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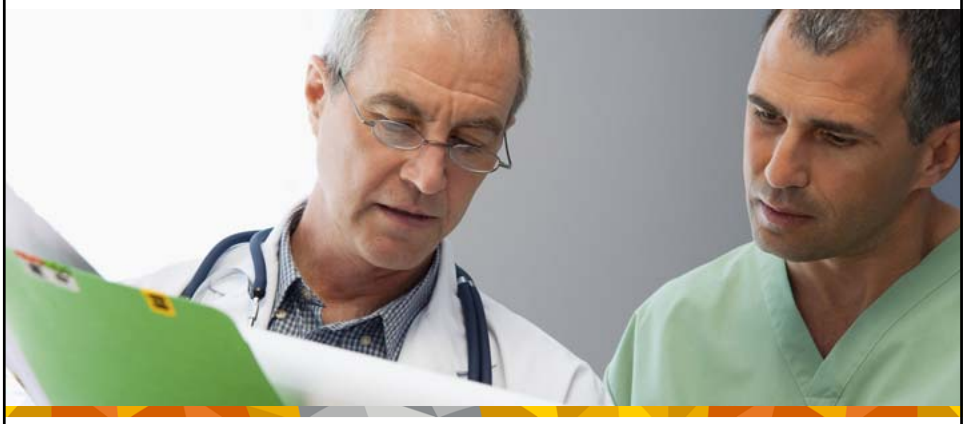

Chronic Obstructive Pulmonary Disease (COPD): Recognizing Severity, Current Treatments of Exacerbation and Readmission Avoidance

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Agenda

- Definition of COPD
- Risk factors for COPD
- Symptoms of COPD
- Diagnosis of COPD
- Treatment of COPD
  - Right care
  - Right medication
  - Right provider
  - Right lifestyle
- Managing comorbidities associated with COPD
- Barriers to care and readmission risks
- Case Management Opportunities

Objectives

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

- Explore clinical features, risk factors, screening, prevention, evaluation and treatment of COPD.
- Recognize the severity of exacerbation and strategies to prevent readmission of individuals with COPD.
- State the impact physical and behavioral health has on COPD.
- Discuss the pharmacologic and nonpharmacologic treatments for managing COPD.
- Discuss the importance of a multidisciplinary approach when managing individuals with COPD.

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Care Management of COPD

Right Provider

- *PCP*
- *Pulmonologist*
- *Pulmonary Rehab Program*
- *Behavioral Health*

Right Care

- *Identifying Cause of COPD*
- *Identifying and Monitoring Symptoms*
- *Having COPD Action Plan*
- *Immunizations*
- *Palliative Care/Hospice*
- Oxygen

Right Medications

- *LABA*
- *LAMA*
- *SABA*
- *Inhaled Corticosteroids (ICS)*
- *Combined Therapy*
- *Monitoring Side Effects*

Right Lifestyle

- *Smoking Cessation*
- *Limit Exposure to Triggers*
- *Nutrition*
- *Exercise*
- *Achieve and Maintain Healthy Weight*
- *Avoid ETOH Abuse*

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What is COPD?

"Chronic obstructive pulmonary disease (COPD) is a **common, preventable, and treatable disease** that is characterized by **persistent respiratory symptoms** and **airflow limitation** that is due to airway and/or alveolar abnormalities usually caused by significant **exposure to noxious particles or gases**."[1]

- COPD characterized by:
  - A mixture of small airways disease (e.g., obstructive bronchiolitis and parenchymal destruction {emphysema}),
  - The relative contributions can vary from person to person
- Structural changes of lungs
  - Small airways narrowing
    - A loss of small airways may contribute to airflow limitation and mucociliary dysfunction, a characteristic feature of the disease
  - Destruction of lung parenchyma (portion of the lung that involves gas transfer)[2]

[1] 2017 Gold Teaching Slide Set: Slide 14, goldcopd.org/gold-teaching-slide-set/, used for educational purposes
[2] 2018 GOLD Report: Definition: pp 22, goldcopd.org/wp-content/uploads/2016/04/GOLD-2018-WMS.pdf

Case Study

Mrs. J is a 62 year old female smoker who presents to urgent care with shortness of breath, productive cough and fever.

When you inquire, she states that she usually has a cough, worse in the morning, productive of gray sputum, gets short of breath if she walks more then 10 feet, and has episodes of wheezing if she gets sick (e.g., with an upper respiratory infection).

Polling Question #1

What are the Risk Factors for COPD?

