

Evolving Pediatric Asthma Guidelines

Fernando Urrego, MD, MPH
Section Head, Pediatric Pulmonology
Ochsner Children's Hospital

Disclosures

- No disclosures



FUNDACIÓN UNIVERSITARIA
JUAN N. CORPAS

50
Años



THE UNIVERSITY OF
TENNESSEE
HEALTH SCIENCE CENTER.

COLLEGE OF MEDICINE CHATTANOOGA

UNIVERSITY OF MIAMI
MILLER SCHOOL
of MEDICINE



Tulane University

SCHOOL OF PUBLIC HEALTH
AND TROPICAL MEDICINE



Outline

- Review literature supporting asthma guideline changes
- Barriers to guideline implementation

Alphabet Gumbo

- Short acting beta-2 agonist (SABA)
- Long acting beta-2 agonist (LABA)
- Inhaled corticosteroid (ICS)
- Leukotriene receptor antagonist (LRTA)
- Short-acting anti-muscarinic antagonist (SAMA)
- Long-active anti-muscarinic antagonist (LAMA)
- Anti-inflammatory Rescue (AIR)
- Single Maintenance and Rescue Therapy (SMART)



Why Do We Have Guidelines?

- Improve consistency of care
- Optimize patient care

Different Asthma Guidelines

- National Asthma Education and Prevention Program (NAEPP) Expert Panel Report (EPR-4)
- Global Initiative for Asthma (GINA)
- European Respiratory (ERS)
- British Thoracic Society (BTS)
- Canadian Thoracic Society (CTS)

Why Do They Keep Changing?

- New data
- Better regimens to improve outcome
- Recommendations to “match” what patients are actually doing

Six Priority Topics Identified

- Adjustable medication dosing in recurrent wheezing and asthma
- Long-acting antimuscarinic (LAMA) agents in asthma management as add-ons to inhaled corticosteroids (ICS)
- Fractional exhaled nitric oxide (FeNO)
- Indoor allergen mitigation
- Immunotherapy and the management of asthma
- Bronchial thermoplasty (BT) in adult severe asthma

Six Priority Topics Identified

- Adjustable medication dosing in recurrent wheezing and asthma
- Long-acting antimuscarinic (LAMA) agents in asthma management as add-ons to inhaled corticosteroids (ICS)
- Fractional exhaled nitric oxide (FeNO)
- Indoor allergen mitigation
- Immunotherapy and the management of asthma
- Bronchial thermoplasty (BT) in adult severe asthma

Key Questions Identified

- 1) What is the comparative effectiveness of **intermittent ICS** compared to no treatment, pharmacologic therapy, or non-pharmacologic therapy in children aged 0 to 4 with recurrent wheezing?
- 2) What is the comparative effectiveness of **intermittent ICS** compared to ICS controller therapy in individuals aged 4 years and older with persistent asthma?
- 3) What is the comparative effectiveness of **ICS with LABA used both as controller and quick-relief** compared to ICS with or without LABA used as a controller therapy in individuals aged 4 years and older with persistent asthma?

Outcome Measures

- Clinical improvement
- Treatment with systemic corticosteroids
- Asthma specific emergency room visits
- Hospitalizations
- Asthma control test (ACT)

Key Question 1

What is the comparative effectiveness of **intermittent ICS** compared to no treatment, pharmacologic therapy, or non-pharmacologic therapy in children aged 0 to 4 with recurrent wheezing?

ICS/SABA PRN vs Placebo PRN for Recurrent Wheezing

Asthma symptoms less in treatment group

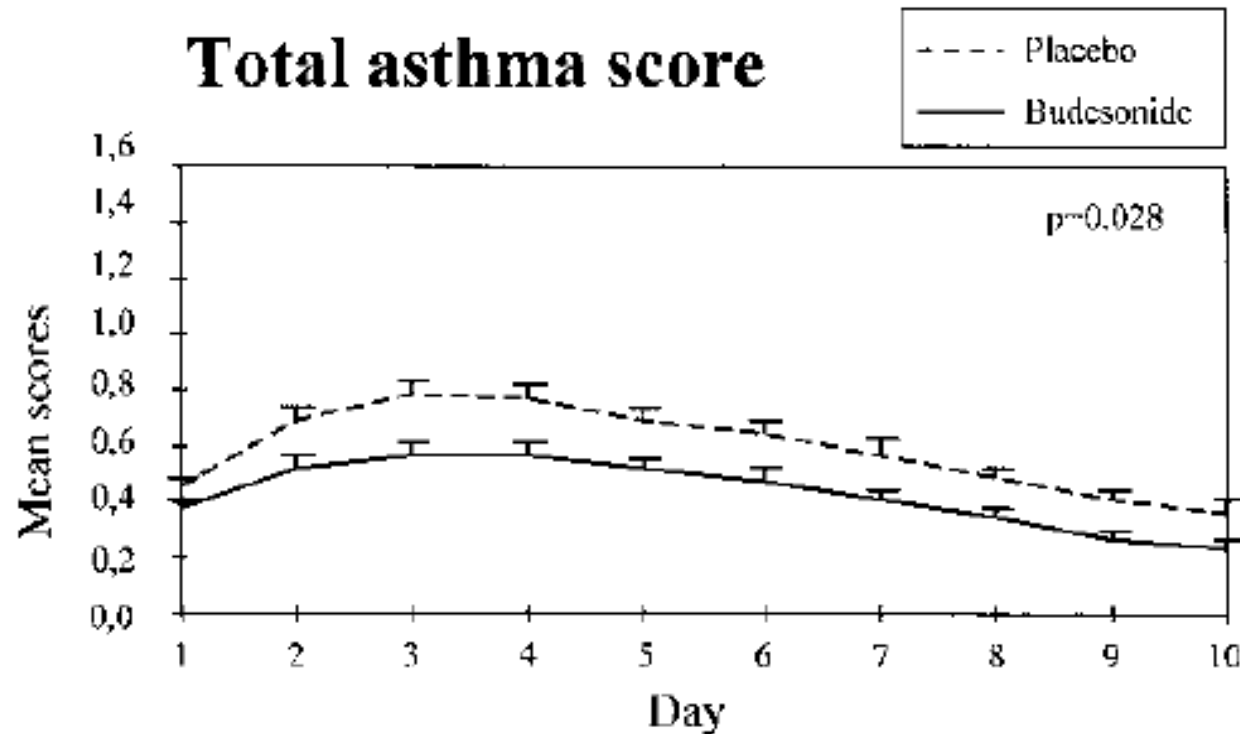
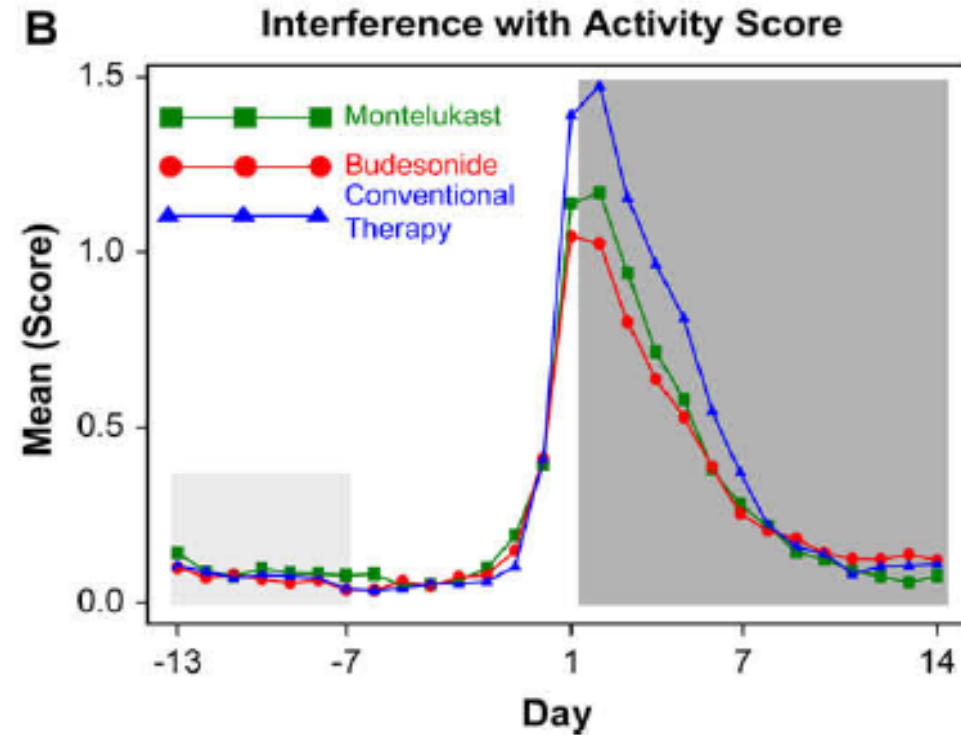
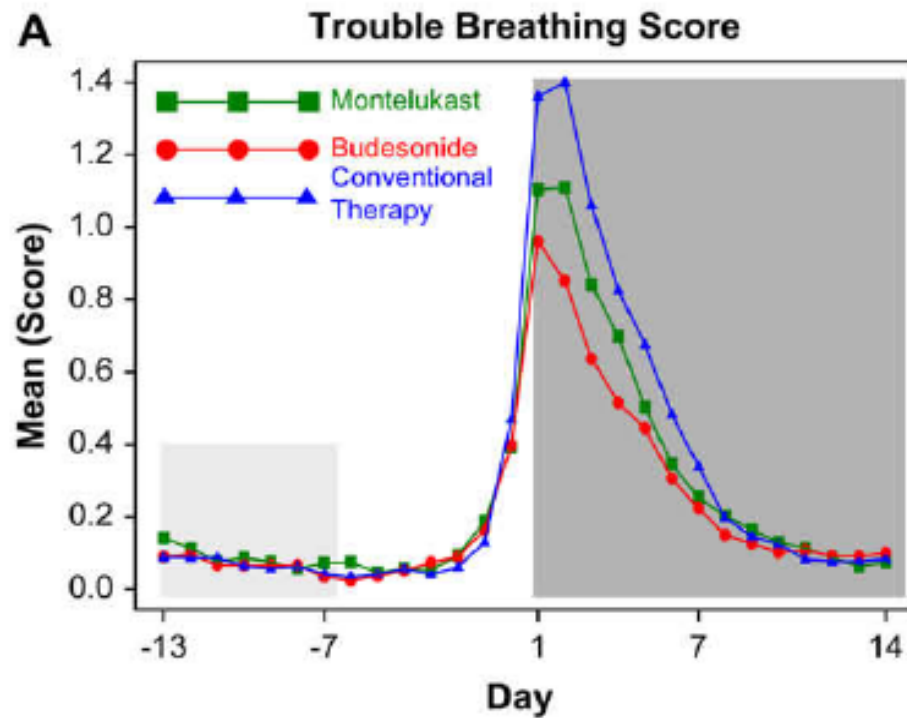


