

Case study Approach to Asthma Management:  
Focus on Pharmacology and Guidelines

Wendy L. Wright,  
DNP, ANP-BC, FNP-BC FAANP, FAAN, FNAP  
Adult / Family Nurse Practitioner  
Owner - Wright & Associates Family Healthcare  
Amherst, New Hampshire  
Owner – Partners in Healthcare Education, PLLC

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Disclosures

- Speaker Bureau:
  - Sanofi-Pasteur, Merck, Pfizer, Seqirus, Moderna: Vaccines
  - AbbVie and Pfizer: Migraines
  - AstraZeneca: Asthma and COPD
- Consultant:
  - Sanofi-Pasteur, Merck, Pfizer, Moderna, and Seqirus: Vaccines
  - Idorsia: Insomnia
  - Shield Therapeutics: Iron Deficiency Anemia

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Objectives

Upon completion, the participant will be able to:

1. Identify statistics regarding asthma
2. Discuss diagnostic criteria for asthma
3. Discuss pharmacologic treatment options for asthma

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### Knowledge Question One

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Which of the following is true about use of anti-inflammatory therapies (corticosteroids) in patients with asthma?

- A. Systemic corticosteroids are an effective, low-risk method for treating most asthma exacerbations
- B. Anti-inflammatory airway effects of inhaled corticosteroids do not occur until 2-3 days of consecutive use
- C. For patients with mild asthma, SABA-only rescue therapy is preferred to ICS-containing rescue regimens due to improved outcomes and lower corticosteroid exposure
- D. Adding ICS to a fast-acting bronchodilator for rescue or rescue and maintenance therapy results in fewer exacerbations compared to SABA-only rescue therapy

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### Knowledge Question Two

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Which of the following is true about use of SABA in patients with asthma?

- A. SABA-only rescue therapy is recommended for patients with mild asthma (step 1) in the GINA 2022 Report
- B. Increasing SABA use is associated with a higher risk of exacerbations
- C. SABA + ICS rescue therapy is equally as effective for preventing and treating exacerbations as SABA-only rescue therapy
- D. There are currently several FDA-approved SABA + ICS combination inhalers available in the United States

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# Asthma

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### Asthma Definition

**Definition of asthma:**

"Asthma is a heterogenous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness and cough, that vary over time and in intensity, together with variable expiratory airflow limitation."

- 2022 GINA Report

GINA, The Global Initiative for Asthma  
Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention 2022. Available from: www.ginasthma.org. Fletcher MJ, et al. *NPJ Prim Care Respir Med*. 2020;30:20.

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### Prevalence of Asthma

- Asthma affects approximately 339 million people worldwide 1
  - Despite significant advances in guidance and treatments, asthma continues to cause substantial health burden
- Impacts approximately 25.2 million individuals in the United States (18 and older) 2
- Most common chronic disease of childhood affecting 4.2 million children 2

1 GINA, The Global Initiative for Asthma  
2 <https://www.cdc.gov/asthma/asthmaaddata.htm> accessed 01-16-2024 Wright, 2024

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### Impact of Asthma

- 9.6 million visits to providers office annually (1)
- 2 million ED visits annually (2)
  - 500,000 hospitalizations (2)
- 3517 deaths annually (2021)
  - Highest rates: adults (5x more likely than children to die)
- Children: boys > girls
- Adults: women > men

[https://www.cdc.gov/asthma/asthma\\_stats/asthma-related-physician-visits.html#:~:text=In%2020%2015%2C%20about%206.2%25%20of%20all%20physician%20office,children%20and%2020%20per%2010%20000%20pers%20among%20adults](https://www.cdc.gov/asthma/asthma_stats/asthma-related-physician-visits.html#:~:text=In%2020%2015%2C%20about%206.2%25%20of%20all%20physician%20office,children%20and%2020%20per%2010%20000%20pers%20among%20adults) accessed 01-15-2024

2 <https://www.cdc.gov/asthma/asthmaaddata.htm> accessed 01-15-2024 Wright, 2024

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**Pathophysiology of Asthma**

