Chronic Obstructive Pulmonary Disease

Practical Approaches to Diagnosis and Management

MAY 14, 2014
11:15 AM – 12:30 PM
Chicago, Illinois

Sponsored by pmiCME

Educational Partner
MMC
Miller Medical Communications, LLC.
Session 3: Chronic Obstructive Pulmonary Disease: 
Practical Approaches to Diagnosis and Management

Learning Objectives
1. Evaluate the role of spirometry in chronic obstructive pulmonary disease (COPD) diagnosis and monitoring.
2. Review recommended pharmacologic interventions to reduce COPD symptoms and decrease exacerbations.
3. Select appropriate patient counseling strategies.

Faculty

**Barbara P. Yawn, MD, MSc, FAAPP**
Director of Research
Olmsted Medical Center
Adjunct Professor
Department of Family and Community Health
University of Minnesota
Rochester, Minnesota

Dr Barbara Yawn is a family physician with many years of both practice and research experience. She has published more than 350 articles in peer reviewed journals, including many regarding obstructive lung disease such as asthma and chronic obstructive pulmonary disease (COPD). She served on the National Heart, Lung, and Blood Institute national asthma guidelines committee in 2007 and on the World Health Organization’s COPD and asthma guidelines committees.

Much of Dr Yawn’s respiratory related research is designed to develop tools and methods to translate guidelines into everyday practice to improve patient outcomes. Her research is funded by the National Institutes of Health, the Agency for Healthcare Research and Quality, and the Centers for Disease Control and Prevention. She has been a frequent speaker for Pri-Med and has also given many presentations on COPD in the United States and internationally. Her role as a primary care educator includes not only podium talks, but webinars, interactive virtual presentations, and group mentoring. Dr Yawn hopes to make COPD a comfortable and productive part of every primary care physician’s practice while also facilitating other clinicians’ important roles in chronic disease management.

**David M. Mannino, MD**
Professor and Chair
Department of Preventive Medicine and Environmental Health
Director of Graduate Studies, Master of Science in Clinical Research Design
Director, Pulmonary Epidemiology Research Laboratory
Director, Southeast Center for Agricultural Health and Injury Prevention
University of Kentucky College of Public Health
Lexington, Kentucky

Dr David Mannino is professor and chair, department of preventive medicine and environmental health, at the University of Kentucky College of Public Health, Lexington, Kentucky. His research interests there include the epidemiology of asthma and chronic obstructive pulmonary disease (COPD) and the effects of air pollution exposure on respiratory function and lung diseases.

Dr Mannino received his medical degree from Jefferson Medical College, Philadelphia, Pennsylvania, and served both his internship and residency at Lankenau Hospital, Philadelphia. He went on to complete a fellowship in pulmonary medicine at West Virginia University School of Medicine/National Institute for Occupational Safety and Health, Morgantown, West Virginia.
Early career appointments included medical staff officer at a federal correctional institution in Kentucky and section chief, analytic epidemiology section, at the National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, Georgia. Dr Mannino has served as cocooridnator of the respiratory section of Global Burden of Disease, among several other international and national consultative positions. He is the recipient of the COPD Foundation award for development of the COPD Pocket Consultant Guide and the Soffer Research Award from the American College of Chest Physicians (for best scientific abstract at a scientific meeting).

Dr Mannino has authored more than 200 articles for peer reviewed journals, in addition to book chapters, editorials, and book reviews. He has spoken nationally and internationally, as well as having held the position of principal investigator on a number of COPD related studies.

Faculty Financial Disclosure Statements
The presenting faculty reported the following:

Dr Barbara Yawn receives research funding from Boehringer Ingelheim.

Dr David Mannino receives advisor honoraria from Amgen, Astra-Zeneca, Boehringer Ingelheim, GlaxoSmithKline, and Novartis.

Education Partner Financial Disclosure
The content collaborators at Miller Medical Communications, LLC, report the following:

Lyerka D. Miller, PhD, has no financial relationships to disclose.

Suggested Reading List


Gibson PG, Simpson JL. The overlap syndrome of asthma and COPD: what are its features and how important is it? Thorax. 2009;64(8):728-735.