Fig. 1. Total asthma symptom score (mean and SD).

ICS/SABA PRN vs SABA PRN Recurrent Wheezing

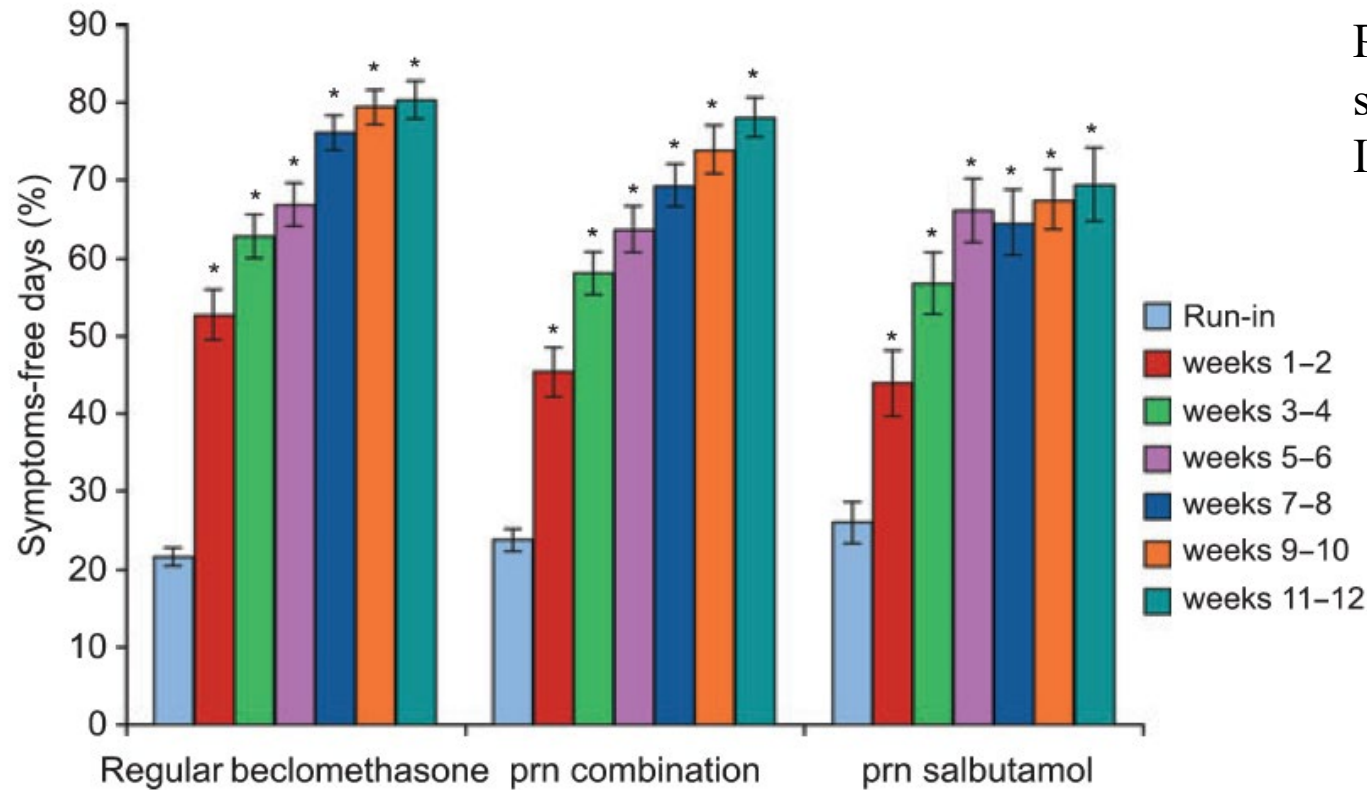
- Children 1-6 years of age
- Recurrent wheezing
- ICS or placebo BID at onset of URTI for max of 10 days
- Treatment group exposed to less OCS (8% vs 18%)
- More studies needed

