COPD: Utilizing Guideline Based Care to Improve Outcomes

Faculty

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Position and Institution</th>
</tr>
</thead>
</table>
| Franck Rahaghi, MD, MHS, FCCP | Director, Pulmonary Hypertension Clinic  
Director, Pulmonary Education and Rehabilitation  
Cleveland Clinic Florida Weston, FL |
| Arunabh Talwar, MD, FCCP | Director, Pulmonary Hypertension and Advanced Lung Disease Program, North Shore University Hospital, Manhasset, NY  
Associate Professor of Medicine, Hofstra North Shore-LIJ School of Medicine, Hofstra University Hempstead, NY |

FACULTY DISCLOSURES

✧ Franck Rahaghi, MD, MHS, FCCP  
- Consultant – Intermune  
- Consultant/Lecturer – Baxter, CSL Behring, Grifols  
- Lecturer – Forest, BI  
- Research – BI, Gilead

✧ Arunabh Talwar, MD, FCCP  
- Consultant - Bayer
LEARNING OBJECTIVES

After participating in this educational activity, clinicians should be better able to:

1. Recognize the burden of symptoms and exacerbations on the health status of COPD patients
2. Recognize the role of pharmacotherapy to reduce COPD exacerbations and decrease symptom burden
3. Employ guideline-based, personalized care for COPD patients, including pharmacotherapy and non-pharmacotherapy to decrease symptom burden and decrease risk of future adverse events
4. Identify and manage multi-morbidities in COPD patients

PRE-TEST QUESTION 1

On a scale of 1 to 5, please rate how confident you would be in the diagnosis and management of a patient with COPD.

1. Not at all confident
2. Slightly confident
3. Moderately confident
4. Pretty much confident
5. Very confident
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PRE-TEST QUESTION 2

46 year old female presents with 20 pack years of smoking and breathlessness.

Frequent exacerbations of COPD (ie, >2 per year) have been associated with all of the following, EXCEPT:

1. Reduced FEV<sub>1</sub>
2. Reduced dyspnea
3. Reduced survival
4. Reduced health status

PRE-TEST QUESTION 3

46 year old female presents with 20 pack years of smoking and breathlessness. Spirometry confirms non-reversible airflow obstruction.

All of the following therapies can improve breathlessness except for which?

1. Long acting anticholinergic
2. Long acting beta-agonist
3. Montelukast
4. Pulmonary rehabilitation
5. Lung Volume reduction surgery
PRE-TEST QUESTION 4

46 year old female presents with 20 pack years of smoking and breathlessness. Spirometry confirms non-reversible airflow obstruction. There is no history of chronic bronchitis but two episodes of ‘acute bronchitis’ required antibiotic therapy last year.

All of the following therapies could be considered to decrease the risk of a future acute exacerbation of COPD except?

1. Inhaled corticosteroids + long acting beta-agonist
2. Long acting anti-cholinergic alone
3. Roflumilast
4. Long term azithromycin
5. Long acting anticholinergic + long acting beta-agonist

PRE-TEST QUESTION 5

46 year old female presents with 20 pack years of smoking and breathlessness. Spirometry confirms non-reversible airflow obstruction. There is no history of chronic bronchitis but two episodes of ‘acute bronchitis’ required antibiotic therapy last year. She is known to have osteoporosis.

Which of the following therapies should be avoided to decrease the risk of a future acute exacerbation of COPD given her osteoporosis?

1. Inhaled corticosteroids
2. Long acting anti-cholinergic
3. Long acting anticholinergic + long acting beta-agonist
4. None of the above
60 YEAR OLD SMOKER WITH PROGRESSIVE SOB

✧ HPI
  ✧ Exertional limitation over the past several years
  ✧ Morning cough with clear sputum production
  ✧ Two ‘bronchitis’ episodes last year – one treated with antibiotics the other antibiotics/medrol dosepak

✧ PMH
  ✧ Hypertension
  ✧ Type II DM

✧ SH
  ✧ 1 pack/day for 40 yrs

✧ PE
  ✧ 140/82, 90, 18, 97.8
  ✧ HEENT – negative
  ✧ No JVD
  ✧ Chest – decreased BS, no wheezes/rales
  ✧ CV – S4, no m
  ✧ Ext – no clubbing, cyanosis, trace edema

DEFINITION

Chronic Obstructive Pulmonary Disease (COPD), a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and comorbidities contribute to the overall severity in individual patients.

