

Conflict of Interest

- I have no conflicts of interest

Implementation of Best Practices for Asthma Care

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Pharmacy Technician Objectives

- Review the proper technique for various inhaler types.
- Describe the dosage form and proper storage of biologic agents to treat asthma.



Pharmacist Objectives

- Review the proper technique and counseling points for various inhaler types.
- Describe the mechanism of action, dosage form, side effects and proper storage of biologic agents to treat asthma.

Assessment Question

- Which of the following inhalers requires a slow, deep inhalation?
 - Respimat
 - RediHaler
 - RespiClick
 - Inhub



Assessment Question

- Which of the following is true about the storage of biologic medications for asthma?
 - 20°C to 25°C
 - Protect from light
 - 2°C to 8°C thirty minutes prior to injection
 - 50°C to -15 °C

Global Initiative for Asthma (GINA)

- 68.5% of adults with asthma in Illinois have uncontrolled asthma
- 70-80% of patients have poor inhaler technique
- 50% fail to take controller medications as prescribed
- Pharmacists and pharmacy technicians are needed!

https://www.cdc.gov/asthma/asthma_stats/uncontrolled-asthma-adults.htm
https://ginasthma.org/wp-content/uploads/2020/04/GINA-2020-full-report_final_wms.pdf

Patient Case



SM is a 53-year-old admitted to the hospital 2 days ago for an asthma exacerbation.



She is being discharged home today.



You are delivering her medications to her bedside before discharge.



She has some questions for you.

Patient Case- Medications for Home

- Symbicort 80/4.5 mcg (budesonide and formoterol) 2 inhalations bid and prn
- Spiriva (tiotropium) **1.25** mcg 2 inhalations daily
- Fluticasone nasal spray 50 mcg 2 sprays in each nostril daily
- Famotidine 20 mg PO daily
- Montelukast 10 mg PO daily

How do I use this inhaler?

- Purpose
 - Single Maintenance and Reliever Therapy
 - Off-label use**
- Expectations
- Proper use
- Side effects
- Length of therapy
- Days supply
 - Max 72 mcg formoterol/day

Asthma Action Plan with SMART

GREEN ZONE



Asthma Action Plan with SMART

Starting to cough, wheeze or have shortness of breath

Waking up at night

Peak Flow 60-80% personal best

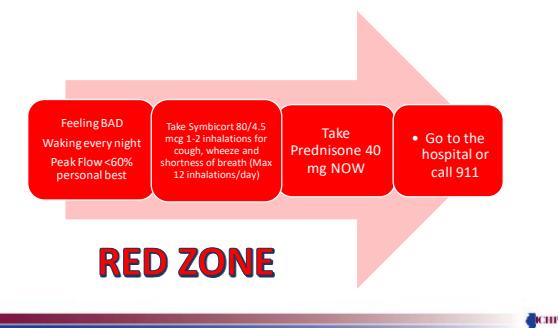
Yellow Zone

Continue Symbicort 80/4.5 mcg 2 inhalations in the morning and night

Start Symbicort 80/4.5 mcg 1-2 inhalations for cough, wheeze and shortness of breath (Max 12 inhalations/day)

Call the office at 312-355-3200 or start prednisone 40 mg by mouth daily for 5 days

Asthma Action Plan with SMART



Transition to Outpatient

- After discharge SM comes into the pharmacy. She has five inhalers with her and is confused.
 - Symbicort (budesonide/formoterol) MDI 80/4.5 mcg
 - Spiriva (tiotropium) Respimat 1.25 mcg
 - Qvar (beclomethasone) RediHaler 80 mcg
 - ProAir (albuterol) RespiClick 90 mcg
 - Wixela Inhub (fluticasone/salmeterol) 250/50 mcg

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Many Products with Fluticasone/Salmeterol

- Advair Diskus
- Fluticasone/Salmeterol Diskus
- Advair HFA
- Aireduo RespiClick
- Fluticasone/Salmeterol RespiClick
- Wixela Inhub

Many Products with Albuterol

- ProAir RespiClick and MDI
 - generic
- Ventolin
 - generic
- Proventil
- Combivent and Duoneb
 - Albuterol/Ipratropium

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Inhaler Use MDI and DPI

Metered-dose Inhaler (MDI)

- Most common inhaler type
- Use
 - Slow, deep inhalation
- Use with spacer
- Avoid heat and cold
- Long discard date



Dry-Powder Inhaler (DPI)

- Patent inhaler examples
 - Diskus, Ellipta, Flexhaler, Inhub, RespiClick, Twisthaler
- Demonstration
 - Quick, deep, inhalation
- Avoid moisture, shaking and spacer
- Short discard date



Assessment of Inspiratory Flow



Inhaler Use SMI and BAI

Slow-Mist Inhaler (SMI)

- Available as Respimat
- Demonstration
 - Assemble and prime
 - Slow, deep inhalation
- Avoid freezing
- Discard date 3 months



Breath-Actuated Inhaler (BAI)