- Likely genetic predisposition with environmental triggers
- Genetic predisposition
  - Chromosome: 5Q31-Q33
- Results from repeated exposure to allergens in the individual already equipped with the genetic predisposition
- Upon exposure to an allergen, there is a release of IgE antibodies
- IgE antibody binds with the antigen

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**Pathophysiology of Asthma**

- IgE/allergen complex - then attaches itself to the mast cells on the nasal and bronchial mucosa
- Release of numerous chemical mediators

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**Components of Asthma**

- Asthma triggers
  - Allergens, exercise, irritants, viruses, weather

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- Smooth muscle dysfunction AND
  - Hypertrophy and hyperplasia, inflammatory mediator release
- Inflammation
  - Architectural changes, mucus secretion, epithelial damage and impaired ciliary function

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### Components of Asthma

- Smooth muscle dysfunction and inflammation lead to:
  - Bronchial constriction
  - Bronchial hyperreactivity
  - Inflammatory cell infiltration
- Leads to: SYMPTOMS and EXACERBATIONS

Sinyor B, Concepcion Perez L. Pathophysiology Of Asthma. [Updated 2023 Jun 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK551579/> Wright, 2024

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
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### Consequences of Inflammation

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Acute inflammation           <ul style="list-style-type: none"> <li>–Altered airway physiology</li> <li>–Increased airflow obstruction</li> </ul> </li> </ul> |  | <ul style="list-style-type: none"> <li>• Chronic inflammation           <ul style="list-style-type: none"> <li>–Injury</li> <li>–Airway remodeling</li> <li>–Permanently altered lung function</li> </ul> </li> </ul> |
|--|---|---|

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### Asthma is...

- A disease of:
  - Inflammation
    - Primary Process
  - Hyperresponsiveness
  - Airway bronchoconstriction
  - Excessive mucous production

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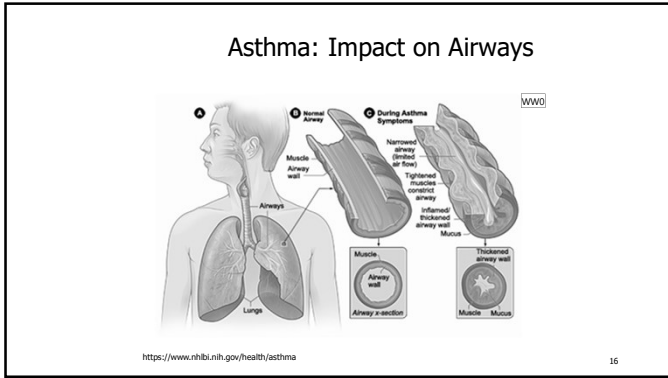
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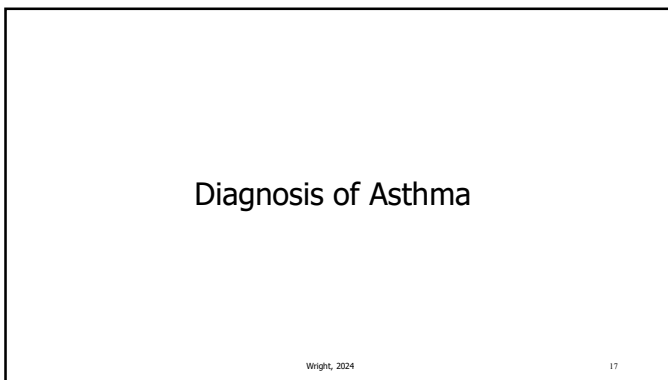
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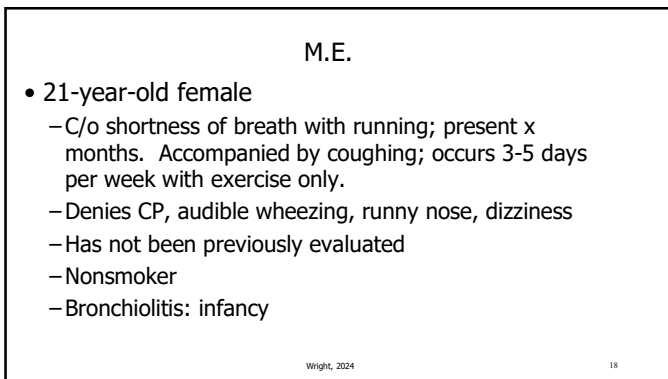
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### Diagnosis of Asthma