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50 BILLION

Figure 9: National Projected Annual Cost of COPD, 2010

Indirect Mortality Costs, $12.4
Indirect Morbidity Costs, $8.0
Direct Health Care Expenditures, $29.5


PREVALENCE SEEMS TO BE HIGHEST IN THE MIDWEST AND SOUTHEAST STATES

Figure 8: COPD - Age-Adjusted Prevalence (%) in Adults by State, 2011


Notes:
- COPD prevalence rates are age-adjusted using the "N" method to prevent bias due to differences in age distribution of the population.
- Prevalence rates are age-adjusted to allow for more accurate comparisons between states with different age profiles.
A clinical diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, and/or a history of exposure to risk factors for the disease.

Spirometry is required to make the diagnosis; the presence of a postbronchodilator FEV₁/FVC <0.70 confirms the presence of persistent airflow limitation and thus of COPD.

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SPIROMETRY: NORMAL AND COPD

- FEV₁: Normal 4.150, COPD 2.350
- FVC: Normal 5.200, COPD 3.900
- FEV₁/FVC: Normal 80%, COPD 60%

COPD <70%

60 YEAR OLD SMOKER WITH PROGRESSIVE SOB

University of Michigan Health System
1530 E Medical Center Dr., Ann Arbor, MI 48109 (734) 936-5293

Name:

Diagnosis: 482.8 - Emphysema

Test Date: 12/20/2001 8:09

Ht (in) 58.8

Physician: / Standford Theodore J.

Temp / BP 22 / 73 S

Sex / Race F / W

Req ID: 131472

Lab Test Form: UH / PUL

Pred Set: UMI

Obstruction

Non-reversible

FVC: 1.29, 21%

FEV₁: 0.93, 11%

1. Ventil 1.47, 51%

2. FEV₂/FVC: 0.42, 5.5%

3. FEV₃/FVC: 0.21, 3.7%

4. FEF₂₅/₇₅: 0.11, 1.5%

5. FV₁: 0.56, 24.9%

6. FEV₂/FVC: 1.26, 5.4%

7. FEV₃/FVC: 1.23, 3.7%

8. FEF₂₅/FEF₇₅: 0.17, 100%

MV: 90 x 24%
CLASSIFICATION OF SEVERITY OF AIRFLOW LIMITATIONS COPD (GOLD and COPD Foundation)

<table>
<thead>
<tr>
<th>GOLD</th>
<th>GOLD I Mild</th>
<th>GOLD II Moderate</th>
<th>GOLD III Severe</th>
<th>GOLD IV Very severe</th>
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</thead>
<tbody>
<tr>
<td>COPDF</td>
<td>SG 1</td>
<td>SG 2</td>
<td>SG 3</td>
<td></td>
</tr>
</tbody>
</table>

FVC = forced vital capacity; GOLD = Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease; SG = Spirometry Grade


ARS QUESTION

Mrs. P, the 60y/o smoker with progressive COPD, was found to have a FEV₁ after bronchodilator of 32% predicted.

What is the GOLD classification according to her spirometry findings?

