

ASTHMA MANAGEMENT: (S)MART AND AIR

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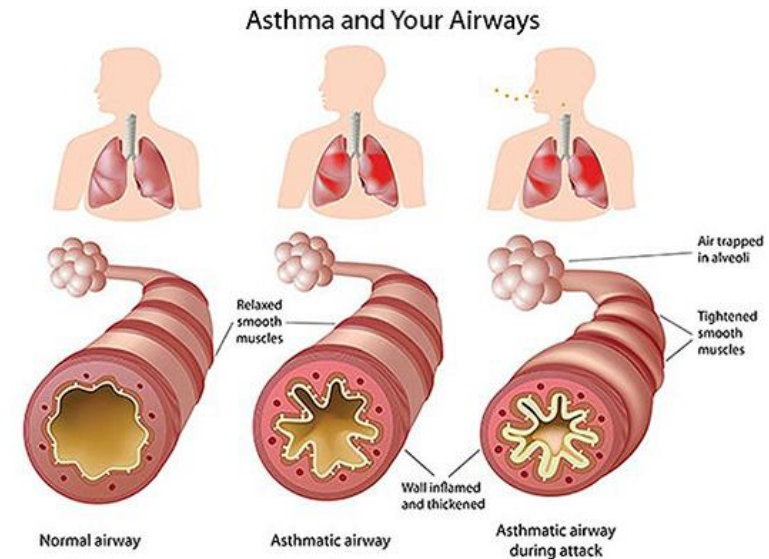
JANUARY 30, 2025

DISCLOSURES

- Nothing to disclose.

ASTHMA

- Heterogenous disorder
- Contains multiple phenotypes and endotypes
- **All phenotypes and endotypes → reversible airway obstruction from bronchial smooth muscle spasm and airway mucosal inflammation that causes variable expiratory airflow limitations**



ASTHMA MORBIDITY

- Most common medical diagnosis among children hospitalized in the US; 260 million children affected worldwide
 - Accounts for >5% nonsurgical admissions to the hospital
- Leading cause for emergency care visits
- Leading cause for missed school
- This is despite asthma morbidity and mortality being largely preventable

ASTHMA MORBIDITY

- Oral steroid courses are not benign
- Adverse effects in the short and long term, including:
 - Growth impairment
 - Reduced bone mineral density
 - Behavioral effects
 - Increased infection susceptibility

Aljebab, F. Arch Dis Child 2016

Bleecker, E. WAO J 2022

Gray, N. JAMA Pediatr 2017

Kamada, AK. Pediatr Allergy Immunol 1995

Kelly, HM. Pediatr 2008

Papadopoulos, N. Pediatr Allergy Immunol 2018

Price, D. Eur Respir Rev 2020

Yao, TC. JAMA Pediatr 2021



ENTER...SMART THERAPY

DECREASING SABA USE AND INCREASING ICS/LABA



SMART: SINGLE MAINTENANCE AND RELIEVER THERAPY

- 2019 Global Initiative for Asthma (GINA) report first recommended as needed ICS-formoterol in 2019 for adolescents and adults
- The 2020 National Asthma Education and Prevention Program (NAEPP) guidelines preferentially recommended this for step 3 and 4 therapy in those 4 years and older
- Most recently updated in the GINA 2024 guidelines
- New terminology is **MART** – **M**aintenance **A**nd **R**eliever **T**herapy with ICS-formoterol
- Another term is **AIR** – **A**nti-**I**nflammatory **R**eliever

Why not treat with inhaled short-acting beta₂-agonists (SABA) alone?



- SABA treats the symptoms, but not the disease
- People with apparently mild asthma can have severe or fatal exacerbations (*Dusser, 2007*)
 - Up to 27% asthma deaths are in patients with occasional symptoms (*Bergstrom, 2008*)
 - Exacerbation triggers are unpredictable (viral, allergen, pollution, stress)
 - Even 4–5 **lifetime** OCS courses increase the cumulative risk of adverse events including osteoporosis, diabetes, cataract, heart failure, pneumonia (*Price et al, J Asthma Allerg 2018*)
- **Regular** use of SABA, even for 1–2 weeks, is associated with increased AHR, reduced bronchodilator effect, increased allergic response, increased eosinophils (*e.g. Cockcroft 2006*)
 - Can lead to a vicious cycle encouraging overuse
 - Over-use of SABA is associated with ↑ exacerbations and ↑ mortality (*e.g. Suissa 1994, Nwaru 2020*)
- Starting treatment with SABA **trains** the patient to regard it as their primary asthma treatment
 - Poor adherence with ICS is almost inevitable
- There is strong evidence for a more effective and safer alternative than SABA alone, or ICS plus as-needed SABA: **as-needed ICS-formoterol**

The blue one's good because you can just have a couple of squirts and get back to what you were doing

Cole et al, BMJ Open 2013

Why is GINA Track 1 with ICS-formoterol preferred?

- n **Steps 1–2:** weight of evidence for effectiveness and safety compared with SABA alone, or low-dose ICS plus as-needed SABA (4x12 month studies, n~10,000) (*Crossingham et al, Cochrane 2021*)
 - § As-needed ICS-SABA: only one 6-month RCT (n=455) (*Papi et al, NEJMed 2007*)

- n **Steps 3–5:** weight of evidence for effectiveness and safety of MART versus regimens with as-needed SABA (n~30,000) (*Sobieraj et al, JAMA 2018; Cates et al, Cochrane 2013*)
 - § As-needed ICS-SABA: only one RCT (n=3,132) vs as-needed SABA (*Papi et al, NEJMed 2022*); cannot be used for maintenance and reliever therapy

- n Both the ICS and the formoterol contribute to reduction in severe exacerbations (*Tattersfield et al, Lancet 2001; Pauwels et al, ERJ 2003; Rabe et al, Lancet 2006*)
 - § Safety established up to total 12 inhalations in any day, in large studies

- n **Simplicity of approach** for patients and clinicians
 - § A single medication for both symptom relief and maintenance treatment (if needed) from diagnosis
 - § Avoids confusion about inhaler technique with different devices
 - § Short-term increase in symptoms → patient increases the number of **as-needed** doses
 - § Step treatment down or up by changing the number of maintenance doses

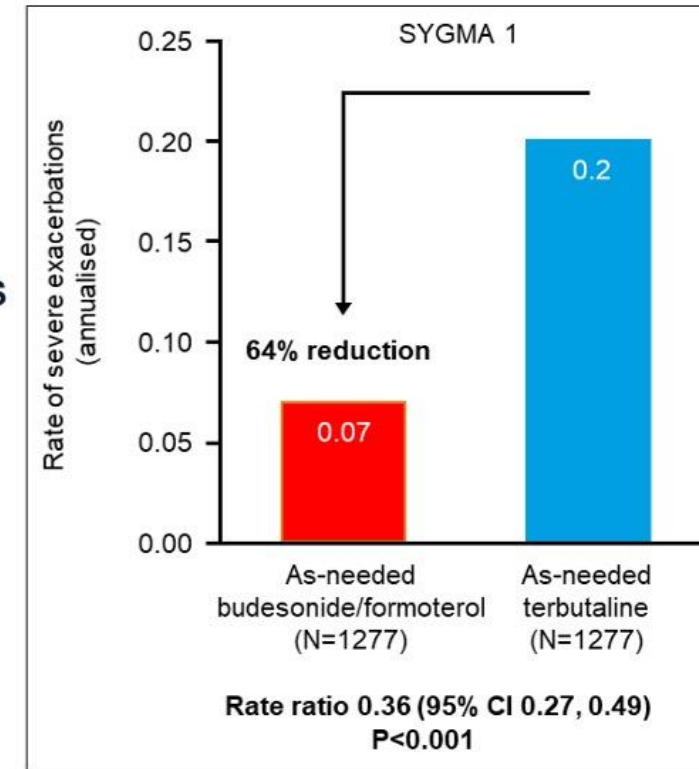
As-needed low-dose ICS-formoterol* in mild asthma (n=9,565)