- History and Physical Examination
  - Want to exclude other conditions which can have similar symptoms
- Spirometry is needed to make diagnosis
- Monitoring:
  - Peak Flow Meters, can be an alternative if spirometry is not available

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### Important:

2% of individuals who present with asthma symptoms have a significant cardiorespiratory condition (other than asthma)

<https://www.aafp.org/afp/2020/0615/p762.html> accessed 04-01-2021

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### Symptoms and Signs of Asthma in Children and Adults

- Coughing, particularly at night or after exercise
- Wheezing
- Chest tightness
- SOB/DOE
- Cough that lingers x weeks after URI

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M.E. (continued)

- VSS
- Lungs clear
- Heart: S1, S2, RRR; no S3 or S4; no murmurs
- Spirometry (Quality A)
  - FEV1: 72% predicted
  - FEV1/FVC ratio: 94% predicted

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Spirometry



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GINA: DIAGNOSIS

- Various ways to make diagnosis
  - At least once during the diagnostic process (when FEV1 is low), document that FEV1/FVC ratio is also low
  - Improvement of 12% or more in FEV1 and 200 mL from baseline after bronchodilator OR
  - Improvement of 12% or more in FEV1 and 200 mL from baseline after 4 weeks of anti-inflammatory

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M.E. (continued)

- Baseline spirometry (Quality A)
  - FEV1: 72% predicted
  - FEV1/FVC ratio: 94% predicted
- Post-bronchodilator (Quality A)
  - FEV1: 90% (up 18%); 220 ML improvement in PEFR
  - FEV1/FVC ratio: 95%

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Important to Note

- 25-30% of asthma will not be diagnosed with first time spirometry
  - May need to repeat
  - Perform when ill

[https://ginasthma.org/wp-content/uploads/2020/04/Main-pocket-guide\\_2020\\_04\\_03-final-wms.pdf](https://ginasthma.org/wp-content/uploads/2020/04/Main-pocket-guide_2020_04_03-final-wms.pdf)

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Classification of Asthma Severity: EPR (Youths ≥12 Years of Age and Adults)

Initial Diagnosis: Determine Severity and Treatment Needed		Intermittent		Persistent	
Components of Severity		Intermittent	Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta <sub>2</sub> -agonist use for symptom control (not prevention of EIB) (interference with normal activity)	≤2 days/week	>2 days/week but not >1x/day	Daily	Several times per day
Lung function	Normal FEV <sub>1</sub> /FVC, 8-15 y 85%, 20-39 y 80%, 40-59 y 75%, 60-80 y 70%	Normal FEV <sub>1</sub> between exacerbations	FEV <sub>1</sub> >80% predicted	FEV <sub>1</sub> >60% but <80% predicted	FEV <sub>1</sub> <60% predicted
		FEV <sub>1</sub> /FVC normal	FEV <sub>1</sub> /FVC normal	FEV <sub>1</sub> /FVC reduced ≥20%	FEV <sub>1</sub> /FVC reduced ≥30%
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year (see note)	Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations may be related to FEV <sub>1</sub> .	Step 3	Step 4
	Recommended Step for Initiating Treatment	Step 1	Step 2	and consider short course of oral systemic corticosteroids	

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GINA: Classification of Severity

- Mild asthma:
  - Asthma that can be controlled with Step 1 or Step 2 treatment
- Severe asthma
  - Asthma that requires Step 5 treatment

[https://ginasthma.org/wp-content/uploads/2020/04/Main-pocket-guide\\_2020\\_04\\_03-final-wms.pdf](https://ginasthma.org/wp-content/uploads/2020/04/Main-pocket-guide_2020_04_03-final-wms.pdf)  
Accessed 01-16-2024

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M.E. (continued)

