



# Minnesota School Nurse Asthma Guideline Update

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# Disclosure Information

Minnesota School Nurse Asthma Guideline Update  
by  
Gail M Brottman MD

I will be discussing the “off label” use of medication  
budesonide/formoterol (Symbicort) and mometasone/formoterol  
(Dulera) inhalers

# Objectives:

- Understand the changes in recommendations for the use of combination inhalers for the treatment of asthma using “SMART” therapy
- Demonstrate the proper use of MDI with spacers
- Be able to utilize written asthma plans to improve optimal asthma care in schools



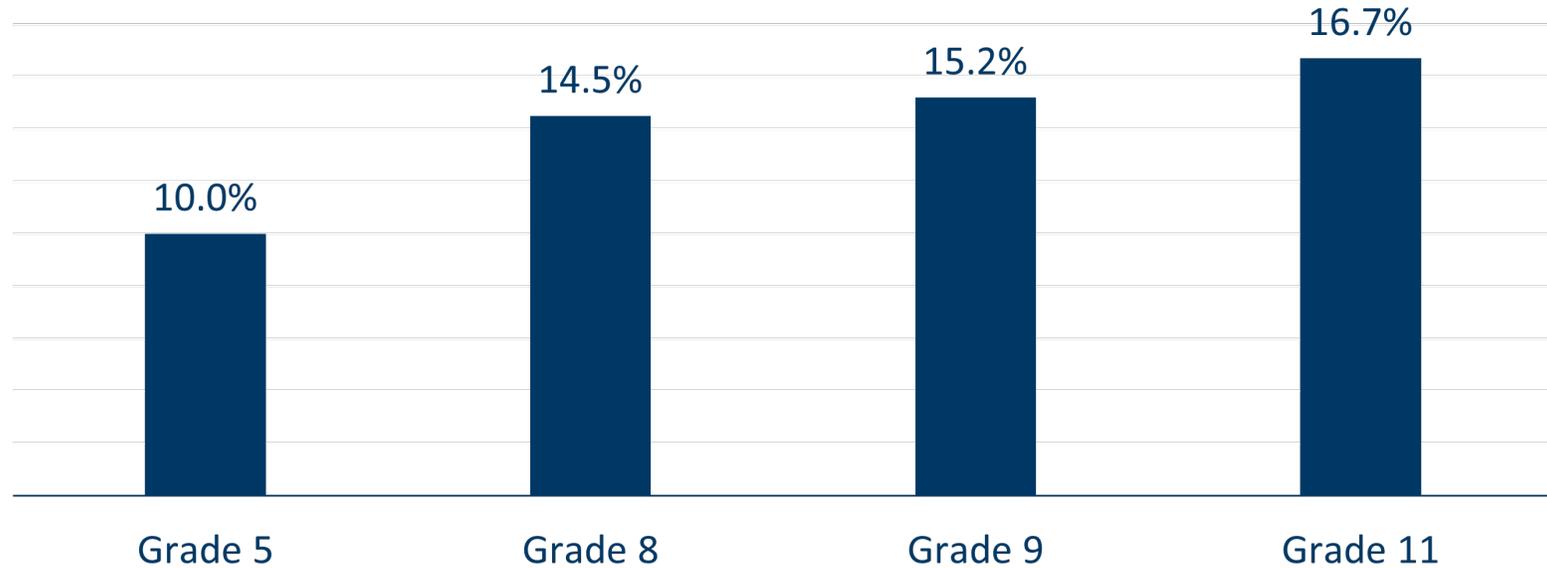
# Asthma 2022 Minnesota Student Survey Update

Lilly Nystel | Asthma Program Student Worker

# Background

- Self-reported online survey
  - Census design
  - Conducted every 3 years
- 5<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> & 11<sup>th</sup> grades
- Voluntary and anonymous
  - School districts 70% participation rate in 2022

## Percent of students reporting a history of asthma by grade



14.1%

N=17,244

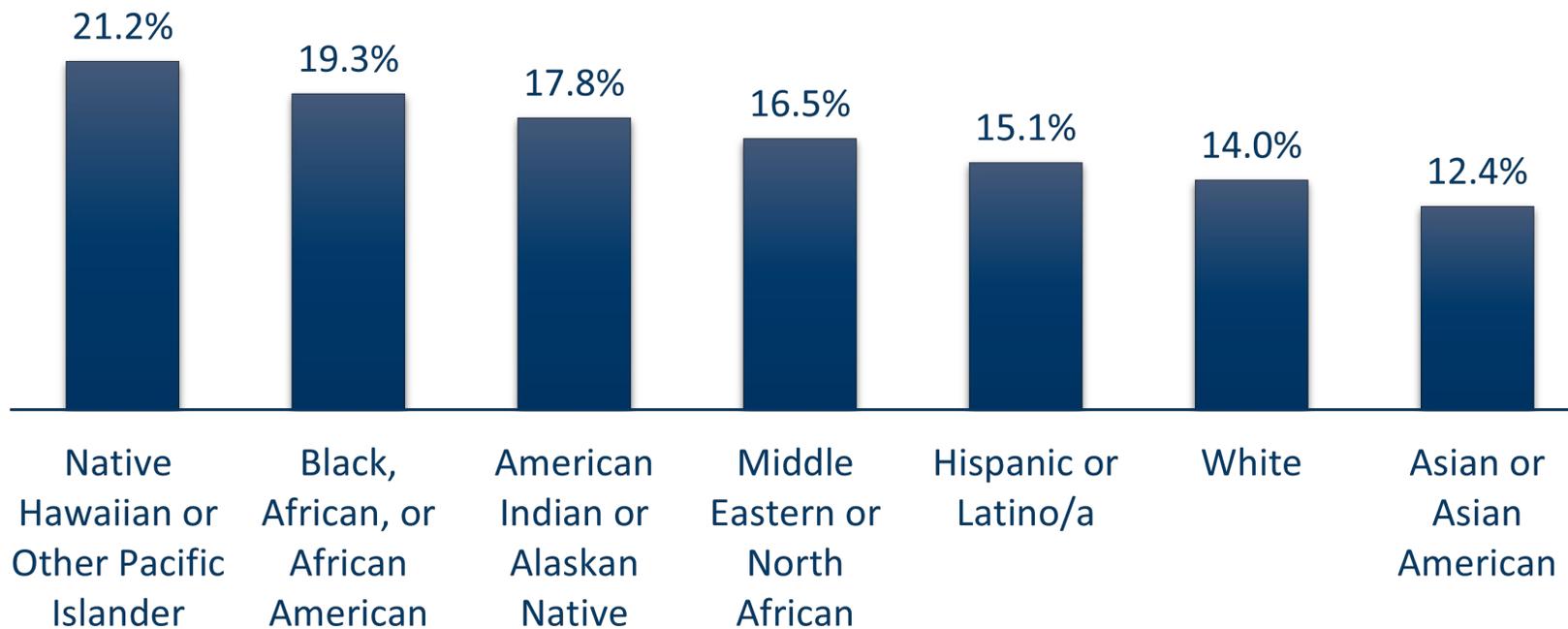
95% CI =(0.139 – 0.143)