Clinical Risk Factors

- Cigarette smoking
- Environmental exposure
- Increased airway responsiveness
- Gender (Women appear to be more susceptible to developing COPD and emphysema than men.)
- Asthma
- Antioxidant deficiency
- Broncho pulmonary dysplasia
- Tuberculosis (TB)

Molecular Risk Factors

- Alpha-1 antitrypsin deficiency
- Gene polymorphisms
- Enzymatic dysfunction

Polling Question #2

UpToDate: Chronic obstructive pulmonary disease: Risk factors and risk reduction, Clinical Risk Factors, www.uptodate.com/contents/chronic-obstructive-pulmonary-disease-risk-factors-and-risk-reduction?search=COPD%20Risk%20Factors&source=search_result&selectedTitle=1~77&usage_type=default&display_rank=1

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What are the Symptoms of COPD?

- Chronic cough
- Dyspnea
- Sputum production
- Wheezing
- Chest tightness

Exacerbations:
Are periods of acute worsening of respiratory symptoms

Polling Question #3

2018 GOLD Report: Symptoms: pp 18 and 41: goldcopd.org/wp-content/uploads/2016/04/GOLD-2018-WMS.pdf

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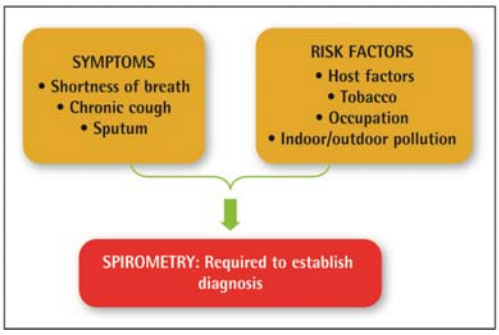
How is COPD Diagnosed?

Figure 2.1. Pathways to the diagnosis of COPD



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How is COPD Diagnosed?

Figure 2.2A. Spirometry – Normal Trace

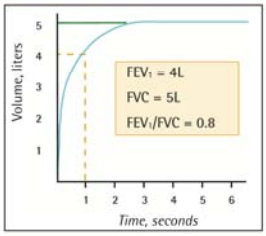
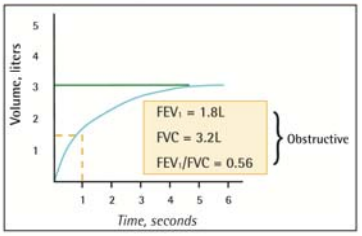


Figure 2.2B. Spirometry – Obstructive Disease



FVC =
FEV1 =

Table 2.4. Classification of airflow limitation severity in COPD (Based on post-bronchodilator FEV_1)		
In patients with $FEV_1/FVC < 0.70$:		
GOLD 1:	Mild	$FEV_1 \geq 80\%$ predicted
GOLD 2:	Moderate	$50\% \leq FEV_1 < 80\%$ predicted
GOLD 3:	Severe	$30\% \leq FEV_1 < 50\%$ predicted
GOLD 4:	Very Severe	$FEV_1 < 30\%$ predicted

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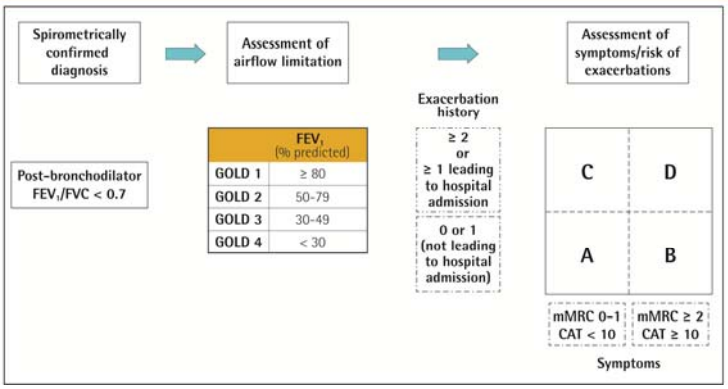
How is COPD Staged/Assessed?

Figure 2.4. The refined ABCD assessment tool



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COPD Assessment Test

Figure 2.3. CAT Assessment

For each item below, place a mark (✗) in the box that best describes you currently. Be sure to only select one response for each question.

Example: I am very happy (0) ✗ (1) (2) (3) (4) (5) I am very sad	SCORE
I never cough (0) (1) (2) (3) (4) (5) I cough all the time	
I have no phlegm (mucus) in my chest at all (0) (1) (2) (3) (4) (5) My chest is completely full of phlegm (mucus)	
My chest does not feel tight at all (0) (1) (2) (3) (4) (5) My chest feels very tight	
When I walk up a hill or one flight of stairs I am not breathless (0) (1) (2) (3) (4) (5) When I walk up a hill or one flight of stairs I am very breathless	
I am not limited doing any activities at home (0) (1) (2) (3) (4) (5) I am very limited doing activities at home	
I am confident leaving my home despite my lung condition (0) (1) (2) (3) (4) (5) I am not at all confident leaving my home because of my lung condition	
I sleep soundly (0) (1) (2) (3) (4) (5) I don't sleep soundly because of my lung condition	
I have lots of energy (0) (1) (2) (3) (4) (5) I have no energy at all	
	TOTAL SCORE

Reference: Jones et al. ERJ 2009; 34 (3); 648-54.