1. GOLD 1
2. GOLD 2
3. GOLD 3
4. GOLD 4

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I: Mild COPD</td>
<td>• FEV₁/FVC &lt;70% (for stages I-IV) • FEV₁ ≥80% predicted</td>
</tr>
<tr>
<td>II: Moderate COPD</td>
<td>≤50% FEV₁ &lt;80% predicted</td>
</tr>
<tr>
<td>III: Severe COPD</td>
<td>≥30% FEV₁ &lt;50% predicted</td>
</tr>
<tr>
<td>IV: Very severe COPD</td>
<td>&lt;30% FEV₁</td>
</tr>
</tbody>
</table>
Differential Diagnosis: COPD and Asthma

COPD
- Onset in mid-life
- Symptoms slowly progressive
- Long smoking history

ASThma
- Onset early in life (often childhood)
- Symptoms vary from day to day
- Symptoms worse at night/early morning
- Allergy, rhinitis, and/or eczema also present
- Family history of asthma

Goals for Treatment of Stable COPD
- Relieve symptoms
- Improve exercise tolerance
- Improve health status
- Prevent disease progression
- Prevent and treat exacerbations
- Reduce mortality

Reduce symptoms
Reduce Risk

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

**COMBINED ASSESSMENT OF COPD**

- Assess symptoms
- Assess degree of airflow limitation using spirometry
- Assess risk of exacerbations

*Combine these assessments for the purpose of improving management of COPD*

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**CLINICAL ASSESSMENT OF STABLE COPD: GOLD 2011**

Modified Medical Research Council Dyspnea Scale (mMRC)

```
PLEASE TICK IN THE BOX THAT APPLIES TO YOU (ONE BOX ONLY)

mMRC Grade 0. I only get breathless with strenuous exercise. [ ]

mMRC Grade 1. I get short of breath when hurrying on the level or walking up a slight hill. [ ]

mMRC Grade 2. I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level. [ ]

mMRC Grade 3. I stop for breath after walking about 100 meters or after a few minutes on the level. [ ]

mMRC Grade 4. I am too breathless to leave the house or I am breathless when dressing or undressing. [ ]

www.goldcopd.org
```
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CLINICAL ASSESSMENT OF STABLE COPD: GOLD 2011

COPD Assessment Tool (CAT)

Example: I am very happy

I never cough

I have no phlegm (mucus) in my chest all of the time.

Score: 

My chest does not feel tight at all.

My chest feels very tight.

When I walk up a hill or one flight of stairs, I am not out of breath.

I am not limited doing any activities at home.

I am not limited by my lung condition.

I do not sleep normally because of my lung condition.

I have lots of energy.

Score: 

www.catesonline.org

EXACERBATIONS HAVE MAJOR IMPACT IN COPD

Patients With Frequent Exacerbations

Faster Decline in Lung Function

Greater Airway Inflammation

Poorer Quality of Life

Higher Mortality

Adapted from Wedzicha JA, Seemungal TA. Lancet. 2007;370:786-796.
COPD: Utilizing Guideline Based Care to Improve Outcomes

Global Strategy for Diagnosis, Management and Prevention of COPD

COMBINED ASSESSMENT OF COPD

Assess symptoms first

If mMRC 0-1 or CAT < 10:
Less Symptoms (A or C)

If mMRC ≥ 2 or CAT ≥ 10:
More Symptoms (B or D)

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CLINICAL ASSESSMENT OF STABLE COPD IN OUR PATIENT

**PLEASE TICK IN THE BOX THAT APPLIES TO YOU (ONE BOX ONLY)**

- mMRC Grade 0. I only get breathless with strenuous exercise. [ ]
- mMRC Grade 1. I get short of breath when hurrying on the level or walking up a slight hill. [ ]
- mMRC Grade 2. I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level. [x]
- mMRC Grade 3. I stop for breath after walking about 100 meters or after a few minutes on the level. [ ]
- mMRC Grade 4. I am too breathless to leave the house or I am breathless when dressing or undressing. [ ]

www.goldcopd.org

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**CLINICAL ASSESSMENT OF STABLE COPD IN OUR PATIENT**

- Example: I am very happy [ ] [ ] [ ] [ ] [ ] [ ]
  - I never cough [ ] [ ] [ ] [ ] [ ] [ ]
  - I have no wheeze or crackles in my chest at all [ ] [ ] [ ] [ ] [ ] [ ]
  - My chest does not feel tight at all [ ] [ ] [ ] [ ] [ ] [ ]
  - When I walk up a hill or one flight of stairs I am not breathless [ ] [ ] [ ] [ ] [ ] [ ]
  - I am not limited during any activities at home [ ] [ ] [ ] [ ] [ ] [ ]
  - I am confident leaving my home despite my lung condition [ ] [ ] [ ] [ ] [ ] [ ]
  - I sleep soundly [ ] [ ] [ ] [ ] [ ] [ ]
  - I have lots of energy [ ] [ ] [ ] [ ] [ ] [ ]