ICS/SABA PRN vs ICS Daily + SABA PRN vs LTRA PRN for Recurrent Wheezing



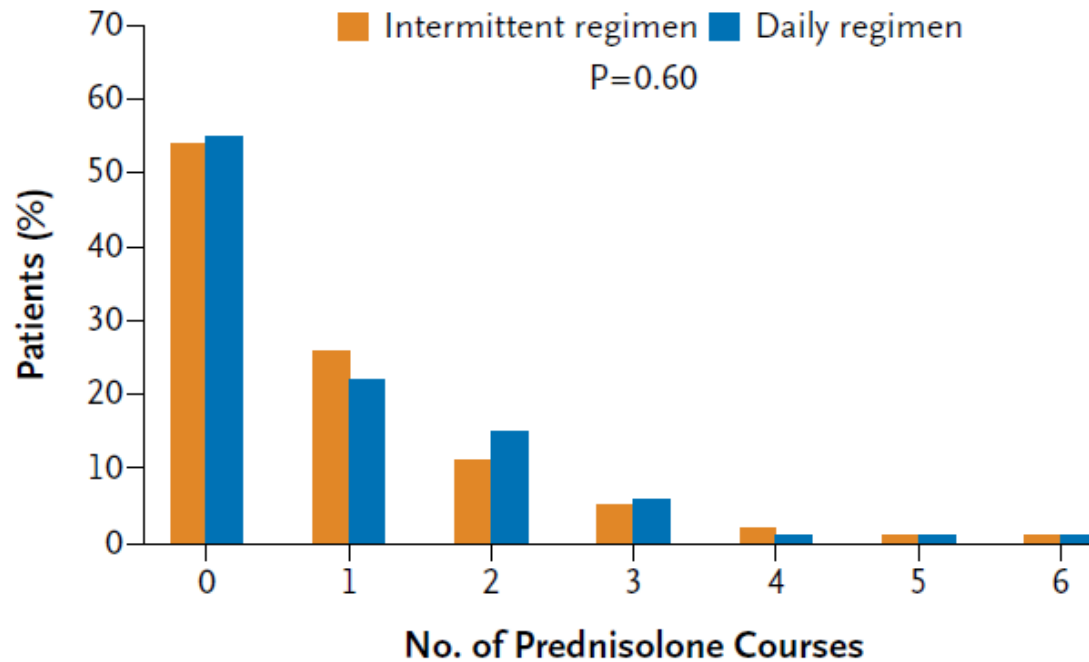
Asthma symptoms less in treatment group

ICS/SABA PRN vs ICS Daily vs SABA PRN for Recurrent Wheezing

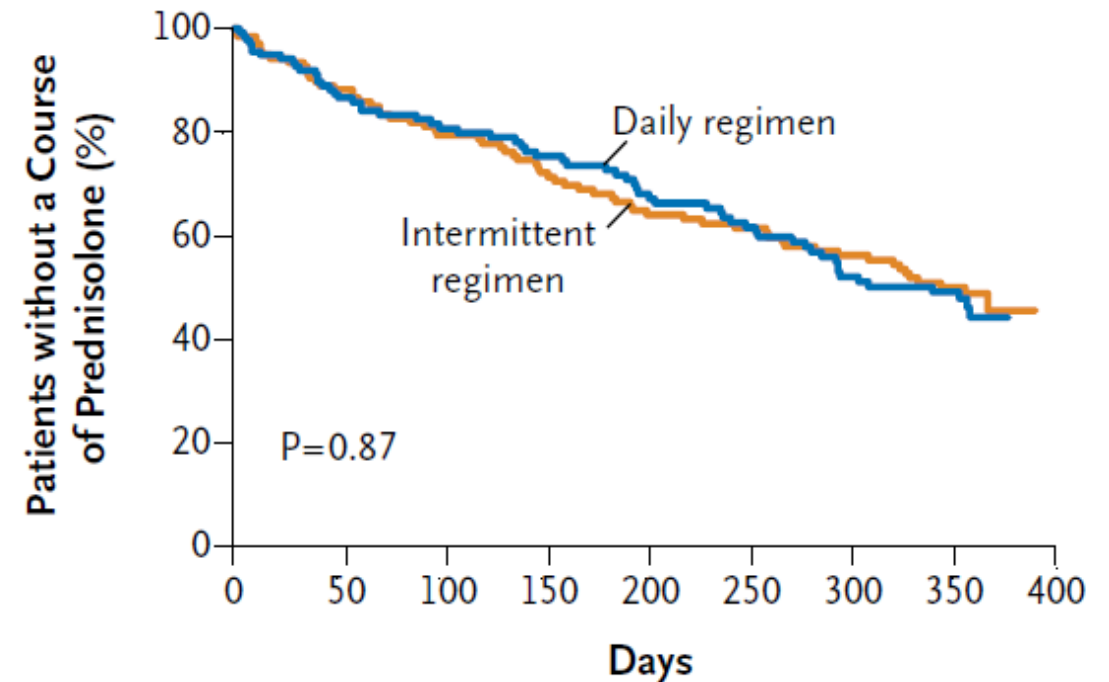


ICS/SABA PRN vs ICS Daily for Recurrent Wheezing

A Frequency of Exacerbations



B Time to First Exacerbation



No significant change in frequency of exacerbations
Exposure to budesonide less with PRN vs BID

NHLBI Recommendations

Children aged 0-4 years old with recurrent wheezing triggered by viral URTIs and no wheezing between infections conditionally recommend starting a **short course of daily ICS with as-needed SABA** for quick relief (high)

AGES 0-4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

		Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 0-4 Years				
Treatment		STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Preferred		PRN SABA and At the start of RTI: Add short course daily ICS▲	Daily low-dose ICS and PRN SABA	Daily low-dose ICS-LABA and PRN SABA▲ or Daily low-dose ICS + montelukast,* or daily 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 + oral systemic corticosteroid and PRN SABA
Alternative			Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast*+ oral systemic corticosteroid and PRN SABA
				For children age 4 years only, see Step 3 and Step 4 on Management of Persistent Asthma in Individuals Ages 5-11 Years diagram.			

Assess Control

- First check adherence, inhaler technique, environmental factors,▲ and comorbid conditions.
- Step up** if needed; reassess in 4-6 weeks
- Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 3 or higher is required. Consider consultation at Step 2.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Commentary