2022 MN Student Survey

**Overall, 14.1% of students reported that they had ever been told they have asthma.**

# Asthma disproportionately impacts students of color.

Percent of students reporting a history of asthma by race and ethnicity

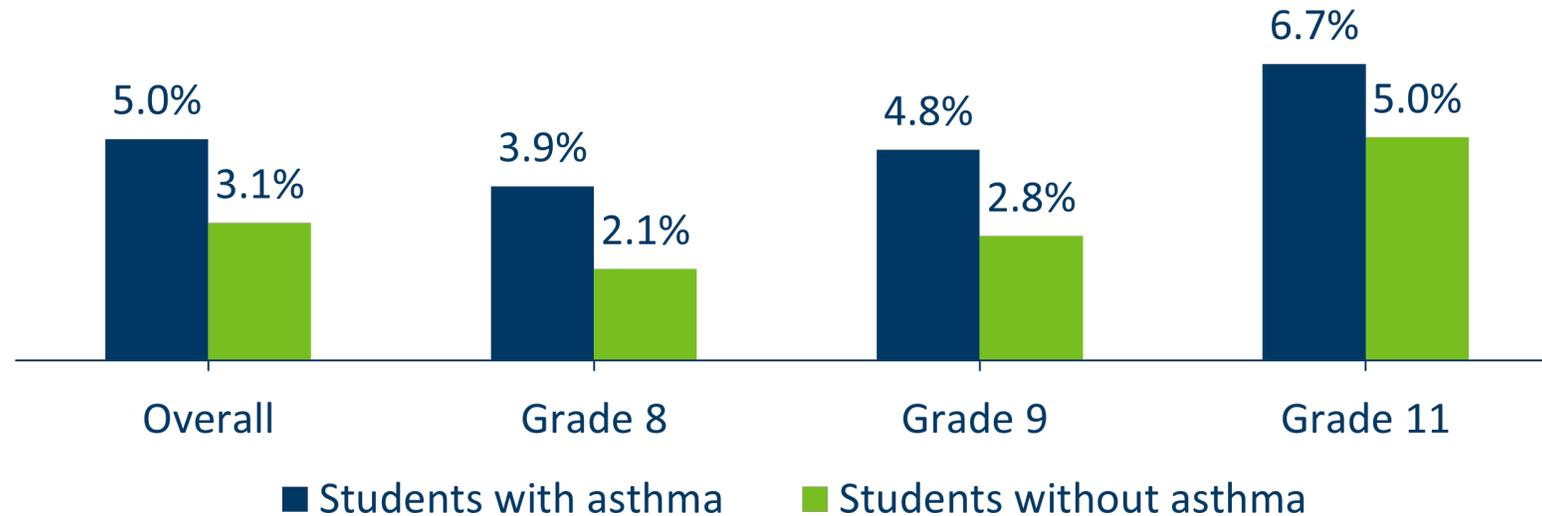


Courtesy of [lilly.nystel@state.mn.us](mailto:lilly.nystel@state.mn.us)

2022 MN Student Survey

# Students with asthma are more likely to be current smokers of cigarettes.

Percent of youth reporting smoking at least one cigarette in the last 30 days by asthma status

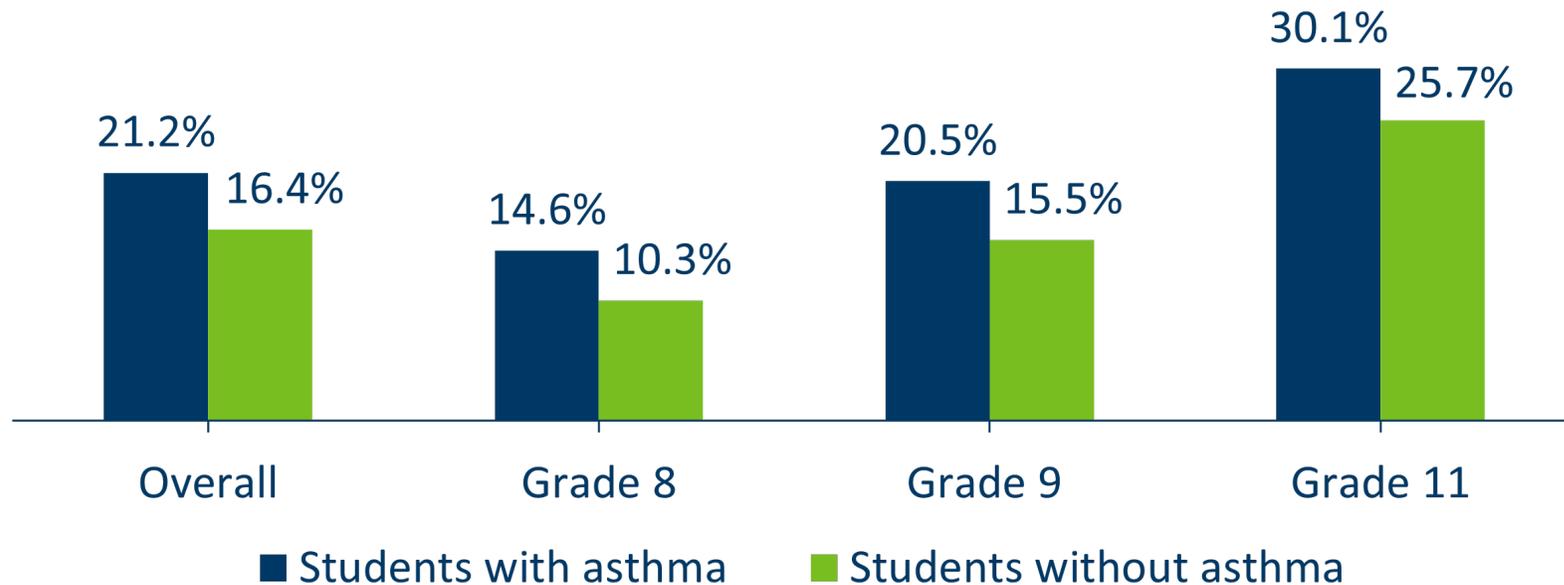


Courtesy of [emily.groebner@state.mn.us](mailto:emily.groebner@state.mn.us)

2019 MN Student Survey

# Students with asthma are more likely to be current users of e-cigarettes.

Percent of youth reporting vaping at least once in the last 30 days by history of asthma



Courtesy of [emily.groebner@state.mn.us](mailto:emily.groebner@state.mn.us)

2019 MN Student Survey

# Goals of Asthma Care

The National Institutes of Health (NIH) has established the following goals for asthma management:

- No missed school or work due to asthma
- No sleep disruption
- Maintenance of normal activity levels
- No (or minimal) need for ER visits/hospitalizations
- Normal or near-normal lung function

National Asthma Education and Prevention Program. *Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma*. Bethesda, Md: National Heart, Lung, and Blood Institute, National Institutes of Health; April 1997. NIH publication 97-4051.