COMPARED WITH AS-NEEDED SABA

- Risk of severe exacerbations reduced by 60–64% (SYGMA 1, Novel START)

COMPARED WITH MAINTENANCE LOW DOSE ICS plus as-needed SABA

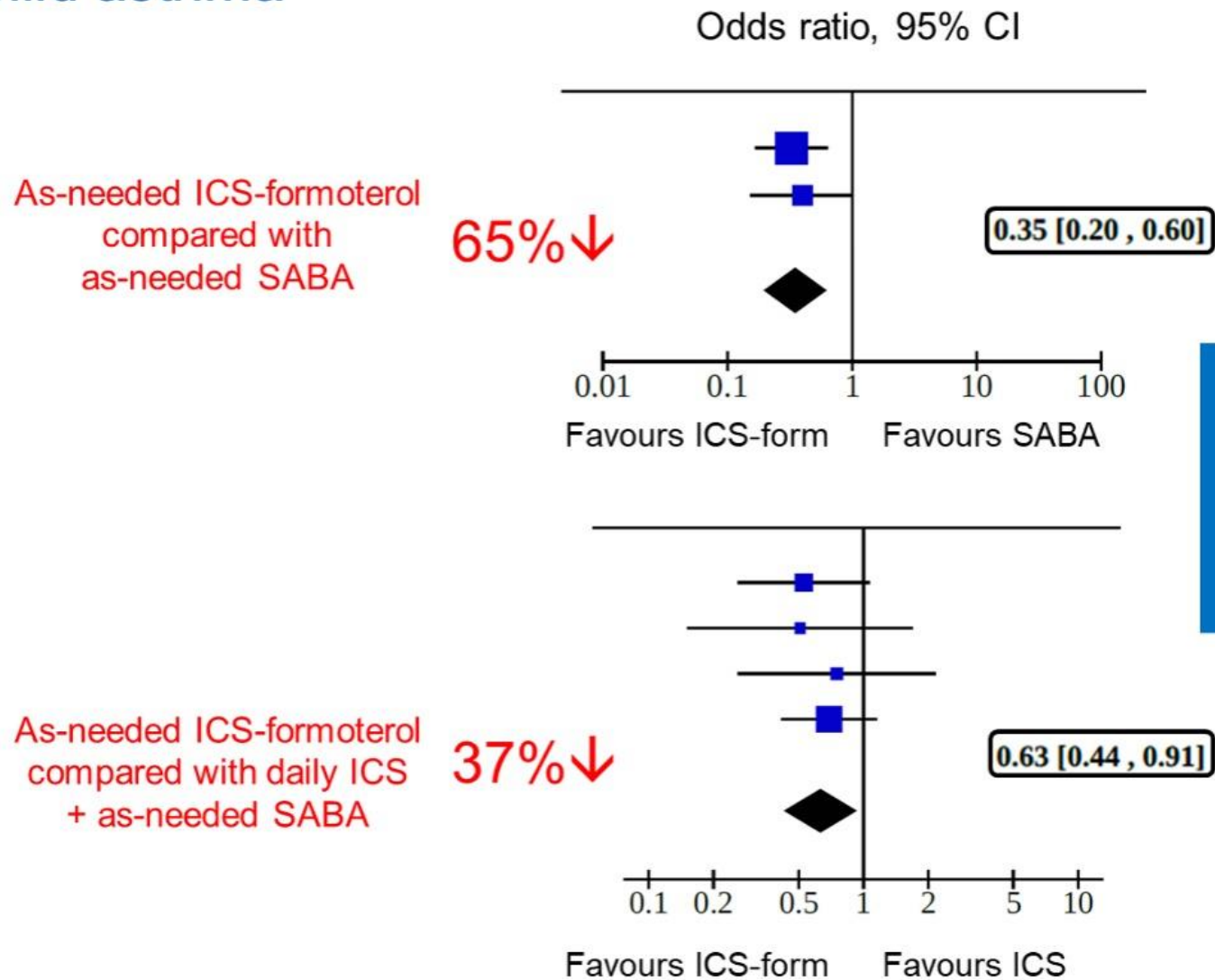
- Risk of severe exacerbations similar (SYGMA 1 & 2), or lower (Novel START, PRACTICAL)
- No clinically important differences in symptom control or FEV₁ (all 4 studies) or in FeNO (Novel START, PRACTICAL), and no worsening in these outcomes over 12 months
- Patients used the as-needed inhaler on ~30% of days: very low ICS dose
- Outcomes for severe exacerbations and ACQ-5 were independent of baseline characteristics including blood eosinophils, FeNO, lung function, history of exacerbations (Novel START, PRACTICAL)
- Embedded qualitative research demonstrated most patients preferred as-needed combination treatment over regular daily treatment (*Baggott 2020 & 2022; Foster 2020 & 2022*)



O'Byrne et al, NEJM 2018

*Budesonide-formoterol 200/6 [160/4.5] mcg, 1 inhalation as needed for symptom relief

As-needed-only ICS-formoterol reduces emergency visits and hospitalisations in patients with mild asthma



Approved by regulators in ~50 countries
Recommended in asthma guidelines of ~32 countries

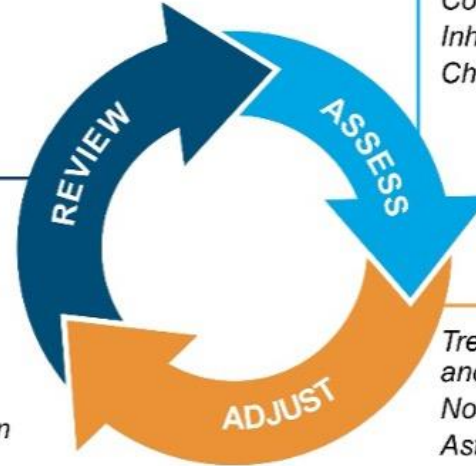
From Crossingham et al, Cochrane Database Syst Rev 2021 (n=9565)

GINA 2024 – Children 5 years and younger

Personalized asthma management:

Assess, Adjust, Review response

Symptoms
Exacerbations
Side-effects
Risk factors
Comorbidities
Child and parent/
caregiver satisfaction



Exclude alternative diagnoses
Symptom control & modifiable risk factors
Comorbidities
Inhaler technique & adherence
Child and parent/caregiver preferences and goals

Treat modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications
Education & skills training

Asthma medication options:

Adjust treatment up and down for individual child's needs

PREFERRED CONTROLLER CHOICE

STEP 1
(Insufficient evidence for daily controller)

STEP 2
Daily low dose inhaled corticosteroid (ICS)
(see Box 11-3 for ICS dose ranges for pre-school children)

STEP 3
Double 'low dose' ICS
(See Box 11-3)

STEP 4
Continue controller & refer for specialist assessment

Other controller options
(limited indications, or less evidence for efficacy or safety)

Consider intermittent short course ICS at onset of viral illness

Daily leukotriene receptor antagonist (LTRA[†]), or intermittent short course of ICS at onset of respiratory illness

Low dose ICS + LTRA[†]
Consider specialist referral

Add LTRA[†], or increase ICS frequency, or add intermittent ICS

RELIEVER

★ As-needed short-acting beta₂-agonist

CONSIDER THIS STEP FOR CHILDREN WITH:

Infrequent viral wheezing and no or few interval symptoms

Symptom pattern not consistent with asthma but wheezing episodes requiring SABA occur frequently, e.g. ≥3 per year. Give diagnostic trial for 3 months. Consider specialist referral.
Symptom pattern consistent with asthma, and asthma symptoms not well-controlled or ≥3 exacerbations per year.

