






Asthma & COPD in Older Adults

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Objectives

-  Define asthma & COPD; causes and risk factors for each
-  Recognize signs and symptoms of COPD
-  Identify strategies for management of COPD
-  Identify pharmacologic treatment options, including those for exacerbations
-  Review inhaler technique

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Asthma vs COPD

<p>Asthma</p> <ul style="list-style-type: none"> ▶ Onset usually during childhood ▶ Symptoms vary from day to day ▶ Symptoms worse at night/early morning ▶ Allergy, rhinitis and/or eczema also present ▶ Family history of asthma ▶ Shortness of breath with exercise ▶ Largely REVERSIBLE airflow limitation 	<p>COPD</p> <ul style="list-style-type: none"> ▶ Onset in middle age or later ▶ Symptoms slowly progress ▶ Shortness of breath with ▶ History of tobacco smoking or other risk factors ▶ Shortness of breath with exercise ▶ Largely IRREVERSIBLE airflow limitation
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Exacerbations of COPD

-  Acute increase in usual respiratory symptoms
-  Change in sputum is often the 1st sign Increase in amount and purulence
-  Can come on very quickly - within hours to days
-  Other symptoms such as confusion and decreased O2 level
-  Early identification and treatment is important to reduce risk for hospitalization and mortality







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COPD Risk Factors

Smoking	Secondhand smoke	Poor air quality
Dusts	Chemicals	Fumes
Age	Genetics	Lung development

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Clinical Presentation of COPD

-  **Dyspnea - hallmark symptom**
-  **Wheezing**
-  **Chest tightness**
-  **Fatigue**
-  **Cough with or without sputum production**
-  **Decreased exercise tolerance**

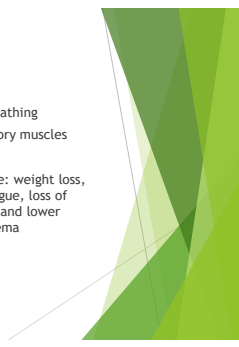
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Physical Findings of COPD

- ▶ Diminished breath sounds
- ▶ Increased respiratory rate
- ▶ Prolonged expiration, chest tightness, and wheezing
- ▶ Barrel chest
- ▶ Anxiety
- ▶ Depression
- ▶ Pursed lip breathing
- ▶ Use of accessory muscles
- ▶ Hypoxemia
- ▶ Severe disease: weight loss, anorexia, fatigue, loss of muscle mass, and lower extremity edema

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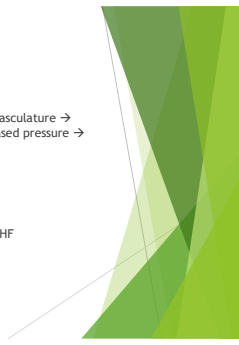


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Complications of COPD

- ▶ Right-sided heart failure
 - ▶ Chronic hypoxia → vasoconstricts the pulmonary vasculature → pulmonary hypertension → pumping against increased pressure → right-sided hypertrophy → failure
- ▶ Polycythemia
 - ▶ Hypoxia → increased production of RBCs
- ▶ Respiratory failure
 - ▶ Caused by COPD exacerbation, pneumonia, PE, or HF

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COPD Management



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Goals of Treatment for COPD

-  Reduce symptoms
-  Improve exercise tolerance and QOL
-  Decrease risk and severity of exacerbations/complications
-  Minimize progression
-  Reduce mortality

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Non-pharmacological Treatment

-  Smoking cessation!!!!!!
-  Avoid triggers
-  Oxygen
-  Pulmonary rehab
-  Immunizations

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Respiratory Treatments

SINGLE-ACTING BETA₂-AGONIST BRONCHODILATORS

LONG-ACTING BETA₂-AGONIST BRONCHODILATORS

INHALED CORTICOSTEROIDS

MUSCARINIC ANTAGONISTS (ANTICHOLINERGIC)

COMBINATION MEDICATIONS

BIOLOGICS

BRONCHIAL THERMOPLASTY

PDE4 INHIBITORS

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Inhaled Treatment for Asthma and COPD