# Establishing the Diagnosis of Asthma

Determine the presence of:

- Airflow obstruction is at least partially reversible
- Episodic symptoms of airway hyper-responsiveness
- **Airway inflammation-the primary driver of the hyper responsiveness and airflow obstruction**

# Asthma is an Inflammatory Airway disease NOT Reactive Airways disease

Reactive Airway Disease editorial.pdf - Adobe Reader

Pulmonary Perspective

## “Reactive Airways Disease” A Lazy Term of Uncertain Meaning That Should Be Abandoned

JOHN V. FAHY and PAUL M. O'BYRNE

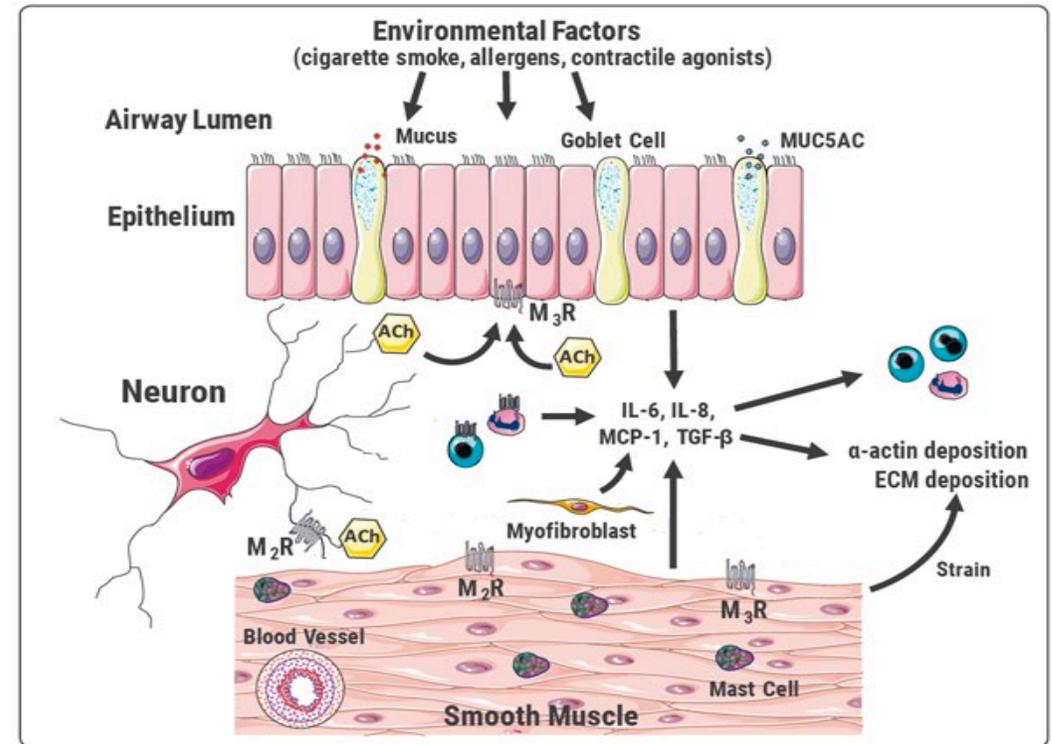
Department of Medicine and the Cardiovascular Research Institute, University of California, San Francisco, California; and the Department of Medicine, McMaster University, Hamilton, Ontario, Canada

The terms “reactive airways” and “reactive airways disease” have crept into the clinical lexicon in recent years. They are being used as synonyms for asthma. The terms are widely used in case presentations involving outpatients and inpatients, and even patients in intensive care units. They are in particular commonly used in the pediatric setting. The problem is that “reactive airways” and “reactive airways disease” are highly nonspecific terms that have no clinical meaning. As such, we view these terms as unhelpful and potentially harmful, and we recommend that they not be used.

Patients are usually labeled with “reactive airways” if they have a history of cough, sputum production, wheeze, or dyspnea. This is a very common clinical presentation of asthma, but the disorder is currently recognized as distinct by the American Thoracic Society and the American College of Chest Physicians (3).

Airway hyperreactivity is also a specific term that means that the airways are hyperreactive to a variety of stimuli including methacholine, histamine, hypertonic saline, distilled water, exercise, or eucapnic hyperventilation (4). Hyperreactivity in this context means a bronchoconstrictor response at “doses” that normally have no bronchoconstrictor effect. Airway hyperreactivity actually encompasses both airway sensitivity (the dose of agonist at which the FEV<sub>1</sub> begins to fall) and airway hyperresponsiveness (the slope of the dose response

Fahy, J., O'Byrne, P. AJRCCM v163. 2001



[https://inflammation-type2.org/holistic-view-on-asthma/?utm\\_source=TrendMD&utm\\_medium=cpc&utm\\_campaign=Type\\_2\\_Inflammation\\_TrendMD\\_Accessed](https://inflammation-type2.org/holistic-view-on-asthma/?utm_source=TrendMD&utm_medium=cpc&utm_campaign=Type_2_Inflammation_TrendMD_Accessed)  
6.14.20

# Changes in the NAEPP and GINA Asthma Treatment Recommendations

# Assessing Asthma Control: EPR-3

Components of Control		Well Controlled			Not Well Controlled			Very Poorly Controlled		
		Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years
Impairment	Symptoms	≤2 days/week	≤2 days/week but not more than once on each day	≤2 days/week	>2 days/week	>2 days/week or multiple times on ≤2 days/week	>2 days/week	Throughout the day		
	Nighttime awakenings	≤1x/month		≤2x/month	>1x/month	≥2x/month	1-3x/week	>1x/week	≥2x/week	≥4x/week
	Interference with normal activity	None			Some limitation			Extremely limited		
	SABA* use for symptom control (not to prevent EIB*)	≤2 days/week			>2 days/week			Several times per day		
	Lung function									
	➔ FEV <sub>1</sub> * (% predicted) or peak flow (% personal best)	Not applicable	>80%	>80%	Not applicable	60-80%	60-80%	Not applicable	<60%	<60%
	➔ FEV <sub>1</sub> /FVC*		>80%	Not applicable		75-80%	Not applicable		<75%	Not applicable
Validated questionnaires†										
➔ ATAQ*	Not applicable	Not applicable	0	Not applicable	Not applicable	1-2	Not applicable	Not applicable	3-4	
➔ ACQ*			≤0.75†			≥1.5			Not applicable	
➔ ACT*			≥20			16-19			≤15	
Risk	Asthma exacerbations requiring oral systemic corticosteroids <sup>§</sup>	0-1/year			2-3/year	≥2/year		>3/year	≥2/year	
		<i>Consider severity and interval since last asthma exacerbation.</i>								
	Reduction in lung growth/Progressive loss of lung function	Not applicable	Evaluation requires long-term follow-up care.		Not applicable	Evaluation requires long-term follow-up care.		Not applicable	Evaluation requires long-term follow-up care.	
Treatment-related adverse effects	<i>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.</i>									
Recommended Action for Treatment	<p>(See "Stepwise Approach for Managing Asthma Long Term," page 7)</p> <p>The stepwise approach is meant to help, not replace, the clinical decisionmaking needed to meet individual patient needs.</p>	Maintain current step.			Step up 1 step	Step up at least 1 step	Step up 1 step	Consider short course of oral systemic corticosteroids.		
		Regular follow-up every 1-6 months.			Reevaluate in 2-6 weeks to achieve control.			Step up 1-2 steps.		
		Consider step down if well controlled for at least 3 months.			For children 0-4 years, if no clear benefit observed in 4-6 weeks, consider adjusting therapy or alternative diagnoses.			Reevaluate in 2 weeks to achieve control.		
<p>Before step up in treatment: Review adherence to medication, inhaler technique, and environmental control. If alternative treatment was used, discontinue and use preferred treatment for that step. For side effects, consider alternative treatment options.</p>										