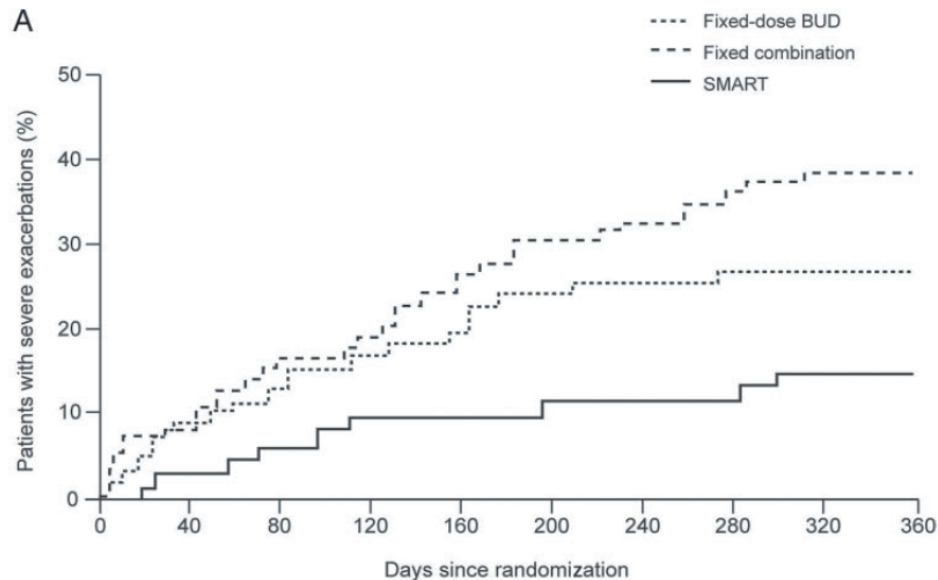
- Option for children with high risk for asthma
- Should not extrapolate to children without asthma risk
- ICS options limited due to insurance coverage



Key Question 3

What is the comparative effectiveness of ICS with LABA used both as controller and quick-relief compared to ICS with or without LABA used as controller therapy in individuals aged 4 years and older with persistent asthma?

ICS/LABA + ICS/LABA PRN vs ICS/LABA Daily + SABA PRN vs ICS Daily + Higher ICS dose PRN for Moderate to Severe Asthma

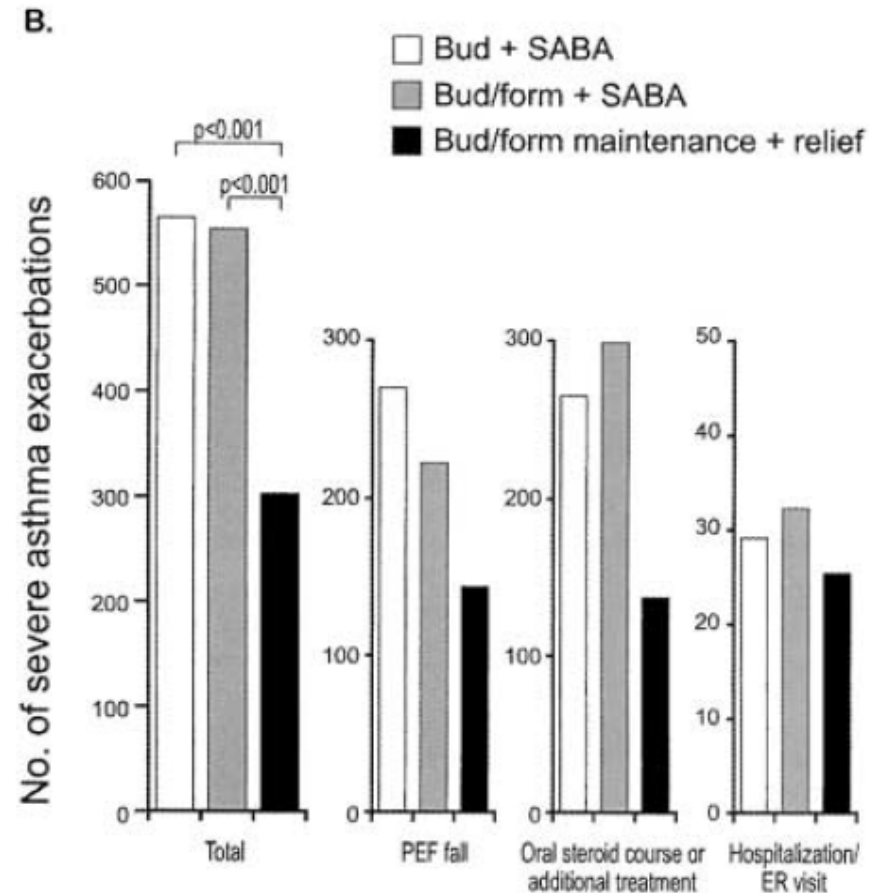


60-70% reduced risk of exacerbation with MART

SMART vs fixed combination $p < 0.001$
SMART vs fixed-dose BUD $p = 0.02$
Fixed combination vs fixed-dose BUD $p = 0.12$

ICS/LABA + ICS/LABA PRN vs ICS/LABA + SABAPRN vs ICS + SABAPRN

47% lower exacerbation risk with MART



NHLBI Recommendations

- In individuals aged 4 years and older with moderate to severe asthma **ICS/LABA in a single inhaler used as both daily controller and reliever therapy** recommended over either a higher-dose ICS as daily controller therapy and SABA for quick-relief or the same dose ICS/LABA as daily controller therapy and SABA for quick-relief therapy
- Rescue Recommendations
 - <12 years old max 8 puffs/day
 - >12 years old max 12 puffs/day

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▲	Daily and PRN combination medium-dose ICS-formoterol▲	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▲			Consider Omalizumab**▲	

Assess 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 asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.



Key Question 2

What is the comparative effectiveness of **intermittent ICS** compared to ICS controller therapy in individuals aged 4 years and older with persistent asthma?

Key Question 2

How About **ICS/SABAPRN** or **ICS/LABAPRN**
for this age group?

ICS/SABA PRN vs ICS Daily + SABA PRN for Mild Asthma

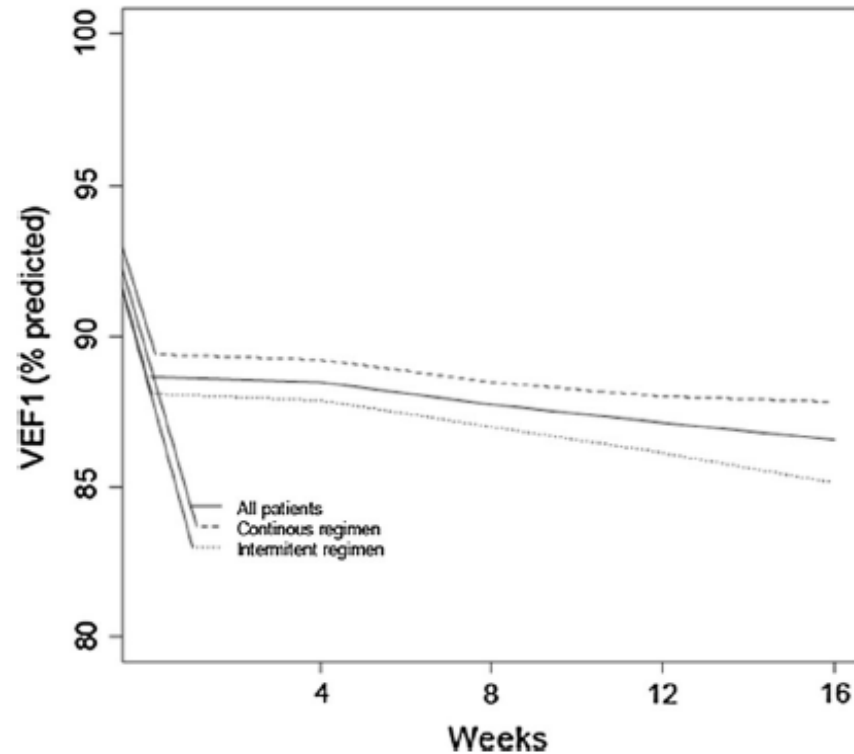


Fig. 4 Curve fitting for FEV1 (% predicted) from randomization to the end of the follow up of all (continuous line), intermittent (dotted line) and continuous (dashed line) participants

