use inhalers correctly
  - A sub-optimal technique can result in decreased lung delivery and potentially reduced efficacy
- The proliferation of inhalation devices in the market can result in confusion for clinicians, nurses, respiratory therapists, and patients
  - Each available device requires specific inhalation techniques
- Studies have demonstrated lack of knowledge in the use of devices by health care professionals
  - 39% to 67% of HCPs are unable to adequately perform or describe inhalation techniques
- Physicians need to select the right inhaler for each patient
  - Knowing each product’s characteristics is key

Factors That Determine Selection of an Inhaler Delivery System

- **Clinician Factors**
  - Deliver wide range of therapies
  - Clinical efficacy/safety
  - Type of prescribed medications (ICS vs bronchodilator)
  - Patient’s disease severity/inspiratory flow
  - Ease of use/Liked by patients
  - Cost/Reimbursement insurance coverage

- **Patient Factors**
  - Lifestyle/Preference
  - Disease severity
  - Cost/Reimbursement
  - Clinical setting/Caregiver
  - Physical ability/dexterity
  - Cognitive ability

The Use of Inhaled Delivery Devices

- Age is a major factor that determines correct use of inhaler devices secondary to decreased muscle strength, memory problems, and loss of coordination.
Mishandling of Inhaler Devices in a Primary Care Setting

Frequency of Critical Errors by Device According to Age Class

n = 3811

At least one critical error according to age class

Flow-Independent Delivery System Required for Elderly Patients With Severe COPD


The Non-Compliance Spiral Use Of Inhaler Devices

- Waste of inhalers
- Worsening of symptoms
- Lack of compliance
- Patients’ misuse of inhalers

↑↑ Health Care Costs

- Morbidity
- Hospitalizations
- Health Care Provider step-up treatments
- Mortality

Key Points on Inhalation Devices

Table 4.4. Key points for inhalation of drugs

- The choice of inhaler device has to be individually tailored and will depend on access, cost, prescriber, and most importantly, patient’s ability and preference.
- It is essential to provide instructions and to demonstrate the proper inhalation technique when prescribing a device, to ensure that inhaler technique is adequate and re-check at each visit that patients continue to use their inhaler correctly.
- Inhaler technique (and adherence to therapy) should be assessed before concluding that the current therapy requires modification.
What the Pulmonary Specialist Should Know About the New Inhalation Therapies

- Know the types of devices that are available to deliver specific drugs and classes of drugs
- Appreciate the advantages and disadvantages of each device
- Choose devices that the patient can and will use effectively
- Choose devices that have been approved by the appropriate authorities
- Train patients about the correct inhalation maneuver that is appropriate for the device being prescribed
- Check the patient’s inhaler technique regularly
- Review the patient’s adherence to treatment at each visit
- Not switch to a new device without the patient’s involvement and without follow-up education on how to use the device properly
Table 4.9. Key points for the use of non-pharmacological treatments

**Education, self-management and pulmonary rehabilitation**
- Education is needed to change patient’s knowledge but there is no evidence that used alone it will change patient behavior.
- Education self-management with the support of a case manager with or without the use of a written action plan is recommended for the prevention of exacerbation complications such as hospital admissions (Evidence B).
- Rehabilitation is indicated in all patients with relevant symptoms and/or a high risk for exacerbation (Evidence A).
- Physical activity is a strong predictor of mortality (Evidence A). Patients should be encouraged to increase the level of physical activity although we still don’t know how to best insure the likelihood of success.

**Vaccination**
- Influenza vaccination is recommended for all patients with COPD (Evidence A).
- Pneumococcal vaccination: the PCV13 and PPSV23 are recommended for all patients > 65 years of age, and in younger patients with significant comorbid conditions including chronic heart or lung disease (Evidence B).

**Nutrition**
- Nutritional supplementation should be considered in malnourished patients with COPD (Evidence B).

**End of life and palliative care**
- All clinicians managing patients with COPD should be aware of the effectiveness of palliative approaches to symptom control and use these in their practice (Evidence D).
- End of life care should include discussions with patients and their families about their views on resuscitation, advance directives and place of death preferences (Evidence D).

**Treatment of hypoxemia**
- In patients with severe resting hypoxemia long-term oxygen therapy is indicated (Evidence A).
- In patients with stable COPD and resting or exercise-induced moderate desaturation, long term oxygen treatment should not be routinely prescribed. However, individual patient factors may be considered when evaluating the patient’s needs for supplemental oxygen (Evidence A).
- Resting oxygenation at sea level does not exclude the development of severe hypoxemia when travelling by air (Evidence C).