2017 Gold Teaching Slide Set: Slide 36, goldcopd.org/gold-teaching-slide-set/, used for educational purposes

Modified Medical Research Council (mMRC) questionnaire

Table 2.5. Modified MRC dyspnea scale[a] PLEASE TICK IN THE BOX THAT APPLIES TO YOU (ONE BOX ONLY) (Grades 0–4)	
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.	❑

Polling Question #4

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COPD Therapy Goals

- Relieve symptoms
- Reduce frequency and severity of exacerbations
- Improve exercise tolerance
- Improve health status
- Minimize adverse effects from treatment
- Reduce hospital admission

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Smoking Cessation

Table 3.1. Brief strategies to help the patient willing to quit

- **ASK:** Systematically identify all tobacco users at every visit.
  Implement an office-wide system that ensures that, for EVERY patient at EVERY clinic visit, tobacco-use status is queried and documented.
- **ADVISE:** Strongly urge all tobacco users to quit.
  In a clear, strong, and personalized manner, urge every tobacco user to quit.
- **ASSESS:** Determine willingness and rationale of patient's desire to make a quit attempt.
  Ask every tobacco user if he or she is willing to make a quit attempt at this time (e.g., within the next 30 days).
- **ASSIST:** Aid the patient in quitting.
  Help the patient with a quit plan; provide practical counseling; provide intra-treatment social support; help the patient obtain extra-treatment social support; recommend use of approved pharmacotherapy except in special circumstances; provide supplementary materials.
- **ARRANGE:** Schedule follow-up contact.
  Schedule follow-up contact, either in person or via telephone.

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Immunizations

Annual Influenza vaccination

Pneumococcal vaccinations

- **Pneumococcal conjugate vaccine** (PCV13 or Prevnar 13®)
- **Pneumococcal polysaccharide vaccine** (PPSV23 or Pneumovax 23®)

2018 GOLD Report: Overall Key Points, pp 61: goldcopd.org/wp-content/uploads/2016/04/GOLD-2018-WMS.pdf

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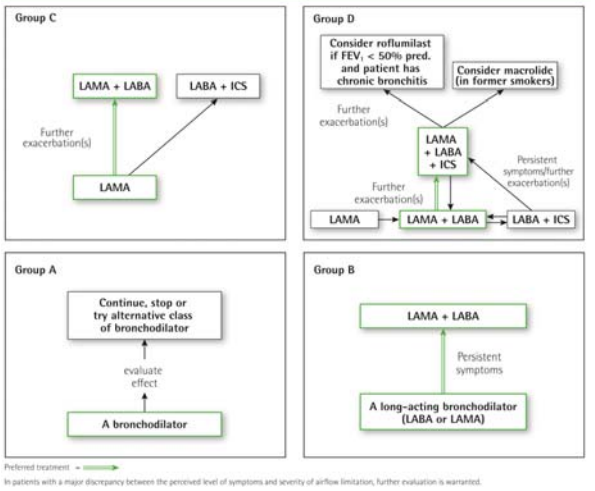
Pharmacologic Treatment Algorithms by GOLD Grade

Figure 4.1. Pharmacologic treatment algorithms by GOLD Grade [highlighted boxes and arrows indicate preferred treatment pathways]



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COPD Pharmacotherapy: Short-Acting Beta-Agonist (SABA)

Place in Therapy:

Treatment of acute bronchospasm and for bronchospasm prophylaxis

Adverse Effects:

Tachycardia, tremor, excitability, headache, throat irritation

Costs:

Inhaled Aerosol: Around $60/month

Nebulizer Solution: $15-$250

Generic Name	Brand Name	How Supplied
Inhaled Aerosol		
Albuterol Sulfate	**Proair HFA** **Proventil HFA** **Ventolin HFA**	90mcg
Levalbuterol Tartrate	**Xopenex HFA**	45mcg
Nebulizer Solution		
Albuterol Sulfate	**Accuneb** **Proventil** **Generic**	0.63mg/3mL (0.021%) 1.25mg/3mL (0.042%) 2.5mg/3mL (0.083%) 5mg/1mL (0.5%)
Levalbuterol HCl	**Xopenex** **Generic**	0.31mg/3mL 0.63mg/3mL 1.25mg/0.5mL 1.25mg/3mL
Metaproterenol Sulfate	**Generic**	0.4% 0.6%

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/.