Asthma diagnosis, and asthma not well-controlled on low dose ICS
Before stepping up, check for alternative diagnosis, check inhaler skills, review adherence and exposures

Asthma not well-controlled on double ICS

[†]Advise about risk of neuropsychiatric adverse effects

Personalized asthma management:

Assess, Adjust, Review

Symptoms
Exacerbations
Side-effects
Lung function
Comorbidities
Child and parent/
caregiver satisfaction



Confirmation of diagnosis if necessary
Symptom control & modifiable
risk factors (see Box 2-2)
Comorbidities
Inhaler technique & adherence
Child and parent/caregiver preferences and goals

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

Asthma medication options:

Adjust treatment up and down for individual child's needs

PREFERRED CONTROLLER

to prevent exacerbations and control symptoms



Other controller options
(limited indications, or less evidence for efficacy or safety)

RELIEVER

<p>STEP 1</p> <p>Low dose ICS taken whenever SABA taken*</p>	<p>STEP 2</p> <p>Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for children)</p>	<p>STEP 3</p> <p>Low dose ICS-LABA, OR medium dose ICS, OR very low dose ICS-formoterol maintenance and reliever therapy (MART)</p>	<p>STEP 4</p> <p>Refer for expert advice, OR medium dose ICS-LABA, OR low dose ICS-formoterol maintenance and reliever therapy (MART)</p>	<p>STEP 5</p> <p>Refer for phenotypic assessment ± higher dose ICS-LABA or add-on therapy, e.g. anti-IgE, anti-IL4Rα, anti-IL5</p>
	<p>Daily leukotriene receptor antagonist (LTRA[†]), or low dose ICS taken whenever SABA taken*</p>	<p>Low dose ICS + LTRA[†]</p>	<p>Add tiotropium or add LTRA[†]</p>	<p>As last resort, consider add-on low dose OCS, but consider side-effects</p>



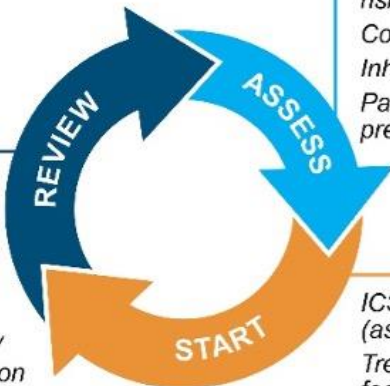
As-needed SABA (or ICS-formoterol reliever* in MART in Steps 3 and 4)

*Anti-inflammatory reliever; †advise about risk of neuropsychiatric adverse effects



GINA 2024 – STARTING TREATMENT in children aged 6–11 years with a diagnosis of asthma

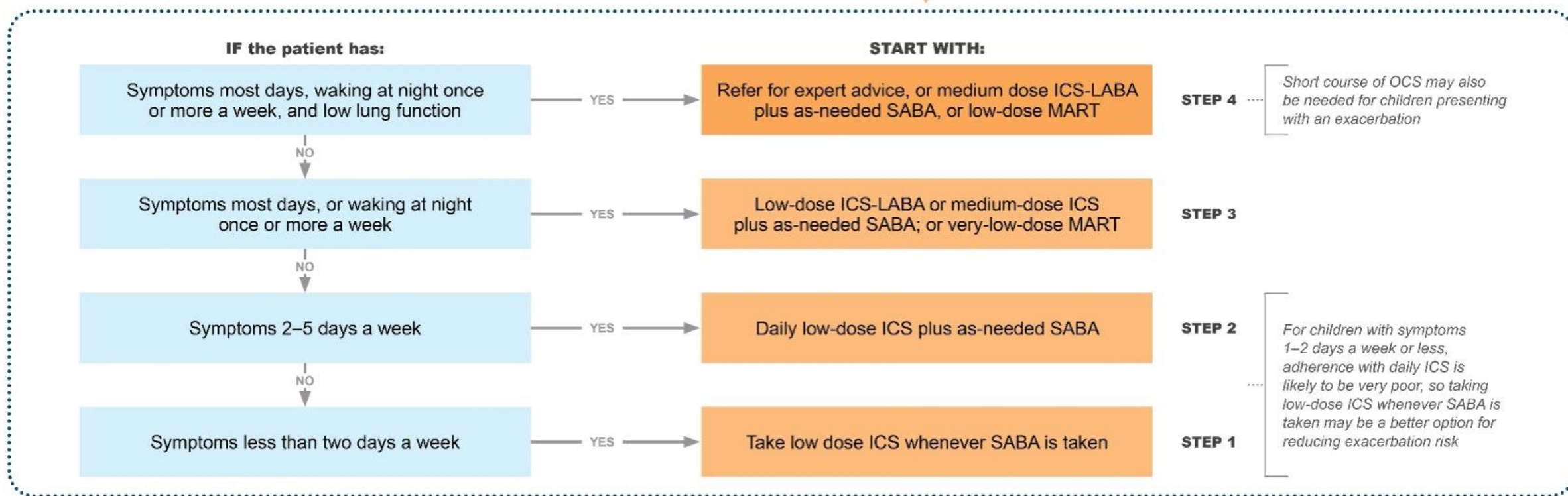
Symptoms
Exacerbations
Side-effects
Lung function
Comorbidities
Patient (and parent/
caregiver) satisfaction



Confirm diagnosis if necessary
Symptom control & modifiable
risk factors (see Box 2-2)
Comorbidities
Inhaler technique & adherence
Patient (and parent/caregiver)
preferences and goals

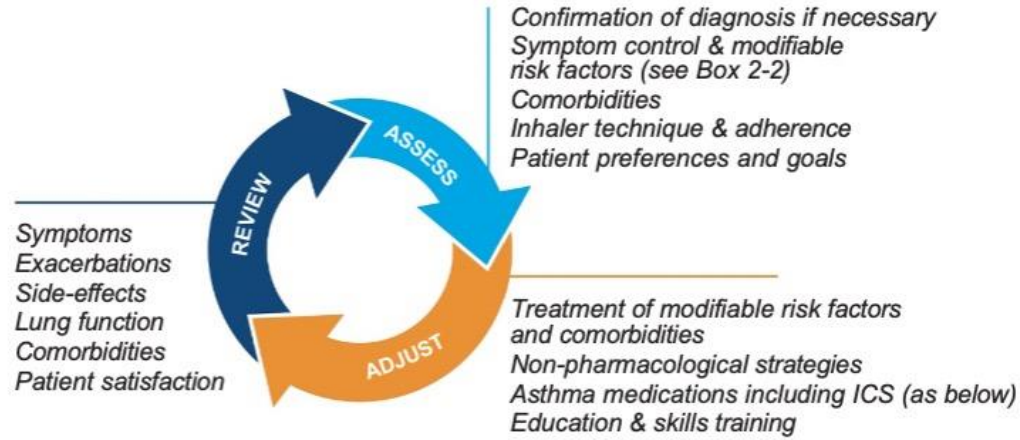
ICS-containing medications
(as below)
Treatment of modifiable risk
factors and comorbidities
Non-pharmacological strategies
Education & skills training