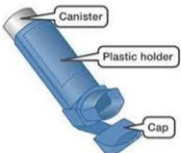
Short-acting bronchodilators <small>(rescue inhaler)</small> <ul style="list-style-type: none"> Open your airways. Quick relief for sudden attacks. 	Inhaled corticosteroids. <ul style="list-style-type: none"> Reduce inflammation. Taken daily to prevent asthma attacks.
Long-acting bronchodilators. <ul style="list-style-type: none"> Open your airways. Taken daily to control COPD or asthma. 	Combination. <ul style="list-style-type: none"> Multiple medications in one inhaler. Taken daily.
Types of Inhalers	
Metered-dose. <ul style="list-style-type: none"> Puffs dose of medicine when you press on it. 	Dry powder. <ul style="list-style-type: none"> Delivers powder medicine when you inhale.
	Soft mist. <ul style="list-style-type: none"> Sprays dose of medicine when you press on it.

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Metered-Dose Inhalers (MDIs)

- MDIs consist of a metal canister that holds liquid medication with a propellant under pressure and a plastic holder that helps to release the medication.
- When the user presses the canister, the medication particles are propelled toward the throat to be inhaled.



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<https://youtu.be/gFGM-8X98zs7t-23>

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Key Points - Priming



- Prime the inhaler if it is brand new or if it has not been used in several days.
- Some inhalers also require priming if they have been dropped.
- Each inhaler that requires priming has specific instructions on how often to do it.
 - Soft-mist inhalers (SMIs), for example, should be primed if they have not been used for 3 days or more.
 - Dry powder inhalers (DPIs), however, should not be primed since full doses are loaded once you hear it click.^{7,9}


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Table 1. How to Use an MDI Closed Mouth	
1	Remove the cap
2	Shake the inhaler well for 5 seconds
3	Hold the inhaler firmly by placing the index finger on top of the canister and the thumb on the bottom of the mouthpiece
4	Sit straight or stand up
5	Tilt head back slightly
6	Exhale away from the inhaler
7	Put the inhaler in the mouth. Press the inhaler and start breathing in at the same time SLOWLY and DEEPLY for 3-4 seconds
8	Hold breath for 10 seconds and exhale slowly through mouth and nose
9	Wait 30 seconds or longer if another dose is needed

MDI: metered-dose inhaler. Source: Reference 9.

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MDI Spacer



- Medication is propelled from an MDI at about 60 miles an hour, allowing medication to be lost in the air, stuck inside the mouth or back of the throat, or swallowed.
- The goal of the MDI is to have the medication delivered deep into the lungs, which requires coordination and timing.
- The spacer is a device that modifies the complicated administration technique of an MDI and maximizes the amount of medication reaching the lungs.
- Anyone who has difficulty with the complicated administration steps of an MDI should use a spacer to maximize drug delivery.

<https://youtu.be/cjv7WnEBI>

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Table 2. How to Use an MDI With a Spacer	
MDI With Mask	MDI With Mouthpiece
1 Remove the cap from the inhaler	
2 Shake the inhaler well for 5 seconds	
3 Insert the inhaler into the adapter section of the spacer. Ensure proper fit	
4 Sit straight or stand up	
5 Place the mask over the nose and mouth. Ensure a good seal	Place the mouthpiece into the mouth and close the lips around it. Ensure a good seal
6 Press the canister down on the inhaler	
7 Breathe in and out NORMALLY for about 6 breaths	Breathe out gently and press the MDI at the beginning of a slow inhalation. Breathe in SLOWLY and DEEPLY for a full breath
8 Remove the mask from the face	Hold for 10 seconds
9 Wait 1 minute or longer if another dose is needed	

MDI: metered-dose inhaler. Source: Reference 9, 10.


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Dry Powder Inhalers (DPIs)

- Unlike MDIs, where the medication is propelled into the lungs, DPIs require the user to take a fast, deep breath to activate the medication.
- DPIs come in multiple shapes, including the Diskus, Twisthaler, Flexhaler, and Ellipta.
- The DPIs each have a unique way of opening the device and activating the dose, however all require the patient to exhale away from the inhaler, place the mouthpiece in the mouth, take a quick deep breath, and hold the breath for 10 seconds.

