Saturday General Session

*COPD in Primary Care: Managing Expectations and Optimizing Outcomes*

Frank Sciurba, MD  
Associate Professor and Medical Director, Pulmonary Physiology Laboratory  
Division of Pulmonology, Allergy and Critical Care Medicine  
University of Pittsburgh School of Medicine  
Pittsburgh, Pennsylvania

Leonard Fromer, MD  
Executive Medical Director, Group Practice Forum  
Los Angeles, California

**Educational Objectives**  
By the end of this activity, the participant should be better able to:  
1. Recognize risk factors and early symptoms of COPD.  
2. Summarize the current clinical guidelines for the optimal management of COPD.  
3. Devise a treatment plan for COPD patients that includes the appropriate use of bronchodilators.  
4. Evaluate inhaler use among COPD patients.

**Speaker Disclosure**  
Dr. Sciurba has disclosed that he has received research support from Astellas, AstraZeneca, Boehringer-Ingelhiem, Commonwealth of Pennsylvania, COPD Foundation, Department of Defense, GlaxoSmithKline, NIH, Phillips Respironics, PneumRX, and PulmonX; and he is on the advisory board for AstraZeneca and Boehringer-Ingelhiem.

Dr. Fromer has disclosed that he is on the speaker’s bureau for Boehringer Ingelhiem Pharmaceuticals.

**Supporter Disclosure**  
This educational activity is supported by an educational grant from GlaxoSmithKline. It has been planned and produced by Annenberg Center for Health Sciences with Texas Academy of Family Physicians strictly as an accredited continuing medical education activity.
Leonard M. Fromer, MD

Leonard M. Fromer, MD, is executive medical director of the Group Practice Forum, a division of The Kinetix Group, helping group practices achieve success in clinical integration, quality improvement, and care coordination. He was previously an assistant clinical professor in the Department of Family Medicine at the University of California, Los Angeles, and the Western University of Health Sciences in Pomona, California.

Dr. Fromer received his medical degree, magna cum laude, from the State University of New York Downstate Medical Center in Brooklyn, New York, and completed his residency at UC Irvine/Long Beach Memorial Medical Center. He is a diplomate of the American Board of Family Practice and the National Board of Medical Examiners.

An authority on health-system reform and on asthma and allergies, Dr. Fromer is the contributor of numerous articles, is a sought-after lecturer, and is frequently interviewed by national print and electronic media on these topics. He is editor of *A Guide to Forming Physician Directed Managed Care Networks*, and serves on the editorial board of the international publication *Primary Care Respiratory Journal*.

Dr. Fromer is a former member and chairman of the American Academy of Family Physicians (AAFP) Commission on Quality, chaired the Medical Leadership Council on Cultural Proficiency in Health Care, and served on the California Department of Health IMAP (Integrating Medicine and Public Health Program) Advisory Panel on Allergy and Asthma. He served as a board member and clinical integration consultant to TransforMED, LLC, focusing on practice redesign to meet the needs of both patients and primary care practitioners.

Previous positions held by Dr. Fromer include serving on the board of directors, managing director and chief financial officer for Prairie Medical Group of Santa Monica, president of the California Academy of Family Physicians, chair of the Commission on Health Care Services for the American Academy of Family Physicians, nominee to the National Committee on Vital Health Statistics of the US Department of Health and Human Services, and consultant to the American Medical Association.

Dr. Fromer serves on the Board of Directors for the Annenberg Center for Health Sciences.
Frank C. Sciurba, MD

Frank C. Sciurba, MD, is an associate professor at the University of Pittsburgh School of Medicine, director of the Emphysema/COPD research center, and director of the clinical pulmonary physiology laboratories and pulmonary rehabilitation program. He received his medical degree from the University of Chicago Pritzker School of Medicine and completed his residency in internal medicine and a pulmonary/critical care fellowship at the University of Pittsburgh Medical Center.

Dr. Sciurba is chair elect of the American Thoracic Society (ATS) Clinical Problems Program Committee and has contributed to and coauthored several ATS statements related to field and laboratory exercise testing and COPD issues.