- Diagnosis:
  - Moderate Persistent Asthma
- Plan: Step 3 Care

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Treatment of Asthma

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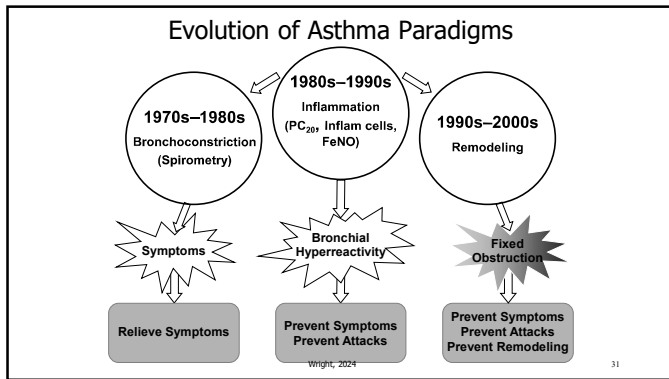
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### Childhood Asthma Control Can Predict Adult Lung Status

- Study of 119 asthmatic children during 1966 and 1969
- Ages: 5-14 were evaluated using FEV1
- Follow-up performed 17-18 years later and 27-28 years later
- Children who were well controlled during childhood had the smallest decline in total lung volume during adulthood

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**Table 10-14: Classification of Asthma Severity (Youths ≥ 12 Years of Age and Adults)**

**Initial Diagnosis: Determine Severity and Treatment Needed**

Components of Severity		Persistent			
		Intermittent	Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not >1x/day	Daily	Several times per day
Lung function	Interference with normal activity	None	Minor limitation	Some limitation	Extreme limitation
	Normal FEV <sub>1</sub> /FVC: 8-19 y 85%, 20-39 y 80%, 40-59 y 75%, 60-80 y 70%	None	Minor limitation	Some limitation	Extreme limitation
	Lung function	Normal FEV <sub>1</sub> between exacerbations	FEV <sub>1</sub> >80% predicted	FEV <sub>1</sub> >60% but <80% predicted	FEV <sub>1</sub> <60% predicted
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year (see note)	Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations may be related to FEV <sub>1</sub> .	≤2/year (see note)	≥3/year (see note)
	Recommended Step for Initiating Treatment	Step 1	Step 2	Step 3	Step 4

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**Managing Asthma in Primary Care**

**International guidance: 2022 GINA Report**  
**US Guidelines: NAEPP 2020**

- Major components of asthma management:
  - Selection of initial therapy
    - Based on assessment of current asthma severity
  - Assessment of asthma control and risk of exacerbations
  - Adjusting therapy based on a stepwise approach

NAEPP, National Asthma Education and Prevention Program  
 Cloutier RM, et al. *J Allergy Clin Immunol* 2020;146(6):1217-1270. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention, 2022. Available from: www.ginaasthma.org

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<https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/2020-focused-updates-asthma-management-guidelines>

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**Indoor Allergen Mitigation**

- Can be very helpful for individuals with allergic component
- Recommend air purifiers, mattress and pillow covers, HEPA filters

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M.E. (continued)

- Where do we go with her if using EPR-4?
- Plan:
  - ICS with LABA (formoterol)
  - Return for f/u in 4 - 6 weeks
    - If well-controlled, continue x 3 months
    - If not well-controlled, step up care

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What Would You Do If You Are Using GINA Guideline?



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GINA Treatment Recommendations

- GINA no longer recommends SABA agent as monotherapy for adolescents and adults with asthma
- All adolescents and adults with asthma should receive an ICS containing product
  - Symptom driven: ICS/SABA OR ICS/LAMA as needed OR
  - Daily: ICS/LABA

[https://ginasthma.org/wp-content/uploads/2020/04/Main-pocket-guide\\_2020\\_04\\_03-final-wms.pdf](https://ginasthma.org/wp-content/uploads/2020/04/Main-pocket-guide_2020_04_03-final-wms.pdf) accessed 01-16-2024

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**WWO** I have requested permission to use

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### Assessing Asthma Control (Youths ≥12 Years of Age and Adults)

Follow-up Visits: Determine Level of Control and Treatment Needed				
Components of Control		Well-controlled	Not Well-controlled	Very Poorly Controlled
<b>Impairment</b>	<b>Symptoms</b>	≤2 days/week	>2 days/week	Throughout the day
	Nighttime awakenings	≤2 x/month	1-3x/week	≥4x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting beta <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	FEV <sub>1</sub> or peak flow	>80% predicted/personal best	60-80% predicted/personal best	<60% predicted/personal best
	Validated Questionnaires ATAQ ACQ ACT	0 ≤0.75* ≥20	1-2 ≥1.5 16-19	≥4 N/A ≤15
	Exacerbations	0-1/year Consider severity and interval since last exacerbation	≥2/year (see note)	
<b>Risk</b>	Progressive loss of lung function	Evaluation requires long-term follow-up care		
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control, but should be considered in the overall assessment of risk.		