$COCC$ [ ] [ ] [ ] [ ]

[20]

www.catestonline.org
COPD: Utilizing Guideline Based Care to Improve Outcomes

Global Strategy for Diagnosis, Management and Prevention of COPD

COMBINED ASSESSMENT OF COPD

Assess risk of exacerbations next

<table>
<thead>
<tr>
<th>Risk (GOLD Classification of Airflow Limitation)</th>
<th>Risk (Exacerbation history)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mMRC 0-1 CAT &lt; 10</td>
<td>0 or 1 exacerbations per year: Low Risk (A or B)</td>
</tr>
<tr>
<td>mMRC ≥ 2 CAT ≥ 10</td>
<td>If GOLD 3 or 4 or more exacerbations per year: High Risk (C or D)</td>
</tr>
</tbody>
</table>

Symptoms (mMRC or CAT score)

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Global Strategy for Diagnosis, Management and Prevention of COPD

COMBINED ASSESSMENT OF COPD

Use combined assessment

Patient is now in one of four categories:

A: Les symptoms, low risk
B: More symptoms, low risk
C: Less symptoms, high risk
D: More symptoms, high risk

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NON-PHARMACOLOGICAL THERAPY OF STABLE COPD: GOLD 2011

<table>
<thead>
<tr>
<th>Patient</th>
<th>Essential</th>
<th>Recommended</th>
<th>Local guidelines</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Smoking cessation</td>
<td>Physical activity</td>
<td>Flu and pneumococcal vaccination</td>
</tr>
<tr>
<td>B, C, D</td>
<td>Smoking cessation, Pulmonary rehabilitation</td>
<td>Physical activity</td>
<td>Flu and pneumococcal vaccination</td>
</tr>
</tbody>
</table>

www.goldcopd.org

SMOKING CESSATION SLOWS LUNG FUNCTION DECLINE IN MILD COPD

The Lung Health Study at 11 Years

- Sustained Quitters
- Intermittent Quitters
- Continuous Smokers

HR mortality in usual care vs special intervention: 1.18 (95% CI: 1.02-1.37)

PREVENTION OF HOSPITALIZATIONS
PNEUMOCOCCAL AND INFLUENZA VACCINATION


Global Strategy for Diagnosis, Management and Prevention of COPD
THERAPEUTIC OPTIONS: COPD MEDICATIONS

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### COPD Foundation Guide for COPD Therapy

<table>
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<th>Spirometry grade</th>
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<th>Oxygen</th>
<th>Exercise/ Pulmonary Rehabilitation</th>
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<td>Yes’</td>
<td></td>
<td>First line</td>
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<table>
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<th>First line</th>
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</table>

<table>
<thead>
<tr>
<th>Exacerbation risk high</th>
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<th>First line</th>
<th>Yes’</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Oxygenation Severe hypoxemia</th>
<th>Episodic hypoxemia</th>
<th>Yes</th>
<th>Possibly</th>
</tr>
</thead>
</table>

| Emphysema | Yes’ | Select cases |

| Chronic bronchitis | Yes’ |

| Comorbidities | Evaluate and treat identified comorbid conditions |

*Indicated if chronic bronchitis, high exacerbation risk, and spirometry grades 2/3 present.†All potential options depending upon frequency of exacerbations and severity of COPD. Red text is first-line therapy.

