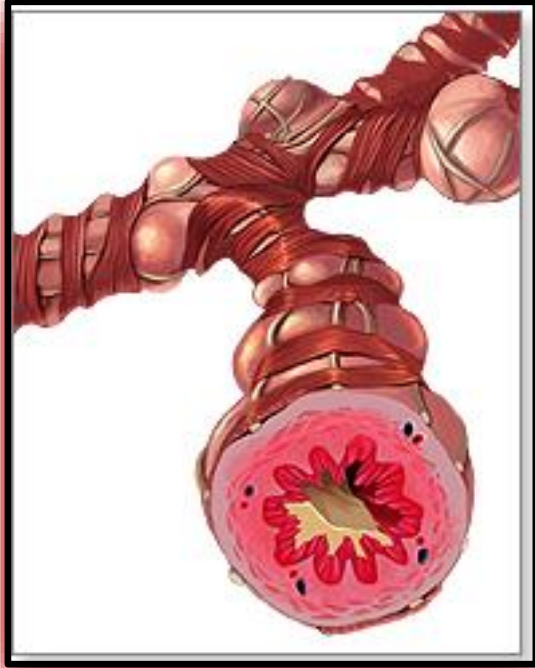


Asthma Reliever Therapy



SABA vs. ICS-SABA vs. ICS-Formoterol



Associate Professor
Nova Southeastern
College of Allopathic Medicine
Fort Lauderdale, FL

Dana V. Wallace, MD



Learning objectives

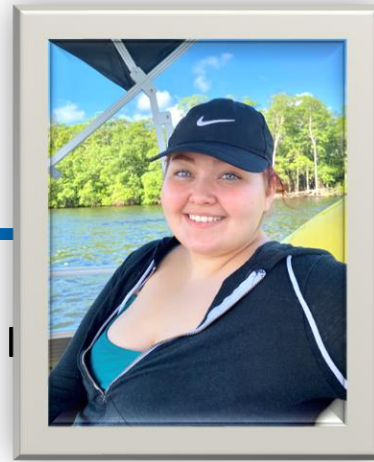


National Heart, Lung,
and Blood Institute

At the end of this educational activity, the participant should be able to:

1. List the pros and con of ICS-formoterol vs. ICS-SABA vs. SABA rescue for an acute asthma exacerbation in adolescents/adults
2. Describe the most recent updates in GINA 2023 and NHLBI 2020 asthma guidelines for adolescents/adults
3. Discuss the role of reliever therapy in reducing the risk of future asthma exacerbations

Annie: Assessment



- 18-year-old mild intermittent to persistent asthmatic with frequent asthma exacerbations
- Asthma dating to early childhood
- Normal activities between exacerbations- school, softball
- Co-morbid allergic rhinitis and conjunctivitis
- Recent ED visit for asthma exacerbation
- Asthma is currently uncontrolled by AIRQ
- Elevated FeNO
- Increased BMI
- Possible depression
- Nonadherent to daily maintenance asthma treatment
- Fear of steroid side effects

Terminology

- **Reliever**
 - For symptom relief, or before exercise or allergen exposure
- **Controller**
 - Function: targets both domains of asthma control (symptom control and future risk)
 - Mostly used for ICS-containing treatment
- **Maintenance treatment**
 - Frequency: regularly scheduled, e.g. twice daily

ICS: inhaled corticosteroid; SABA: short-acting beta₂-agonist

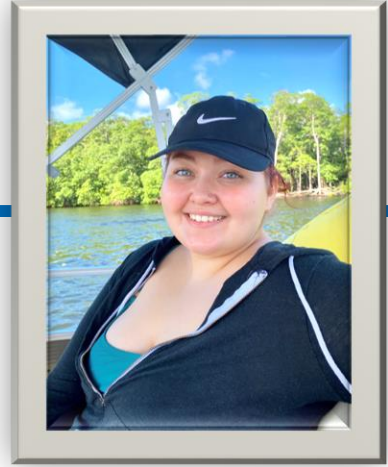
Terminology

- **Anti-Inflammatory Reliever = AIR**
 - E.g. ICS-formoterol, ICS-SABA
 - Provides rapid symptom relief, plus a small dose of ICS
 - Reduces the risk of exacerbations, compared with using a SABA reliever
- **Maintenance And Reliever Therapy with ICS-formoterol = MART AKA SMART (Single MART)**
 - A low dose of ICS-formoterol is used as the patient's maintenance treatment, plus whenever needed for symptom relief
- ICS-formoterol can also be used **before exercise or allergen exposure**

ICS: inhaled corticosteroid; SABA: short-acting beta₂-agonist; MART is sometimes also called SMART

Annie may fall into treatment Step 1, 2, and 3

Annie has 3 or more treatment options



- To control Annie's asthma, she needs Step 1 ↔ 2 treatment, even Step 3 treatment, at times.
- Patient name has multiple treatment options:
 - STEP 1
 - NHLBI: One preferred option; no alternate
 - GINA: One preferred option (**not FDA approved**); 2 alternates (1 is not FDA approved)
 - STEP 2
 - NHLBI: Two preferred options (**one not FDA approved**); 5 alternates
 - GINA: One preferred option (**not FDA approved**); 2 alternates (one not FDA approved)
 - STEP 3
 - NHLBI: One preferred options (**reliever not FDA approved**); 5 alternates
 - GINA: One preferred option (**reliever not FDA approved**); 2 alternates
 - STEP 1 & 2
 - FDA approved but not NHLBI guideline recommended STEP 1 & 2: **PRN ICS-SABA**

NHLBI 2020 Guidelines

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 [■]
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)**	

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 status.

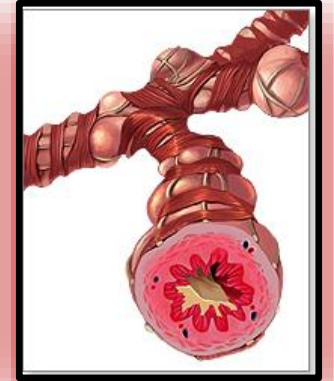
Journal of Allergy and Clinical Immunology 2020;146:1217-1270 DOI: (10.1016/j.jaci.2020.10.003)