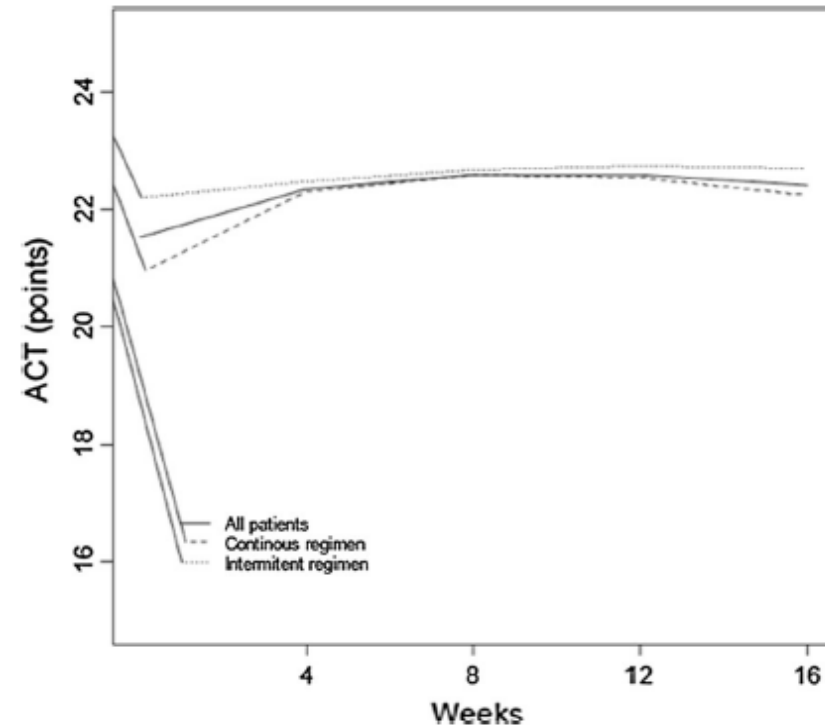
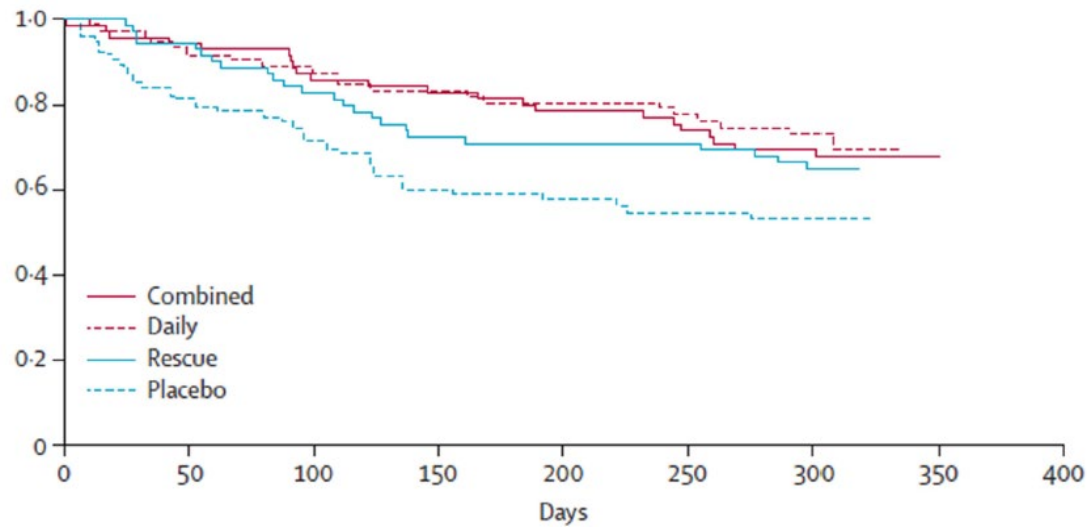


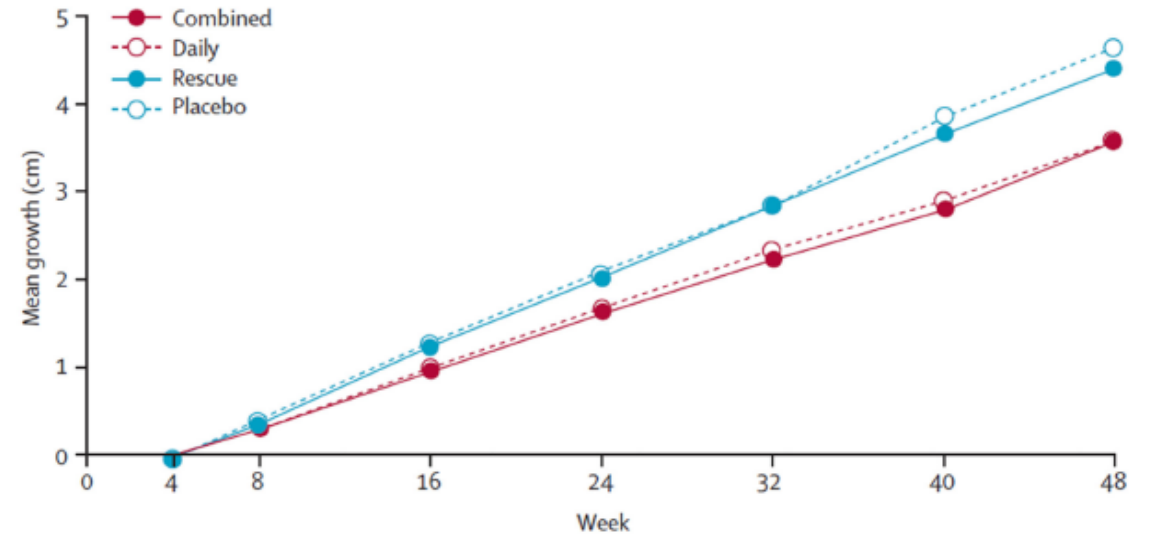
Fig. 3 Curve fitting for ACT/cACT scores from randomization to the end of the follow up of all (continuous line), intermittent (dotted line) and continuous (dashed line) participants.