### PATIENT-CENTERED OUTCOMES: LABAs VS PLACEBO

<table>
<thead>
<tr>
<th>Study</th>
<th>Duration (weeks)</th>
<th>Dose (µg)</th>
<th>Dyspnea</th>
<th>Exercise</th>
<th>HRQoL</th>
<th>Exac</th>
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<td>16</td>
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<tr>
<td>Jones 1997</td>
<td>16</td>
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<tr>
<td>Mahler 1999</td>
<td>12</td>
<td>S 42</td>
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<td>NS</td>
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<tr>
<td>Rutten-van Möl 1999</td>
<td>12</td>
<td>S 50</td>
<td>–</td>
<td>–</td>
<td>NS</td>
<td>–</td>
</tr>
<tr>
<td>van Noord 2000</td>
<td>12</td>
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<tr>
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<td>–</td>
<td>NS</td>
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</table>

* Improvement; NS: not significant; NM: not mentioned

Modified from NICE Guidelines

### PATIENT-CENTERED OUTCOMES: Tiotropium VS Placebo

<table>
<thead>
<tr>
<th>Study</th>
<th>Duration (weeks)</th>
<th>Dyspnea</th>
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<td>vs Placebo</td>
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</tbody>
</table>

* Difference of 4.44 units in SGRQ total score vs. control, P=0.055
† Abstract

Range: N = 91 to 1829

Modified from NICE Guidelines
Recent studies have demonstrated the efficacy of a comprehensive pulmonary rehabilitation in chronic obstructive pulmonary disease patients at any GOLD stage.
### COPD Foundation Guide for COPD Therapy

<table>
<thead>
<tr>
<th>Spirometry grade</th>
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<th>LAMA or LABA or LAMA+ LABA</th>
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<tbody>
<tr>
<td>SG 1 SG 2/3</td>
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<td>Possibly</td>
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<td>Yes</td>
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<td>First line†</td>
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<td>Chronic bronchitis</td>
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</tbody>
</table>

*Indicated if chronic bronchitis, high exacerbation risk, and spirometry grades 2/3 present. †All potential options depending upon frequency of exacerbations and severity of COPD. Red text is first-line therapy.

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**TREADMILL ENDURANCE TIME IMPROVES WITH COMBINATION TIOTROPIUM AND PULMONARY REHABILITATION RANDOMIZED TO TRIPTROPIUM OR PLACEBO**

![Graph showing changes in Treadmill Endurance Time over weeks of treatment with Tiotropium and Placebo](chart.png)

COPD: Utilizing Guideline Based Care to Improve Outcomes

**TIOTROPIUM PROLONGS TIME TO FIRST EXACERBATION COMPARED WITH SALMETEROL**

![Graph showing time to first exacerbation][1]


**ICS/LABA DECREASES AECOPD C/W LABA**

<table>
<thead>
<tr>
<th>Study</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FP/SCM</strong></td>
<td></td>
</tr>
<tr>
<td>Kardos 2007</td>
<td>0.65 (0.56, 0.75)</td>
</tr>
<tr>
<td>TORCH</td>
<td>0.88 (0.81, 0.96)</td>
</tr>
<tr>
<td>TRISTAN</td>
<td>0.93 (0.81, 1.08)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.84 (0.78, 0.89)</td>
</tr>
<tr>
<td><strong>BDF</strong></td>
<td></td>
</tr>
<tr>
<td>Calverley 2003</td>
<td>0.75 (0.59, 0.94)</td>
</tr>
<tr>
<td>Szafranski 2003</td>
<td>0.77 (0.60, 0.99)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.76 (0.64, 0.90)</td>
</tr>
</tbody>
</table>


[1]: https://example.com/graph.png
ICS/LABA ADDED TO TIOTROPIUM DECREASES EXACERBATION RATE IN AT RISK COPD PATIENTS

Welte et al, AJRCCM 2009; 180: 741-50

REDUCTION IN COPD EXACERBATIONS* IN severe COPD, chronic bronchitis and a history of exacerbation

COPD: Utilizing Guideline Based Care to Improve Outcomes

**AZITHROMYCIN DECREASES AECOPD**

![Graph showing Time to 1st AECOPD](image)