- Available as the RediHaler
- Use
 - Opening the cap prepares the inhaler
 - Deep inhalation to release the medication
- Avoid priming, shaking, heat, water and spacers
- Long discard date

Assessment Question

- Which of the following inhalers requires a slow, deep inhalation?
 - Respimat
 - RediHaler
 - RespiClick
 - Inhub

Inhaler Disposal

- Metered-dose inhalers
- Breath-actuated inhaler
- Hazardous waste product
- Flammable
- Encourage take-back and proper disposal
- Resources
 - Dispose my Meds <http://disposemymeds.org/>
 - Local government regulations
 - EPA
 - Safety Data Sheet for medications

Technology to Improve Adherence

Hale Sensors

- Flovent HFA, ProAir HFA, Symbicort, Ventolin

Propeller

- MDI, Diskus, Ellipta, Respimat

ProAir Digihaler

- Dosing and inspiratory flow

Apps

- www.asthmamd.org
- <https://www.medisafeapp.com/>

Outpatient plan

- Final medication list after assessments and talking with MD
 - Symbicort (budesonide/formoterol) MDI 80/4.5 mcg 2 inhalations bid and prn
 - Spiriva (tiotropium) Respimat 1.25 mcg 2 inhalations daily

Patient Case

SM returns to your pharmacy after seeing the allergist.

 She has new prescriptions for: zoster vaccine, recombinant adjuvant (Shingrix)
epinephrine pen

 A new medication for asthma will be shipped to her for home administration.

 "How do I store my new medication?"

 "Can I stop taking my controller medication?"

Mechanism of Action and Dosing for Asthma Biological Agents

Generic	Omalizumab	Mepolizumab	Reslizumab	Benralizumab	Dupilumab
Brand	Xolair	Nucala	Cincair	Fasenra	Dupixent
mAb target	IgE	IL-5	IL-5	IL-5R	IL-4Ra
Adult dosing	150-375 mg SC q2-4 weeks based on baseline IgE and weight	100 mg SC q4 weeks	3 mg/kg IV q4 weeks	30 mg SC q4 weeks X 3 doses followed by 30 mg q8 weeks	400 mg SC 1 then 200 mg SC q2 weeks OR 600 mg SC X1 then 300 mg SC q2 weeks
Home	No	Yes	No	Yes	Yes
Pediatric dosing	6 to <12 years of age 75-375 mg SC q2-4 weeks	6-11 years of age 40 mg SC q4 weeks (in clinic)	Not available	12 years and older see adult dosing	12 years and older see adult dosing

Additional Indications for Asthma Biological Agents

- Omalizumab
 - Chronic Idiopathic Urticaria (CIU)
- Mepolizumab
 - Eosinophilic granulomatosis with polyangiitis (EGPA)
- Reslizumab
 - No other indications
- Benralizumab
 - No other indications
- Dupilumab
 - Moderate to severe atopic dermatitis
 - Chronic rhinosinusitis with nasal polyps

Proper Storage and Counseling for Asthma Biological Agents

Generic	Omalizumab	Mepolizumab	Reslizumab	Benralizumab	Dupilumab
Brand	Xolair	Nucala	Cinnaqir	Fasenra	Dupixent
Proper Storage	<ul style="list-style-type: none"> • 2°C to 8°C • Protect from light • Room temp 30 minutes prior to injection 				
Counseling	Hypersensitivity reactions (anaphylaxis, angioedema, bronchospasm, hypotension, urticaria, rash) Avoid live vaccines (Dupilumab) Malignancy Herpes zoster (Mepolizumab)				

Counseling for all Asthma Biologic Agents

- Do not abruptly discontinue systemic or inhaled corticosteroids upon initiation
- Treat parasitic (helminth) infections
- Registry for pregnancy
- Excluded from studies cigarette smokers

Assessment Question

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Asthma Education Checklist

- Asthma education
 - Chronic, inflammatory disease
 - Trigger identification and avoidance
 - Medication education
 - Asthma action plans
- Inhaler skills training
- Adherence monitoring of ICS
- Vaccinations

Action Needed

- Publications of pharmacists' interventions and patient outcomes (decreased hospitalizations and ED visits)
- Case reports including cigarette smokers with asthma and biologic agents
- Use of technology to improve adherence and outcomes
- Vaccination screening and administration for asthma patients
- Inhaler take-back program education and assessment

Send a chat message!

WHAT ARE YOU DOING TO IMPROVE THE CARE OF ASTHMA PATIENTS?

References

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- 9) Rabe KF, Parameswaran N, Brusselle G, Maspero JF, Castro M, Sher L, et al. Efficacy and safety of dupilumab in glucocorticoid-dependent severe asthma. *N Engl J Med.* 2018; 378(28): 2475-2485.