ICS-formoterol PRN for Step 1&2 not considered

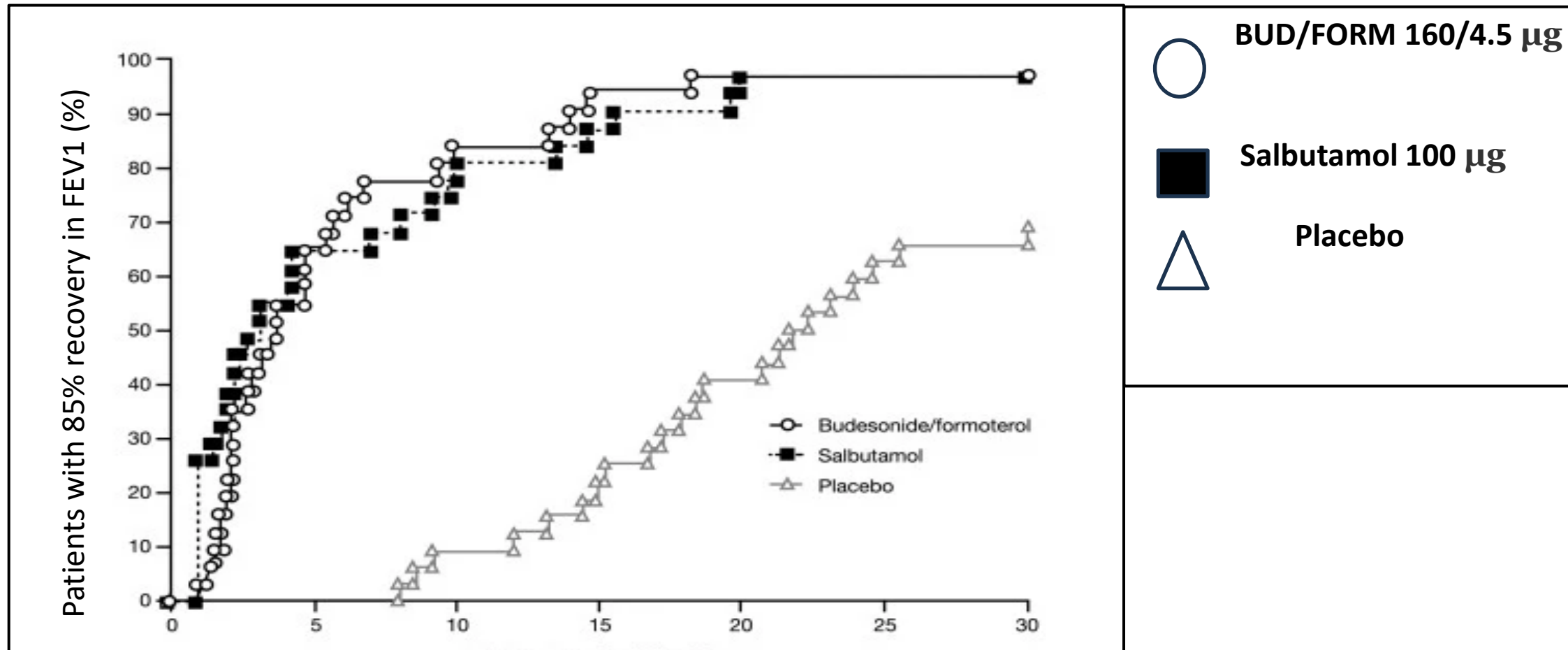
- Initial questions developed 2015
- 6 key questions selected 2017
- Literature search for 6 questions ended March 2018
- Studies on BUD/FORM published after 3/2018

Why are we concerned about using SABA for reliever therapy?

- There is no evidence for the safety or efficacy of SABA-only treatment
- Regular use, even 1-2 wks., increases airway hyperreactivity
- SABA may increase asthma severity with long-term use
- Overuse during an asthma exacerbation may:
 - Delay patients seeking care
 - Increase hypoxemia and cardiotoxicity
 - Increase use of OCS courses- osteoporosis, DM, cataract
 - Increase morbidity and mortality
- ICS maintenance is effective IF USED– but nonadherence is high in clinical practice
- ICS-formoterol used as a reliever ensures the delivery of an anti-inflammatory agent with a bronchodilator
- ICS-formoterol titrates the dose of ICS to the severity of the inflammation



Does ICS/FORM have the same onset of action as albuterol?



Minutes after administration

Jonkers, R. E., et al (2006). Respir Res 7(1): 141.

Background for discussion

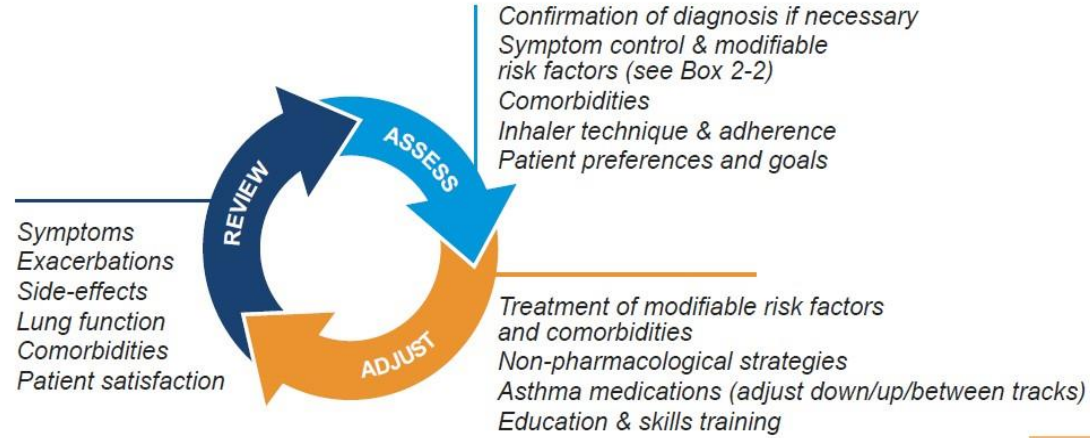
Combination albuterol-beclomethasone inhaler in US

- In January 2023, the FDA approved a SABA-ICS combination inhaler for PRN treatment of asthma exacerbations and for the prevention of bronchoconstriction & to reduce risk of exacerbations
- Albuterol (180µg)- budesonide (160 µg) [Airsupra] for PRN treatment
- Approved for adults **≥18 yrs.**
- Max **12 inhalations/24 hours**

GINA 2023 – 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*

See GINA severe asthma guide

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 LTRA or HDM SLIT, or switch to high dose ICS

Add azithromycin (adults) or LTRA. As last resort consider adding low dose OCS but consider side-effects

GINA 2023 – Adults and adolescents Track 1

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



AIR
ICS/Formoterol PRN

MART
ICS/Formoterol daily & PRN

As-needed-only ICS-formoterol
(‘AIR-only’)

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

STEP 3
Low dose maintenance ICS-formoterol*

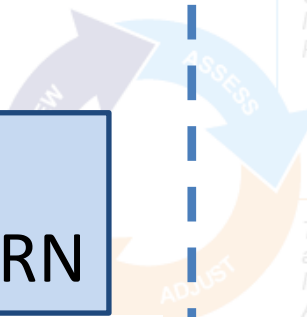
STEP 4
Medium dose maintenance ICS-formoterol

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 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

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



Track 1 and 2
Asthma medications (adjust down/up/between tracks)

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*

*An anti-inflammatory reliever (AIR)

Medium/high dose maintenance ICS-LABA
Add-on ICS-SABA*

Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP

Other controller options (limited)