Some examples of dry powder inhaler devices include:

- Twisthaler®
- Flexhaler®
- Diskus®
- HandiHaler®
- Ellipta®
- Breezhaler®



<https://www.trelegy.com/using-trelegy/how-to-use-trelegy/>

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	Diskus	Ellipta	Twisthaler	Flexhaler
1	Hold the inhaler in both hands. Open the inhaler by using the thumb grip, slide until you hear a click and the mouthpiece is exposed	Check the dose counter for accuracy	Hold the inhaler straight up. Rotate counterclockwise to open	Hold the inhaler straight up. Rotate the cover and remove it
2	Hold the inhaler horizontally, like a hamburger	Slide open the mouthpiece cover until there is a click	Lift the cap to load the dose. Ensure the indented arrow located directly above the base is in line with the dose counter	Rotate the brown grip in one direction. Rotate the grip completely back in the other direction until there is a click
3	Slide the tab downward until you hear a click	Hold the inhaler horizontally		
4	Exhale away from the inhaler			
5	Place the mouthpiece in the mouth and take a QUICK, DEEP breath			
6	Hold the breath 10 seconds			
7	Wash out mouth if using a corticosteroid inhaler			

DPI: dry powder inhaler. Source: Reference 13-16.

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Key Points – Dose Counting

Don't let inhalers run out – check the dose counter



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Soft Mist Inhaler (SMI)

- One of the newer drug-delivery devices is the soft-mist inhaler (SMI), Respimat.
- SMIs produce a mist with a smaller particle size, lower velocity, and longer duration of aerosol cloud, which means there is improved coordination of inhalation with actuation and higher lung deposition, compared with MDIs.
- Remember the acronym "TOP"
 - T = Turn
 - O = Open
 - P = Press



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Table 4. How to Use a Respimat SMI

1	Follow assembly instructions prior to first use
2	Turn the transparent base in the direction of the arrow until hearing a click
3	Open the cap and hear a click
4	Sit straight or stand up
5	Tilt head back slightly
6	Exhale away from the inhaler
7	Place Respimat in the mouth, start taking a SLOW, DEEP breath, and press the dose-release button at the same time
8	Hold breath for 10 seconds

SMI: soft-mist inhaler. Source: Reference 20, 21.

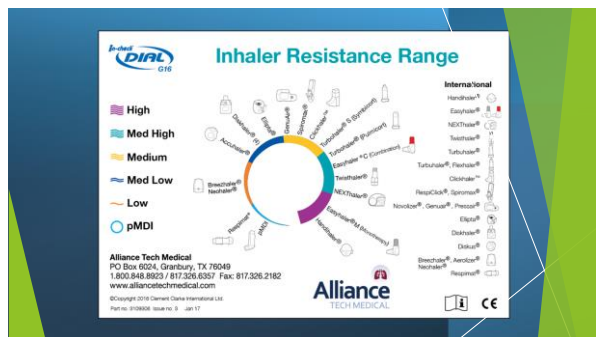
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Assessing Inhaler Technique

In-Check Dial simulates the resistance of DPI and MDI inhaler devices.



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Bronchodilators- Short-acting Beta 2 Agonist (SABA)

- ▶ Used for PRN for intermittent symptoms
- ▶ Adverse Effects:
 - ▶ Hand Tremor
 - ▶ Nervousness
 - ▶ Tachycardia
 - ▶ Palpitations

Short-acting beta ₂ -agonist (SABA)	Typical Dosing
Albuterol (Proventil® HFA, Ventolin® HFA; ProAir HFA, Digihaler or RespiClick®)	MDI: 1-2 puff every 4-6 hours Neb: 2.5 mg 3-4 times daily
Levalbuterol (Xopenex® HFA, generic)	MDI: 2 puffs every 4-6 hours Neb: 0.31, 0.63 or 1.25 mg every 6-8 hours

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Bronchodilators- Short-acting Antimuscarinics (SAMA)

- ▶ Used for PRN for intermittent symptoms
- ▶ Adverse Effects:
 - ▶ Dry mouth
 - ▶ Nausea
 - ▶ Bitter/metallic taste
 - ▶ Blurred vision

Short-acting antimuscarinics (SAMA)	Typical dosing
Ipratropium bromide (Atrovent® HFA)	MDI: 2 puffs 3-4 times daily Neb: 0.5 mg 3-4 times daily
Combination Products (SABA/SAMA)	Typical dosing
Ipratropium/albuterol (Combivent Respimat®)	1 inhalation 4 times daily Neb: 0.5/2.5mg 3-4 times daily; up to every 4 hours PRN