No difference in primary outcomes
Both groups achieved similar control

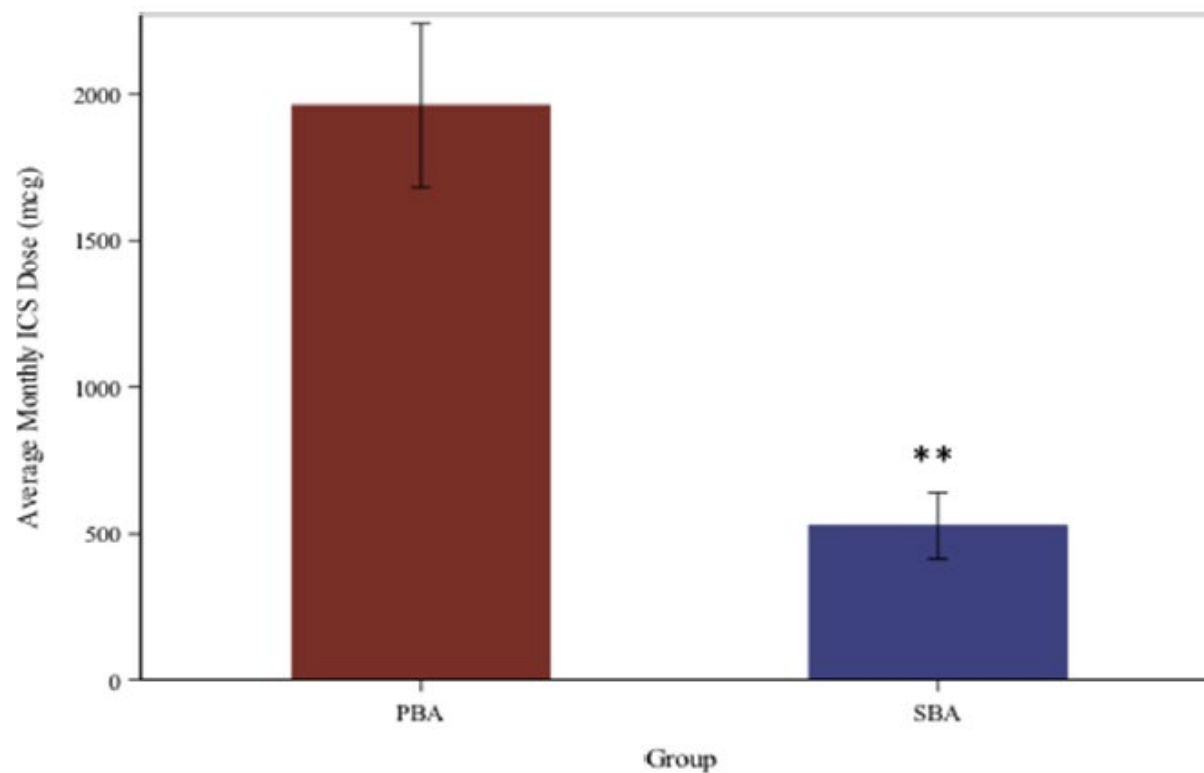
ICS/SABA PRN vs ICS Daily + SABA PRN vs for Mild Asthma



Time to first exacerbation



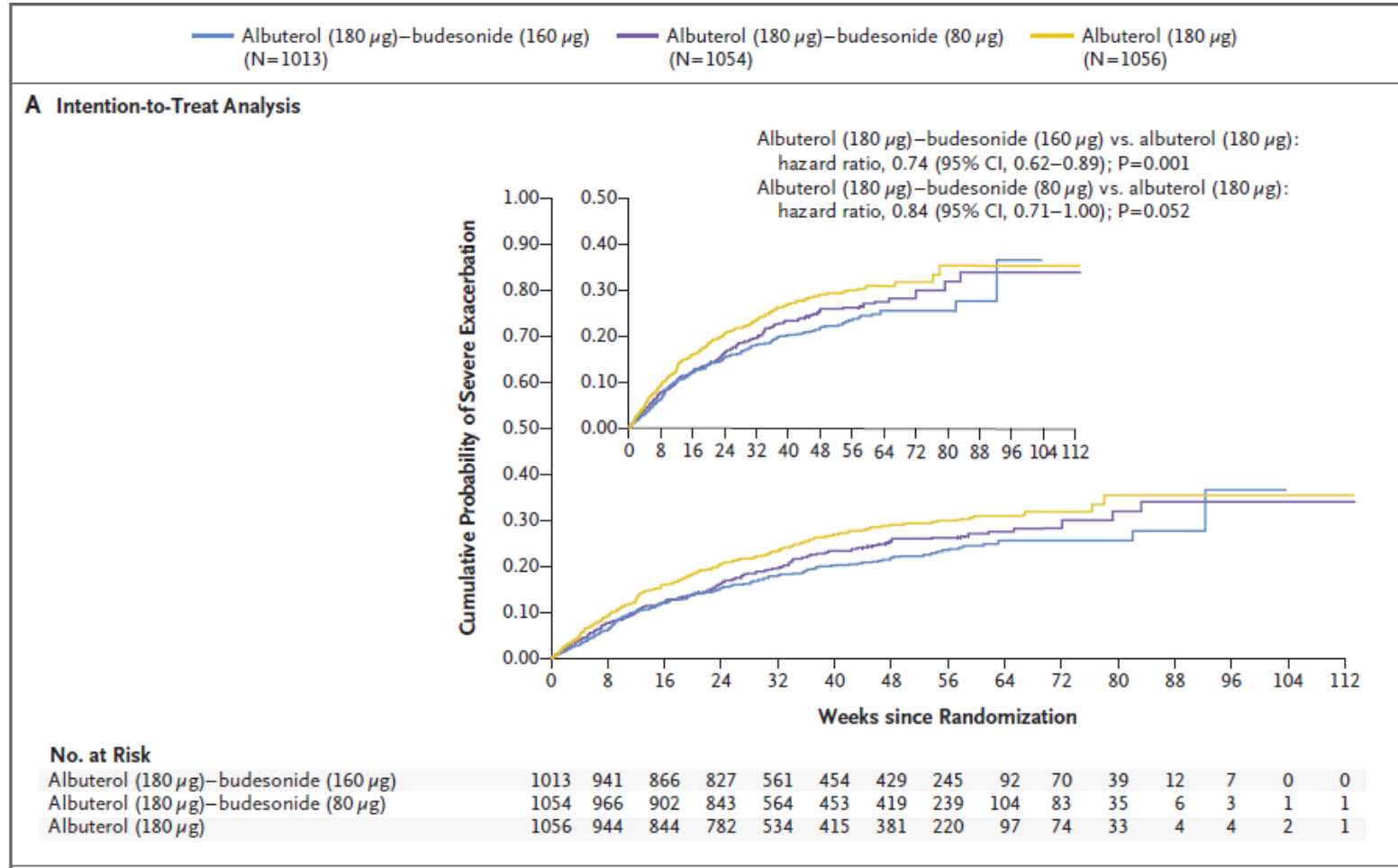
ICS/SABA PRN vs ICS Daily + SABA PRN for Mild Asthma



ACT scores similar
PBA more ICS exposure

ICS/SABA PRN vs SABA PRN + ICS Containing Controller for Moderate to Severe Asthma

Risk of severe asthma significantly lower with ICS/SABA PRN vs SABA PRN



ICS/LABA PRN vs SABAPRN

15 community hospitals in New Zealand
5-15 years old with asthma on SABAPRN

ICS/LABA PRN vs SABAPRN

Primary outcome asthma exacerbations

ICS/LABA PRN superior to SABAPRN for
preventing exacerbations with similar safety
profile