These recommendations are
based on the (little) available
evidence and consensus



GINA 2024 – Adults & adolescents 12+ years

Personalized asthma management
Assess, Adjust, Review
for individual patient needs



TRACK 1: PREFERRED CONTROLLER and RELIEVER

Using ICS-formoterol as the reliever* reduces the risk of exacerbations compared with using a SABA reliever, and is a simpler regimen



STEPS 1 – 2
As-needed-only low dose ICS-formoterol

STEP 3
Low dose maintenance ICS-formoterol

STEP 4
Medium dose maintenance ICS-formoterol

STEP 5
Add-on LAMA
Refer for assessment of phenotype. Consider high dose maintenance ICS-formoterol, ± anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

RELIEVER: As-needed low-dose ICS-formoterol*

TRACK 2: Alternative CONTROLLER and RELIEVER

Before considering a regimen with SABA reliever, check if the patient is likely to adhere to daily controller treatment



STEP 1
Take ICS whenever SABA taken*

STEP 2
Low dose maintenance ICS

STEP 3
Low dose maintenance ICS-LABA

STEP 4
Medium/high dose maintenance ICS-LABA

STEP 5
Add-on LAMA
Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

RELIEVER: As-needed ICS-SABA*, or as-needed SABA

Other controller options (limited indications, or less evidence for efficacy or safety – see text)

Low dose ICS whenever SABA taken*, or daily LTRA†, or add HDM SLIT	Medium dose ICS, or add LTRA†, or add HDM SLIT	Add LAMA or add LTRA† or add HDM SLIT, or switch to high dose ICS-only	Add azithromycin (adults) or add LTRA†. As last resort consider adding low dose OCS but consider side-effects
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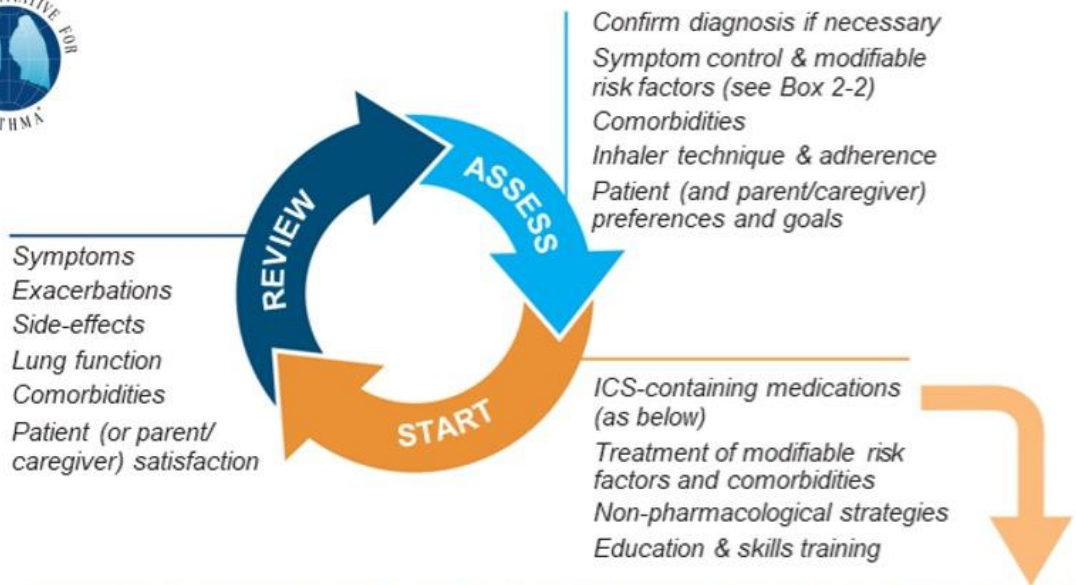
See GINA severe asthma guide

*Anti-inflammatory reliever; †advise about risk of neuropsychiatric adverse effects



GINA 2024 – STARTING TREATMENT
in adults and adolescents 12+ years with a diagnosis of asthma

These recommendations are based on the (little) available evidence and consensus



IF the patient has:	START WITH:	TRACK 1 (preferred)	OR	TRACK 2	
Daily symptoms, waking at night once a week or more and low lung function, or recent exacerbation	YES	Medium dose ICS-formoterol maintenance and reliever (MART)		Medium/high dose ICS-LABA + as-needed SABA (or ICS-SABA)	STEP 4 <i>Short course of OCS may also be needed for patients presenting during an exacerbation</i>
NO					
Symptoms most days, or waking at night once a week or more, or low lung function	YES	Low dose ICS-formoterol maintenance and reliever (MART)		Low dose ICS-LABA + as-needed SABA (or ICS-SABA)	STEP 3
NO					
Symptoms less than 3–5 days a week, with normal (or mildly reduced) lung function	YES	As-needed-only low dose ICS-formoterol		Low dose ICS + as-needed SABA (or ICS-SABA)	STEP 2 <i>In patients with symptoms 1–2 days a week or less, adherence with daily ICS would be very poor, so taking low-dose ICS whenever SABA is taken could reduce the risk of exacerbations</i>
				Take low dose ICS whenever SABA is taken	STEP 1



LET'S JUMP IN. HOW TO PRESCRIBE?



CHOOSING THE MEDICATION

- Studies primarily in budesonide-formoterol (Symbicort, Breyna)
 - Could consider mometasone-formoterol (Dulera)
- Recommended strengths and max inhalations are based on age
 - 6-11 years: 80/4.5, MAX 8 puffs per day
 - 12 years and older: 160/4.5 MAX 12 puffs per day
 - In studies, few patients have needed the max number
- Do not prescribe if another ICS-LABA is being used

DOSE RECOMMENDATIONS

MART Recommendations	Children 6-11 years 80/4.5 MAX 8 inhalations per day	Adolescents 12 and up 160/4.5 MAX 12 inhalations per day
Step 1	N/A	1 inhalation as needed
Step 2	N/A	1 inhalation as needed
Step 3	1 inhalation once daily + 1 as needed	1 inhalation once or twice a day plus 1 as needed
Step 4	1 inhalation once daily + 1 as needed	2 inhalations twice daily + 1 as needed
Step 5	Not recommended	2 inhalations twice daily + 1 as needed

TAKE HOME MESSAGE

- **NO SABA only. Also need ICS.**
 - For asthmatics 6 years and older

POTENTIAL PROVIDER QUESTIONS

- Does ICS-LABA work as quickly as a SABA for symptom and bronchoconstriction relief
 - Yes, same onset of action but the LABA lasts longer
- Is it safe?
 - Yes
 - Supported by a lot of evidence (Pool analysis of 6 DBRCT and 7 open label clinical trials, Cochrane Review of 13 trials, 2020 NAEPP Asthma Update recommendation)
- Will patients be less adherent to their maintenance dosing since the same medication is available for rescue?
 - It's possible, but studies have shown overall increased ICS-LABA use
- How much to prescribe for MART: Two budesonide-formoterol inhalers per month, but this is not always covered



THE ASTHMA PLAN



THE ONE-SIZE-FITS ALL PLAN

- Included in the PCCN Asthma Network Guide
- Can use for all asthma patients
- Will need to add MART/AIR specific info

<https://aafa.org/wp-content/uploads/2022/10/asthma-action-plan-aafa.pdf>

ASTHMA ACTION PLAN



The colors of a traffic light will help you use your asthma medicines.

- GREEN means Go Zone!**
Use preventive medicine.
- YELLOW means Caution Zone!**
Add quick-relief medicine.
- RED means Danger Zone!**
Get help from a doctor.