# NAEPP Stepwise Treatment: EPR-3

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	
<b>At each step:</b> Patient education, environmental control, and management of comorbidities							
0-4 years of age		<b>Intermittent Asthma</b>	<b>Persistent Asthma: Daily Medication</b> Consult with asthma specialist if step 3 care or higher is required. Consider consultation at step 2.				
	Preferred Treatment*	SABA* as needed	low-dose ICS*	medium-dose ICS*	medium-dose ICS* + either LABA* or montelukast	high-dose ICS* + either LABA* or montelukast	high-dose ICS* + either LABA* or montelukast + oral corticosteroids
	Alternative Treatment*†		cromolyn or montelukast				
	<i>If clear benefit is not observed in 4-6 weeks, and medication technique and adherence are satisfactory, consider adjusting therapy or alternate diagnoses.</i>						
Quick-Relief Medication	<ul style="list-style-type: none"> <li>SABA* as needed for symptoms; intensity of treatment depends on severity of symptoms.</li> <li>With viral respiratory symptoms: SABA every 4-6 hours up to 24 hours (longer with physician consult). Consider short course of oral systemic corticosteroids if asthma exacerbation is severe or patient has history of severe exacerbations.</li> <li>Caution: Frequent use of SABA may indicate the need to step up treatment.</li> </ul>						
5-11 years of age		<b>Intermittent Asthma</b>	<b>Persistent Asthma: Daily Medication</b> Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.				
	Preferred Treatment*	SABA* as needed	low-dose ICS*	low-dose ICS* + either LABA,* LTRA,* or theophylline <sup>(b)</sup>	medium-dose ICS* + LABA*	high-dose ICS* + LABA*	high-dose ICS* + LABA* + oral corticosteroids
	Alternative Treatment*†		cromolyn, LTRA,* or theophylline <sup>§</sup>	<b>OR</b> medium-dose ICS	medium-dose ICS* + either LTRA* or theophylline <sup>§</sup>	high-dose ICS* + either LTRA* or theophylline <sup>§</sup>	high-dose ICS* + either LTRA* or theophylline <sup>§</sup> + oral corticosteroids
	Consider subcutaneous allergen immunotherapy for patients who have persistent, allergic asthma.**						
Quick-Relief Medication	<ul style="list-style-type: none"> <li>SABA* as needed for symptoms. The intensity of treatment depends on severity of symptoms: up to 3 treatments every 20 minutes as needed. Short course of oral systemic corticosteroids may be needed.</li> <li>Caution: Increasing use of SABA or use &gt;2 days/week for symptom relief (not to prevent EIB*) generally indicates inadequate control and the need to step up treatment.</li> </ul>						
≥12 years of age		<b>Intermittent Asthma</b>	<b>Persistent Asthma: Daily Medication</b> Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.				
	Preferred Treatment*	SABA* as needed	low-dose ICS*	low-dose ICS* + LABA* <b>OR</b> medium-dose ICS*	medium-dose ICS* + LABA*	high-dose ICS* + LABA*	high-dose ICS* + LABA* + oral corticosteroid <sup>(b)</sup>
	Alternative Treatment*†		cromolyn, LTRA,* or theophylline <sup>§</sup>	low-dose ICS* + either LTRA,* theophylline, <sup>§</sup> or zileuton <sup>‡</sup>	medium-dose ICS* + either LTRA,* theophylline, <sup>§</sup> or zileuton <sup>‡</sup>	high-dose ICS* + LABA* <b>AND</b> consider omalizumab for patients who have allergies <sup>††</sup>	high-dose ICS* + LABA* + oral corticosteroid <sup>(b)</sup> <b>AND</b> consider omalizumab for patients who have allergies <sup>††</sup>
	Consider subcutaneous allergen immunotherapy for patients who have persistent, allergic asthma.**						
Quick-Relief Medication	<ul style="list-style-type: none"> <li>SABA* as needed for symptoms. The intensity of treatment depends on severity of symptoms: up to 3 treatments every 20 minutes as needed. Short course of oral systemic corticosteroids may be needed.</li> <li>Caution: Use of SABA &gt;2 days/week for symptom relief (not to prevent EIB*) generally indicates inadequate control and the need to step up treatment.</li> </ul>						

# Single Maintenance and Reliever Therapy or “SMART” Therapy for Asthma

# Combination Inhalers

- Combine 2 medications into 1 inhaler
  - Typically refers to the combination of an inhaled corticosteroid (ICS) and a long-acting beta-agonist (LABA)
- Studies have shown that adding a Long-Acting Beta Agonist (LABA) to an ICS is more effective than increasing the dose of ICS (Lancet 1994)
- IMPORTANT DISTINCTION:
  - LABA's are not all the same:
    - Salmeterol: delayed onset of action (20-30 minutes)
    - Formoterol: immediate onset of action, similar to albuterol

# Single Maintenance and Reliever Therapy (SMART)

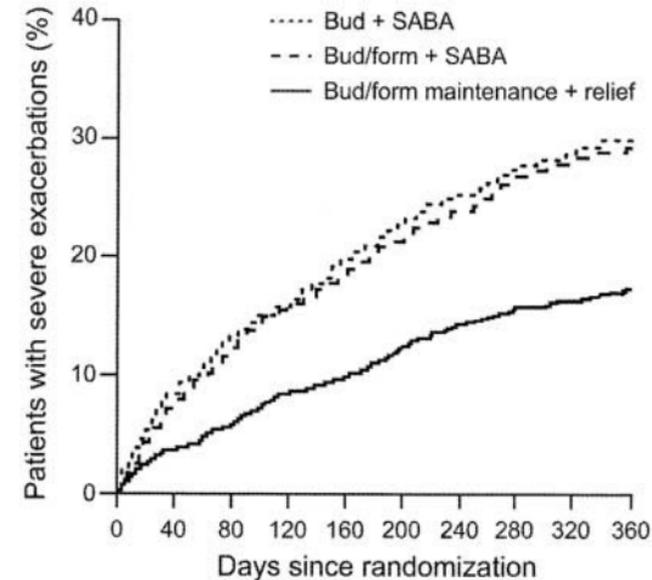
- SMART trial\*
  - Patients already receiving a low daily maintenance dose of budesonide/formoterol (bud/form-Symbicort), replacing (SABA- albuterol) reliever therapy with the as-needed bud/form combination
  - Allows patients to adjust their anti-inflammatory therapy while simultaneously obtaining rapid relief from symptoms.
  - Outcome measures: reduced asthma exacerbations and improve asthma control

\*O'Byrne PM, Bisgaard H, Godard PP, Pistolesi M, Palmqvist M, Zhu Y, Ekström T, Bateman ED. Budesonide/formoterol combination therapy as both maintenance and reliever medication in asthma. *Am J Respir Crit Care Med*. 2005 Jan 15;171(2):129-36. doi: 10.1164/rccm.200407-884OC. Epub 2004 Oct 22. PMID: 15502112.