**Proportion Free of AECOPD (%)**

- **Azithromycin**
- **Placebo**

Log-rank, $P<0.001$

**HR=0.73 (95% CI 0.63, 0.84), P<0.0001**


**ADVERSE EFFECTS OF THERAPY**

<table>
<thead>
<tr>
<th>B2-Agonists$^{1,2}$</th>
<th>Anticholinergics$^{3,4}$</th>
<th>Inhaled Glucocorticoids$^5$</th>
<th>Roflumilast$^6$</th>
<th>Azithromycin$^7,8$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tremors</td>
<td>Dry Mouth</td>
<td>Dysphonia</td>
<td>Diarrhea</td>
<td>Antimicrobial resistance</td>
</tr>
<tr>
<td>Palpitations</td>
<td>Urinary retention</td>
<td>Thrush</td>
<td>Weight decrease</td>
<td>Hearing decrease</td>
</tr>
<tr>
<td>Hypokalemia</td>
<td>Glaucoma</td>
<td>Systemic Effects: bruising, bone density, cataract</td>
<td>Nausea</td>
<td>Arrhythmia</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>Arrhythmias</td>
<td>Pneumonia</td>
<td>Headache</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depression</td>
</tr>
</tbody>
</table>

5. Saag et al *Upto Date* 2011;
COPD: Utilizing Guideline Based Care to Improve Outcomes

Global Strategy for Diagnosis, Management and Prevention of COPD

MANAGE STABLE COPD: PHARMACOLOGIC THERAPY
(Medications in each box are mentioned in alphabetical order, and therefore not necessarily in order of preference.)

<table>
<thead>
<tr>
<th>Patient</th>
<th>Recommend 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>LAMA or LABA or SABA and SAMA</td>
<td>Theophylline</td>
</tr>
<tr>
<td>B</td>
<td>LAMA or LABA</td>
<td>LAMA and LABA</td>
<td>SABA and/or SAMA Theophylline</td>
</tr>
<tr>
<td>C</td>
<td>ICS + LABA or LAMA</td>
<td>LAMA and LABA or LAMA and PDE4-inh. or LABA and PDE4-inh.</td>
<td>SABA and/or SAMA Theophylline</td>
</tr>
<tr>
<td>D</td>
<td>ICS + LABA and/or LAMA</td>
<td>ICS + LABA and LAMA or ICS+LABA and PDE4-inh. or LAMA and LABA or LAMA and PDE4-inh.</td>
<td>Carbocysteine SABA and/or SAMA Theophylline</td>
</tr>
</tbody>
</table>

Short-Acting Bronchodilator
- LAMA or LABA or LAMA+LABA
- ICS/LABA
- Roflumilast
- Oxygen
- Exercise/Pulmonary Rehabilitation
- Lung Volume Reduction Surgery

Spirometry grade
- SG 1
- SG 2/3
First line as needed
Possibly
First line
Yes
Yes

Regular symptoms
First line as needed
First line
Yes
Yes
First line

Exacerbation risk high
First line
First line
Yes

Oxygenation
Severe hypoxemia
Yes

Emphysema
Possibly
Select cases

Chronic bronchitis
Yes

Comorbidities
Evaluate and treat identified comorbid conditions

Indicated if chronic bronchitis, high exacerbation risk, and spirometry grade 2/3 present.
All potential options depending upon frequency of exacerbations and severity of COPD.

COPD FOUNDATION GUIDE
FOR COPD THERAPY

Oxygen Therapy:

In the 1980s, two landmark multicentre trials, the Nocturnal Oxygen Therapy Trial (NOTT) (NOTT 1980) and the Medical Research Council (MRC) (MRC 1981) study, showed that long-term oxygen therapy (LTOT) was the sole treatment that improved survival in patients with COPD. Use at least 18 hours.