Low dose ICS whenever

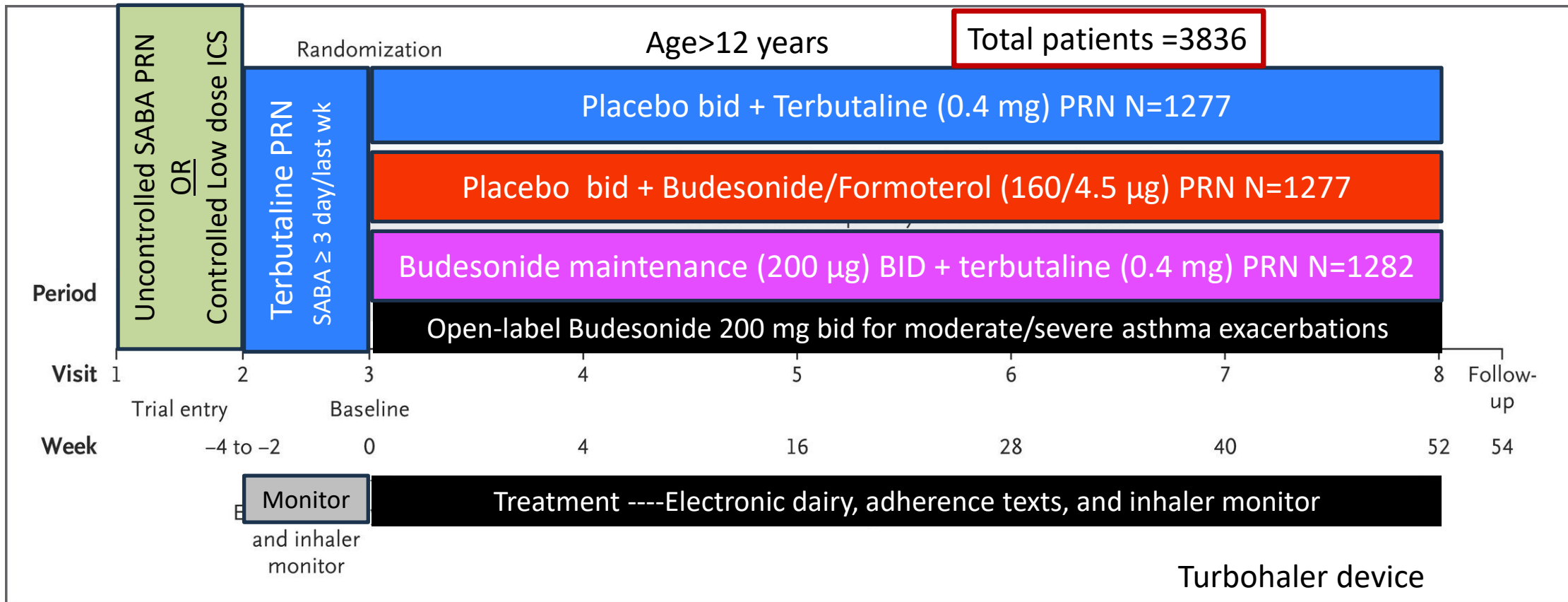
Medium dose ICS, or

Add LAMA or LTRA or

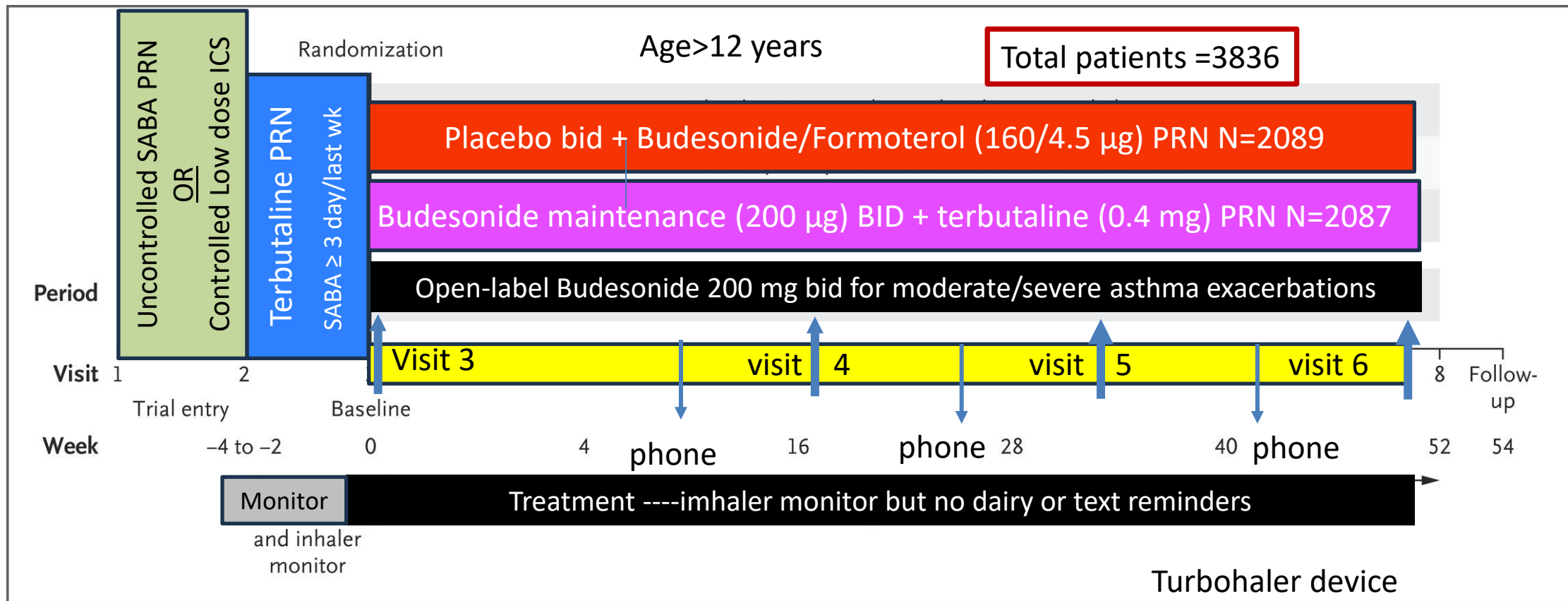
Add azithromycin (adults) or LTRA. As last resort consider

Studies that support
PRN Budesonide-Formoterol
for Step 1 & 2 Tx

SYGMA 1 Study Design



SYGMA 2 Study Design



SYGMA 1 & 2 Primary Endpoints

SYGMA 1

1. # of **Well-Controlled Asthma Weeks** based upon e-monitor (eWCAW)

- A. 2 or more of the following fulfilled:
 - ≤ 2 days with asthma symptom score $>1^*$
 - ≤ 2 days need for PRN reliever meds
 - Morning PEF $\geq 80\%$ predicted every day
- **AND**
- B. Both fulfilled:
 - No night-time awakenings due to asthma
 - No additional ICS or oral corticosteroid

SYGMA 2

1. Annualized severe asthma exacerbation rate

- Severe exacerbation defined as requiring one of the following:
 - A. Use of systemic corticosteroids ≥ 3 days
 - B. ED visit requiring systemic corticosteroids
 - C. Hospitalization

* ACQ-5, Asthma Control Questionnaire (lower is better)