# SMART Trial\*

- Randomized, double-blind, 1-year study
- 2,760 patients with asthma aged 4–80 years
- Maintenance dose of budesonide
  - mean daily dose of 640 µg/day in adults and 320 µg/day in children)
- Bud/form for maintenance AND relief (*less than maintenance group*)
  - mean daily dose of budesonide of 240 µg/day in adults and 126 µg in children
- Results
  - ✓ Reduced total severe exacerbations
  - ✓ Reduced exposure to oral steroids
  - ✓ Reduced reliever medication use
  - ✓ Decreased night-time symptoms
  - ✓ Improved lung function

- Time to first exacerbation



\*O'Byrne PM, Bisgaard H, Godard PP, Pistolesi M, Palmqvist M, Zhu Y, Ekström T, Bateman ED. Budesonide/formoterol combination therapy as both maintenance and reliever medication in asthma. Am J Respir Crit Care Med. 2005 Jan 15;171(2):129-36. doi: 10.1164/rccm.200407-884OC. Epub 2004 Oct 22. PMID: 15502112.

# Case #1

- **HPI:** Athleta is a 6-year-old who is in the office for an asthma follow-up visit. She was recently admitted to the hospital for an asthma exacerbation and not sure what triggered the event. She typically spends weekends at her grandmother's house and sleeps on the carpet on the floor.
- **Current asthma management:** Low-dose ICS inhaler and albuterol as needed. She uses her albuterol 2-3 times a week at night due to cough and shortness of breath, even when she is not sick
- **Physical exam** is normal with no wheezing or cough
- **Asthma Control Assessment:** Poorly controlled asthma based on the frequency of symptoms and albuterol use

# Treatment Plan (Case #1)

Lab results: Immunocap positive for cockroach, mice and dust

Treatment: LABA-ICS (low dose) as single therapy for controller and rescue Multi-component environmental trigger reduction strategies

***Recommendation: In individuals ages 4 years and older with moderate to severe persistent asthma, the Expert Panel recommends ICS-formoterol in a single inhaler used as both daily controller and reliever therapy compared to either a higher-dose ICS as daily controller therapy and SABA for quick-relief therapy or the same-dose ICS-LABA as daily controller therapy and SABA for quick-relief therapy.***

In children less than 12 years old ICS-formoterol can be used up to 8 puffs daily.

# NAEPP 2020 EPR-4 Update

AGES 5-11 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA						
	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 5-11 Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-formoterol <sup>▲</sup>	Daily and PRN combination medium-dose ICS-formoterol <sup>▲</sup>	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LTRA,* or daily low-dose ICS + Theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* + oral systemic corticosteroid or daily high-dose ICS + Theophylline* + oral systemic corticosteroid, and PRN SABA
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy <sup>▲</sup>			Consider Omalizumab <sup>**▲</sup>	

# SMART Implementation

## Children 4-11 years

- With moderate –severe persistent asthma
- On low or medium dose ICS (step 2 or 3 therapy)
- Preferred treatment: combination inhaler with ICS-Formoterol (Symbicort or Dulera)
  - **NOT ADVAIR or BREO**
- Used both daily and as needed
  - Rescue dose 1-2 puffs as needed for asthma symptoms
  - Maximum puffs per day
    - Age 4-11 = 8 puffs

## Case #2

- Jalen is a 15-year-old with known asthma at a well childcare visit.
- He was taking Flovent 44 mcg 2 puffs twice daily which was increased to Flovent 110 mcg 2 puffs twice daily at his last admission for an asthma exacerbation. He also takes montelukast 10 mg daily and cetirizine 10 mg daily at bedtime
- He continues to have nighttime symptoms 2-3 times a week and is using his albuterol 2-3 times a week for daytime symptoms.
- His Asthma Control test is 16 and he has required 3 steroid bursts in the last year
- Physical Exam: Allergic shiners with good BS bilaterally and no wheezing

## Treatment Plan (Case #2)

PFT's: FEV1- 75% predicted, FEV1/FVC- 80% predicted, FEF 25- 75%- 70% predicted

Treatment: **ICS-LABA single therapy used twice daily and prn for quick relief**

***Recommendation: In individuals ages 12 years and older with moderate to severe persistent asthma, the Expert Panel conditionally recommends ICS-formoterol in a single inhaler used as both daily controller and reliever therapy compared to higher-dose ICS-LABA as daily controller therapy and SABA for quick-relief therapy.***

In children 12 years or older, ICS-formoterol can be used up to 12 puffs daily

# NAEPP 2020 EPR-4 (1)

## AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma In Individuals Ages 12+ Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6 <sup>■</sup>
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA ▲	Daily and PRN combination low-dose ICS-formoterol ▲	Daily and PRN combination medium-dose ICS-formoterol ▲	Daily medium-high dose ICS-LABA + LAMA and PRN SABA ▲	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA, ▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA ▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy ▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

# NAEPP 2020 EPR-4 (2)

In patients 12 years and older with MILD Persistent asthma:

- Treatment options for Step 2 therapy
  - 1) Daily low-dose ICS and as needed SABA
  - 2) Intermittent as-needed SABA AND ICS (one after the other) for worsening asthma symptoms
    - 2-4 puffs of albuterol followed by 80-250 mcg beclomethasone (or equivalent) every 4 hours as needed for asthma symptoms

# NAEPP 2020 EPR-4 (3)

## AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma In Individuals Ages 12+ Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6 <sup>■</sup>
<b>Preferred</b>	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA ▲	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily medium-high dose ICS-LABA + LAMA and PRN SABA ▲	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA
<b>Alternative</b>		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA,▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA ▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

# NAEPP 2020 EPR-4 (4)

## Stepwise Recommended Medication Escalation Treatment for Managing Asthma Long Term

Adapted from [2020 Focused Updates to the Asthma Management Guidelines: Clinician's Guide](#)

Age, years	Step 1	Step 2	Step 3	Step 4	Step 5 <sup>†</sup>	Step 6 <sup>†</sup>
Symptoms	Intermittent	Mild Persistent	Moderate Persistent	Severe Persistent		
<b>0-4** Preferred</b>	SABA as needed for symptoms  And at the start of RTI add short course of daily ICS	Low-dose ICS and prn SABA	Medium dose ICS and prn SABA.	Daily medium-dose ICS-LABA and prn SABA	Daily high-dose ICS-LABA and prn SABA	Daily high-dose ICS-LABA + OCS and prn SABA
<b>5-11 Preferred</b>	SABA as needed for symptoms	Daily Low-dose ICS	Daily and PRN combination low-dose ICS-formoterol	Daily and prn medium-dose ICS-formoterol	Daily high-dose ICS-LABA and prn SABA	Daily high-dose ICS-LABA + OCS and prn SABA
<b>≥ 12 Preferred</b>	SABA as needed for symptoms	Daily Low-Dose ICS and prn SABA or PRN concomitant ICS and SABA	Daily and prn combination low-dose ICS-formoterol	Daily and PRN combination medium-dose ICS-formoterol	Daily medium or high-dose ICS-LABA + LAMA and prn SABA	Daily high-dose ICS-LABA + OCS + prns SABA
<b>Quick Relief</b>	Use SABA as needed for symptoms. The intensity of treatment depends on the severity of symptoms: up to 3 treatments at 20-minute intervals as needed.  *In steps 3 and 4, the preferred option includes the use of ICS-formoterol 1 to 2 puffs as needed up to a maximum total daily maintenance and rescue dose of 8 puffs (< 12 years) and 12 puffs (> 12 years).					
*Preferred **Adapted from <a href="#">2020 NHLBI Asthma Focused Updates</a>						