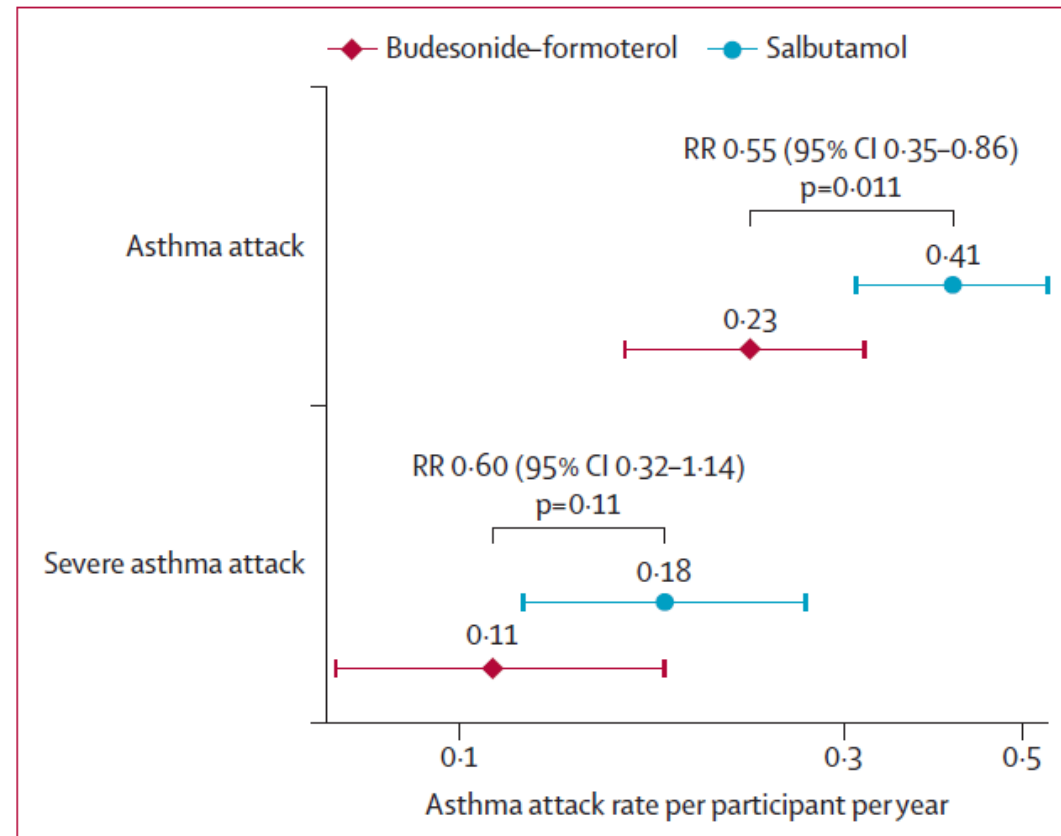


Figure 2: Annualised asthma attack rates
X-axis is displayed on the logarithm scale. RR=relative rate.

GINA 2026 Children 6–11 years

Personalized asthma management:
Assess, Adjust, Review

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



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors
Comorbidities
Inhaler technique & adherence
Child and parent/caregiver preferences and goals

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medication including ICS
Education & skills training, action plan

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

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
AIR-only:* As-needed low dose ICS-formoterol or As-needed low dose ICS+SABA (combination or separate inhalers)	Daily low dose inhaled corticosteroid (ICS)	Medium dose ICS or Low dose ICS-LABA or Low dose ICS-formoterol maintenance-and-reliever (MART)*	Medium dose ICS-LABA or Low dose† ICS-formoterol MART* or Refer for expert advice	Refer for phenotypic assessment Consider higher dose ICS-LABA or Add-on therapy e.g., LAMA, anti-IgE, anti-IL4Rα, anti-IL5
	<i>As-needed low dose ICS-formoterol*, or as-needed low dose ICS-SABA* (combination or separate inhalers), or daily LTRA†</i>	<i>Low dose ICS + LTRA†</i>	<i>Add tiotropium or LTRA† to Step 3 preferred controller</i>	<i>Refer for expert advice</i>
As-needed low dose ICS-formoterol* or as-needed low dose ICS-SABA* or as-needed SABA (if AIR not available)				

Anti-inflammatory reliever (AIR). ICS+SABA with separate inhalers means that the patient takes low dose ICS whenever they take SABA. †Double the Step 3 dose (still a low daily dose of ICS). Consider add-on allergen immunotherapy at Steps 1–3 for children with clinically relevant sensitization and not well-controlled (but stable) asthma. See text for details.

GINA 2026 Adults & adolescents 12+ years

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

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



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors
Comorbidities
Inhaler technique & adherence
Patient (and parent/caregiver) preferences and goals

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medication including ICS
Education & skills training, action plan

**TRACK 1: PREFERRED
CONTROLLER and RELIEVER**
Using ICS-formoterol* as the reliever
reduces the risk of exacerbations
compared with using a SABA reliever,
and Track 1 is a simple, single inhaler,
strategy

STEPS 1 – 2

AIR-only:* as-needed low dose ICS-formoterol

STEP 3

MART* with
low dose maintenance
ICS-formoterol

STEP 4

MART* with
medium dose
maintenance
ICS-formoterol

STEP 5

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

RELIEVER: As-needed low dose ICS-formoterol*

See GINA
severe
asthma guide

**TRACK 2: Alternative
CONTROLLER and RELIEVER**
Before considering a regimen with a
SABA reliever, check if the patient is
likely to adhere to their ICS treatment

STEP 1

AIR-only:* as-needed low
dose ICS+SABA (combination
or separate inhalers)

STEP 2

Low dose
maintenance ICS

STEP 3

Low dose
maintenance
ICS-LABA

STEP 4

Medium dose
maintenance
ICS-LABA

STEP 5

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

RELIEVER: As-needed low dose ICS-SABA* (or, if not available, as-needed SABA)

Anti-inflammatory reliever (AIR). ICS+SABA with separate inhalers means that the patient takes ICS whenever they take SABA. MART is maintenance-and-reliever therapy with ICS-formoterol.
Track 2 reliever: if ICS-SABA* is not available, use SABA reliever, but closely monitor adherence with maintenance ICS to avoid SABA-only treatment.
Non-pharmacologic strategies for asthma include smoking cessation, physical activity, pulmonary rehabilitation, weight reduction, vaccinations (see text for more).
Allergen immunotherapy, e.g. HDM SLIT: consider for patients with clinically relevant sensitization and not-well-controlled (but stable) asthma. See text for more information and safety advice.
See text for additional controller options at each step that have less evidence for efficacy or for safety than Tracks 1 and 2. Maintenance OCS should only ever be used as last resort.



Barriers in Pediatrics

- Lack of clinic training and clinical decision support
- Discomfort transitioning away from traditional albuterol and concern about SMART effectiveness as rescue medication
- Poor communication and lack of aligned care plans across community settings
- Challenges navigating insurance coverage