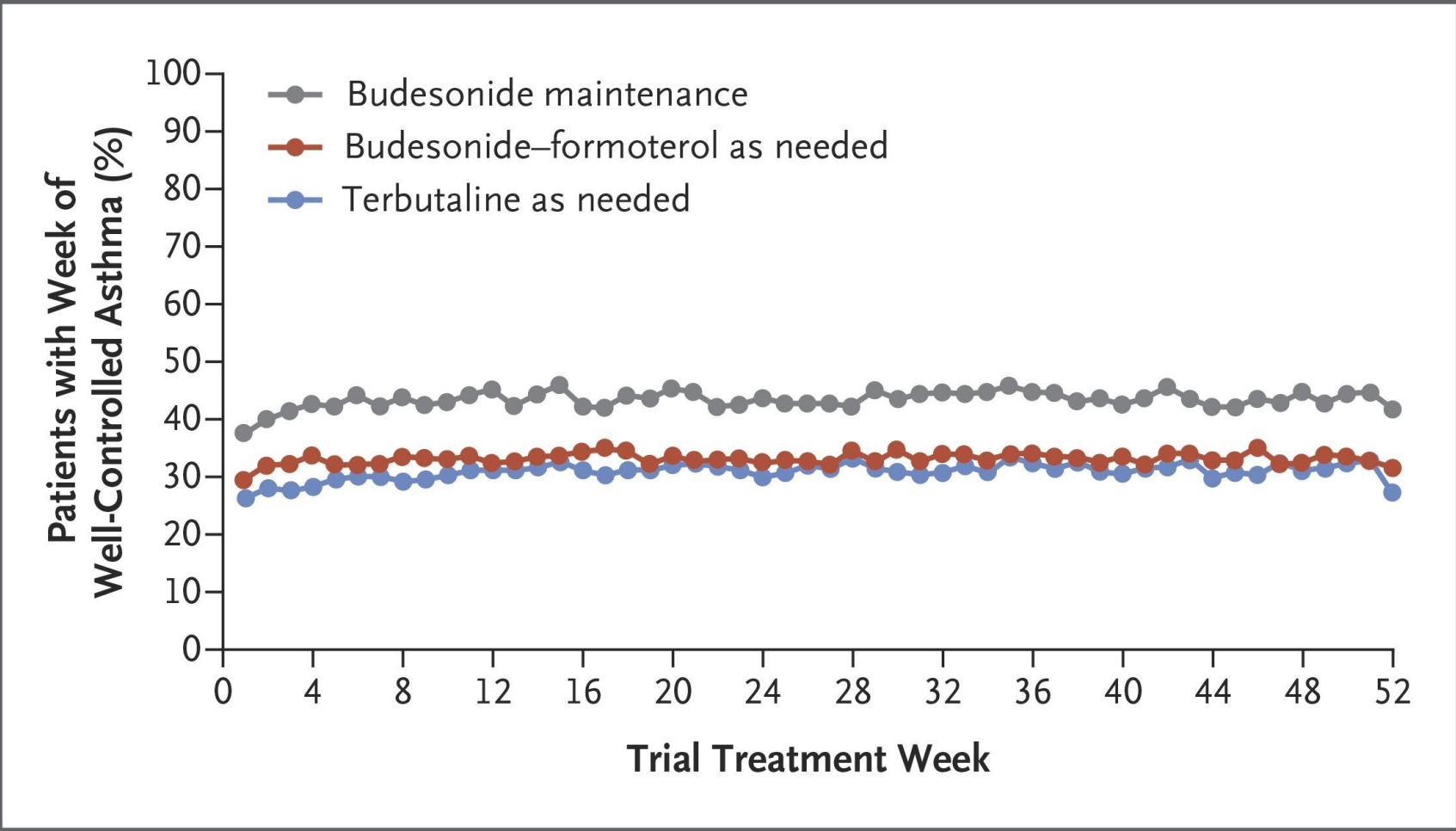
SYGMA 1 & 2: Baseline Patient Characteristics

O'Byrne PM et al. N Engl J Med 2018;378:1865-1876

Bateman, E. D. et al, (2018).N Engl J Med 378(20): 1877-1887.

Patient Characteristics	SYGMA-1	SYGMA-2
Age	39.6 years	41.0 years
Female sex	61.1%	62.2%
Median years since asthma diagnosis	6.4 years	7.6 years
ACQ-t score mean	1.57	1.51
Pre-BD FEV1, % predicted, mean	84.2%	84.3%
Post-BD FEV1, % predicted, mean	95.6%	96.1%
Pre-study treatment, %		
Uncontrolled on bronchodilator	44.5%	46.3%
Controlled on ICS or LRTA	55.5%	53.7%
Severe exacerbation in last 12 months, %	19.7%	22.0%