<sup>†</sup>Consider Asthma Biologics

- Assess asthma control:
  - First check adherence, inhaler technique, environmental factors, and comorbid conditions
  - Step up if needed; reassess in 2-6 weeks
  - Step down if possible (if asthma is well controlled for at least 3 consecutive months)
- Consult with an asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

<https://www.chop.edu/clinical-pathway/asthma-known-or-new-diagnosis-clinical-pathway> Accessed 3/13/21

# Mild Intermittent or Exercise-induced Asthma

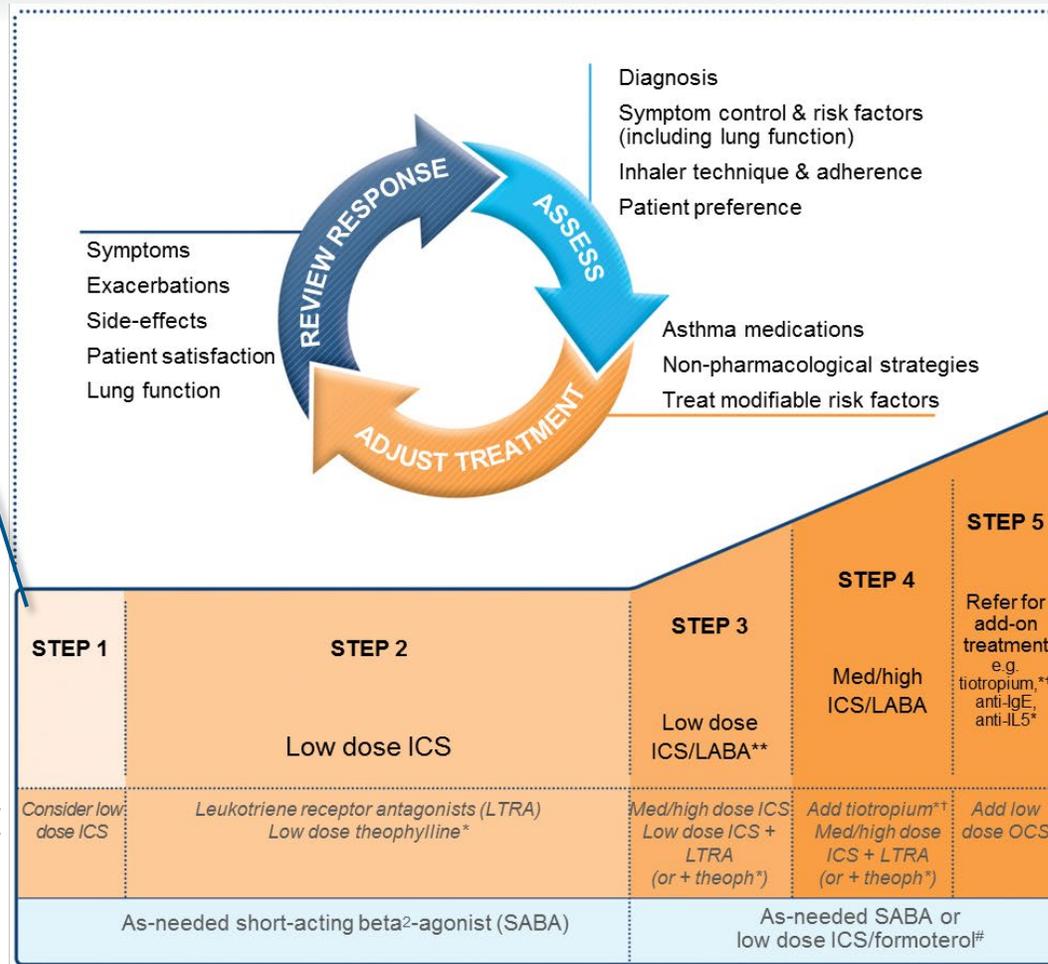


# GINA 2018 – main treatment figure



Step 1 treatment is for patients with symptoms <twice/month and no risk factors for exacerbations

Previously, no controller was recommended for Step 1, i.e. SABA-only treatment was 'preferred'



\*Not for children <12 years  
 \*\*For children 6-11 years, the preferred Step 3 treatment is medium dose ICS  
 #For patients prescribed BDP/formoterol or BUD/formoterol maintenance and reliever therapy  
 † Tiotropium by mist inhaler is an add-on treatment for patients ≥12 years with a history of exacerbations

# GINA 2018 – main treatment figure (continued)

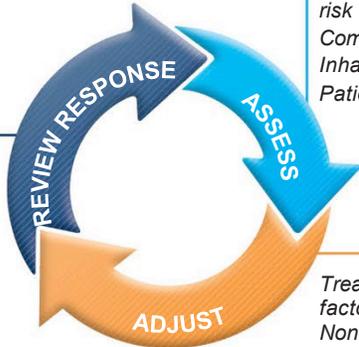


**Box 3-5A**  
**Adults & adolescents 12+ years**

**Personalized asthma management:**  
 Assess, Adjust, Review response

'Controller' treatment means the treatment taken to prevent exacerbations

**Asthma medication options:**  
 Adjust treatment up and down for individual patient needs



Confirmation of diagnosis if necessary  
 Symptom control & modifiable risk factors (including lung function)  
 Comorbidities  
 Inhaler technique & adherence  
 Patient goals

Symptoms  
 Exacerbations  
 Side-effects  
 Lung function  
 Patient satisfaction

Treatment of modifiable risk factors & comorbidities  
 Non-pharmacological strategies  
 Education & skills training  
 Asthma medications

**PREFERRED CONTROLLER**

to prevent exacerbations and control symptoms

Other controller options

**PREFERRED RELIEVER**

Other reliever option

**STEP 1**

As-needed low dose ICS-formoterol \*

Low dose ICS taken whenever SABA is taken †

**STEP 2**

Daily low dose inhaled corticosteroid (ICS), or as-needed low dose ICS-formoterol \*

Leukotriene receptor antagonist (LTRA), or low dose ICS taken whenever SABA taken †

**STEP 3**

Low dose ICS-LABA

Medium dose ICS, or low dose ICS+LTRA #

**STEP 4**

Medium dose ICS-LABA

High dose ICS, add-on tiotropium, or add-on LTRA #

**STEP 5**

High dose ICS-LABA

Refer for phenotypic assessment ± add-on therapy, e.g. tiotropium, anti-IgE, anti-IL5/5R, anti-IL4R

Add low dose OCS, but consider side-effects

As-needed low dose ICS-formoterol \*

As-needed low dose ICS-formoterol ‡

As-needed short-acting  $\beta_2$ -agonist (SABA)

\* Off-label; data only with budesonide-formoterol (bud-form)

† Off-label; separate or combination ICS and SABA inhalers

‡ Low-dose ICS-form is the reliever for patients prescribed bud-form or BDP-form maintenance and reliever therapy