SESSION 3
11:15am–12:30pm

Chronic Obstructive Pulmonary Disease - Practical Approaches to Diagnosis and Management

SPEAKERS
Barbara P. Yawn, MD, MSc, FAAPP
David M. Mannino, MD

Faculty

David M. Mannino, MD
Professor and Chair
Department of Preventive Medicine and Environmental Health
Director of Graduate Studies, Master of Science in Clinical Research Design
Director, Pulmonary Epidemiology Research Laboratory
Director, Southeast Center for Agricultural Health and Injury Prevention
University of Kentucky College of Public Health
Lexington, Kentucky

Barbara P. Yawn, MD, MSc, FAAPP
Director of Research
Olmsted Medical Center
Adjunct Professor
Department of Family and Community Health
University of Minnesota
Rochester, Minnesota

Learning Objectives

Upon completion of this activity, participants should be better able to:
- Evaluate the role of spirometry in COPD diagnosis and monitoring
- Review recommended pharmacologic interventions to reduce COPD symptoms and decrease exacerbations

Friday Afternoon 4:45 PM Visit

- Nancy—56 yo with cc of bronchitis
- Wants antibiotics before the weekend
- Coughing more for 2 weeks, productive-yellow
- ?Fever, some breathlessness up stairs
- Does not want to go to the ED again
- Does not want chest x-ray
- The last kind she received worked

What should we do?

- Take more history
  - Smoker 35 pack-years
  - Third episode of “bronchitis” in past 2 years
    - Colds last for weeks
    - Always worse than others
  - Decrease in activities due to trouble breathing with walking. Now SOB with 6 stairs
  - Has “smoker’s cough” for past 3 years
  - Mother developed “asthma” at age 60 and died of CHF at age 68

Think chronic lung disease!
**Definition of COPD**

- Chronic Obstructive Pulmonary Disease
  - Common, preventable and treatable disease
  - Characterized by:
    - Persistent airflow limitation
    - 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 burden of disease in individual patients

**Mechanisms Underlying Airflow Limitation in COPD**

- **Small Airways Disease**
  - Airway inflammation
  - Airway fibrosis, luminal plugs
  - Increased airway resistance
- **Parenchymal Destruction**
  - Loss of alveolar attachments
  - Decrease of elastic recoil

**Why Is COPD Underdiagnosed? Clinicians Tell All**

Survey of 278 Clinicians

<table>
<thead>
<tr>
<th>Patient has multiple chronic conditions (%)</th>
<th>MDs</th>
<th>NPs/PAs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>46</td>
<td>36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient fails to report/recall dyspnea (%)</th>
<th>MDs</th>
<th>NPs/PAs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inadequate knowledge and training (%)</th>
<th>MDs</th>
<th>NPs/PAs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient lacks specific symptoms (%)</th>
<th>MDs</th>
<th>NPs/PAs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
<td>28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lacks access to spirometry (%)</th>
<th>MDs</th>
<th>NPs/PAs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lack of effective treatment (%)</th>
<th>MDs</th>
<th>NPs/PAs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>19</td>
</tr>
</tbody>
</table>

**The COPD Population Screener (COPD-PS)**

1. During the past 6 weeks, how much of the time did you feel short of breath?
   - None of the time
   - Some of the time
   - Most of the time
   - All of the time

2. Do you ever cough up any “stuff”, such as mucus or phlegm?
   - No
   - Yes, a few times a month
   - Yes, a few times a week
   - Yes, most of the time

3. Please select the answer that best describes you in the past 12 months:
   - I do less than I used to because of my breathing problems.
   - I do as much as I used to
   - I do less than I used to
   - I do as much as I used to because of my breathing problems.

4. Have you smoked at least 100 cigarettes in your ENTIRE LIFE?
   - Yes
   - No

5. How old are you?
   - Age 35 to 49
   - Age 50 to 59
   - Age 60 to 69
   - Age 70 +

**Asthma vs COPD**

<table>
<thead>
<tr>
<th>Feature</th>
<th>COPD</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Often in middle</td>
<td>Often in childhood</td>
</tr>
<tr>
<td>Family History</td>
<td>Variable</td>
<td>Often</td>
</tr>
<tr>
<td>Medical or Social History</td>
<td>Smoking (often &gt;20 pack-years)</td>
<td>Atopy (ie, allergy and/or eczema)</td>
</tr>
<tr>
<td>Patients report symptoms as...</td>
<td>Most notable during exercise</td>
<td>Most notable at night or early morning</td>
</tr>
<tr>
<td>Airflow Obstruction</td>
<td>May be some reversibility with bronchodilation</td>
<td>Largely reversible with bronchodilation</td>
</tr>
</tbody>
</table>

Key Indicators of COPD

Symptoms
- Chronic cough
- Chronic sputum production
- Dyspnea:
  - Progressive, persistent
  - Worse with exercise and respiratory infections