Name:	Date:
Doctor:	Medical Record #:
Doctor's Phone #: Day	Night/Weekend
Emergency Contact:	
Doctor's Signature:	

Personal Best Peak Flow: _____

GO		Use these daily controller medicines:		
		MEDICINE	HOW MUCH	HOW OFTEN/WHEN
You have <i>all</i> of these: <ul style="list-style-type: none"> Breathing is good No cough or wheeze Sleep through the night Can work & play 	Peak flow: 			
		For asthma with exercise, take:		
CAUTION		Continue with green zone medicine and add:		
		MEDICINE	HOW MUCH	HOW OFTEN/ WHEN
You have <i>any</i> of these: <ul style="list-style-type: none"> First signs of a cold Exposure to known trigger Cough Mild wheeze Tight chest Coughing at night 	Peak flow: 			
		CALL YOUR ASTHMA CARE PROVIDER.		
DANGER		Take these medicines and call your doctor now.		
		MEDICINE	HOW MUCH	HOW OFTEN/WHEN
Your asthma is getting worse fast: <ul style="list-style-type: none"> Medicine is not helping Breathing is hard & fast Nose opens wide Trouble speaking Ribs show (in children) 	Peak flow: 			

GET HELP FROM A DOCTOR NOW! Your doctor will want to see you right away. It's important!
If you cannot contact your doctor, go directly to the emergency room. DO NOT WAIT.
 Make an appointment with your asthma care provider within two days of an ER visit or hospitalization.

My Asthma Action Plan

For Single Inhaler Maintenance and Reliever Therapy (SMART) with budesonide/formoterol

Name: _____ Action plan provided by: _____

Date: _____ Doctor: _____

Usual best PEF: _____ L/min Doctor's phone: _____
(If used)

Normal mode

My SMART Asthma Treatment is:

- budesonide/formoterol 160/4.5 (12 years or over)
- budesonide/formoterol 80/4.5 (4-11 years)

My Regular Treatment Every Day:

(Write in or circle the number of doses prescribed for this patient)

Take [1, 2] inhalation(s) in the morning

and [0, 1, 2] inhalation(s) in the evening, every day

Reliever

Use 1 inhalation of budesonide/formoterol whenever needed for relief of my asthma symptoms

I should always carry my budesonide/formoterol inhaler

My asthma is stable if:

- I can take part in normal physical activity without asthma symptoms

AND

- I do not wake up at night or in the morning because of asthma

Other Instructions

Asthma Flare-up

If over a Period of 2-3 Days:

- My asthma symptoms are getting worse **OR NOT** improving **OR**
- I am using more than 6 budesonide/formoterol reliever inhalations a day (if aged 12 years and older) or more than 4 inhalations a day (if 4-11 years)

I should:

- Continue to use my regular everyday treatment **PLUS** 1 inhalation budesonide/formoterol whenever needed to relieve symptoms
- Start a course of prednisolone
- Contact my doctor

Course of Prednisolone Tablets:

Take _____ mg prednisolone tablets per day for _____ days **OR**

- If I need more than **12 budesonide/formoterol inhalations (total)** in any day, (or more than 8 inhalations for children 4-11 years) I **MUST** see my doctor or go to the hospital the same day

Asthma Emergency

Signs of an Asthma Emergency:

- Symptoms getting worse quickly
- Extreme difficulty breathing or speaking
- Little or no improvement from my budesonide/formoterol reliever inhalations.

If I have any of the above danger signs, I should dial _____ for an ambulance and say I am having a severe asthma attack.

While I am waiting for the ambulance start my asthma first aid plan:

- Sit upright and stay calm
- Take 1 inhalation of budesonide/formoterol. Wait 1-3 minutes. If there is no improvement take another inhalation of budesonide/formoterol (up to a maximum of 6 inhalations on a single occasion)
- If only albuterol is available, take 4 puffs as often as needed until help arrives
- Start a course of prednisolone tablets (as directed) while waiting for the ambulance
- Even if my symptoms appear to settle quickly, I should see my doctor immediately after a serious attack

A FEW NOTES FOR PATIENTS

- Can the ICS/LABA be used for exercise pretreatment?
 - Yes, if available. It provides greater protection from exercise-induced bronchospasm
- What should be used at school?
 - If ICS-formoterol is not available, use SABA instead
- What if they reach the max number of puffs?
 - Use albuterol or seek emergency treatment per plan. But in studies, reaching the max number was uncommon.
- What about in the Red Zone?
 - Use Albuterol if max doses of ICS-formoterol used
- Rinse mouth after ICS/LABA
- Let the provider know if there are issues getting the inhaler(s) or if it is cost prohibitive.

For this patient, which is the right class of medication?

⋮

For these medications, which inhalers are currently available to the patient?

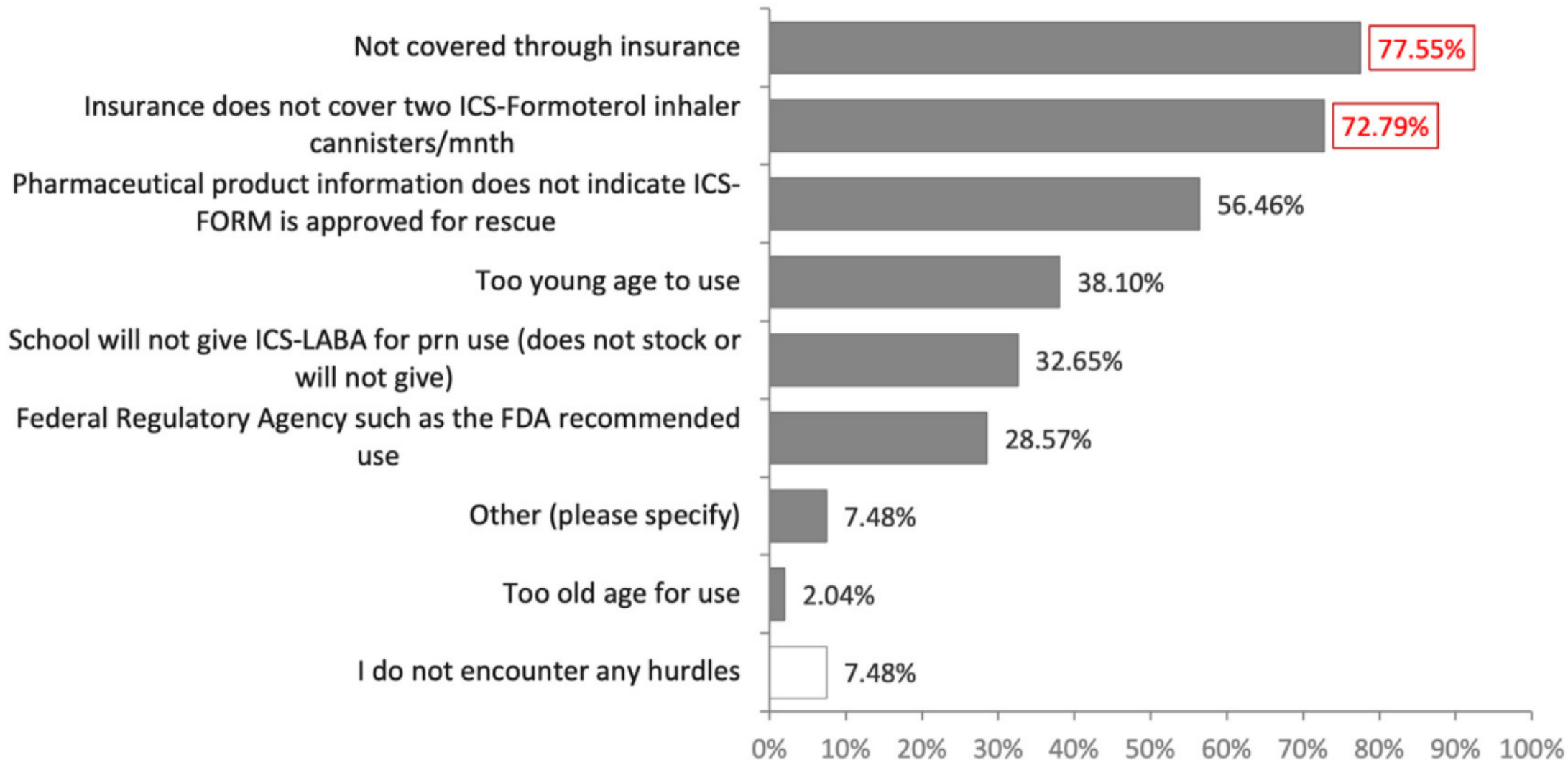
Which of these inhalers can the patient use correctly after training?