COPD Pharmacotherapy: Long-Acting Beta-Agonists (LABA)

Place in Therapy:

- Maintenance treatment of bronchoconstriction associated with COPD
- Reduce Exacerbations and treat dyspnea with COPD
  - Formoterol and Salmeterol (BID dosing) – **significantly** improves FEV1 and lung volumes, dyspnea, reduce exacerbations and reduce number of hospitalizations
  - Indacaterol (QD dosing) – improves breathlessness and reduces exacerbations; May cause cough
  - Oladaterol and Vilanterol (QD dosing) – improves lung function and symptoms

Adverse Effects:

- Sinus Tachycardia, tremor, hypokalemia (especially if member is also on a thiazide diuretic),

Costs: $200 - >$500/month

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/.

COPD Pharmacotherapy: Long-Acting Beta-Agonists (LABA)

Generic Name	Brand Name	How Supplied	Usual Dosage
Inhalation Powder / Inhalers			
Formoterol Fumarate	**Foradil Aerolizer** Do Not Shake	12mcg inhalation powder (60)	1 inhalation BID
Indacaterol Maleate	**Arcapta Neohaler** Do Not Shake Use new inhaler with each RX	75mcg inhalation powder (30)	1 inhalation daily
Olodaterol	**Striverdi Respimat** Prime if no use x 3 days Discard after 90-days	2.5mcg inhalation aerosol (60)	1 inhalation daily
Salmeterol	**Serevent Diskus** Do Not Shake	50mcg inhalation powder (60)	1 inhalation BID
Nebulizer Solutions			
Arformoterol Tartrate	**Brovana** Do not mix	15mcg/2mL single-dose vial	15mcg SVN Q12h *SVN over 5-10 minutes*
Formoterol Fumarate	**Perforomist** Jet nebulization	20mcg/2mL	20mcg SVN BID

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/.

COPD Pharmacotherapy: Antimuscarinic Antagonists

Place in Therapy:

- **Long-Acting**: Provide long-term maintenance of bronchospasm associated with COPD, improve symptoms (tiotropium), reduce exacerbations (and thus hospitalizations).
- **Short-Acting**: Short acting muscarinic antagonists provided small benefits over SABA in terms of lung function, health status and requirement for oral steroids. SAMA requires multiple daily dosing, not used as often as LAMA.

Adverse Effects:

- Anticholinergic effects - primarily dry mouth. May cause urinary retention, increased intraocular pressure, but incident rates are low.

Costs: $80 - >$500

Generic Name	Brand Name	How Supplied
Short-Acting Inhaled Antimuscarinics (SAMA)		
Ipratropium (aerosol)	**Atrovent HFA**	17mcg/actuation
Ipratropium (nebulizer)	**Atrovent Solution** Generic	0.2% solution for inhalation
Long-Acting Inhaled Antimuscarinics (LAMA)		
Tiotropium	**Spiriva Handihaler** Do not swallow capsule Do not shake	18mcg inhalation powder
Tiotropium	**Spiriva Respimat** Do not swallow capsule Discard after 3 months	2.5mcg inhalation aerosol
Aclidinium	**Tudorza Pressair** Do not shake Discard after 45 days	400mcg inhalation powder
Umeclidinium	**Incruse Ellipta** Do not shake Discard after 30 sprays	62.5mcg inhalation powder

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/.

COPD Pharmacotherapy: Inhaled Corticosteroids (ICS)

Place in Therapy:

- Suppression of inflammation and immune response
- Monotherapy does not modify long-term decline in FEV1 nor mortality for COPD patients
- Combination therapy with LABA and/or LAMA show improved efficacy over monotherapy

Adverse Effects:

- Candidiasis, hoarse voice, skin bruising, pneumonia.
- Observational studies suggest increase risk of hyperglycemia, cataracts and mycobacterial infection (including TB).
- Varied results regarding risk of fractures and decreases in bone density with randomized controlled trials.

Costs: $150 - >$300

- **Oral glucocorticoids** play a role in acute management of exacerbations but have no role in chronic daily treatment of COPD
- Several side effects, including steroid myopathy can contribute to muscle weakness and respiratory failure in those with severe COPD

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. https://pharmacist.therapeuticresearch.com/Content/Articles/PL/2018/Jan/Re-Evaluate-Blood-Pressure-Goals-With-New-Hypertension-Guidelines
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: http://www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). http://goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/.