Risk Factors
- Host factors
  - Genetics (e.g., alpha-1 antitrypsin deficiency), hyper-responsiveness, lung growth
- Exposures
  - Tobacco, smoke from cooking fires, occupational dust, flour, chemicals

COPD Mis-Diagnosis

Hypothetical Male Patient With COPD Symptoms
42% diagnosed as COPD by physicians
COPD symptoms in women were most commonly misdiagnosed as asthma

Hypothetical Female Patient With COPD Symptoms
32% diagnosed as COPD by physicians

Algorithm for Interpreting Spirometry Results

Acceptable Spirogram

Spirometry: Obstructive Disease

Nancy’s Numbers

You do spirometry on Nancy and get the following results:

Good quality tracing—rated B

Pre-bronchodilator
FEV₁ 2.2 L, 65% pred
FVC 4.0 L
FEV₁/FVC 0.55

Post-bronchodilator
FEV₁ 2.7 L, 68% pred
FVC 4.1 L
FEV₁/FVC 0.66

Nancy needs spirometry!

Needs pre- and post-bronchodilator to see about reversibility and if she meets obstruction definition

Needs FEV₁ and FVC to determine severity and how to begin maintenance therapy

FVC = forced vital capacity
FEV₁ = forced expiratory volume in 1 second


Acceptable Spirogram

Further testing
Avoid Interpretation Pitfalls

Common Interpretation Errors Among Family Physicians (N=12 practices) new to spirometry use

COPD Management

Suspect COPD

Spirometry

Select Rx based on:

Symptoms

FEV1

Exacerbations

Modifications

Inadequate response

Adequate response

Why inadequate?

Inadequate response: Adequate response

Adherence

Triggers

Comorbidities

Psycho-societal

Inhaler technique

Exacerbations

Disease progression

COPD According to GOLD 2014

Determine:

- Current level of patient’s symptoms
- Severity of the spirometric abnormality
- Frequency of exacerbations
- Presence of comorbidities

Assessment of COPD

Assess symptoms

- Dyspnea: Progressive, persistent, and characteristically worse with exercise
- Chronic cough: May be intermittent and may be unproductive
- Chronic sputum production: COPD patients commonly cough up sputum

Use mMRC, CAT, or CCQ to assess the patient’s level of symptom burden.

Modified MRC (mMRC) Questionnaire

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 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

Assessment of COPD

- Assess symptoms
- Assess airflow limitation using spirometry

GOLD 1: Mild FEV₁ ≥80% predicted

GOLD 2: Moderate FEV₁ 50% to 79% predicted

GOLD 3: Severe FEV₁ 30% to 49% predicted

GOLD 4: Very severe FEV₁ <30% predicted

www.goldcopd.org
Assessment of COPD

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

Use history of exacerbations and spirometry.
- 2 exacerbations or more within the last year or
- FEV₁ <50 % of predicted value indicators of high risk.

Combined Assessment of COPD

Assess symptoms first

<table>
<thead>
<tr>
<th>(C)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>(B)</td>
</tr>
</tbody>
</table>

If mMRC 0–1 or CAT <10: Less Symptoms (A or C)
If mMRC ≥2 or CAT ≥10: More Symptoms (B or D)

Combined Assessment of COPD

Assess risk of exacerbations next

<table>
<thead>
<tr>
<th>(C)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>(B)</td>
</tr>
</tbody>
</table>

If GOLD 1 or 2 and only 0 or 1 exacerbations per year: Low Risk (A or B)
If GOLD 3 or 4 or two or more exacerbations per year or 1 leading to hospital admission: High Risk (C or D)

Pharmacological Therapy of Stable COPD: GOLD 2011

When assessing risk, choose the highest risk according to GOLD grade or exacerbation history.

Patient is now in 1 of 4 categories:
- A: Less symptoms, lower risk
- B: More symptoms, lower risk
- C: Less symptoms, higher risk
- D: More symptoms, higher risk

Additional Investigations

- Chest X-ray: Seldom diagnostic, but valuable to exclude alternative diagnoses (CHF, lung cancer) and establish presence of significant comorbidities
- Alpha-1 Antitrypsin Deficiency Screening: In COPD patients of Caucasian descent <45 yrs old, with strong family history of COPD
- Lung Volumes and Diffusing Capacity: Help to characterize severity, but not essential to patient management
- Oximetry and Arterial Blood Gases: Pulse oximetry can be used to evaluate a patient’s oxygen saturation and need for supplemental oxygen therapy
Manage Stable COPD: Goals of Therapy