ATAQ score of 0-20 (4 is the maximum score, with 4 being the best score and 20 being the worst score). ACT score of 0-20 (20 is the maximum score, with 20 being the best score and 0 being the worst score).

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### Asthma Control Questionnaires

- Numerous exist
  - ACT
  - AirQ
  - ACQ

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### Short -Acting Beta-2 Agonists

- Generic Albuterol HFA
  - 90mcg/puff, 200 puffs
  - 1 - 2 puffs every 4-6 hours or 2 puffs 15 minutes before exercise
  - Onset: 5 minutes
- Use of SABA as reliever therapy is associated with worse outcomes than ICS/LABA or ICS/SABA combination as reliever

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**Short-Acting Beta-2 Agonists**

- Usage of these medications more than 2 times/week is indicative of poor control
- 1 inhaler = 200 inhalations
- It is time to begin transitioning patients away from SABA alone

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**Albuterol and Budesonide Inhaler<sup>7</sup>**

- Name: **Albuterol and budesonide (Airsupra™)**
- Class: SABA/ICS
- Indication: As needed treatment for acute bronchospasm or prevention of bronchospasm and to reduce the risk of acute asthma exacerbations in adults 18 years of age and older
- Dosage: 180 mcg of albuterol and 160 mcg of budesonide
  - Dosed: 2 puffs every 4 hours as needed
  - Do not exceed 6 doses (12 puffs) in 24 hours.

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**Albuterol and Budesonide Inhaler<sup>7</sup> (continued)**

<ul style="list-style-type: none"> <li>• Adverse effects                     <ul style="list-style-type: none"> <li>▪ Oral candidiasis: Should instruct to rinse mouth out.</li> <li>▪ Caution: DPI – Acute paradoxical bronchospasm</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Why a combination?                     <ul style="list-style-type: none"> <li>▪ GINA and EPR4 recommend use of ICS whenever SABA is needed to prevent/reduce exacerbations and the need for systemic corticosteroids.</li> <li>▪ Provides ICS/SABA in one inhaler thus decreasing copays</li> </ul> </li> </ul>
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**Albuterol and Budesonide Inhaler<sup>7</sup> (continued)**

- Drug interactions
  - Budesonide
    - CYP450 3A4 substrate
    - Avoid strong 3A4 inhibitors as they may increase systemic exposure of budesonide.
- Not currently approved for children

- Available December 2023
- Canister will have a dosing counter on it to enable patient to see how many doses remain.

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**Controller Medications**

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**Inhaled Corticosteroids**

- Most potent and effective anti-inflammatory medication currently available

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### Inhaled Corticosteroids

- Examples
  - Beclomethasone (QVAR)
  - Budesonide (Pulmicort)
  - Fluticasone (ArmonAir, Arnuity Ellipta)
  - Mometasone (Asmanex)
  - Ciclesonide (Alvesco)

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### Comparative Daily Doses: ICS

- [https://www.nhlbi.nih.gov/files/docs/guidelines/asthma\\_qrg.pdf](https://www.nhlbi.nih.gov/files/docs/guidelines/asthma_qrg.pdf)