# Consider adding HDM SLIT for sensitized patients with allergic rhinitis and FEV<sub>1</sub> >70% predicted

# Future Therapy Option for Asthma-

- Albuterol–Budesonide Fixed-Dose Combination Rescue Inhaler for Asthma
  - A total of 3132 patients underwent randomization, among whom 97% were 12 years of age or older.
  - The risk of severe asthma exacerbation was significantly lower, by 26%, in the higher-dose combination group than in the albuterol-alone group (hazard ratio, 0.74; 95% confidence interval [CI], 0.62 to 0.89; P=0.001).
- CONCLUSIONS
  - The risk of severe asthma exacerbation was significantly lower with as-needed use of a fixed-dose combination of 180 µg of albuterol and 160 µg of budesonide than with as-needed use of albuterol alone among patients with uncontrolled moderate to-severe asthma who were receiving a wide range of inhaled glucocorticoid-containing maintenance therapies
- Airsupra (Astra Zeneca) is FDA approved and is expected to be available in 2024

Papi A, Chipps BE, Beasley R, Panettieri RA Jr, Israel E, Cooper M, Dunsire L, Jeynes-Ellis A, Johnsson E, Rees R, Cappelletti C, Albers FC. Albuterol-Budesonide Fixed-Dose Combination Rescue Inhaler for Asthma. N Engl J Med. 2022 Jun 2;386(22):2071-2083. doi: 10.1056/NEJMoa2203163. Epub 2022 May 15. PMID: 35569035.

# Written Asthma Action Plans

- Important chronic care document
  - Helps patients/caregivers know what medications to take on a daily basis to control their asthma
  - Explains what they should do if they have increased asthma symptoms
  - Explains what to do if they have respiratory distress and documents clinic phone numbers
- See MDH Asthma Program “November News” for great information!

# Asthma Action Plan- HCMC

## My Asthma Action Plan

Name: **Merry Deere**

Date: **05/20/2010**

My Doctor or Clinic: **HCMC General Medicine**

My Doctor or Clinic Phone: **612-873-2300**

My Asthma Severity: **Moderate Persistent**

My Peak Flow Number: **618**

Avoid your asthma triggers: **Smoke , Colds/flu**

 <b>GO</b>  • I feel good • No cough or wheeze • Can work, sleep and play without asthma symptoms My peak flow number is above <b>494</b>	<b>Green Zone: Asthma in good control</b> 1. Take your asthma <u>control medicine</u> every day: • <b>Fluticasone/Salmeterol Inhaler 250 mcg/50 mcg (Advair) 1 puff twice a day</b> 2. If exercise triggers your asthma, take: • <b>Albuterol Neb (AccuNeb) 0.63mg/3ml</b> • 15 minutes before exercise or sports, and • during exercise if you have asthma symptoms 3. Spacer to use with inhaler: <b>No inhaler</b>
 <b>Slow</b>  I have <u>any</u> of these: • I do not feel good • Cough or wheeze • Chest feels tight • Wake up at night My peak flow number is between <b>309 and 494</b>	<b>Yellow Zone: Asthma getting worse</b> 1. Keep taking your Green Zone medicines. 2. Start taking your <u>rescue medicine</u> : • <b>Albuterol Neb (AccuNeb) 0.63mg/3ml</b> every 20 minutes for up to 1 hour. Then every 4 hours for 24-48 hours. 3. If you do not return to the Green Zone in 12-24 hours, or you get worse, start taking your <u>oral steroid medicine</u> : • <b>Prednisone Tablet, 30.0 mg, Twice a day for 5 days.</b> 4. If you stay in the Yellow Zone for more than 12-24 hours, call your doctor.
 <b>Stop</b>  I have <u>any</u> of these: • I feel awful • Medicine not helping • Breathing getting harder • Trouble walking or talking • Nose opens wide to breathe My peak flow number is below <b>309</b>	<b>Red Zone - Medical Alert - Get help</b> 1. Take your <u>rescue medicine</u> NOW: • <b>Albuterol Neb (AccuNeb) 0.63mg/3ml</b> 2. Take your oral <u>steroid medicine</u> NOW: • <b>Prednisone Tablet, 30.0 mg, Twice a day for 5 days.</b> 3. Call your doctor NOW. 4. If you are still in the Red Zone after 20 minutes, and you have not reached your doctor: • Take your rescue medicine again, and • Call 911 or go to the emergency room right away.