- Assess and relieve symptoms
  - Individual tools for assessment
- Improve exercise tolerance
  - Pulmonary rehab
- Improve health status
- Prevent disease progression
  - Exposure to smoking, occupational
- Prevent and treat exacerbations
- Pharmacotherapy, exposures
- Reduce mortality

Reduce Symptoms

 Reduce Risk


Therapeutic Options: Key Points

- Smoking cessation has the greatest capacity to influence the natural history of COPD
- Pharmacotherapy and immunizations improve the lives of people with COPD
- Regular physical activity and should repeatedly be encouraged to remain active

Nonpharmacologic Management: GOLD Overview

- Active reduction of risk factors
- Administer vaccinations
- Increase physical activity
- Consider evaluation for need for supplemental oxygen
- Consider surgical evaluation


Recommended Pharmacotherapy

**Recommended Pharmacotherapy**

- **A**
  - Minimal symptoms, mild/moderate exacerbations (≤2/yr)
  - SABA or SAMA (prn)
  - LAMA (scheduled)
  - ICS/LABA

- **B**
  - Severe symptoms, mild/moderate exacerbations (≤2/yr)
  - LABA + LAMA
  - ICS/LABA

- **C**
  - Severe symptoms, very severe exacerbations (≥3/yr)
  - ICS/LABA + LAMA
  - LABA + PDE-4 inh

- **D**
  - Severe symptoms, very severe exacerbations (≥2/yr)
  - LABA + PDE-4 inh


**Pharmacotherapy (Summary)**

- **A**
  - Minimal symptoms, mild/moderate exacerbations (≤2/yr)
  - SABA or SAMA (prn)
  - LABA + LAMA (scheduled)
  - Consider Theophylline

- **B**
  - Severe symptoms, mild/moderate exacerbations (≤2/yr)
  - LABA + LAMA (scheduled)
  - ICS/LABA

- **C**
  - Severe symptoms, very severe exacerbations (≥3/yr)
  - ICS/LABA + LAMA
  - LABA + PDE-4 inh
  - Consider Theophylline

- **D**
  - Severe symptoms, very severe exacerbations (≥2/yr)
  - LABA + PDE-4 inh
  - Consider Theophylline


**Adverse Effects of Therapy**

<table>
<thead>
<tr>
<th>β₂-Agonists</th>
<th>Anticholinergics</th>
<th>Inhaled Glucocorticoids</th>
<th>PDE-4 inhibitor (Roflumilast)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachycardia</td>
<td>Dry mouth</td>
<td>Dyshypertonia</td>
<td>Diarrhea</td>
</tr>
<tr>
<td>Palpitations</td>
<td>Urinary retention</td>
<td>Thrush</td>
<td>Weight decrease</td>
</tr>
<tr>
<td>PVC*</td>
<td>Glaucoma</td>
<td>Systemic effects:</td>
<td>Headache</td>
</tr>
<tr>
<td>Tremors</td>
<td></td>
<td>bruising, bone density, cataract</td>
<td>Insomnia</td>
</tr>
<tr>
<td>Hypokalemia</td>
<td></td>
<td>Pneumonia</td>
<td>Depression/Suicidal ideations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*PVC=premature ventricular contraction


Revised 11th June, 2016.

Saag et al. UpToDate. 2013.


**Therapeutic Options: Other Pharmacologic Treatments**

*Influenza vaccines can reduce serious illness. Pneumococcal polysaccharide vaccine is recommended for COPD patients 65 years and older and for COPD patients younger than age 65 with an FEV₁ <40% predicted.*

The use of antibiotics, other than for treating infectious exacerbations of COPD and other bacterial infections, is currently not indicated.


**Manage Stable COPD: Nonpharmacologic Treatments**

<table>
<thead>
<tr>
<th>Patient</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>
</table>

Activity in People With COPD

- COPD patients are very inactive
- This inactivity is present in all GOLD stages

Therapeutic Options: Rehabilitation

- All COPD patients benefit from exercise training programs with improvements in exercise tolerance and symptoms of dyspnea and fatigue
- Although an effective pulmonary rehabilitation program is 6 weeks, the longer the program continues, the more effective the results
- If exercise training is maintained at home, the patient's health status remains above pre-rehabilitation levels
- Nutrition counseling and education

Must-Haves for COPD

- Spirometry
- Smoking cessation
- Pulmonary rehabilitation
- Pharmacotherapy
- Assessment and therapy of comorbidities
- Good across-group communications
- Team approach

Questions?

Address Comorbidities of COPD

COPD Management