Dr. Sciurba's research has been inspired by real clinical problems facing his patients. He has coauthored more than 200 manuscripts and has had continuous NIH funding for 20 years including a Specialized Clinical Center of Research Excellence in COPD P50 award. He has demonstrated clinical and translational research leadership in phenotyping and subclassification of COPD and ILD, surgical and bronchoscopic volume reduction; biomarker identification and development, lab-based cardiopulmonary and field walk exercise testing and has facilitated tissue biology, genetic and blood mechanistic and translational projects with basic science collaborators.

Current leadership positions held by Dr. Sciurba include: principal investigator of the Network Management Core of the new NHLBI-sponsored Pulmonary Trials Consortium which manages the execution of pragmatic, "real world" studies in a variety of chronic pulmonary conditions; and academic chair of the COPD Biomarker Qualification Committee, a group of academic, foundation and industry partners that work with FDA and EMA leadership to address the need for new biomarkers to facilitate development of drugs and devices for chronic pulmonary conditions.

Dr. Sciurba has coauthored more than 200 manuscripts and has published extensively in national and international journals.
TARGET AUDIENCE

This activity was developed for family physicians, internists, and other health care professionals who have an interest in COPD.

LEARNING OBJECTIVES

At the conclusion of this activity, participants should be better able to:

- Recognize risk factors and early symptoms of COPD
- Summarize the current clinical guidelines for the optimal management of COPD
- Devise a treatment plan for COPD patients that includes the appropriate use of bronchodilators
- Evaluate inhaler use among COPD patients

FACULTY

Frank C. Sciurba, MD
Associate Professor of Medicine
Medical Director, Pulmonary Physiology Laboratory
Division of Pulmonary, Allergy and Critical Care Medicine
University of Pittsburgh School of Medicine
Pittsburgh, Pennsylvania

Leonard M. Fromer, MD
Executive Medical Director
Group Practice Forum
Los Angeles, California

ACCREDITATION AND CERTIFICATION

The Annenberg Center for Health Sciences at Eisenhower is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The Annenberg Center for Health Sciences at Eisenhower designates this live activity for a maximum of 1.0 AMA PRA Category 1 Credit™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

This live activity, COPD in Primary Care: Managing Expectations and Optimizing Outcomes, from 03/31/2017–06/24/2017, has been reviewed and is acceptable for up to 1.00 Prescribed credit by the American Academy of Family Physicians. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

DISCLOSURE STATEMENT

It is the policy of the Annenberg Center for Health Sciences to ensure fair balance, independence, objectivity, and scientific rigor in all programming. All faculty and planners participating in sponsored programs are expected to identify and reference off-label product use and disclose any relationship with those supporting the activity or any others with products or services available within the scope of the topic being discussed in the educational presentation.

The Annenberg Center for Health Sciences assesses conflict of interest with its instructors, planners, managers, and other individuals who are in a position to control the content of CE/CME activities. All relevant conflicts of interest that are identified are thoroughly vetted by the Annenberg Center for fair balance, scientific objectivity of studies utilized in this activity, and patient care recommendations. The Annenberg Center is committed to providing its learners with high-quality CE/CME activities and related materials that promote improvements or quality in health care and not a specific proprietary business interest of a commercial interest.
In accordance with the Accreditation Council for Continuing Medical Education Standards, parallel documents from other accrediting bodies, and Annenberg Center for Health Sciences policy, the following disclosures have been made:

Frank C. Sciurba, MD
Research Support  AstraZeneca, Boehringer Ingelheim, Commonwealth of Pennsylvania, GlaxoSmithKline, National Institutes of Health (NIH), PneumRX, Pulmonx, Respironics
Advisory Board  Boehringer Ingelheim, GlaxoSmithKline

Leonard M. Fromer, MD
Consultant   Mylan
Speakers Bureau  Boehringer Ingelheim

The faculty for this activity have disclosed that there will be no discussion about the use of products for non-FDA approved applications.

Additional content planners
The following have no significant relationship to disclose:

Eugene Cullen, MD (peer reviewer)
Eve Wilson, PhD (medical writer)

The ideas and opinions presented in this educational activity are those of the faculty and do not necessarily reflect the views of the Annenberg Center and/or its agents. As in all educational activities, we encourage practitioners to use their own judgment in treating and addressing the needs of each individual patient, taking into account that patient's unique clinical situation. The Annenberg Center disclaims all liability and cannot be held responsible for any problems that may arise from participating in this activity or following treatment recommendations presented.

This educational activity is supported by an educational grant from GlaxoSmithKline.