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Bronchodilators- Long-acting Beta 2 Agonist (LABA)

- ▶ More convenient and effective at symptom management
- ▶ Improve lung function and reduce exacerbation risk
- ▶ Adverse Effects:
 - ▶ Hand Tremor
 - ▶ Nervousness
 - ▶ Tachycardia
 - ▶ Palpitations

LABA	Typical Dosing
Arformoterol (Brovana [®])	15 mcg neb twice daily
Formoterol (Perforomist [®])	Neb: 20 mcg every 12 hours
Indacaterol (Arcapta Neohaler [®])	1 capsule (75 mcg) inhaled once daily
Olodaterol (Striverdi Respimat [®])	2 puffs (2.5 mcg each) once daily
Salmeterol (Serevent Diskus [®])	1 puff (50 mcg) every 12 hrs

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Bronchodilators- Long-acting Antimuscarinic (LAMA)

- ▶ Symptom control and decrease exacerbations
 - ▶ LAMA > LABA for ↓ exacerbations
- ▶ Adverse effects:
 - ▶ Dry mouth
 - ▶ Nausea
 - ▶ Bitter/metallic taste
 - ▶ Blurred vision

LAMA	Typical Dosing
Aclidinium (Tudorza Pressair [®])	15 mcg neb twice daily
Glycopyrrolate (Seebri Neohaler [®])	1 capsule (15.6 mcg) inhaled twice daily
Revefenacin (Yupelri [®]) neb	1 vial (175 mcg) inhaled once daily
Tiotropium (Spiriva Handihaler [®] , Spiriva Respimat [®])	H: 1 capsule inhaled (18 mcg) once daily R: 2 inhalations (2.5 mcg each) once daily
Umeclidinium (Incruse Ellipta [®])	1 inhalation (62.5 mcg) once daily

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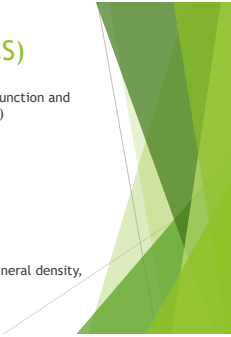
Bronchodilator Combination- LAMA/LABA

LABA/LAMA	Typical Dosing
Aclidinium/formoterol (Duaklir Pressair [®])	1 inhalation (400mcg/12mcg) twice daily
Glycopyrrolate/indacaterol (Utibron Neohaler [®])	1 capsule (15.6/27.5 mcg) inhaled twice daily
Glycopyrrolate/formoterol (Bevespi Aerosphere MDI [®])	2 inhalations (9 mcg/4.8 mcg each) twice daily
Tiotropium/olodaterol (Stiolto Respimat [®])	2 inhalations (2.5/2.5mcg each) once daily
Umeclidinium/vilanterol (Anoro Ellipta [®])	1 inhalation (62.5/25 mcg) once daily

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Inhaled Corticosteroids (ICS)

- ▶ Used in combination with LABAs to improve lung function and decrease exacerbations (no monotherapy in COPD)
- ▶ Adverse Effects:
 - ▶ **Thrush (rinse mouth after use)**
 - ▶ Sore throat, hoarseness
 - ▶ Increased incident of pneumonia
- ▶ Monitoring Parameters:
 - ▶ Adverse effects
 - ▶ Long-term/high-dose effects (reduced bone mineral density, risk of fractures)

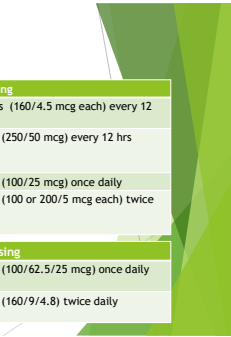


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Inhaled Corticosteroids (ICS) Combinations

ICS/LABA	Typical Dosing
Budesonide/formoterol (Symbicort MDI®)	2 inhalations (160/4.5 mcg each) every 12 hrs
Fluticasone/salmeterol (Advair Diskus®, Wixela Inhub®, Advair MDI®, AirDuo RespiClick®)	1 inhalation (250/50 mcg) every 12 hrs
Fluticasone/vilanterol (Breo Ellipta®)	1 inhalation (100/25 mcg) once daily
Mometasone/formoterol (Dulera MDI®) (off-label use for COPD)	2 inhalation (100 or 200/5 mcg each) twice daily

ICS/LAMA/LABA	Typical Dosing
Fluticasone/umeclidinium/vilanterol (Trelegy Ellipta®)	1 inhalation (100/62.5/25 mcg) once daily
Budesonide/glycopyrrolate/formoterol (Breztri Aerosphere®)	2 inhalation (160/9/4.8) twice daily



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Key Points – Corticosteroids

- Have the resident rinse and spit following inhaled corticosteroid use to avoid sores in the mouth (thrush).