Product	2-5 years			6-11 years			12 years and older		
	Strength	Volume	Dose	Strength	Volume	Dose	Strength	Volume	Dose
Beclomethasone	0.05 mg/mL	2.5 mL	1.25 mcg	0.05 mg/mL	2.5 mL	1.25 mcg	0.05 mg/mL	2.5 mL	1.25 mcg
Budesonide	0.2 mg/mL	1.25 mL	0.25 mcg	0.2 mg/mL	1.25 mL	0.25 mcg	0.2 mg/mL	1.25 mL	0.25 mcg
Fluticasone	0.1 mg/mL	1.25 mL	0.125 mcg	0.1 mg/mL	1.25 mL	0.125 mcg	0.1 mg/mL	1.25 mL	0.125 mcg
Mometasone	0.1 mg/mL	1.25 mL	0.125 mcg	0.1 mg/mL	1.25 mL	0.125 mcg	0.1 mg/mL	1.25 mL	0.125 mcg
Ciclesonide	0.05 mg/mL	1.25 mL	0.0625 mcg	0.05 mg/mL	1.25 mL	0.0625 mcg	0.05 mg/mL	1.25 mL	0.0625 mcg

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### Schenkel, E. et. al

- 98 patients randomized to either placebo or mometasone furoate aqueous nasal spray
- Ages: 3 - 9 years
- After 1 year, there was no suppression of height in the children using the nasal corticosteroid when compared with the child using placebo

Pediatrics Vol 105 No. 2 February 2000, p. 22

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ICS/LABA Combination

- GINA:
  - This is now preferred over ICS alone as controller and reliever medications
  - Formoterol is preferred LABA

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Long-Acting Beta-2 Agonists

- Formoterol
  - Not indicated by FDA as single agent for asthma
  - Approved as combination with ICS for asthma
    - $\geq 5$  years of age: 1 inhalation every 12 hours
  - May be used for prevention of EIB

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Long-Acting Beta-2 Agonists

- Salmeterol (Serevent)
  - Diskus
    - $\geq 4$  years of age-1 puff po q 12 hours
  - Seems to help children affected by the nocturnal cough and wheezing
  - Good for prevention of exercise induced asthma
    - 1 puff 30-60 minutes prior to exercise

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LABA

- Should be used only with inhaled corticosteroid in the patient with asthma

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Combination Products

- Fluticasone/salmeterol (Advair, AirDuo, Wixela Inhub)
- Budesonide/formoterol (Symbicort)
- Mometasone/formoterol (Dulera)
- Fluticasone/vilanterol (Breo Ellipta)

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Updates

- Montelukast (Singulair)
  - FDA strengthened warnings re: serious behavior changes and mood changes
  - Per FDA – benefits of treatment may NOT outweigh risks, especially in mild disease or for allergic rhinitis

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### Leukotriene Receptor Antagonists

- Cysteinyl leukotriene production in the body has been associated with airway edema, smooth muscle constriction and the inflammatory process
- These medications block the leukotriene receptors which in turn is able to prevent inflammation and bronchoconstriction
- Has been removed from all of the major guidelines due to neuropsychiatric issues

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### Montelukast

- (Montelukast) Singulair
  - 4 mg Granules once daily: 12 – 23 months
  - 4 mg tablet for children 2 - 5 years of age
  - 5mg qhs for ages 6-14
  - 10mg qhs for ages 15 and older

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### Montelukast

- Drug Interactions
  - Metabolized through CYP2A6 (minor pathway)
  - Phenobarbital: decreases montelukast but no dosage adjustment is required
- Side effects: headache, fatigue, dizziness, Churg-Strauss
- Precautions
  - Not for an acute exacerbation
- Category: B

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Monoclonal Antibodies

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Omalizumab (Xolair)

- Indicated for adults and adolescents (6 and older) with moderate to severe persistent asthma who have a positive skin test or *in vitro* reactivity to a perennial aeroallergen
- And...whose symptoms are inadequately controlled with inhaled corticosteroids
- SC injection (weight and IGE based)
- Every 2 – 4 weeks
- Warning: anaphylaxis

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Omalizumab (Xolair)

- Recombinant DNA-derived humanized IgG1 monoclonal antibody that selectively binds to human immunoglobulin E (IgE).
  - IgE antagonist
- Inhibits the binding of IgE to the high-affinity IgE receptor on the surface of mast cells and basophils
- Limits the degree of release of mediators of the allergic response.