Our Policy on Privacy
Annenberg Center for Health Sciences respects your privacy. We don't share information you give us, or have the need to share this information in the normal course of providing the services and information you may request. If there should be a need or request to share this information, we will do so only with your explicit permission. See Privacy Statement and other information at http://www.annenberg.net/privacy-policy/

Contact Information
For help or questions about this activity please contact Continuing Education: ce@annenberg.net
Annenberg Center for Health Sciences
39000 Bob Hope Drive
Dinah Shore Building
Rancho Mirage, CA 92270
Phone 760-773-4500
Fax 760-773-4513
8 AM – 5 PM, Pacific Time, Monday – Friday
Definition and Early Symptoms of COPD

- Common, preventable, treatable disease characterized by persistent respiratory symptoms and airflow limitation due to airway and/or alveolar abnormalities caused by significant exposure to noxious particles or gases1
- Umbrella term for progressive lung diseases, including2
  - Emphysema
  - Chronic bronchitis
  - Refractory (nonreversible) asthma/asthma-COPD overlap syndrome
  - Some forms of bronchiectasis
- Most common early symptoms3
  - Dyspnea on exertion
  - Chronic cough
  - Abnormal sputum production

Epidemiology of COPD

**United States**1,2
- Third leading cause of death
- Number affected: 13.7 million
- Age-adjusted prevalence among individuals ≥ 25 y: 6.5%
- Now affects more women than men
- Incidence is increasing among younger individuals (ages 45-64)

**Worldwide**3,4
- Fourth leading cause of death
- Number affected: 384 million
- Prevalence among individuals ≥ 30 y: 11.4%
- Prevalence is expected to increase with increasing prevalence of smoking in developing countries and increasing age of populations in high-income countries
**COPD Deaths by Gender, 1979-2009**

![Chart showing COPD deaths by gender from 1979 to 2009.](chart)

**Etiology and Pathophysiology of COPD**

- **ETIOLOGY/RISK FACTORS**
  - Environmental factors
    - Smoking
    - Pollution/exposure
  - Host factors
    - Genetics
    - Age
    - Gender
    - Lung growth and development
    - Socioeconomic status
    - Asthma/Infants
    - Hypoglycemia
    - Chronic bronchitis
    - Infections

- **PATHOGENESIS**
  - Oxidative stress
  - Protozoa/antiproteine
  - Hypertrophy
  - Inflammatory
    - Inflammatory cells
  - Fibrosis
  - Peripheral nerve
  - Intestinal

- **PATHOPHYSIOLOGY**
  - Airflow limitation
  - Gas trapping
  - Gas exchange abnormalities
  - Muscle weakness
  - Hypoxemia
  - Hypercapnia
  - Pulmonary hypertension

**The Inactivity-Dyspnea Spiral**

- Respiratory impairment → Dyspnea during mild exertion → Hypoventilation, depression, dyspnea → further deconditioning → D stalled from exercise → Physical deconditioning → Dyspnea during moderate exertion → further deconditioning → Dyspnea during ADL → further deconditioning

**Comorbidities are Common in COPD**

- Lung Cancer
- End Stage Renal Disease
- Atherosclerosis
- Connective tissue disease
- Peptic ulcer disease
- Osteoporosis
- Depression

**COPD and Cardiac Disease: A Common Combination**

- PHCA provided hospital discharges between Oct. 1, 2007 and Sept. 30, 2008 (n=408,824)
- COPD: N=57,289
- CHF: N=41,475
- CAD: N=61,869
- CHF + CAD: N=24,307
- COPD + CAD: N=16,220 (n=57,289)
- CHF + CAD + COPD: N=8,668

**Case 1: Burt J.**

- Burt is a 42-y-o IT specialist who recently quit smoking (2 pk/d habit from age 16-38 y). He is in the office for a routine checkup.
- All vitals are normal except for slightly elevated blood pressure. He is 6' tall and weighs 205 lbs.
- He reports ongoing fatigue that he attributes to "recovering from a chest cold."
- Recent medical history is significant for 2 episodes of acute bronchitis, 1 and 2 years previous.
Case 1: Question

Should Burt be screened for COPD?