COPD Pharmacotherapy: Inhaled Corticosteroids (ICS)

Generic Name	Brand Name	How Supplied
Inhaled Aerosol		
Beclomethasone Dipropionate	**QVAR** **QVAR Redihaler** Breath Activated	40, 80mcg
Ciclesonide	**Alvesco** Not indicated for COPD	80, 160mcg
Fluticasone Propionate	**Flovent HFA** Prime with 1st use (4 sprays) and if no use x 7 days (1 spray) Shake well	44, 110, 220mcg
Mometasone	**Asmanex HFA** Prime with 1st use (4 sprays). Repeat priming if no use x 5 days Shake well	100mcg, 200mcg

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com

COPD Pharmacotherapy: Inhaled Corticosteroids (ICS)

Generic Name	Brand Name	How Supplied
Inhalation Powder		
Budesonide	**Pulmicort Flexhaler** Prime per instructions that come with device Do Not Shake	90mcg, 180mcg
Fluticasone Propionate	**Flovent Diskus** Discard after 6 weeks from pouch opening (50mcg dose) Discard 2 months from foil pouch opening (100 and 250mcg dose)	50, 100, 250mcg
Fluticasone Furoate	**Arnuity Ellipta** Discard after 30 Sprays	100, 200mcg
Mometasone Furoate	**Asmanex Twisthaler** Discard after 45 days of foil pouch opening	110, 220mcg
Nebulizer Solution (SVN)		
Budesonide	Pulmicort Respules Generic	0.25mg/2mL, 0.5mg/2mL, 1mg/2mL

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com

COPD Pharmacotherapy: Combination Therapy

Long-Acting Beta-Agonist + Inhaled Corticosteroid:

- Combination is more effective than the individual components in improving lung function, health status and reducing exacerbations in patients with moderate to very severe COPD

Long-Acting Beta-Agonist + Inhaled Corticosteroid + Long-Acting Anti-Muscarinic:

- Triple inhaled therapy more effective than ICS/LABA or LAMA monotherapy in improving lung function, health status and reducing exacerbations
- More evidence is needed to draw conclusions on the benefits of triple therapy compared to LABA/LAMA

Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/.

COPD Pharmacotherapy: Combined Long-Acting Beta-Agonist and Inhaled Corticosteroid (LABA + ICS)

Generic Name	Brand Name	How Supplied	Usual Dosage
Inhalation Aerosols			
Formoterol Fumarate + Mometasone Furoate	**Dulera** Prime if no use x 5 days	100-5mcg or 200-5mcg inhalation aerosol (120)	2 inhalations BID
Formoterol Fumarate + Budesonide	**Symbicort** Prime if no use x 7 days or dropped Discard after 90-days	80-4.5mcg or 160-4.5mcg Inhalation aerosol (120)	2 inhalations BID
Salmeterol Xinafoate + Fluticasone Propionate	**Advair HFA** Prime if no use x 28 days Shake well	45-21, 115-21, 230-21mcg Inhalation aerosol (120)	2 inhalations BID
Inhalation Powders			
Salmeterol + Fluticasone Propionate	**Advair Diskus** Discard after 30-days Do Not Shake	100-50, 250-50, 500-50mcg Inhalation powder (60)	1 inhalation BID
Vilanterol + Fluticasone Furoate	**Breo Ellipta** Discard after 30-days Do Not Shake	100-25mcg Inhalation powder (30)	1 inhalation daily
Salmeterol + Fluticasone Propionate	**AirDuo RespiClick** Discard after 30-days Do Not Shake Generic	55-14, 113-14, 232-14mcg Inhalation powder (60)	1 inhalation BID

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/

COPD Pharmacotherapy: Combined Long-Acting Beta-Agonist and Antimuscarinics (LABA + LAMA)

Generic Name	Brand Name	How Supplied	Usual Dosage
Formoterol + Glycopyrrolate	**Bevespi Aerosphere** Prime with 1st use (4 sprays) and if no use x 7 days (2 sprays) Shake well	9mcg-4.8mcg inhalation aerosol	2 inhalations BID
Indacterol + Glycopyrrolate	**Utibron Neohaler** Do Not Swallow Capsule – insert capsule into Neohaler chamber	27.5mcg -15.6mcg Inhalation powder	1 capsule BID
Olodaterol + Tiotropium	**Stolito Respimat** Prime with 1st use and after 21 days of no use - actuate until aerosol cloud is visible, then repeat 3 more times. Discard after 3 months	2.5mcg-2.5mcg per inhalation spray	2 inhalations qd
Vilanterol + Umeclidinium	**Anoro Ellipta** Do Not Shake Discard after 30-sprays	62.5-25mcg inhalation powder (30)	1 inhalation daily

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/

COPD Pharmacotherapy: Miscellaneous Medications

Phosphodiesterase-4 Inhibitor

- **Place in Therapy:**
  - Exact mechanism still unknown. Decreases inflammatory activity, affecting the actions of pro-inflammatory cells including neutrophils, leukocytes, T-lymphocytes, monocytes, macrophages and fibroblasts
  - Medication has no effects on bronchodilation
  - **Roflumilast (Daliresp)** 250, 500mg Tablet; QD dosing
- **Adverse Effects**:
  - Weight loss, diarrhea, headache. May increase suicidal ideation.
- **Costs: <$300 for 30 days**