SYGMA 1 Primary Outcome



O'Byrne PM et al. N Engl J Med 2018;378:1865-1876

Primary Endpoint met

Budesonide/formoterol PRN 34.4%

Terbutaline PRN 31.1%

BUD/FORM vs. Terbutaline:
OR=1.14; P=0.046

BUD/FORM inferior to BUD

Budesonide BID 44.4%

Budesonide/formoterol PRN 34.4%

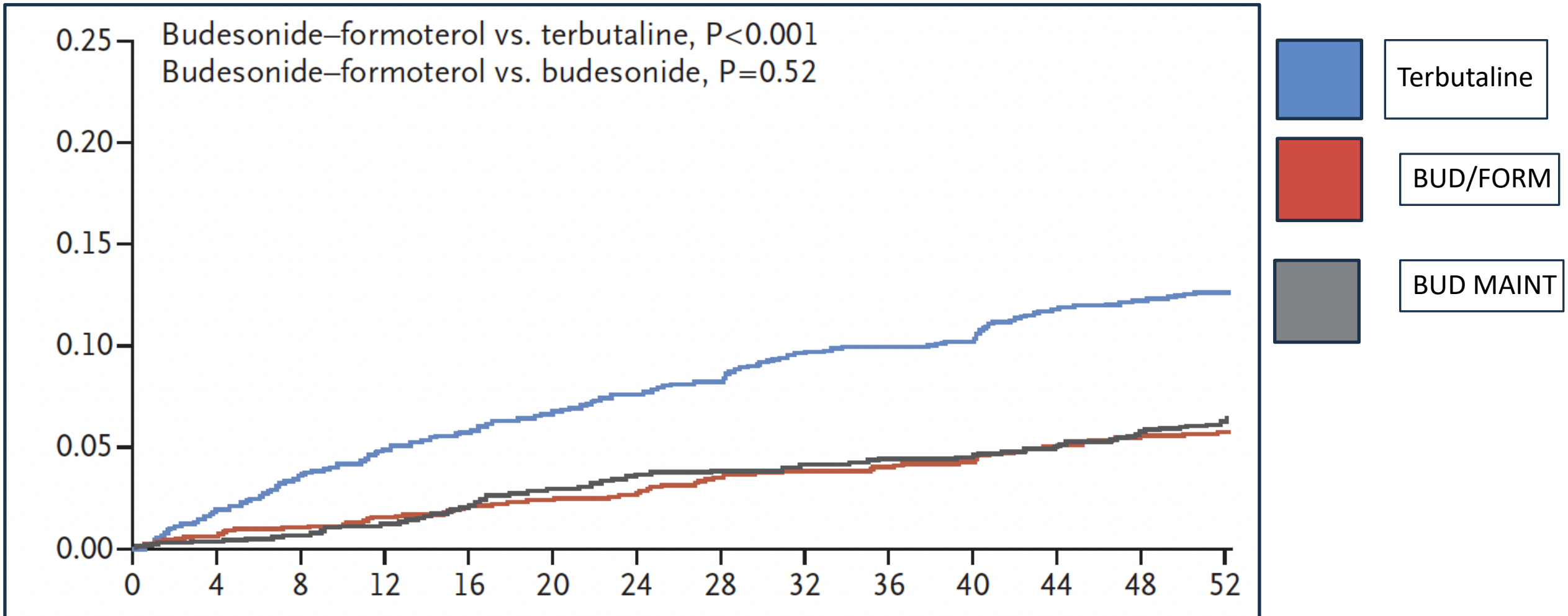
BUD vs BUD/FORM
OR=.64

SYGMA 1 Secondary Outcomes

Variable	Terbutaline PRN	Budesonide/Formoterol PRN	Budesonide BID
SEVERE EXACERBATIONS			
Patients with ≥ 1 exacerbation	11.9%	5.6%	6.1%
Total no. of exacerbations	1.88	77	89
Annualized exacerbation rate	0.20	0.07	0.09
Total no. of hospitalizations	21	6	8
ED visits and systemic steroid use	29	9	10
Systemic corticosteroids ≥ 3 days	372	76	84
MODERATE OR SEVERE EXACERBATIONS			
Patients with ≥ 1 exacerbation	21.5%	10.3%	11.2%
Total no. of exacerbations	0.36	0.14	0.15
Annualized exacerbation rate			

SYGMA 1 Secondary Outcome

Time to first severe exacerbation



SYGMA 1 Secondary Outcomes

Variable	Terbutaline PRN	Budesonide/Formoterol PRN	Budesonide BID
SEVERE EXACERBATIONS			
Patients with ≥ 1 exacerbation	11.9%	5.6%	6.1%
Total no. of exacerbations	1.88	77	89
Annualized exacerbation rate	0.20	0.07	0.09
Total no. of hospitalizations	21	6	8
ED visits and systemic steroid use	29	9	10
MODERATE OR SEVERE EXACERBATIONS			
Patients with ≥ 1 exacerbation	21.5%	10.3%	11.2%
Total no. of exacerbations	0.36	0.14	0.15
Annualized exacerbation rate			