1. Only if he reports dyspnea
2. No, because there is no evidence of cough
3. Yes, because he is a former smoker
4. No, because he is too young to have COPD

Indicators for Pursuing a Diagnosis of COPD

- Dyspnea that is persistent, progressive over time, worse with exercise
- Chronic cough
  - Intermittent
  - Recurrent wheezing/shortness of breath
  - Productive or unproductive
  - Chronic sputum production
- Recurrent lower respiratory tract infections
- History of risk factors such as smoking, indoor air pollution, occupational particle exposure
- Family history of COPD and/or childhood factors, e.g., low birth weight, childhood respiratory infections

High Index of Suspicion for COPD Screening and Diagnosis

Consider COPD in patients with any symptoms and history of exposure to risk factors

- **SYMPTOMS**
  - Shortness of breath
  - Chronic cough
  - Sputum

- **RISK FACTORS**
  - Host factors
  - Tobacco smoke
  - Occupation
  - Indoor/outdoor air pollution

Spirometry is required to make diagnosis

Post-bronchodilator FEV1/FVC ratio < 0.70 confirms presence of persistent airflow limitation

Diagnosis: Medical History

- **Smoking**
- Past medical history, e.g., asthma, allergy, respiratory infections in childhood, chronic respiratory/nonrespiratory illnesses
- Family history of COPD or other chronic respiratory illnesses
- Patterns of symptom development
- History of exacerbations or hospitalizations for respiratory illnesses
- Presence of comorbidities, e.g., heart disease, osteoporosis, other conditions that may restrict activity

Misdiagnoses and Missed Diagnoses

- ~50% of patients with COPD may be misdiagnosed or undiagnosed
- Contributing factors
  - Lack of awareness of early symptoms
  - Acceptance of symptoms as a consequence of smoking or aging among the general population
  - Symptomatic similarities to asthma
  - Failure of health care providers to use spirometry for diagnosis
- Potential impact
  - No treatment, inadequate treatment, or inappropriate treatment
  - Unchecked disease progression and rate of decline, with increased frequency/severity of exacerbations and increased hospitalizations
  - Loss of lung function
  - Reduced quality of life
  - Younger age at death

COPD Foundation: http://www.goldcopd.org/gold
Gender Bias: COPD is Less Likely to be Diagnosed in Women

Hypothetical Male Patient With COPD Symptoms: Diagnosed as COPD by 65% of physicians

Hypothetical Female Patient With Identical COPD Symptoms: Diagnosed as COPD by 55% of physicians

COPD diagnostics in women are most commonly misdiagnosed as asthma.

Spirometry

• Incorporate procedure into clinic workflow for appropriate patients
• Most reproducible/objective measurement of airflow limitation
• Critical for
  • Confirming diagnosis
  • Assessing prognosis
  • Monitoring response to treatment and treatment adjustments
  • Identifying rapid decline
• Accuracy depends on appropriate preparation, bronchodilation, technician coaching/patient effort
• Consider other diagnoses when symptoms are disproportionate to degree of airflow obstruction

Spirometry: Range of Severity

GOLD Refined Combined COPD Assessment

Diagnosis Confirmed by Spirometry → Assessment of Airflow Limitation → Assessment of Symptoms and Risk of Exacerbations

GOLD Level

FEV1/FVC < 0.7
1 Mild
2 Moderate
3 Severe
4 Very Severe

Assessment of Airflow Limitation

FEV1 ≥ baseline
1 No change
2 Improvement
3 Decline ≥ 10%
4 Decline ≥ 20%

Assessment of Symptoms and Risk of Exacerbations

Symptoms

C D A B

GOLD Level

FEV1/FVC < 0.7
1 Mild
2 Moderate
3 Severe
4 Very Severe

Asthma-COPD Overlap Syndrome

Proposed Diagnostic Criteria

Major Criteria
- Marked reversibility with bronchodilators (>15% and >400 mL in FEV1)
- History of asthma (>40 years of age)
- Sputum/blood eosinophilia

Minor Criteria
- Reversibility on 2 separate occasions (>12% and >200 mL in FEV1)
- History of atopy
- Increased total serum IgE

Overlap syndrome: 2 major criteria OR 1 major + 2 minor criteria

Does Early Diagnosis Improve Outcomes?

• Smoking cessation even at early stages of disease slows the decline of lung function
• Does early detection of COPD with spirometry increase likelihood of smoking cessation?