Methylxanthines

- **Place in Therapy**:
  - Relaxation of smooth muscle of bronchial airways and pulmonary blood vessels. Exact mechanism still unknown; does possess anti-inflammatory and immunomodulary effects.
  - **Theophylline (various strengths)**
- **Adverse Effects:**
  - Nausea, headache, insomnia, tremors, restlessness
- **Additional Information**:
  - Significant drug interactions and dose-related toxicities. Tobacco, marijuana and "low-carb" diets can alter medication clearance. Low cost, Many dosage strengths and forms

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/

COPD Pharmacotherapy: Miscellaneous Medications

Mucolytics and Antioxidants

- **Place in Therapy:**
  - May reduce the risk of exacerbations in select populations
- **N-Acetylcysteine**
  - Adjuvant mucolytic therapy
- **Carbocysteine**
  - "Medical Food" antioxidant

Antibiotics

- **Place in Therapy:**
  - Some antibiotics, including Azithromycin (250mg/d or 500mg TIW) or Erythromycin (500mg bid) may reduce exacerbation rate
  - No data beyond 1 year showing the safety or efficacy of chronic antibiotic use for COPD exacerbation prophylaxis.
  - Increase in bacterial resistance noted, along with common side effects associated with each antibiotic.

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/

Barriers to Care: Inhaled Delivery Systems

Education and training in inhaler device techniques is imperative to proper administration and efficacy

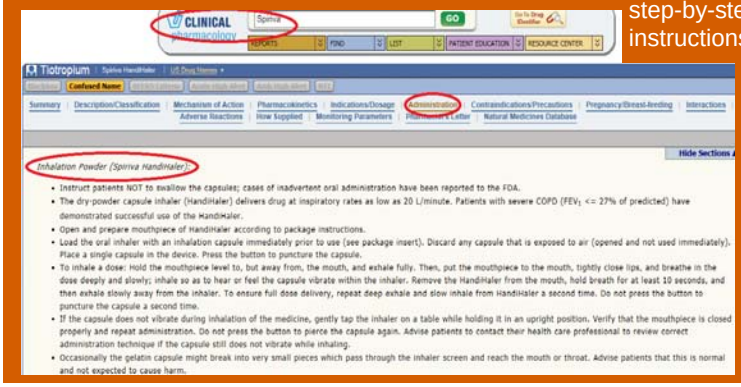
Education Improves Inhalation

- **Use of placebo devices and repetitive demonstration**
- **Use of instructional videos**
- **Teach-back approach**
- **Assessment of inhaler technique with each office/pharmacy visit**

- Clinical Resource, Correct Use of Inhalers. Pharmacist's Letter. January 2017. pharmacist.therapeuticresearch.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd

Instructions for Inhaler Devices

Clinical Pharmacology offers step-by-step administration instructions.



- Instructional videos on inhaler device use are available on most manufacturers' websites and on the CDC website
  - www.cdc.gov/asthma/inhaler_video/default.htm

Spiriva. Clinical Pharmacology [Internet]. Tampa (FL): Elsevier. 2018 Copyright. [8/2018]. Available from: www.clinicalpharmacology.com

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Instructions for Inhaler Devices

National Jewish Treatment Program

Watch instructional videos that demonstrate how to properly use inhaled medications for asthma and other lung diseases.

- Metered-Dose Inhaler (*Open Mouth* Technique)
- Aerochamber®
- Autohaler®
- Diskus®
- Flexhaler®
- Neohaler®
- Twisthaler®
- Using a Nebulizer with a Mask
- Metered-Dose Inhaler (*Closed Mouth* Technique)
- Aerochamber® with Mask
- Aerolizer®
- Ellipta™
- Handihaler®
- Pressair™
- Using a Nebulizer
- Using a Respimat

www.nationaljewish.org/treatment-programs/medications/asthma-medications/devices/instructional-videos

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Barriers to Care: Cost

Be mindful of the member's benefits

- Few generic medications are commercially available for the treatment of COPD
- Encourage open discussion with member and prescribing physician regarding affordability issues
- Average monthly cash price for branded COPD medications, including and combination therapy, Drug Cost: range from about $250-$500
- Mail Order usually provides a 3-month supply at a lower average monthly cost
- Salmeterol + Fluticasone Propionate (AirDuo) is the only long-acting combination product commercially available as a generic
  Drug Cost: **cash price about $100 for 30 days**
- Manufacturer Coupons and Mail-in rebate options may be available

- Clinical Resource, Inhalers for COPD. Pharmacist's Letter. January 2018. pharmacist.therapeuticresearch.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd

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Non-pharmacological Treatment

- Education and self-management
- End of life and palliative care
- Tobacco cessation
- Nutritional support
- Pulmonary rehabilitation programs
- Vaccination
- Exercise training
- Oxygen therapy

2017 Gold Teaching Slide Set: Slide 81, goldcopd.org/gold-teaching-slide-set/, used for educational purposes Polling Question #5

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Non-pharmacological Treatment

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)**.