SYGMA 2 PRIMARY AND SECONDARY OUTCOME

PRIMARY OUTCOME MET
BUD/FORM WAS NOT INFERIOR TO BUD
FOR SEVERE EXACERBATIONS

Annualized rate of
severe exacerbations

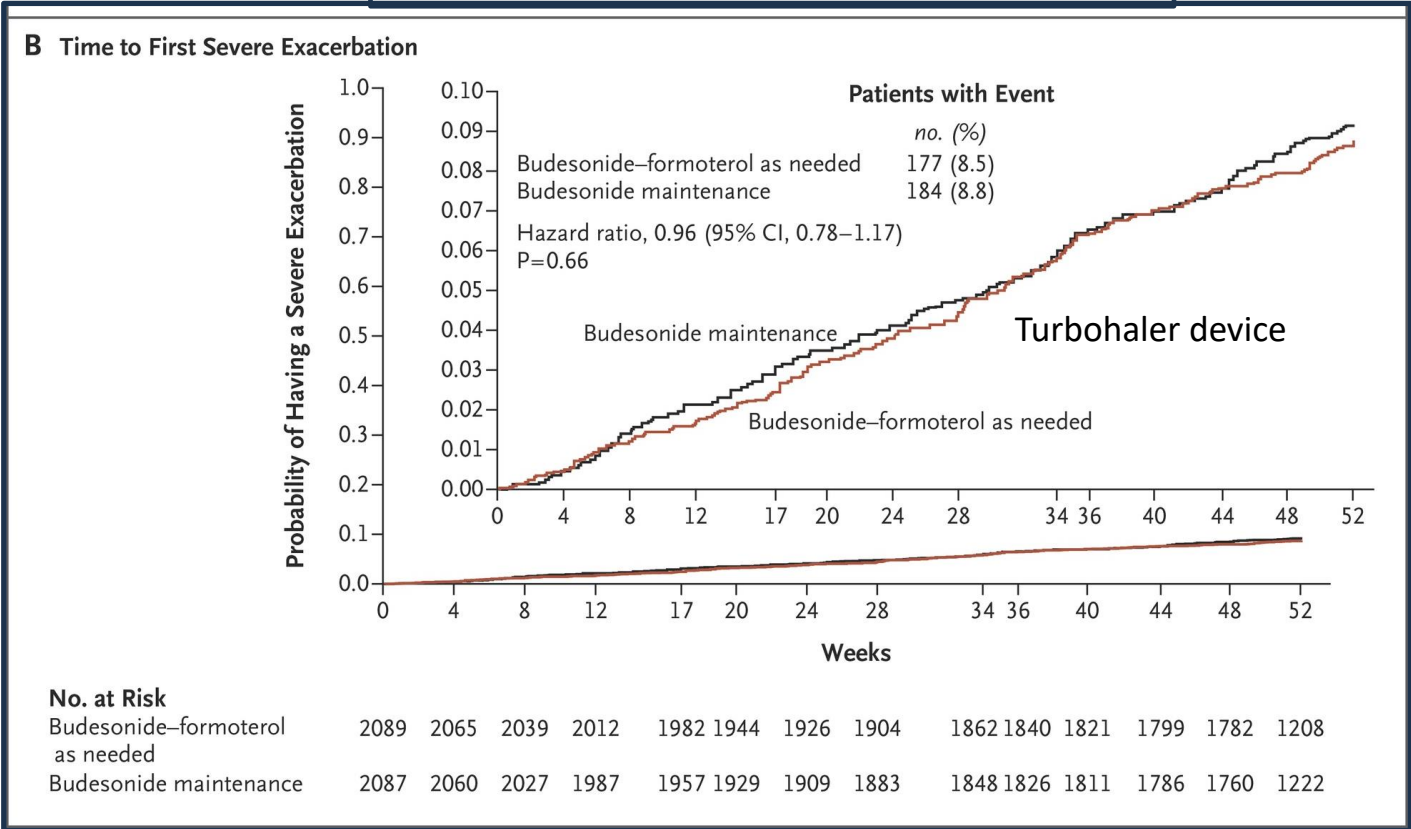
Budesonide/formoterol PRN 34.4%

Budesonide BID 44.4%

Bateman ED et al. N Engl J Med

SECONDARY OUTCOME

Time to first severe exacerbations



SYGMA 1 & 2. Secondary Outcomes

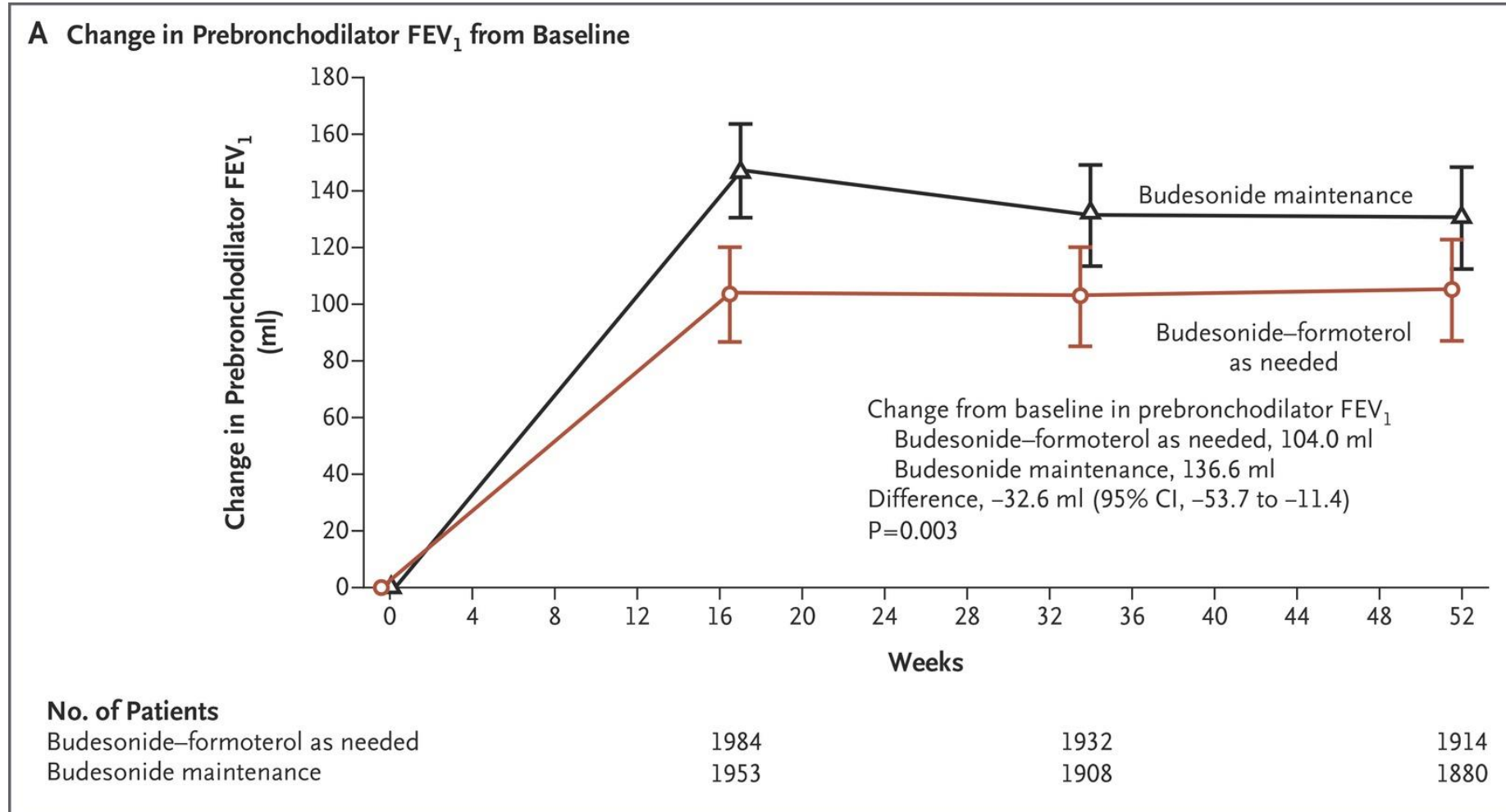
Variable	SYGMA 1		SYGMA 2	
	BUD/FORM PRN	BUD BID	BUD/FORM PRN	BUD BID
SEVERE EXACERBATIONS				
Patients with ≥ 1 exacerbation	5.6%	6.1%	8.5%	8.8%
Total no. of exacerbations	77	89	217	221
Systemic corticosteroid use ≥ 3 days	76	84	209	207
Total no. of hospitalizations	6	8	20	17
ED visits and systemic steroid use	9	10	26	40

O'Byrne PM et al. N Engl J Med 2018;378:1865-1876

Bateman, E. D. et al, (2018).N Engl J Med 378(20): 1877-1887.