Smoking cessation slows lung function decline in men with COPD

Non-smokers

Smokers

Smokers with COPD

Year
Guidelines for Intervention and Treatment

- Multiple guidelines available worldwide
- Global Strategy for Diagnosis, Management, and Prevention of COPD (GOLD Report 2017)\(^1\)
- ACP/CHEST/ATS/ERS Clinical Practice Guideline: Diagnosis and Management of Stable COPD, 2011\(^2\)
- Therapeutic recommendations vary; insufficient guidance on use of newer combination therapies\(^3\)

GOLD: 2017 Report

**Nonpharmacologic Interventions**

<table>
<thead>
<tr>
<th>GOLD Patient Group</th>
<th>A</th>
<th>B, C, D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential</td>
<td>Smoking cessation</td>
<td>Smoking cessation</td>
</tr>
<tr>
<td>Recommended</td>
<td>Physical activity</td>
<td>Physical activity</td>
</tr>
<tr>
<td>Depends on local guidelines</td>
<td>Influenza vaccine</td>
<td>Influenza vaccine</td>
</tr>
<tr>
<td></td>
<td>Pretreatment</td>
<td>Pneumococcal vaccine</td>
</tr>
</tbody>
</table>

Nonpharmacologic Interventions

**Management of COPD: Focus on Prevention and Maintenance**

- **Goals of therapy**
  - Reduce/reduce symptoms
  - Reduce impairment
  - Reduce risk of exacerbations
  - Reduce frequency/severity of exacerbations
  - Decrease long-term lung function decline
  - Increase exercise tolerance
  - Reduce hospitalization and mortality
  - Improve health status and health-related quality of life

- **Nonpharmacologic interventions**
  - Smoking cessation
  - Vaccination (flu and pneumococcal vaccines)
  - Avoidance of indoor/outdoor air pollution
  - Reduce occupational exposure to irritants
  - Physical activity/exercise training
  - Pulmonary rehabilitation

- **Pharmacologic therapy**
  - Bronchodilators
  - Antimuscarinic agents
  - Methylxanthines\(^*\)
  - Corticosteroids
  - Phosphodiesterase-4 inhibitors

**Pharmacologic Interventions: GOLD Grades A and B**

- Group A: Continue, stop, or try alternate bronchodilator
- Group B: LAMA + LABA

**Pharmacologic Interventions: GOLD Grades C and D**

- Group C: Consider nifedipine if FEV\(_1\)<60% predicted chronic bronchitis
- Group D: Consider macrolide in former smokers

Pulmonary Rehabilitation

- **Components**
  - Exercise/physical activity training
  - Education/psychosocial support

- **Programs are underused**
  - < 2% of patients with COPD have participated in pulmonary rehabilitation
  - Many factors contribute to underuse, eg, health system-, physician-, and patient-related factors

**References**

2. Global Initiative for Chronic Obstructive Lung Disease. 2011 Report
**Pharmacologic Options in COPD**

<table>
<thead>
<tr>
<th>Bronchodilators</th>
<th>Anti-Inflammatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Acting</td>
<td>ICS + LABA</td>
</tr>
<tr>
<td>Anticholinergic (SAMA):</td>
<td>Methylprednisolone*</td>
</tr>
<tr>
<td>Ipratropium (SAMA):</td>
<td>Fluticasone (pills)</td>
</tr>
<tr>
<td>β-agonist (SABA):</td>
<td>Fluticasone (pills)</td>
</tr>
<tr>
<td>Formoterol (LABA):</td>
<td>Salmeterol (qd)</td>
</tr>
<tr>
<td>Levalbuterol (LABA):</td>
<td>Olodaterol (BID)</td>
</tr>
<tr>
<td>SAMA + SABA:</td>
<td>Indacaterol (BID)</td>
</tr>
</tbody>
</table>

*This FDA-approved use is for COPD patients (excluding those with chronic obstructive pulmonary disease [COPD]) who are rated using the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines for COPD severity. This oral antimuscarinic agent is indicated for the management of chronic obstructive pulmonary disease (COPD) in patients age 18 years and older. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines provide a framework for the diagnosis, assessment, and treatment of COPD in adults age 18 years and older. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines provide a framework for the diagnosis, assessment, and treatment of COPD in adults age 18 years and older.