Clinic or provider for follow up: **HCMC General Medicine, 612-873-2300**

When: **1 months**

Electronically signed by: **Brottman, MD**

Person given Asthma Action Plan and Trigger Control sheet: **The patient**

# Asthma and COPD Medicines

Quick Reliever Medicines										How-To Videos	
<b>Short-Acting Beta<sub>2</sub>-Agonists (SABA)</b> <b>Albuterol Sulfate HFA Neb</b> (albuterol sulfate 2.5mg/3ml) <b>ProAir<sup>®</sup> Digihaler<sup>™</sup></b> (albuterol sulfate 17mg) <b>ProAir<sup>®</sup> RespiClick<sup>™</sup></b> (albuterol sulfate 17mg) <b>Proventil<sup>®</sup> HFA</b> (albuterol sulfate 120mg) <b>Ventolin<sup>®</sup> HFA</b> (albuterol sulfate 80mg) <b>Xopenex HFA<sup>®</sup></b> (levalbuterol tartrate 80mg) <b>Xopenex<sup>®</sup> Neb</b> (levalbuterol hydrobromide 2.27mg/2ml, 2.43mg/3ml, 1.22mg/2ml)											
<b>Short-Acting Muscarinic Antagonists (SAMA)</b> <b>Atrivent<sup>®</sup> HFA</b> (ipratropium bromide 17mg) <b>Atrivent<sup>®</sup> Neb</b> (ipratropium bromide 200000mcg)											
<b>Short-Acting Combinations (SABA-SAMA)</b> <b>Combivent<sup>®</sup> RespiMat<sup>™</sup></b> (ipratropium bromide and albuterol 20/100mcg) <b>DuoNeb<sup>®</sup></b> (ipratropium bromide and albuterol sulfate 0.2mg/2mg/3ml)											
Maintenance/Controller Medicines											
<b>Inhaled Corticosteroids (ICS) asthma only</b> <b>Aivaca<sup>®</sup> HFA</b> (beclomethasone 80/160mcg) <b>ArmonAir<sup>®</sup> RespiClick<sup>™</sup></b> (budesonide propionate 80/160/320mcg) <b>Asnuity<sup>®</sup> Ellipta<sup>™</sup></b> (budesonide 160/320mcg) <b>Azmanex<sup>®</sup> HFA</b> (mometasone furoate 50/100mcg) <b>Azmanex<sup>®</sup> Twisthaler<sup>™</sup></b> (mometasone furoate 150/300mcg) <b>Budesonide Inhalation Suspension</b> (0.25mg/2ml, 5mg/50ml, 1mg/10ml) <b>Flovent<sup>®</sup> Diskus<sup>™</sup></b> (fluticasone propionate 80/160/240mcg) <b>Flovent<sup>®</sup> HFA</b> (fluticasone propionate 40/160/240mcg) <b>Pulmicort<sup>®</sup> Flexhaler<sup>™</sup></b> (budesonide 80/160mcg) <b>Pulmicort Respules<sup>®</sup></b> (budesonide 0.25mg/2ml, 0.5mg/2ml, 1mg/2ml) <b>QVAR<sup>®</sup> Redihaler<sup>™</sup></b> (beclomethasone dipropionate 40/80mcg)											
<b>Combination Therapy (Inhaled Corticosteroid - Long-Acting Beta<sub>2</sub>-Agonists) (ICS-LABA)</b> <b>Advair Diskus<sup>®</sup></b> (fluticasone propionate and salmeterol 250/50, 250/100, 500/100mcg) <b>Advair<sup>®</sup> HFA</b> (fluticasone propionate and salmeterol 250/50, 250/100, 500/100mcg) <b>AirDuo<sup>®</sup> RespiClick<sup>™</sup></b> (fluticasone propionate and salmeterol 20/10, 20/20, 20/40mcg) <b>Breo<sup>®</sup> Ellipta<sup>™</sup></b> (fluticasone and vilanterol 100/20, 200/20mcg) <b>Symbicort<sup>®</sup></b> (budesonide and formoterol fumarate dihydrate 80/4.5, 160/9mcg) <b>Dulera<sup>®</sup></b> (budesonide and formoterol fumarate dihydrate 80/4.5, 160/9mcg) <b>Wixela<sup>®</sup> Inhub<sup>™</sup></b> (fluticasone propionate and salmeterol 100/50, 200/50, 500/50mcg)											
<b>Triple Therapy (ICS-LABA-LAMA)</b> <b>Trileyg Ellipta<sup>™</sup></b> (budesonide/formoterol combination 100mcg/2.2mg/20mcg) <b>Breztri Aerosphere<sup>®</sup></b> (budesonide, glycopyrrate, and formoterol fumarate 160/84.8mcg)											
<b>Long-Acting Muscarinic Antagonists (LAMA)</b> <b>Incruse<sup>®</sup> Ellipta<sup>™</sup></b> (acetylcholinesterase inhibitor 63.2mg) <b>Lonhala Magnair<sup>®</sup></b> (glycopyrrate 23mg/2ml) <b>Spiriva<sup>®</sup> HandHaler<sup>™</sup></b> (tiotropium bromide 18mg) <b>Spiriva<sup>®</sup> RespiMat<sup>™</sup></b> (tiotropium bromide 1.2mg) <b>Tudorza<sup>®</sup> Pressair<sup>™</sup></b> (aclidinium bromide 400mcg) <b>Yupelri<sup>®</sup> Neb</b> (methylxanthine 575mg/2ml)											
<b>Long-Acting Beta<sub>2</sub>-Agonists (LABA) COPD only</b> <b>Bronva<sup>®</sup> Neb</b> (arformoterol 10mg) <b>Perforomist<sup>®</sup> Neb</b> (formoterol fumarate dihydrate 20mg) <b>Serevent<sup>®</sup> Diskus<sup>™</sup></b> (salmeterol xinafoate 50mg) <b>Srivard<sup>®</sup> RespiMat<sup>™</sup></b> (indinaterol hydrobromide 2.2mg)											
<b>LAMA-LABA COPD only</b> <b>Anoro<sup>®</sup> Ellipta<sup>™</sup></b> (umeclidinium and vilanterol 68/22, 62/320mcg) <b>Brevozi Aerosphere<sup>®</sup></b> (glycopyrrate and formoterol 94.8mcg) <b>Duakir<sup>®</sup> Pressair<sup>™</sup></b> (aclidinium and formoterol 400/20mcg) <b>Stiolto<sup>®</sup> RespiMat<sup>™</sup></b> (tiotropium and formoterol fumarate 2.5/2.2mg)											
Add-On Medicines				Use a valved holding chamber/spacer				Definitions			
<b>Monoclonal Antibody (biologics, injection)</b> <b>Cinqair<sup>®</sup></b> (omalizumab 150mg) <b>Dupixent<sup>®</sup></b> (dupilumab 300/200/300mg) <b>Fasenra<sup>®</sup></b> (reslizumab 30mg) <b>Nucala<sup>®</sup></b> (mepolizumab 100mg) <b>Tezspire<sup>™</sup></b> (tezepelumab 210mg) <b>Xolair<sup>®</sup></b> (omalizumab 150/300mg)				<b>PDE4 Inhibitor</b> <b>Daliresp<sup>®</sup></b> (roflumilast 500/1000mcg)				<b>Leukotriene Receptor Antagonists (LTRA)</b> <b>Singular<sup>®</sup></b> (montelukast sodium 4.5/9mg) <b>Zyflo<sup>®</sup></b> (zileuton 600mg)			
								<ul style="list-style-type: none"> <li>• ICS = Inhaled Corticosteroid</li> <li>• ICS-LABA or LAMA-LABA = Combination Therapy</li> <li>• ICS-LABA-LAMA = Triple Therapy</li> <li>• LABA = Long-Acting Beta<sub>2</sub>-Agonist</li> <li>• LAMA = Long-Acting Muscarinic Antagonist</li> <li>• LTRA = Leukotriene Receptor Antagonist</li> <li>• SABA = Short-Acting Beta<sub>2</sub>-Agonist</li> <li>• SAMA = Short-Acting Muscarinic Antagonist</li> <li>• SMART = Single Maintenance and Reliever Therapy</li> </ul>			
Disease States: <b>A</b> Asthma <b>C</b> COPD <b>G</b> Generic <b>S</b> SMART Therapy											

**DRUG DELIVERY IS  
EVERYTHING!**

Always Demonstrate and Review the  
Proper use of Inhalers and Spacers

# Resources:

- Minnesota Department of Health Asthma Program
  - **[Asthma strategic plan for 2021-2030](https://www.health.state.mn.us/diseases/asthma/about/stateplan.html)**  
(<https://www.health.state.mn.us/diseases/asthma/about/stateplan.html>)
  - **[Asthma Medications: Tools and Resources for Health Care Providers](https://www.health.state.mn.us/diseases/asthma/medications/index.html)**  
(<https://www.health.state.mn.us/diseases/asthma/medications/index.html>)
- American Lung Association
  - **[Asthma Friendly Schools Initiative](https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/health-professionals-educators/asthma-friendly-schools-initiative)** (<https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/health-professionals-educators/asthma-friendly-schools-initiative>)

# Camp Superkids

## A Camp for Kids with Asthma

June 23-28, 2024



Volunteer at Camp Superkids, a camp for kids with asthma!!

## SAVE THE DATE

JUNE 23 - 28, 2024

YMCA Camp Ihduhapi - Loretto, MN

All medical professionals welcome!  
Read more about Camp Superkids here!



# CEU Credit information from MDH

- For One CEU credit, please click the link below, complete the form and a CEU certificate will be sent to you via e-mail.
- Please complete the form by December 21 at 5:00 pm to receive your CEU
- MDH will “open” access to the link at 2:30 pm on November 30 and close access at 5 pm on December 21.
- [CEU form \(https://forms.office.com/g/kH1kFyDDsf\)](https://forms.office.com/g/kH1kFyDDsf)

Thank You!

Questions?