**Treatment of hypercapnia**
- In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, long term non-invasive ventilation may be considered (Evidence B).

**Intervention bronchoscopy and surgery**
- Lung volume reduction surgery should be considered in selected patients with upper-lobe emphysema (Evidence A).
- Bronchoscopic lung volume reduction interventions may be considered in selected patients with advanced emphysema (Evidence B).
- In selected patients with a large bulla surgical bullectomy may be considered (Evidence C).
- In patients with very severe COPD (progressive disease, BODE score of 7 to 10, and not candidate for lung volume reduction) lung transplantation may be considered for referral with at least one of the following: (1) history of hospitalization for exacerbation associated with acute hypercapnia (Pco₂ > 50 mm Hg); (2) pulmonary hypertension and/or cor pulmonale, despite oxygen therapy; or (3) FEV₁ < 20% and either DLCO < 20% or homogenous distribution of emphysema (Evidence C).
## Pulmonary Rehabilitation: Science

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Source</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Cost-effectiveness</td>
<td>ACCP/AACVPR</td>
<td>Weak to very weak evidence; weak recommendation</td>
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<tr>
<td></td>
<td>ACP</td>
<td></td>
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<tr>
<td></td>
<td>Cochrane review</td>
<td>Average effect on dyspnea subscale of the Chronic Respiratory Questionnaire was clinically significant†</td>
</tr>
<tr>
<td></td>
<td>GOLD</td>
<td>Effect on dyspnea subscale of the Chronic Respiratory Questionnaire was greater than minimum clinically important difference‡; strong support</td>
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<tr>
<td>Improved exercise performance</td>
<td>ACCP/AACVPR</td>
<td>Strong evidence; strong recommendation*</td>
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<tr>
<td></td>
<td>ACP</td>
<td>Clinically insignificant improvement in six-minute walk distance</td>
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<td>Cochrane review</td>
<td>Clinically insignificant improvement in six-minute walk distance</td>
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<tr>
<td></td>
<td>GOLD</td>
<td>Evidence grade A‡</td>
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<tr>
<td>Improved health-related quality of life</td>
<td>ACCP/AACVPR</td>
<td>Strong evidence; strong recommendation*</td>
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<td></td>
<td>ACP</td>
<td>Pooled difference in health status scores on the St. George’s Respiratory Questionnaire was less than minimum clinically significant difference§</td>
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<td>Cochrane review</td>
<td>Effect on all subscales of the Chronic Respiratory Questionnaire was greater than minimum clinically important difference‡; strong support</td>
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<td>GOLD</td>
<td>Evidence grade A‡</td>
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<td>Psychosocial benefits</td>
<td>ACCP/AACVPR</td>
<td>Moderate evidence; weak recommendation</td>
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<td></td>
<td>GOLD</td>
<td>Reduced anxiety and depression; evidence grade A‡</td>
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<tr>
<td></td>
<td>Meta-analysis</td>
<td>Small to moderate improvements in anxiety and depression compared with usual care</td>
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<tr>
<td>Reduced health care utilization</td>
<td>ACCP/AACVPR</td>
<td>Moderate evidence; weak recommendation</td>
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<td></td>
<td>ACP</td>
<td>Equivocal for health care utilization outcomes</td>
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<td>GOLD</td>
<td>Evidence grade A‡</td>
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<td>Survival</td>
<td>ACCP/AACVPR</td>
<td>Insufficient evidence; no recommendation provided</td>
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<td>GOLD</td>
<td>Evidence grade B</td>
</tr>
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</table>

AACVPR=American Association of Cardiovascular and Pulmonary Rehabilitation; ACCP=American College of Chest Physicians; ACP=American College of Physicians;

### Table 4.9. Key points for the use of non-pharmacological treatments

#### Education, self-management and pulmonary rehabilitation
- Education is needed to change patient’s knowledge but there is no evidence that used alone it will change patient behavior.
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- Physical activity is a strong predictor of mortality (Evidence A). Patients should be encouraged to increase the level of physical activity although we still don’t know how to best insure the likelihood of success.

#### Vaccination
- Influenza vaccination is recommended for all patients with COPD (Evidence A).
- Pneumococcal vaccination: the PCV13 and PPSV23 are recommended for all patients > 65 years of age, and in younger patients with significant comorbid conditions including chronic heart or lung disease (Evidence B).