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Other Monoclonal Antibodies

- Interleukin-4/13 antagonist
  - Dupilumab (Dupixent)
- Interleukin-5 antagonists
  - Mepolizumab (Nucala)
  - Reslizumab (Cinqair)
  - Benralizumab (Fasenra)

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LAMA

- LAMA
  - Long-acting bronchodilator
  - Increasing/emerging role in the management of asthma
  - Controller medication
  - LAMA are only added to patient with poorly controlled asthma after LABA/ICS is in place

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LAMA

- Caution: urinary retention and glaucoma
- Approved LAMA
  - Tiotropium bromide: approved 6 years of age and older - asthma

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### Triple Drug Therapy

- Fluticasone, umeclidinium, and vilanterol (Trelegy Ellipta)  
– 1 inhalation daily
- LAMA only to be used when patient is on an ICS/LABA combination and is not well-controlled

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### Fractional Exhaled Nitric Oxide

- Nitric oxide can be measured in exhaled breath
- Measure of airway inflammation
- Used:
  - When diagnosis is uncertain
  - In children 4 years of age and younger with recurrent wheezing

<https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/2020-focused-updates-asthma-management-guidelines>

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### Fractional Exhaled Nitric Oxide

- FeNO > 50 ppb (or > 35 ppb in children ages 5 – 12 years) are consistent with elevated T2 (Type 2) inflammation and support diagnosis of asthma
- Allergic rhinitis can increase FeNO levels as well; interpret cautiously

<https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/2020-focused-updates-asthma-management-guidelines>

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### FeNO Testing



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### Acute Asthma Exacerbation Management

<https://ginasthma.org/wp-content/uploads/2022/07/>

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### GINA: Exacerbations

- Step Approach
  - Evaluate patient
  - Is it asthma?
  - Does patient have risk factors for asthma death (previous hospitalization)
  - Document severity (consider worst feature)

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GINA: Exacerbations

- Mild/moderate
  - Talks in phrases without difficulty
  - No accessory muscles used
  - Pulse: 100 – 120 bpm
  - O2 saturation: 90-95%
  - PEFR: 50% of predicted

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GINA: Exacerbations

- Mild/moderate treatment
  - SABA: 4-10 puffs and repeat every 20 minutes for 1 hour
  - Prednisolone: adults: 40-50 mg; children 1-2 mg/kg with max of 40 mg
  - Assess response in 1 hour and if improving: send home with prednisolone prescription and reliever

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Severe Asthma Exacerbations

Talks in words, hunched forward or agitated

Respiratory rate > 30 per minute

Accessory muscles in use

Pulse > 120 bpm

O2 sat < 90%

PEF ≤ 50% of predicted

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GINA: Exacerbations

- Severe
  - SABA: 4-10 puffs and repeat every 20 minutes for 1 hour
  - Prednisolone: adults: 40-50 mg; children 1-2 mg/kg with max of 40 mg
  - Transfer to an acute care facility
  - Place on oxygen during transfer

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Acute Asthma Exacerbation

- Measure FEV1
- Use albuterol: see recommendations (next slide)
- Prednisone, prednisolone, or similar
  - What dose and schedule??
  - 5-7 days is recommended
  - No taper needed as long as treating for < 14 days
  - Oral SCS are preferred over IV/IM

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Knowledge Question One

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Which of the following is true about use of anti-inflammatory therapies (corticosteroids) in patients with asthma?

- A. Systemic corticosteroids are an effective, low-risk method for treating most asthma exacerbations
- B. Anti-inflammatory airway effects of inhaled corticosteroids do not occur until 2-3 days of consecutive use
- C. For patients with mild asthma, SABA-only rescue therapy is preferred to ICS-containing rescue regimens due to improved outcomes and lower corticosteroid exposure
- D. Adding ICS to a fast-acting bronchodilator for rescue or rescue and maintenance therapy results in fewer exacerbations compared to SABA-only rescue therapy

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### Knowledge Question Two ?

Which of the following is true about use of SABA in patients with asthma?

- A. SABA-only rescue therapy is recommended for patients with mild asthma (step 1) in the GINA 2022 Report
- B. Increasing SABA use is associated with a higher risk of exacerbations
- C. SABA + ICS rescue therapy is equally as effective for preventing and treating exacerbations as SABA-only rescue therapy
- D. There are currently several FDA-approved SABA + ICS combination inhalers available in the United States

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Questions?

Wendyarnp@aol.com

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