**LABA/ICS vs. LAMA/LABA: FLAME Trial**

Through FEV1 and SGRQ-C symptom scale were significantly greater in the LAMA/ICS vs. the LABA/ICS group.

**Types of Inhalers Used in COPD**

<table>
<thead>
<tr>
<th>Inhaler Type</th>
<th>Key Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metered-dose inhalers (pMDIs)</td>
<td>Short- and long-acting bronchodilators and combinations</td>
</tr>
<tr>
<td>Pressurized metered-dose inhalers (pMDIs)</td>
<td>Breathing-airway obstruction technique</td>
</tr>
<tr>
<td>Breath-actuated (BA MDI)</td>
<td>May not be suitable for elderly, confused, or those with hand conditions (e.g., arthritis)</td>
</tr>
<tr>
<td>Dry Powder Inhalers (DPIs)</td>
<td>Long-acting bronchodilators and combinations</td>
</tr>
<tr>
<td>Soft Mist Inhalers (SMIs)</td>
<td>Breathing-airway obstruction technique</td>
</tr>
</tbody>
</table>

**Wisdom Trial: Withdrawal of ICS in Patients**

* on LAMA/LABA Long-acting Bronchodilators

**Monitoring Treatment**

- Lung function assessments
  - FEV1 assessed by spirometry
  - Functional capacity assessed by timed-walking test
- Oxygenation at rest using an arterial blood gas sample
- Symptoms
  - Cough
  - Sputum production/color
  - Dyspnea
  - Change in lung function
  - Fatigue
  - Activity limitation
  - Sleep disturbance
  - Weight loss

**Monitoring Treatment (Cont.)**

**Inquire about**

- Exacerbations: frequency, severity, likely causes
- Urgent care visits and hospitalizations (including duration of stay and need for mechanical ventilation)
- Smoking status/exposure to smoking
- Pharmacotherapy
  - Doses of current medications
  - Adherence to treatment regimen
  - Effectiveness of treatment regimen
- Inhaler technique: CHECK AND REVIEW AT EVERY FOLLOW-UP APPOINTMENT
- Side effects of treatment

**Request imaging**

- Worsening symptoms
- Exacerbations with purulent sputum

---

*Reprinted from: Global Initiative for Chronic Obstructive Lung Disease (GOLD) for the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017 Report. Available at: https://goldcopd.org/gold."
**Case 2: Sandy L.**

- Sandy is a 58-yr-o former smoker with moderate COPD.
- She was doing well until recently on combination LAMA + LABA treatment, but she now reports that her symptoms have been increasing, and last month she experienced an exacerbation that sent her to the ED. She was not hospitalized, but she worries that she will be.

**Adherence to Inhaler Therapy in COPD**

- Nonadherence to COPD medications is high
  - 49% do not use inhaled medications as prescribed
  - 31% use ineffective inhaler dosing techniques
  - 50% overdose medications during periods of respiratory distress
- Factors predicting nonadherence
  - Intentional nonadherence: deliberate discontinuation during periods of symptom remission
  - Unintentional nonadherence: nonadherence to treatment advice due to factors beyond their control
  - Cognitive impairment
  - Physical disability
  - Vision impairment
  - Complex regimens/confusion about regimens
  - Poor understanding of COPD

**Identify and Address Poor Adherence**

**Barriers to Adherence**
- Inadequate education about COPD and therapy
- Perceived burden of medication regimen
- Device is difficult to use
- Depressed mood
- Medication-related cost
- Adverse effects

**Red Flags for Nonadherence**
- Failure to refill prescriptions
- Excessive use of rescue medication
- Frequent exacerbations
- Rapid decline in FEV₁

**Common Errors in Inhaler Technique, by Inhaler Type**

<table>
<thead>
<tr>
<th>Error</th>
<th>DPI</th>
<th>pMDI</th>
<th>BA pMDI</th>
<th>μMDI + Siever</th>
<th>Soft Mist Inhaler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure to remove the mouthpiece cap or device cover</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Incorrect preparation/priming or loading of dose</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Failure to pierce capsule</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inhaler upside down</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Breathing out into the device</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firing the device at/after end of inhalation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Weak or very slow inhalation</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-mouth inhalation technique</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhaling through the nose</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stopping inhalation as device is freed</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Strategies for Improving Adherence to Inhaler Use**

- Delegate education to appropriate staff (e.g., PA, NP, or local pharmacist)
- Match the right device to the patient's unique needs
- Provide hands-on verbal instructions and supplement with written instructions
- Make sure patient can demonstrate proper technique for each device prescribed before leaving the appointment
- **RE-ASSESS THE PATIENT'S ABILITY TO USE INHALER(S) AT EVERY FOLLOW-UP APPOINTMENT**

**Case 2: Question**

Which of the following would be the next step in bringing Sandy’s COPD back under control?