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Nebulizer

- ▶ Liquid is placed in the medication cup on machine
- ▶ Aerosol is created from liquid
- ▶ Aerosol is inhaled by patient through mouth piece or mask
- ▶ Treatment usually take 10-15 minutes

- ▶ Examples:
 - ▶ Ipratropium/albuterol (DuoNeb)
 - ▶ Acclidinium (Tudorza Pressair®)
 - ▶ Arformoterol (Brovana®)
 - ▶ Formoterol (Perforomist®)
 - ▶ Revefenacin (Yupetri®) neb



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Monitoring Parameters

- ▶ Improvement in symptoms
- ▶ Exercise tolerance
- ▶ Incidence of exacerbation
- ▶ Short-acting PRN bronchodilator use
- ▶ Adverse effects



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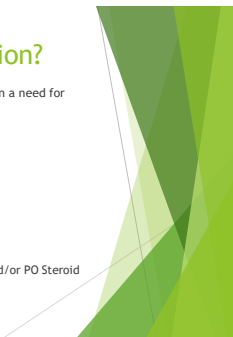
COPD Exacerbation



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What is a COPD Exacerbation?

- ▶ Acute worsening of respiratory symptoms that results in a need for additional therapy
- ▶ **3 Cardinal Symptoms:**
 - ▶ Worsening dyspnea
 - ▶ Increased sputum production
 - ▶ Increased sputum color
- ▶ Classification based on treatment:
 - ▶ Mild: Short-acting bronchodilator
 - ▶ Moderate: Short-acting bronchodilator + Antibiotic and/or PO Steroid
 - ▶ Severe: ER visit and/or hospitalization

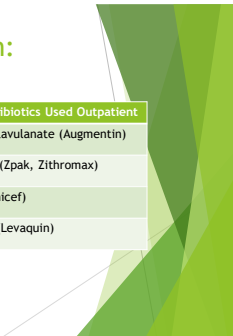


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Treatment of Exacerbation: Antibiotics

- ▶ Used in patients with signs of infections
 - ▶ Increased sputum color PLUS either increased dyspnea or sputum volume/production
- ▶ 5-7 days of treatment

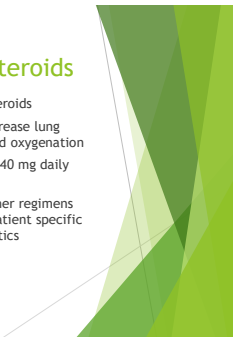
Common Antibiotics Used Outpatient
Amoxicillin/Clavulanate (Augmentin)
Azithromycin (Zpak, Zithromax)
Cefdinir (Omnicef)
Levofloxacin (Levaquin)



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Treatment of Exacerbation: Bronchodilators and Corticosteroids

- ▶ Bronchodilators
 - ▶ Short-acting Beta₂ Agonist with or without a Short-acting Antimuscarinic
 - ▶ Continue long-acting agent as soon as the patient is able
- ▶ Oral Corticosteroids
 - ▶ Used to increase lung function and oxygenation
 - ▶ Prednisone 40 mg daily for 5 days
 - ▶ May see other regimens based on patient specific characteristics



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Key Points

- ▶ Critical to educate patients on proper inhaler use/technique
- ▶ Inhaler technique/adherence should be assessed at each follow-up and prior to changes
- ▶ Smoking cessation is very important to decrease mortality
- ▶ COPD medications only work if they are used properly

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Thank You!!

Questions???

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References

- ▶ 2024 Gold Reports - Global Initiative for Chronic Obstructive Lung Disease. GOLD. (2024, December).
- ▶ Contributor, N. T. (2021, November 19). *How to teach Inhaler Technique*. Nursing Times. Retrieved February 8, 2022, from <https://www.nursingtimes.net/clinical-archive/asthma/how-to-teach-inhaler-technique-26-02-2011/>

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