COPD: Utilizing Guideline Based Care to Improve Outcomes

### COPD FOUNDATION GUIDE FOR COPD THERAPY

<table>
<thead>
<tr>
<th>Spirometry grade</th>
<th>Short-Acting Bronchodilator</th>
<th>LAMA or LABA or LAMA+ LABA</th>
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<th>Exercise/ Pulmonary Rehabilitation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SG 1</td>
<td>First line as needed</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>SG 2/3</td>
<td>First line as needed</td>
<td>Possibly First line</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td>First line</td>
<td></td>
</tr>
</tbody>
</table>

| Regular symptoms | First line as needed        | First line                  | Yes       |             | First line |

| Exacerbation risk high | First line† | First line† | Yes’ |

<table>
<thead>
<tr>
<th>Oxygenation</th>
<th>Severe hypocapnia</th>
<th>Episodic hypoxemia</th>
<th>Select cases</th>
</tr>
</thead>
</table>

| Emphysema | Chronic bronchitis | Yes’ |

| Comorbidities | Evaluate and treat identified comorbid conditions |

Red text is first-line therapy.

---

Mr. Cassidy is a 65y/o w h/o 2PPD x 50 years past smoking history. He has O2-dependent COPD and completed a pulmonary rehabilitation program.

He continues with severe dyspnea with minimal exertion – including ambulation from his home to the mailbox down his driveway. You see him in clinic and he states: “My quality of life (QOL) is nonexistent. I am in either the hospital or doctor’s office with COPD exacerbations every month”.

On a CT chest scan:
There is a predominance of bullae on the apex (top) of the lung in some patients.

A randomized trial named National Emphysema Treatment Trial (NETT) compared conventional medical therapy vs Lung Volume Reduction Surgery (LVRS). It found improved survival, exercise capacity and QOL in the COPD patients after LVRS in certain patients: Upper Lobe emphysema.

Severe COPD
Symptomatic despite maximal medical Rx and pulmonary rehabilitation

- FEV$_1$ ≤ 15% pred
- FEV$_1$ 15-45% pred

Consider Lung transplantation
- Yes
- FEV$_1$ ≤ 25% pred & DL$_{CO}$ ≤ 20% pred or Homogeneous emphysema
- No
  - BODE ≥ 7 and other criteria?
    - Yes
      - Non-upper lobe emphysema and low exercise capacity
    - No
      - Meets NETT Criteria?
        - Yes
          - Upper lobe emphysema and high exercise capacity
          - Upper lobe emphysema and high exercise capacity
        - No
          - Non-upper lobe emphysema and high exercise capacity

Adapted from Nathan; Chest 2005; 127: 1006-16
Martinez et al; AJRCCM 2006; 173: 1326-34
COPD: Utilizing Guideline Based Care to Improve Outcomes

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<td>First line as needed</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<th>First line</th>
<th>Yes</th>
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<table>
<thead>
<tr>
<th>Exacerbation risk high</th>
<th>First line†</th>
<th>First line†</th>
<th>Yes†</th>
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<tr>
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<th>Select cases</th>
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<table>
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<tr>
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<th>Evaluate and treat identified comorbid conditions</th>
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**Indicated if chronic bronchitis, high exacerbation risk, and spirometry grades 2/3 present.**

**All potential options depending upon frequency of exacerbations and severity of COPD.**

Red text is first-line therapy.


---

### GLOBAL STRATEGY FOR DIAGNOSIS, MANAGEMENT AND PREVENTION OF COPD, 2013: MAJOR CHAPTERS

- Definition and Overview
- Diagnosis and Assessment
- Therapeutic Options
- Manage Stable COPD
- Manage Exacerbations
- Manage Comorbidities

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NACE – Emerging Challenges in Primary Care: 2014 COPD - 29
COPD: Utilizing Guideline Based Care to Improve Outcomes

Global Strategy for Diagnosis, Management and Prevention of COPD

MANAGE COMORBIDITIES

Cardiovascular disease (including ischemic heart disease, heart failure, atrial fibrillation, and hypertension)

Osteoporosis and anxiety/depression: often under-diagnosed and associated with poor health status and prognosis.

Lung cancer: frequent in patients with COPD; the most frequent cause of death in patients with mild COPD.