#### Nutrition
- Nutritional supplementation should be considered in malnourished patients with COPD (Evidence B).

#### End of life and palliative care
- All clinicians managing patients with COPD should be aware of the effectiveness of palliative approaches to symptom control and use these in their practice (Evidence D).
- End of life care should include discussions with patients and their families about their views on resuscitation, advance directives and place of death preferences (Evidence D).

#### Treatment of hypoxemia
- In patients with severe resting hypoxemia long-term oxygen therapy is indicated (Evidence A).
- In patients with stable COPD and resting or exercise-induced moderate desaturation, long term oxygen treatment should not be routinely prescribed. However, individual patient factors may be considered when evaluating the patient’s needs for supplemental oxygen (Evidence A).
- Resting oxygenation at sea level does not exclude the development of severe hypoxemia when travelling by air (Evidence C).

#### Treatment of hypercapnia
- In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, long term non-invasive ventilation may be considered (Evidence B).

#### Intervention bronchoscopy and surgery
- Lung volume reduction surgery should be considered in selected patients with upper-lobe emphysema (Evidence A).
- Bronchoscopic lung volume reduction interventions may be considered in selected patients with advanced emphysema (Evidence B).
- In selected patients with a large bulla surgical bullectomy may be considered (Evidence C).
- In patients with very severe COPD (progressive disease, BODE score of 7 to 10, and not candidate for lung volume reduction) lung transplantation may be considered for referral with at least one of the following: (1) history of hospitalization for exacerbation associated with acute hypercapnia (Paco₂ > 50 mm Hg); (2) pulmonary hypertension and/or cor pulmonale,
LTOT=long-term oxygen treatment.

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Intervention Bronchoscopy and Surgery

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BODE=B, body mass index; O, airway obstruction; D, dyspnea; E, exercise tolerance.

Adherence to COPD Medications Is Poor

- More than half of patients with COPD will stop new prescriptions after the first month
- Sustained adherence continues to decay over time

Persistence with any inhaler was 36%, 23%, and 17% at years 1, 2, and 3, respectively

Reprinted from Respiratory Medicine, 105(2), Penning-van Beest F et al, Three-year dispensing patterns with long-acting inhaled drugs in COPD: a database analysis, 259-265, Copyright 2011, with permission from Elsevier.

Multiple Factors Affect Adherence to Therapy

Reprinted from *Chest*, 130(1 suppl), Horne R, Compliance, adherence, and concordance: implications for asthma treatment, 65S-72S, Copyright 2006, with permission from Elsevier.

Horne R. *Chest*. 2006;130(1 suppl):65S-72S.
Recent Studies Support Several Strategies to Improve Adherence

- Use of individualized action plans
- Simplify treatment regimen
  - Plans that are clinically effective and user-friendly
  - Fewer doses per day
  - Oral vs inhaled medications
  - Vehicles that deliver 2 drugs at once
- Use of home visits by health care staff to reinforce adherence
- Use of self-monitoring, goal-setting, and other self-management techniques
Patient Education:
Key Educational Messages for COPD

- Basic facts about COPD
  - Contrast normal and COPD airways
- Roles of medications and potential adverse events
  - Long-term maintenance and quick-relief medications
- Relevant environmental triggers and reducing exposures
- Building an action plan: when and how to take rescue actions
- Skills
  - Inhalers, nebulizers, spacers, symptoms, and early warning signs
COPD Self-Management

- Characteristics of successful programs
  - Self-management intervention, including an action plan in the event of an exacerbation
  - Case manager coordination
  - Patient education
  - Periodic communication (monthly visits or phone calls)
- Unsuccessful programs failed to intervene when symptoms worsened
  - Management did not vary within continuum of disease

Monitoring and Follow-up

- In order to adjust therapy appropriately as the disease progresses, each follow-up visit should include a discussion of the current therapeutic regimen.

- Monitoring should focus on:
  - Dosages of prescribed medications
  - Adherence to the regimen
  - Inhaler technique
  - Effectiveness of the current regime
  - Side effects

- Treatment modifications should be recommended.
Summary: Strategies to Ensure Adherence

- Educate patients about COPD and treatments
- Support self-efficacy; encourage and praise successes
- Set treatment goals
- Ask about device preference
- Use “teach back” method
- Train patients on proper use of devices periodically
- Ask about side effects
- Urge patients to complete treatment course—even if they feel better
FINAL THOUGHTS
THANK YOU!