2017 Gold Teaching Slide Set: Slide 84, goldcopd.org/gold-teaching-slide-set/, used for educational purposes

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My COPD Action Plan

AMERICAN LUNG ASSOCIATION.

It is recommended that patients and physicians/healthcare providers complete this action plan together. This plan should be discussed at each physician visit and updated as needed.

The green, yellow and red zones show symptoms of COPD. The list of symptoms is not comprehensive, and you may experience other symptoms. In the "Actions" column, your healthcare provider will recommend actions for you to take based on your symptoms by checking the appropriate boxes. Your healthcare provider may write down other actions in addition to those listed here.

Green Zone: I am doing well today	Actions
• Usual activity and exercise level	☐ Take daily medicines
• Usual amounts of cough and phlegm/mucus	☐ Use oxygen as prescribed
• Sleep well at night	☐ Continue regular exercise/diet plan
• Appetite is good	☐ At all times avoid cigarette smoke, inhaled irritants*
	☐ _____

Yellow Zone: I am having a bad day or a COPD flare	Actions
• More breathless than usual	☐ Continue daily medication
• I have less energy for my daily activities	☐ Use quick relief inhaler every ____ hours
• Increased or thicker phlegm/mucus	☐ Start an oral corticosteroid (specify name, dose, and duration)
• Using quick relief inhaler/nebulizer more often	_____
• Swelling of ankles more than usual	☐ Start an antibiotic (specify name, dose, and duration)
• More coughing than usual	_____
• I feel like I have a "chest cold"	☐ Use oxygen as prescribed
• Poor sleep and my symptoms woke me up	☐ Get plenty of rest
• My appetite is not good	☐ Use pursed lip breathing
• My medicine is not helping	☐ At all times avoid cigarette smoke, inhaled irritants*
	☐ Call provider immediately if symptoms don't improve*
	☐ _____

Red Zone: I need urgent medical care	Actions
• Severe shortness of breath even at rest	☐ Call 911 or seek medical care immediately*
• Not able to do any activity because of breathing	☐ While getting help, immediately do the following:
• Not able to sleep because of breathing	☐ _____
• Fever or shaking chills	
• Feeling confused or very drowsy	
• Chest pains	
• Coughing up blood	

American Heart Lung: www.lung.org/assets/documents/copd/copd-action-plan.pdf, used for educational purposes

Proprietary and Confidential. Do not distribute. 36

Non-pharmacological Treatment

Table 4.8. Non-pharmacologic management of COPD

Patient group	Essential	Recommended	Depending on local guidelines
A	Smoking cessation (can include pharmacologic treatment)	Physical activity	Flu vaccination Pneumococcal vaccination
B-D	Smoking cessation (can include pharmacologic treatment) Pulmonary rehabilitation	Physical activity	Flu vaccination Pneumococcal vaccination

2017 Gold Teaching Slide Set: Slide 79,, goldcopd.org/gold-teaching-slide-set/, used for educational purposes

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COPD Some Common Comorbidities

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

2017 Gold Teaching Slide Set: Slide 107, goldcopd.org/gold-teaching-slide-set/, used for educational purposes

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Prevalence of Mental Health Issues in COPD

Prevalence estimates vary widely

- Presumption is because of variability in degree of COPD and measurement tools
- Depression/anxiety are important comorbidities and are often under-diagnosed
- Depression/anxiety are associated with poor health status and prognosis[1]
- In stable COPD, the prevalence of:
  - Clinical depression ranges between 10% and 42%,
  - Anxiety ranges between 10% and 19%[2]

[1] 2017 Gold Teaching Slide Set: Slide 106, goldcopd.org/gold-teaching-slide-set/, used for educational purposes
[2] NCBI, www.ncbi.nlm.nih.gov/pmc/articles/PMC4523084, mechanism of potential association with COPD

Mental Health Issues in COPD

Variables Associated with Depression and Anxiety in Patients with COPD

Physical disability

Long-term oxygen therapy

Low body mass index

Severe dyspnea

Percentage of predicted FEV_1 < 50%

Poor quality of life

Presence of comorbidity

Living alone

Female gender

Current smoking

Low social class status

2018 GOLD Report: goldcopd.org/wp-content/uploads/2016/04/GOLD-2018-WMS.pdf

Impact of Anxiety and Depression

- Increased fatigue and disability as well as shortness of breath (SOB)
- Higher medical costs including higher all cause admissions
- Decreased physical functioning
- Lowered Quality of Life
- Higher mortality