Serious infections: respiratory infections are especially frequent.

Metabolic syndrome and manifest diabetes: more frequent in COPD and the latter is likely to impact on prognosis.

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GOLD 2013 APPROACH TO OSTEOPOROSIS

Osteoporosis is a major comorbidity in COPD, is often under-diagnosed and is associated with poor health status and prognosis. Osteoporosis may be more closely associated with emphysema than other subgroups of COPD. Osteoporosis is more often associated with decreased body mass index and low fat-free mass.

Treatment of osteoporosis in patients with COPD

Osteoporosis should be treated according to usual osteoporosis guidelines. There is no evidence that osteoporosis should be treated differently in the presence of COPD.

Treatment of COPD in patients with Osteoporosis

COPD should be treated as usual, as there is no evidence that stable COPD should be treated differently in the presence of osteoporosis. Inhaled triamcinolone was associated with increased loss of bone mass in the Lung Health Study II, whereas this was not the case for inhaled budesonide in the EUROSCOP trial or for inhaled fluticasone propionate in the TORCH trial. An association between inhaled corticosteroids and fractures has been found in pharmacoepidemiological studies; however, these studies have not fully taken severity of COPD or exacerbations and their account.

Systemic corticosteroids significantly increase the risk of osteoporosis and recurrent courses of systemic corticosteroids for COPD exacerbations should be avoided if possible.

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Multidisciplinary Approach is the key to effective COPD management

POST-TEST QUESTIONS
POST-TEST QUESTION 1

46 year old female presents with 20 pack years of smoking and breathlessness.

Frequent exacerbations of COPD (ie, >2 per year) have been associated with all of the following, EXCEPT:

1. Reduced FEV\textsubscript{1}
2. Reduced dyspnea
3. Reduced survival
4. Reduced health status

POST-TEST QUESTION 2

46 year old female presents with 20 pack years of smoking and breathlessness. Spirometry confirms non-reversible airflow obstruction.

All of the following therapies can improve breathlessness except for which?

1. Long acting anticholinergic
2. Long acting beta-agonist
3. Montelukast
4. Pulmonary rehabilitation
5. Lung Volume reduction surgery
POST-TEST QUESTION 3

46 year old female presents with 20 pack years of smoking and breathlessness. Spirometry confirms non-reversible airflow obstruction. There is no history of chronic bronchitis but two episodes of ‘acute bronchitis’ required antibiotic therapy last year.

All of the following therapies could be considered to decrease the risk of a future acute exacerbation of COPD except?
1. Inhaled corticosteroids + long acting beta-agonist
2. Long acting anti-cholinergic alone
3. Roflumilast
4. Long term azithromycin
5. Long acting anticholinergic + long acting beta-agonist

POST-TEST QUESTION 4

46 year old female presents with 20 pack years of smoking and breathlessness. Spirometry confirms non-reversible airflow obstruction. There is no history of chronic bronchitis but two episodes of ‘acute bronchitis’ required antibiotic therapy last year. She is known to have osteoporosis.

Which of the following therapies should be avoided to decrease the risk of a future acute exacerbation of COPD given her osteoporosis?
1. Inhaled corticosteroids
2. Long acting anti-cholinergic
3. Long acting anticholinergic + long acting beta-agonist
4. None of the above
POST-TEST QUESTION 5

On a scale of 1 to 5, please rate how confident you would be in the diagnosis and management of a patient with COPD.

1. Not at all confident
2. Slightly confident
3. Moderately confident
4. Pretty much confident
5. Very confident

POST-TEST QUESTION 6

Which of the statements below describes your approach to diagnosing and treating patients with COPD?

1. I do not diagnose or treat patients with COPD, nor do I plan to this year.
2. I did not diagnose or treat patients with COPD before this course, but as a result of attending this course I'm thinking of managing them now.
3. I do diagnose and treat patients with COPD and I now plan to change my treatment methods based on completing this course.
4. I do diagnose and treat patients with COPD and this course confirmed that I don’t need to change my treatment methods.