Which of these inhalers has the lowest environmental impact?

OPTIMAL INHALER SELECTION
Safest and best for the patient and for the planet

Follow-up:
Is the patient satisfied with the medication(s) and inhaler(s)?

Hurdles for prescribing one's preferred ICS-formoterol use



WHAT'S THE PROBLEM?

- (S)MART therapy is approved in over 120 countries
- BUT, most trials used the dry powder inhaler form and NOT the pressurized metered-dose inhaler (pMDI)
- To change the indication, supporting clinical trial data with the pMDI are needed
- So, ICS-formoterol inhalers are not FDA approved as rescue inhalers or for (S)MART therapy in the United States
 - Disclaimers are required
- Insurance coverage challenges also exist
 - Cost differences between SABA and ICS-LABA
 - Dispensing quantity limits
 - AHCCCS: step-up requirement removed thanks to PCCN, dispenses one inhaler only
 - Cigna: may require prior auth, allows for two inhalers

WHAT TO DO?

- We encourage continued prescribing of MART and AIR therapies since these treatments are proven to be effective
 - It is possible to use MART therapy in many eligible patients. Shared decision making and follow up is helpful
 - **Understanding up-to-date payor practices is important**
- Feel free to reach out to our Phoenix Children's specialists!
 - Our Allergy Immunology and Pulmonary divisions have physicians that specialize in treating the full range of asthma severities.
- **We want to be a resource and support you, whether it's seeing a patient once to offer input, following long term or anything else**
- Also, the Severe Asthma Clinic is a multidisciplinary clinic with both specialties and pharmacy support

ALSO AVAILABLE: CURRENT RESEARCH AND CAMP

- EAGLE: OM-85 (bacterial lysate) in 6 months to 5 year olds with wheezing episodes in the past year
- HORIZON: Tezepelumab in 5 to 11 year olds with severe asthma
- TREKIDS: Dupilumab in 2 to <6 year olds with uncontrolled asthma
- *Upcoming* ARIA: Trelegy Ellipa vs Breo Ellipta in 12-17 year olds with asthma
- Fun and educational asthma camp: Camp Not a Wheeze, June 1-7, 2025.
 - Camp Shadow Pines, Heber, AZ
 - <https://campnotawheeze.org>
 - If interested in flyers, can email info@campnotawheeze.org or Dr. Cindy Bauer at cbauer@phoenixchildrens.com.

ASTHMA MANAGEMENT FOCUS

- Phoenix Children's Care Network is continuing to make asthma management and provider support a high priority this year.
- Focus areas include:
 - (S)MART therapy
 - Asthma Action Plans
 - Asthma Control Test Scores
 - Asthma Medication Ratio information
- PCCN is continuing to evolve its resources to best help providers navigate these challenging but also very promising asthma management advances.



Phoenix Children's[®]
Care Network



NOT DONE YET – LAST SECTION!

REVIEWING ASTHMA INHALERS: NAVIGATING THE MAZE OF WHAT'S COVERED BY INSURANCE AND APPROPRIATE FOR THE PATIENT CAN BE VERY TOUGH



RECENT ASTHMA INHALER CHANGES

- GSK discontinued branded Flovent on Jan 1, 2024. Generics for Flovent HFA and Flovent Diskus are available.
- Teva is discontinuing all Digihaler products (ProAir, AirDuo, ArmonAir). ProAir and AirDuo Resplick will still be available.
- \$35 per month out of pocket caps on some inhalers

Boehringer Ingelheim	AstraZeneca	GSK
Caps started June 1st 2024	Caps started June 1st 2024	Caps started no later than Jan 1 2025
Atrovent HFA (ipratropium)	Symbicort (budesonide and formoterol fumarate, Breyna not listed)	Advair Diskus/HFA (fluticasone propionate and salmeterol)
Combivent Respimat (ipratropium/albuterol)		Arnuity Ellipta (fluticasone furoate)
Spiriva Handihaler/Respimat		Breo Ellipta (fluticasone and vilanterol)
		Ventolin HFA



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SHORT-ACTING BETA₂-AGONIST (SABA) BRONCHODILATORS

relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

Albuterol Sulfate Inhalation Solution 0.63, 1.25 mg, 2.5mg, 3 mL G N	ProAir RespiClick[®] 90 mcg albuterol sulfate inhalation powder DBB A	Proventil[®] HFA 90 mcg albuterol sulfate DBB A G	Ventolin[®] HFA 90 mcg albuterol sulfate DBB A G	Xopenex[®] 0.31, 0.63, 1.25 mg; 3 mL levosalbutamol hydrochloride inhalation solution A G N	Xopenex HFA[®] 45 mcg levosalbutamol tartrate A G
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SABA and ICS

contains SABA to relax airway muscles and offer quick relief of symptoms, and inhaled corticosteroid (ICS) to reduce inflamed airways

AIRSUPRA[®] 90/80 mcg albuterol and budesonide DBB A
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INHALED CORTICOSTEROIDS (ICS)

reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath

Alvesco[®] HFA 80, 160 mcg ciclesonide DBB A	Arnuity[®] Ellipta[®] 50, 100, 200 mcg fluticasone furoate inhalation powder DBB A	Asmanex[®] HFA 50, 100, 200 mcg mometasone furoate DBB A	Asmanex[®] Twisthaler[®] 110, 220 mcg mometasone furoate inhalation powder DBB A	Fluticasone Propionate Diskus Inhalation Powder 50, 100, 250 mcg authorized generic of Flovent Diskus DBB A	Fluticasone Propionate HFA 44, 110, 220 mcg authorized generic of Flovent HFA DBB A	Pulmicort Flexhaler[®] 90, 180 mcg budesonide inhalation powder DBB A	Pulmicort Respules[®] 0.25, 0.50, 1.0 mg, 2 mL budesonide inhalation suspension A G N	QVAR Redihaler[®] 40, 80 mcg beclomethasone dipropionate DBB A
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LONG-ACTING BETA₂-AGONIST (LABA) BRONCHODILATORS

relax tight muscles in airways and offer lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours

Brovana[®] 15 mcg; 2 mL formoterol tartrate inhalation solution G N	Perforomist[®] 20 mcg; 2 mL formoterol fumarate inhalation solution G N	Serevent[®] Diskus[®] 50 mcg salmeterol xinafoate inhalation powder DBB A C	Striverdi[®] Respimat[®] 2.5 mcg olodaterol hydrochloride DBB C
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MUSCARINIC ANTAGONISTS (ANTICHOLINERGICS)

relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

Atrovent[®] HFA 17 mcg ipratropium bromide DBB C	Incruse[®] Ellipta[®] 62.5 mcg umeclidinium powder DBB C	Ipratropium Bromide Inhalation Solution 0.5/3 mg; 3 mL G G N	Spiriva[®] HandiHaler[®] 18 mcg tiotropium bromide inhalation powder G	Spiriva[®] Respimat[®] 1.25, 2.5 mcg tiotropium bromide DBB A C	Tudorza[®] Pressair[®] 400 mcg acridinium bromide inhalation powder DBB C	Yupelri[®] 175 mcg; 3 mL revesefacin inhalation solution G N
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COMBINATION MEDICATIONS

contain ICS and LABA

Advair Diskus[®] 100/50, 250/50, 500/50 mcg fluticasone propionate and salmeterol inhalation powder DBB A C G	Advair[®] HFA 45/21, 115/21, 230/21 mcg fluticasone propionate and salmeterol xinafoate DBB A G	AirDuo[®] RespiClick[®] 55/14, 113/14, 232/14 mcg fluticasone propionate and salmeterol inhalation powder DBB A G	Breo[®] Ellipta[®] 50/25, 100/25, 200/25 mcg fluticasone furoate and vilanterol inhalation powder DBB A C G	Breyna[®] 80/4.5, 160/4.5 mcg budesonide and formoterol fumarate dihydrate (approved generic of Symbyac) DBB A C	Dulera[®] 50/5, 100/5, 200/5 mcg budesonide fumarate and formoterol fumarate dihydrate DBB A	Symbicort[®] 80/4.5, 160/4.5 mcg budesonide and formoterol fumarate dihydrate DBB A C G	Wixela Inhub[®] 100/50, 250/50, 500/50 mcg fluticasone propionate and salmeterol xinafoate (approved generic of Advair Diskus) DBB A C G
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contain LABA and long-acting muscarinic antagonist (LAMA)

Anoro[®] Ellipta[®] 62.5/25 mcg umeclidinium and vilanterol inhalation powder DBB C	Bevespi Aerosphere[®] 9/4, 8 mcg glycopyrrolate and formoterol fumarate DBB C	Duakir[®] Pressair[®] 400/12 mcg aclidinium bromide and formoterol fumarate DBB C	Stiolto[®] Respimat[®] 2.5/2.5 mcg tiotropium bromide and olodaterol DBB C
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contain ICS, LABA and LAMA

Trelegy[®] Ellipta[®] 200/62.5/25 mcg, 100/62.5/25 mcg fluticasone furoate, umeclidinium and vilanterol inhalation powder DBB A C	Breztri Aerosphere[®] 160/9/4, 8 mcg budesonide, glycopyrrolate and formoterol fumarate DBB C
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contain SABA and short-acting muscarinic antagonist (SAMA)

Combivent[®] Respimat[®] 20/100 mcg ipratropium bromide and albuterol DBB C	Ipratropium Bromide and Albuterol Sulfate Inhalation Solution 0.5mg/2.5mg; 3ml G G
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BIOLOGICS

target cells and pathways that cause airway inflammation; delivered by injection or IV

Cinqair[®] 62.5/25 mg reslizumab A	Dupixent[®] 100, 200, 300 mg dupilumab A	Fasenra[®] 30 mg benralizumab A	Nucala[®] 100 mg mepolizumab A	Tezspire[®] 210 mg tezepelumab-ekko A	Xolair[®] 75 to 375 mg omalizumab A
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Reviewed by Dennis Williams, PharmD

Generic versions of some brand name inhalers are not included on this poster. Generic inhalers may be a different color than brand name versions.

PDE4 INHIBITORS

target lung inflammation and reduce exacerbations

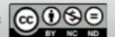
Daliresp[®] 250, 500 mcg roflumilast C
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LEUKOTRIENE MODIFIERS

block chemicals called leukotrienes that cause airway inflammation; available as tablet or granules

Singulair[®] 4, 5, 10 mg montelukast A	Zafirlukast 10, 20 mg A	Zileuton 600 mg A
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INHALED CORTICOSTEROIDS (ICS)

reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath

Alvesco® HFA
80, 160 mcg
ciclesonide
123 A



Arnuity® Ellipta®
50, 100, 200 mcg
fluticasone furoate inhalation powder
123 A



Asmanex® HFA
50, 100, 200 mcg
mometasone furoate
123 A



Asmanex® Twisthaler®
110, 220 mcg
mometasone furoate inhalation powder
123 A



Fluticasone Propionate Diskus Inhalation Powder
50, 100, 250 mcg
authorized generic of Flovent Diskus
123 A



Fluticasone Propionate HFA
44, 110, 220 mcg
authorized generic of Flovent HFA
123 A



Pulmicort Flexhaler®
90, 180 mcg
budesonide inhalation powder
123 A



Pulmicort Respules®
0.25, 0.50, 1.0 mg; 2 mL
budesonide inhalation suspension
A G N



QVAR Redihaler®
40, 80 mcg
beclomethasone dipropionate
123 A



- Flovent Alternatives:
 - **4 and under:** Pulmicort respules (approved 12 months-8 years), Fluticasone HFA (approved for 4 and older), Asmanex Twisthaler and Fluticasone Diskus are also approved at age 4 but proper technique may be an issue
 - **5 and over:** Can also use Asmanex HFA, Arnuity Ellipta (need to confirm breath-activated technique ability)
 - **6 and older:** Can also use Pulmicort Flexhaler, Qvar Redihaler (need to confirm breath-activated technique)
 - Although Qvar is approved for 4 and older, there are likely technique concerns when <6
 - **12 and older:** Can also use Alvesco HFA
- Breath-activated inhalers are NOT used with a spacer

COMBINATION MEDICATIONS contain ICS and LABA

Advair Diskus®
100/50, 250/50,
500/50 mcg
fluticasone propionate
and salmeterol
inhalation powder

123
A C G



Advair® HFA
45/21, 115/21,
230/21 mcg
fluticasone
propionate
and salmeterol
xinafoate

123 A G



AirDuo® RespiClick®
55/14, 113/14, 232/14 mcg
fluticasone propionate
and salmeterol
inhalation
powder

123 A G



Breo® Ellipta®
50/25, 100/25, 200/25 mcg
fluticasone furoate
and vilanterol
inhalation
powder

123
A C G



Breyna®
80/4.5, 160/4.5 mcg
budesonide
and
formoterol
fumarate
dihydrate (approved
generic of Symbicort)

123 A C



Dulera®
50/5, 100/5, 200/5 mcg
mometasone furoate
and formoterol
fumarate dihydrate

123 A



Symbicort®
80/4.5, 160/4.5 mcg
budesonide
and
formoterol
fumarate
dihydrate

123 A C G



Wixela Inhub®
100/50, 250/50, 500/50 mcg
fluticasone propionate
and salmeterol
xinafoate (approved
generic of
Advair Diskus)

123 A C



■ Name-brands

- Advair Diskus: 4 years and older (but 4-5 year olds may have technique limitations)
- Advair HFA: 12 years and older
- Breo Ellipta: 5 years and older (expanded approval in 2023, previously 18+)
- Dulera HFA: 5 years and older
- Symbicort HFA: 6 years and older
- AirDuo : 12 years and older
 - Same medication as Advair HFA, lower dose of salmeterol, uses a respiclick device

■ Generic

- Wixela Inhub (fluticasone/salmeterol) for Advair: 4 years and older (but 4-5+ year olds may have technique limitations)
- Breyna (budesonide/formoterol) for Symbicort: 6 years and older, approved in 2023

800.878.4403 • AllergyAsthmaNetwork.org Allergy & Asthma Network is a national nonprofit organization dedicated to ending needless death and suffering due to asthma, allergies and related conditions through outreach, education, advocacy and research.