UpToDate: Screening for depression in adults, www.uptodate.com/contents/screening-for-depression-in-adults?search=depression&source=search_result&selectedTitle=5~150&usage_type=default&display_rank=5

Treatment Options – Pharmacological Limited Studies in This Patient Population

Buspirone
- Some efficacy demonstrated

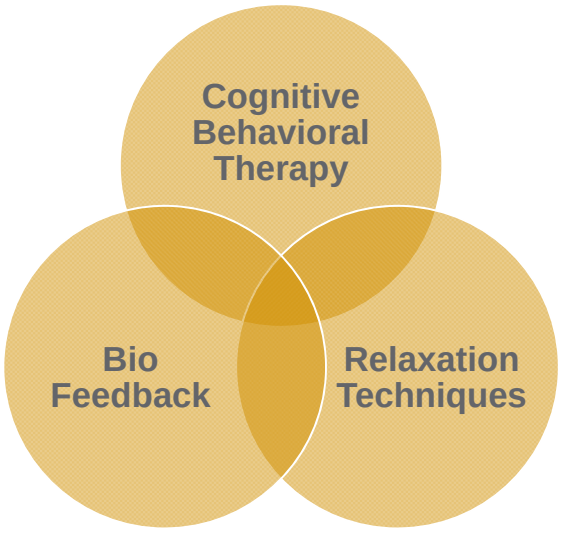
Nortriptyline
- Effective

Citalopram and other SSRI
- Compared to placebo, more effective in patients with mild to moderate COPD

Benzodiazepines
- Generally not recommended because of risk of dependence and respiratory suppression

- Clinical Resource, Correct Use of Inhalers. Pharmacist's Letter. January 2017. pharmacist.therapeuticresearch.com
- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2017 report). goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd

Treatment Options – Non-pharmacological



Care Management of COPD

Right Provider

- *PCP*
- *Pulmonologist*
- *Pulmonary Rehab Program*
- *Behavioral Health*

Right Care

- *Identifying Cause of COPD*
- *Identifying and Monitoring Symptoms*
- *Having COPD Action Plan*
- *Immunizations*
- *Palliative Care/Hospice*
- Oxygen

Right Medications

- *LABA*
- *LAMA*
- *SABA*
- *Inhaled Corticosteroids (ICS)*
- *Combined Therapy*
- *Monitoring Side Effects*

Right Lifestyle

- *Smoking Cessation*
- *Limit Exposure to Triggers*
- *Nutrition*
- *Exercise*
- *Achieve and Maintain Healthy Weight*
- *Avoid ETOH Abuse*

Case Study

Mrs. J is a 62 year old female, previous smoker recently diagnosed with COPD.

Mrs. J is doing well and has been compliant with her care. She has had no hospitalizations or ER admissions. She completed pulmonary rehabilitation program. She is currently engaged in a telephonic case management program with the long term goal of remaining tobacco free.

References

Clinical Pharmacology web-site, www.clinicalpharmacology.com

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Weiss, Scott, Chronic obstructive pulmonary disease: Risk factors and risk reduction, www.uptodate.com/contents /chronic-obstructive-pulmonary-disease-risk-factors-and-risk-reduction, July 2018, Access ed, August 23, 2018

Williams, John and Nieuwsma, Jason, Screening for depression in adults, www.uptodate.com/contents/screening-for-depression-in-adults?search=depression&source=search_result&selectedTitle=5~150&usage_type=default &display_rank=5, July 2018, Accessed, August 23, 2018

Yohannes, Abebaw and Alexopoulos George, Depression and Anxiety in patients with COPD, www.ncbi.nlm.nih.gov/pmc/articles/PMC4523084/, Sept 23, 2014, Accessed Sept 11, 2018

APPENDIX

Instructional Videos for Inhaler Devices for COPD

CDC Know How to Use Your Asthma Inhaler:
www.cdc.gov/asthma/inhaler_video/

Instructional Videos:
www.nationaljewish.org/treatment-programs/medications/asthma-medications/devices/instructional-videos

Case Management Resources

American Lung Association/ My COPD Action Plan:
www.lung.org/assets/documents/copd/copd-action-plan.pdf

mMRC (Modified Medical Research Council) Dyspnea Scale:
www.mdcalc.com/mmrc-modified-medical-research-council-dyspnea-scale

ATS, COPD Assessment Test:
www.thoracic.org/members/assemblies/assemblies/srn/questionaires/copd.php

GOLD, 2018:
goldcopd.org/wp-content/uploads/ 2016/04/GOLD-2018-WMS.pdf