Websites for Asthma Action Plans

- National Heart, Lung, and Blood Institute. Asthma Action Plan. Available at <https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/asthma-action-plan>
- Asthma and Allergy Foundation of America. Asthma Action Plan. Available at <https://www.aafa.org/asthma-treatment-action-plan/>

Websites for Inhaler Use

Metered-Dose Inhaler (MDI)		
Teva Respiratory	Protek/albuterol sulfate	http://www.protek.com/pdf/Protek_Three_Counter_dose_cycling_information.pdf
Merck	Proventi HFA/albuterol sulfate	https://www.merck.com/product/usb/circulars/trivent/pdf/trivent_md_dosereader_pos.pdf
GSK, generic	Ventolin/ albuterol sulfate	https://www.ventolin.com/about-ventolin/tk/how-to-use.html
AstraZeneca	Symbicort/budesonide and formoterol fumarate dihydrate	https://www.myzybrek.com/asthma/about-symbicort/how-to-use-your-inhaler.html
AstraZeneca	Aveospi/ciclesonide	About-Aveospi/How-to-use.html">https://www.aveospi.us>About-Aveospi/How-to-use.html
Armstrong	Primatene Mist/ epinephrine	https://www.primatene.com/pdf/how-to-use-inhaler.pdf
GSK	Hivent HFA/furosemide propionate	https://www.gskcare.com/pharma/Content/Global/Products/Hivent/How-to-use/Hivent_HFA.pdf?L1=GVNT-HFA-P-PLD1-PLHPage.v2
GSK	Aduri/futicasone propionate and salmeterol	https://www.gskcare.com/pharma/Content/Global/Products/Hivent_HFA/How-to-use/Hivent_HFA.pdf?L1=GVNT-HFA-P-PLD1-PLHPage.v2&L2=adri

Websites for Inhaler Use

Slow-Mist Inhaler (SMI)		
RespiMat	BI	Bevanspi/Aerosphere/ bevespiate/albuterol fumarate and formoterol fumarate dihydrate
	BI	Combivent/ ipratropium bromide and albuterol fumarate
		Spiriva/ tiotropium bromide
		Sieflo/ fexofenamine and olodaterol
		Sixverdi/ aluderol

Websites for Inhaler Use

Diskus Inhaler		
	Hale Respiratory	Proleukal
		http://www.halepharm.com/monohaler/diskus/proleukal.html
		Advair/ fluticasone propionate and salmeterol
		http://www.halepharm.com/monohaler/diskus/advair.html
		Rofinex/ Roflumig propionate
		http://www.halepharm.com/monohaler/diskus/rofinex.html
		Serevent/ salmeterol
		http://www.halepharm.com/monohaler/diskus/serevent.html
		Advair/ fluticasone propionate and salmeterol
		http://www.halepharm.com/monohaler/diskus/advair.html
		Asenz/ asenzolidine
		http://www.halepharm.com/monohaler/diskus/asenz.html
		Advair/ Roflumig powder
		http://www.halepharm.com/monohaler/diskus/advair.html
		Advair/ Roflumig powder
		http://www.halepharm.com/monohaler/diskus/advair.html
		Inveksen/ amikinabulin
		http://www.halepharm.com/monohaler/diskus/inveksen.html
		Atelro/ Roflumig/aztreonam
		http://www.halepharm.com/monohaler/diskus/atelro.html

Websites for Inhaler Use

Handheld Inhaler		
	BI	Spirali/ albuterol
		https://www.spirali.com/learn-how-to-use-a-handheld-inhaler.html
	Mylex	Mylose/ fluticasone propionate
		https://www.mylex.com/how-to-use.html
	Sunovion, generic	Sunovan/ fluticasone furoate
		https://www.sunovion.com/resourcecenter/sunovan.html
	Merck	Asmanex HFA/ mometasone furoate
		https://www.merck.com/product/usb/circulars/asmanex_hfa.pdf
	Merck	Dulera/ fluticasone furoate and formoterol fumarate dihydrate
		https://www.dulera.com/what-is-dulera/inhaler-instructions/
	Stalevo/ aluderol	
		https://www.stalevo.com/your-respirator/inhaler/video
	Combivent/ ipratropium bromide and albuterol fumarate	https://www.combivent.com/cool/starting-spiriva/how-to-use-spiriva-resipimat
	Spiriva/ tiotropium bromide	https://www.spiriva.com/stolto-resipimat/how-to-use-stolto-resipimat
	Stieflo/ fexofenamine and olodaterol	https://docs.behringer-ingelheim.com/Resipimat/S20Information/Pis/Stieflo%20Resipimat%20Striverdi.pdf

Websites for Inhaler Use

Breath-Actuated Inhaler (BAI)			
RediHaler	Teva Respiratory	Qvar®/ beclomethasone dipropionate HFA	https://www.qvar.com/redihaler/how-to-use-qvar-redihaler

Italicized products only have written directions for product use. BAI- Breath-actuated inhalation aerosol; HFA- hydrofluoroolethane; DPI- Dry powder inhaler; GSK- GlaxoSmithKline; BI- Boehringer Ingelheim; Merck- Merck & Co., Inc.; MDI- metered dose inhaler; Sunovion- Sunovion Pharmaceuticals Inc.; Armstrong- Armstrong Pharmaceuticals Inc.; SMI- slow mist inhaler