SHORT-ACTING BETA₂-AGONIST (SABA) BRONCHODILATORS

relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

<p>Albuterol Sulfate Inhalation Solution 0.63, 1.25 mg, 2.5mg; 3 mL G N</p> 	<p>ProAir RespiClick® 90 mcg albuterol sulfate inhalation powder DI B A</p> 	<p>Proventil® HFA 90 mcg albuterol sulfate DI B A G</p> 	<p>Ventolin® HFA 90 mcg albuterol sulfate DI B A G</p> 	<p>Xopenex® 0.31, 0.63, 1.25 mg; 3 mL levosalbutamol hydrochloride inhalation solution A G N</p> 	<p>Xopenex HFA® 45 mcg levosalbutamol tartrate A G</p> 
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SABA and ICS

contains SABA to relax airway muscles and offer quick relief of symptoms, and inhaled corticosteroid (ICS) to reduce inflamed airways

AIRSUPRA®
90/80 mcg albuterol and budesonide
DI B A



18+





INHALED CORTICOSTEROIDS (ICS)

reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath

<p>Alvesco® HFA 80, 160 mcg ciclesonide DI B A</p>  <p>12+</p>	<p>Arnuity® Ellipta® 50, 100, 200 mcg fluticasone furoate inhalation powder DI B A</p>  <p>5+</p>	<p>Asmanex® HFA 50, 100, 200 mcg mometasone furoate DI B A</p>  <p>5+</p>	<p>Asmanex® Twisthaler® 110, 220 mcg mometasone furoate inhalation powder G</p>  <p>4+</p>	<p>Fluticasone Propionate Diskus Inhalation Powder 50, 100, 250 mcg authorized generic of Flovent HFA G</p>  <p>4+</p>	<p>Fluticasone Propionate HFA 44, 110, 220 mcg authorized generic of Flovent HFA G</p>  <p>4+</p>	<p>Pulmicort Flexhaler® 90, 180 mcg budesonide inhalation powder DI B A</p>  <p>6+</p>	<p>Pulmicort Respules® 0.25, 0.50, 1.0 mg; 2 mL budesonide inhalation suspension A G N</p>  <p>12m+</p>	<p>QVAR Redihaler® 40, 80 mcg beclomethasone dipropionate DI B A</p>  <p>6+</p>
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LONG-ACTING BETA₂-AGONIST (LABA) BRONCHODILATORS

relax tight muscles in airways and offer lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours

<p>Brovana® 15 mcg; 2 mL formoterol fumarate dihydrate COPD</p> 	<p>Perforomist® 20 mcg; 2 mL formoterol fumarate dihydrate CA</p> 	<p>Serevent® Diskus® 50 mcg salmeterol xinafoate 4+, w/ ICS, not used</p> 	<p>Striverdi® RespiMat® 2.5 mg salmeterol xinafoate COPD</p> 
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MUSCARINIC ANTAGONISTS (ANTICHOLINERGICS)

relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

<p>Atrovent® HFA 17 mcg ipratropium bromide DI B G</p> 	<p>Incruse® Ellipta® 62.5 mcg umecidinium inhalation powder DI B C</p> 	<p>Ipratropium Bromide Inhalation Solution 0.5/3 mg; 3 mL C G N</p> 	<p>Spiriva® HandiHaler® 18 mcg tiotropium bromide inhalation powder C</p> 	<p>Spiriva® Respimat® 1.25, 2.5 mcg tiotropium bromide DI B A C</p> 	<p>Tudorza® Pressair® 400 mcg aclidinium bromide inhalation powder DI B C</p> 	<p>Yupelri® 175 mcg; 3 mL tiotropium bromide inhalation solution C N</p> 
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COMBINATION MEDICATIONS

contain ICS and LABA

<p>Advair Diskus® 100/50, 250/50, 500/50 mcg fluticasone propionate and salmeterol inhalation powder 4+</p> 	<p>Advair® HFA 45/21, 115/21, 230/21 mcg fluticasone propionate and salmeterol 12+</p> 	<p>AirDuo® RespiClick® 55/14, 113/14, 232/14 mcg fluticasone propionate and salmeterol inhalation powder 12+</p> 	<p>Breo® Ellipta® 50/25, 100/25, 200/25 mcg fluticasone furoate and vilanterol inhalation powder 5+</p> 	<p>Breyna® 80/4.5, 160/4.5 mcg budesonide and formoterol fumarate dihydrate (approved generic of Breyna) 6+</p> 	<p>Dulera® 50/5, 100/5, 200/5 mcg mometasone furoate and formoterol fumarate dihydrate DI B A 5+</p> 	<p>Symbicort® 80/4.5, 160/4.5 mcg budesonide and formoterol fumarate dihydrate DI B A G G 6+</p> 	<p>Wixela Inhub® 100/50, 250/50, 500/50 mcg fluticasone propionate and salmeterol xinafoate (approved generic of Wixela) G 4+</p> 
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contain LABA and long-acting muscarinic antagonist (LAMA) | contain ICS, LABA and LAMA | contain SABA and short-acting muscarinic antagonist (SAMA)

<p>Anoro® Ellipta® 62.5/25 mcg umecidinium and vilanterol inhalation powder DI B C</p> 	<p>Bevespi Aerosphere® 9/4.8 mcg glycopyrrolate and formoterol fumarate DI B C</p> 	<p>Duaklir® Pressair® 400/12 mcg aclidinium bromide and formoterol fumarate DI B C</p> 	<p>Stiolto® RespiMat® 2.5/2.5 mcg tiotropium bromide and olodaterol DI B C</p> 	<p>Trelegy® Ellipta® 200/62.5/25 mcg, 100/62.5/25 mcg fluticasone furoate, umecidinium and vilanterol inhalation powder DI B A C</p> 	<p>Breztri Aerosphere® 160/9/4.8 mcg budesonide, glycopyrrolate and formoterol fumarate DI B C</p> 	<p>Combivent® RespiMat® 20/100 mcg ipratropium bromide and albuterol DI B C</p> 	<p>Ipratropium Bromide and Albuterol Sulfate Inhalation Solution 0.5mg/2.5mg; 3mL C G</p> 
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BIOLOGICS

target cells and pathways that cause airway inflammation; delivered by injection or IV

<p>Cinqair® 62.5/25 mL reslizumab A</p> 	<p>Dupixent® 100, 200, 300 mg dupilumab A</p> 	<p>Fasenra® 30 mg benralizumab A</p> 	<p>Nucala® 100 mg mepolizumab A</p> 	<p>Tezspire® 210 mg tezepelumab-ekko A</p> 	<p>Xolair® 75 to 375 mg omalizumab A</p> 
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PDE4 INHIBITORS

target lung inflammation and reduce exacerbations

Daliresp®
250, 500 mcg roflumilast
G



LEUKOTRIENE MODIFIERS

block chemicals called leukotrienes that cause airway inflammation; available as tablet or granules

<p>Singulair® 4, 5, 10 mg montelukast 12m+</p> 	<p>Zafirlukast 10, 20 mg A</p> 	<p>Zileuton 600 mg A</p> 
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THANK YOU!

ANY QUESTIONS OR COMMENTS?

Feel free to reach out!

ckwong@phoenixchildrens.com