Pediatric Healthcare Provider

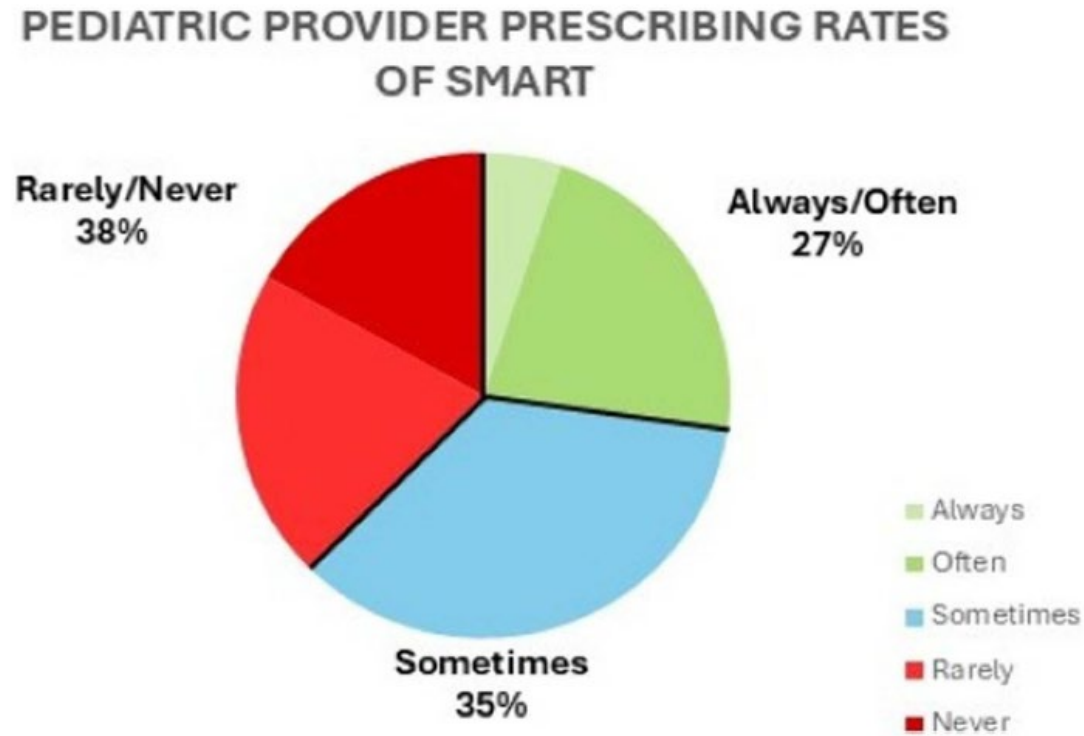


FIGURE 1 | Pediatric Provider Prescribing Rates of Single Maintenance and Reliever Therapy (SMART). ($n = 77$). [Color figure can be viewed at wileyonlinelibrary.com]

School Health Staff

- Nearly all familiar with SMART
- Most believed SMART would be simpler for students
- Better communication with prescribing provider
- SMART-specific asthma plan

SMART Asthma Action Plan

VIRGINIA PEDIATRIC ASTHMA ACTION PLAN

Child Name:	EMERGENCY CONTACT NAME PHONE RELATIONSHIP Additional info:
DOB:	
School Year:	
Healthcare Provider:	
Provider Contact Number:	



GREEN ZONE: GO!

- No trouble breathing
- No cough or wheeze
- Sleeps well
- Can play as usual

Maintenance/Controller ☐ None ☐ Daily

☐ Montelukast/Singulair ☐ Mg once daily
Use controller daily, even when I feel fine. *Spacer recommended with HFA inhalers.*
For Asthma with exercise add: puffs, or puffs
15 minutes prior to exercise: ☐ routinely ☐ only if needed

A.M. Puffs puffs
P.M Puffs puffs



YELLOW ZONE:
Caution!

- Cough
- Wheeze
- Chest tightness
- Shortness of breath

Add: quick-relief medicine—to your GREEN ZONE medicines.
If your quick reliever medicine is: ☐ budesonide/formoterol ☐ mometasone/formoterol
Take: 1 puff every 10 minutes if needed x 3 until symptoms resolve and return to green zone.
If symptoms continue add: ☐ 1 puff as needed up to max of 8 puffs/day for ages 4-11
☐ 1 puff as needed up to max 12 puffs/day for ages 12+
☐ Call your Provider if you need continued maximum quick relief medicine or medicine is not working.

Other
If your quick reliever medicine is: **albuterol**
Take: puffs or 1 nebulizer tx. Can repeat every 15 minutes up to maximum of 3 doses in 1 hour.
If symptoms resolve, return to GREEN ZONE and continue monitoring.
If symptoms continue after 1 hour then continue controller and
Add: ☐ puffs every 4-6 hours as needed until symptoms resolve
☐ Continue every 4-6 hours for days

"SMART" stands for single maintenance and reliever therapy



RED ZONE:DANGER!

- Can't talk, eat, walk well
- Medicine is not helping
- Breathing hard and fast
- Blue lips and fingernails
- Tired or lethargic
- Nonstop cough
- Ribs show

If you have any of these danger signs:
Dial 911 now/ GO TO THE EMERGENCY DEPARTMENT!

- Take 1 puff of budesonide/formoterol or mometasone/formoterol. Wait 1-3 minutes. If there is no improvement, take additional puff(s) up to a maximum of 6 puffs in route to emergency department.
- If only albuterol is available, take puffs or nebulizer as often as needed until help arrives or in route to emergency department.

I approve and give permission for school personnel to follow this asthma management plan of care for my child, contact my child's healthcare provider when needed, and administer medication per the healthcare providers orders. I assume full responsibility for providing the school with prescribed medication and delivery/monitoring devices. With HCP authorization & parental consent, the inhaler will be located: ☐ in clinic or ☐ with student (self-carry)

PARENT/Guardian Signature: _____ Date: _____

School nurse/Staff Signature: _____ Date: _____

SCHOOL MEDICATION CONSENT & HEALTH CARE PROVIDER ORDER

- ☐ Student has demonstrated the ability to safely and effectively self-carry and self-administer inhaled asthma medication.
☐ Student needs assistance & should not self-carry.

Date

MD/DO/NP/PA signature

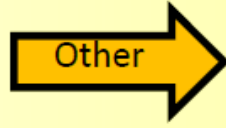


YELLOW ZONE:

Caution!

- Cough
- Wheeze
- Chest tightness
- Shortness of breath

"SMART" stands for
single maintenance
and reliever therapy



Add: quick-relief medicine—to your GREEN ZONE medicines.

If your quick reliever medicine is: ☐ budesonide/formoterol ☐ mometasone/formoterol
Take: 1 puff every 10 minutes if needed x 3 until symptoms resolve and return to green zone.

If symptoms continue add: ☐ 1 puff as needed up to max of 8 puffs/day for ages 4-11
☐ 1 puff as needed up to max 12 puffs/day for ages 12+
☐
☐ Call your Provider if you need continued maximum quick relief medicine or medicine is not working.

If your quick reliever medicine is: **albuterol**

Take: ☐ puffs or 1 nebulizer tx. Can repeat every 15 minutes up to maximum of 3 doses in 1 hour.
If symptoms resolve, return to GREEN ZONE and continue monitoring.

If symptoms continue after 1 hour then continue controller and

Add: ☐ puffs every 4-6 hours as needed until symptoms resolve
☐ Continue every 4-6 hours for ☐ days
☐



RED ZONE:DANGER!

- Can't talk, eat, walk well
- Medicine is not helping
- Breathing hard and fast
- Blue lips and fingernails
- Tired or lethargic
- Nonstop cough
- Ribs show

If you have any of these danger signs:

Dial 911 now/ GO TO THE EMERGENCY DEPARTMENT!

- Take 1 puff of budesonide/formoterol or mometasone/formoterol. Wait 1-3 minutes. If there is no improvement, take additional puff(s) up to a maximum of 6 puffs **in route to emergency department.**
- If only albuterol is available, take ☐ puffs or nebulizer as often as needed until help arrives or **in route to emergency department.**

What Do I Do?

- < 4 yrs only symptomatic with URIs and risk for asthma- AIR (ICS/SABA PRN)
- >4 yrs mild persistent asthma- AIR (ICS/LABA PRN)
- >4 yrs moderate persistent asthma MART (ICS/LABA BID + ICS/LABA PRN)

Final Thoughts

- Safety and efficacy data for guidelines mounting
- Change is hard (but possible)
- Pulmonology consult always available 😊

Fernando.Urrego@ochsner.org

504-428-6901