1. Revisit her inhaler technique
2. Restage her COPD
3. Switch to a different LABA + LAMA combination
4. Switch to triple therapy with LABA + LAMA + ICS
Exacerbations

- Acute events characterized by worsening respiratory symptoms that result in a change in therapy
- Classification
  - Mild: treated with SABDs
  - Moderate: treated with SABDs + antibiotics and/or oral corticosteroids
  - Severe: requires treatment in the emergency room or hospitalization; may be associated with acute respiratory failure
- Common precipitants
  - Respiratory tract infections (viral or bacterial)
  - Pollution
  - Seasonal temperature variations (very cold or very hot, humid temperatures)
- Risk factors for exacerbations
  - History of prior exacerbations
  - History of wheezing or asthma

Impact of Exacerbations in COPD

When Do Exacerbations Require Hospitalization?

- Severe symptoms, such as sudden worsening of resting dyspnea, high respiratory rate, decreased SpO2, change in mental status
- Acute respiratory failure
- Onset of new physical findings (e.g., cyanosis, peripheral edema)
- Failure of response to initial medical management
- Presence of serious comorbidities (e.g., newly occurring arrhythmia, heart failure)
- Insufficient support at home

Conclusions

- Early, accurate diagnosis of COPD is essential to effective intervention
- Guidelines are available to inform diagnosis, treatment selection, and monitoring.
- Bronchodilators, administered using inhalers, are the cornerstone of COPD management
- Patients require frequent follow-up to assess worsening symptoms or decline, adjust treatment as needed, review inhaler practices, and reinforce adherence.

Questions?
The following medications were discussed in this presentation. The table below lists the generic and trade name(s) of these medications.

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aclidinium</td>
<td>Tudorza, Perrair</td>
</tr>
<tr>
<td>Albuterol</td>
<td>Accuneb, Proair, Proventil, Ventolin, Vospire</td>
</tr>
<tr>
<td>Arformoterol</td>
<td>Brovana</td>
</tr>
<tr>
<td>Budesonide/Fomoterol</td>
<td>Symbicort</td>
</tr>
<tr>
<td>Fluticasone/Salmeterol</td>
<td>Advair Diskus, Airduo Resplicick</td>
</tr>
<tr>
<td>Fluticasone/Vilanterol</td>
<td>Breo Ellipta</td>
</tr>
<tr>
<td>Fomoterol</td>
<td>Foradil, Perforomist</td>
</tr>
<tr>
<td>Indacaterol</td>
<td>Arcapta Neohaler</td>
</tr>
<tr>
<td>Indacaterol/Glycopyrrolate</td>
<td>Utibron</td>
</tr>
<tr>
<td>Ipratropium</td>
<td>Atrovent</td>
</tr>
<tr>
<td>Ipratropium/Albuterol</td>
<td>Combivent</td>
</tr>
<tr>
<td>Levalbuterol</td>
<td>Xopenex</td>
</tr>
<tr>
<td>Metaproterenol</td>
<td>None</td>
</tr>
<tr>
<td>Olodaterol</td>
<td>Striverdi Respimat</td>
</tr>
<tr>
<td>Roflumilast</td>
<td>Daliresp</td>
</tr>
<tr>
<td>Salmeterol</td>
<td>Serevent</td>
</tr>
<tr>
<td>Theophylline</td>
<td>Elixophyllin, Theo-24, Theochron</td>
</tr>
<tr>
<td>Tiotropium</td>
<td>Spiriva</td>
</tr>
<tr>
<td>Tiotropium/Olodaterol</td>
<td>Stiolto Respimat</td>
</tr>
<tr>
<td>Umeclidinium</td>
<td>Incruse Ellipta</td>
</tr>
<tr>
<td>Umeclidinium/Vilanterol</td>
<td>Anoro Ellipta</td>
</tr>
</tbody>
</table>