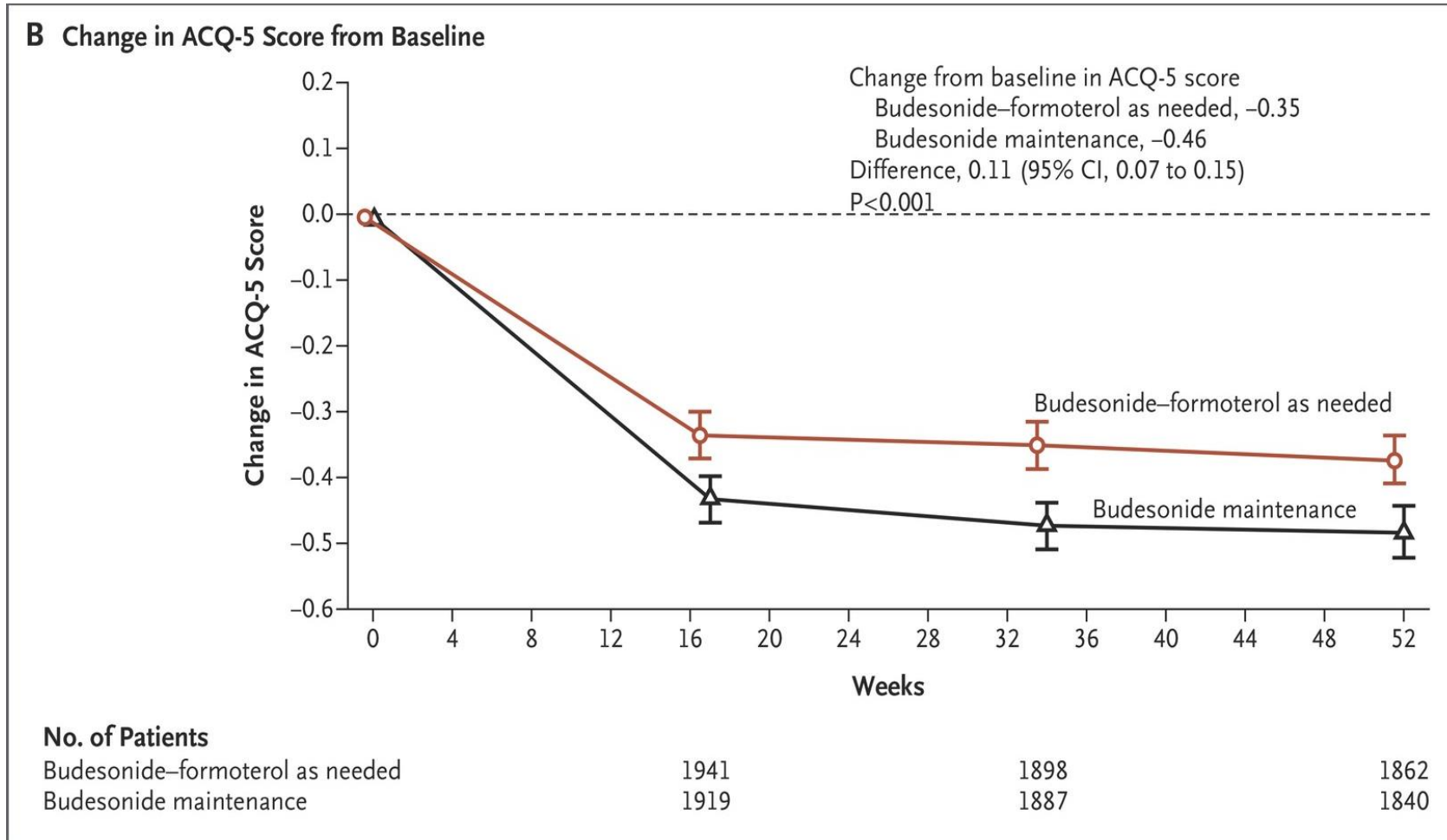
SYGMA 2 Secondary Outcome

Change in Prebronchodilator FEV₁ from baseline

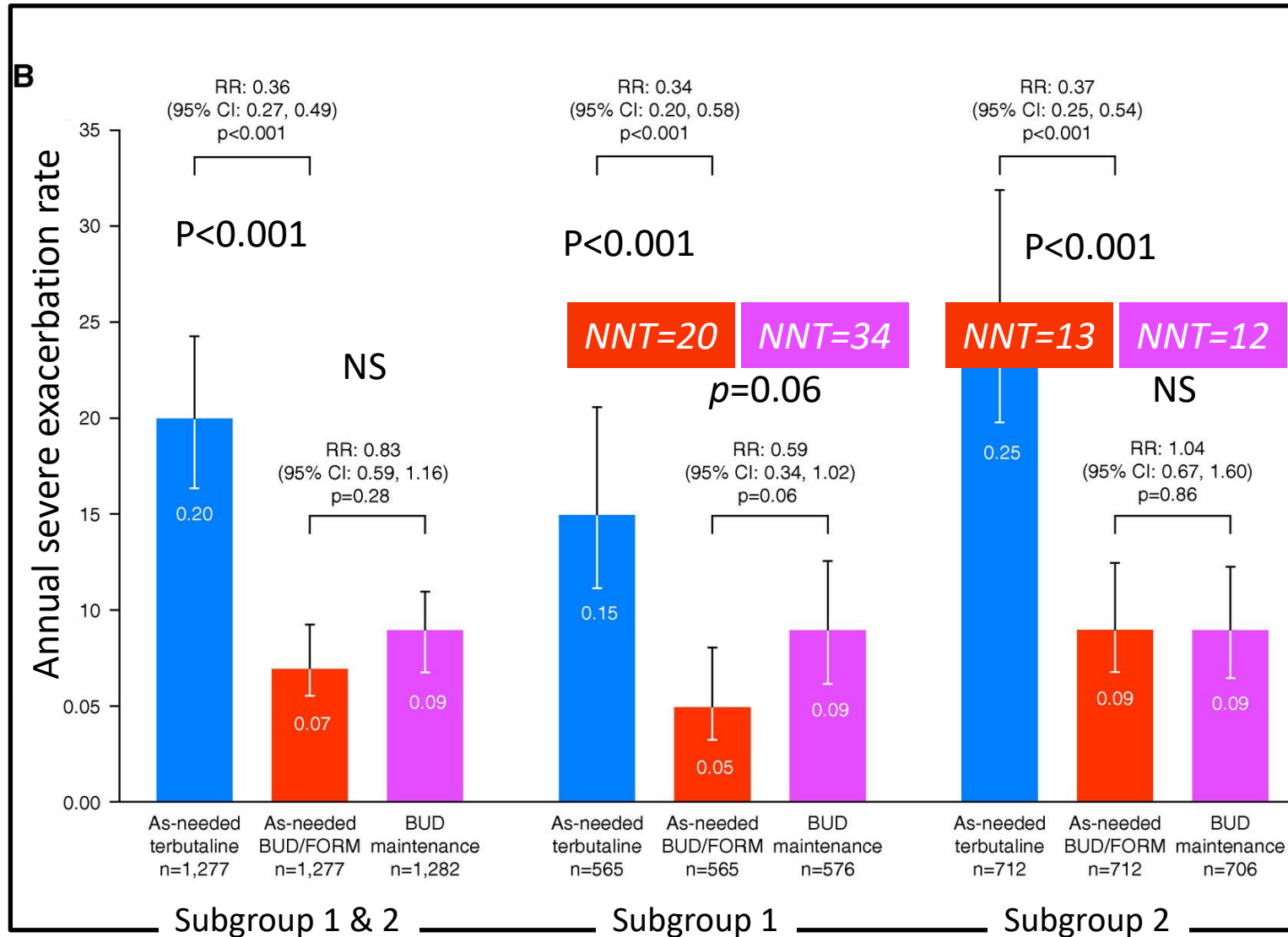


SYGMA 2 Secondary Outcome

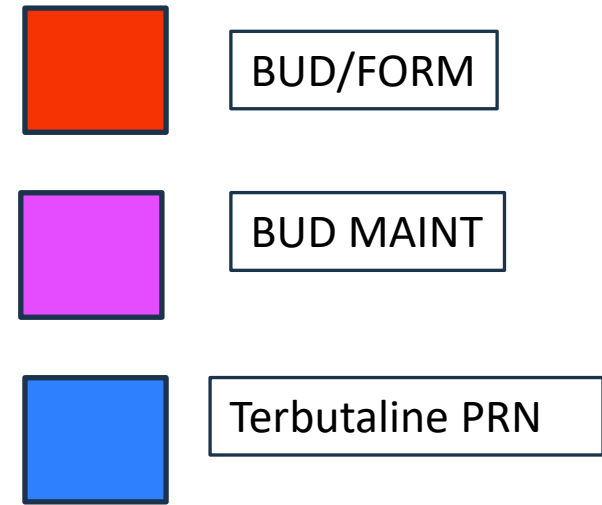
Change in ACQ-5 Score from baseline



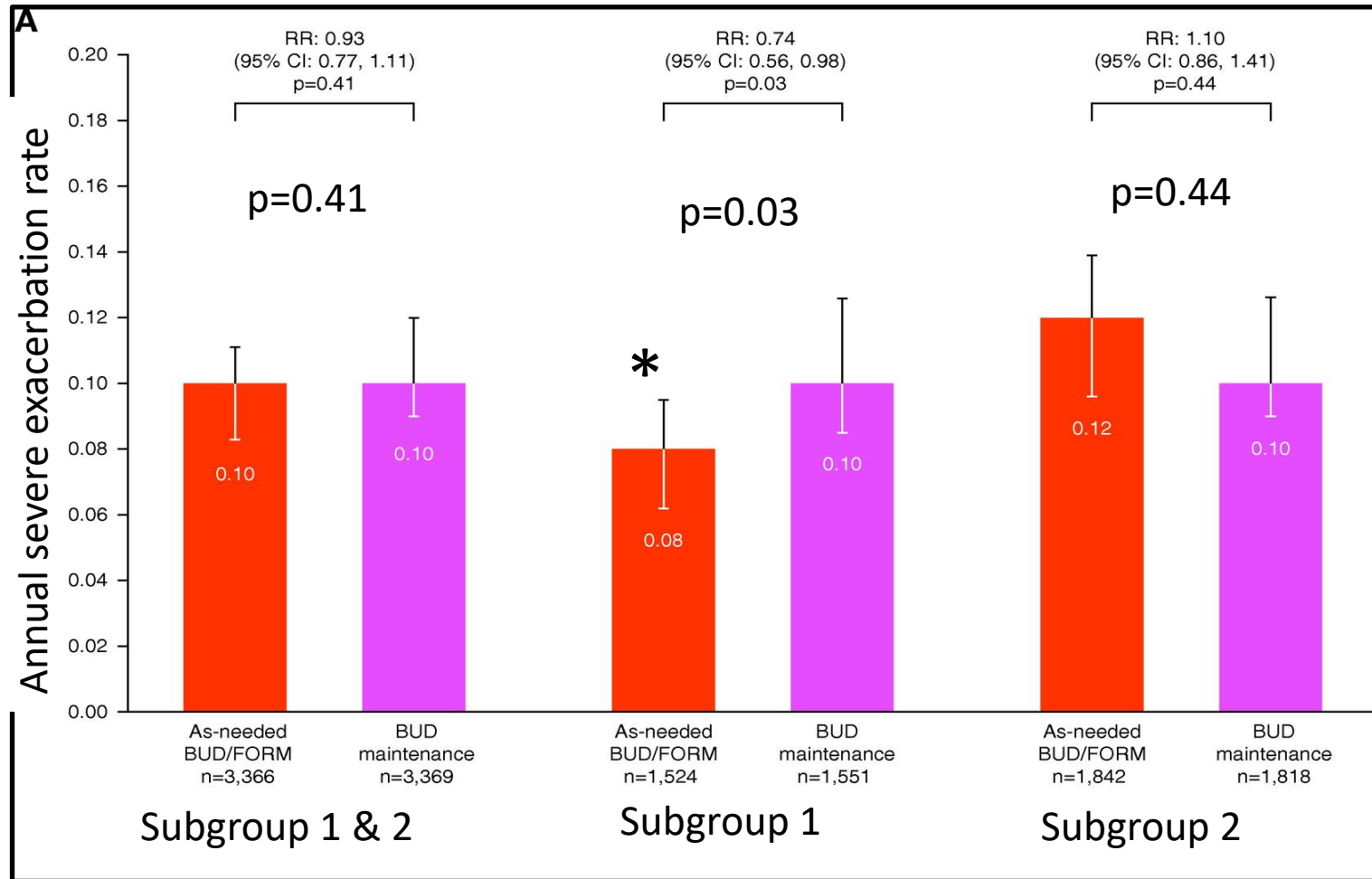
Severe exacerbation rate SYGMA 1 based upon pre-study treatment



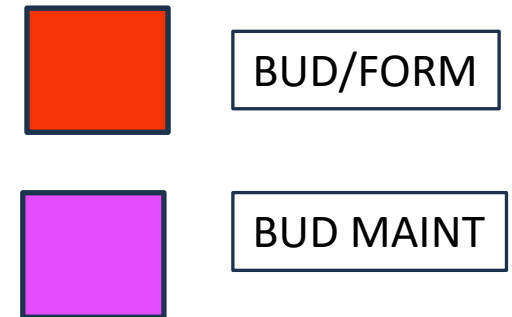
Pre-study Subgroups
 1=SABA PRN-uncontrolled
 2=ICS or LTRA-controlled



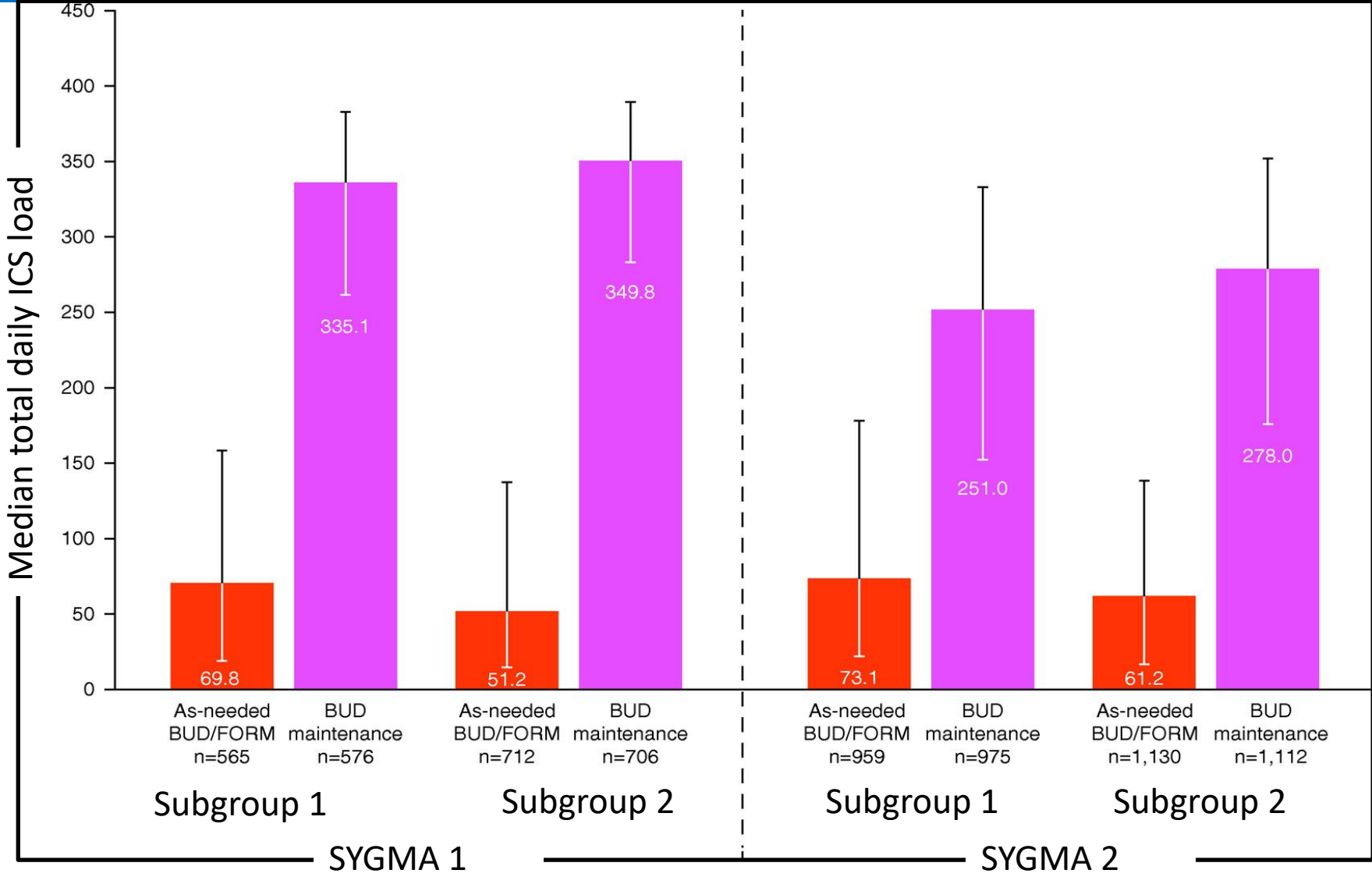
Severe exacerbation rate SYGMA 1 & 2 based upon pre-study treatment



Pre-study Subgroups
1=SABA PRN-uncontrolled
2=ICS or LTRA-controlled



Pre-study treatment had no effect on daily dose of ICS



Pre-study Subgroups
 1=SABA PRN-uncontrolled
 2=ICS or LTRA-controlled

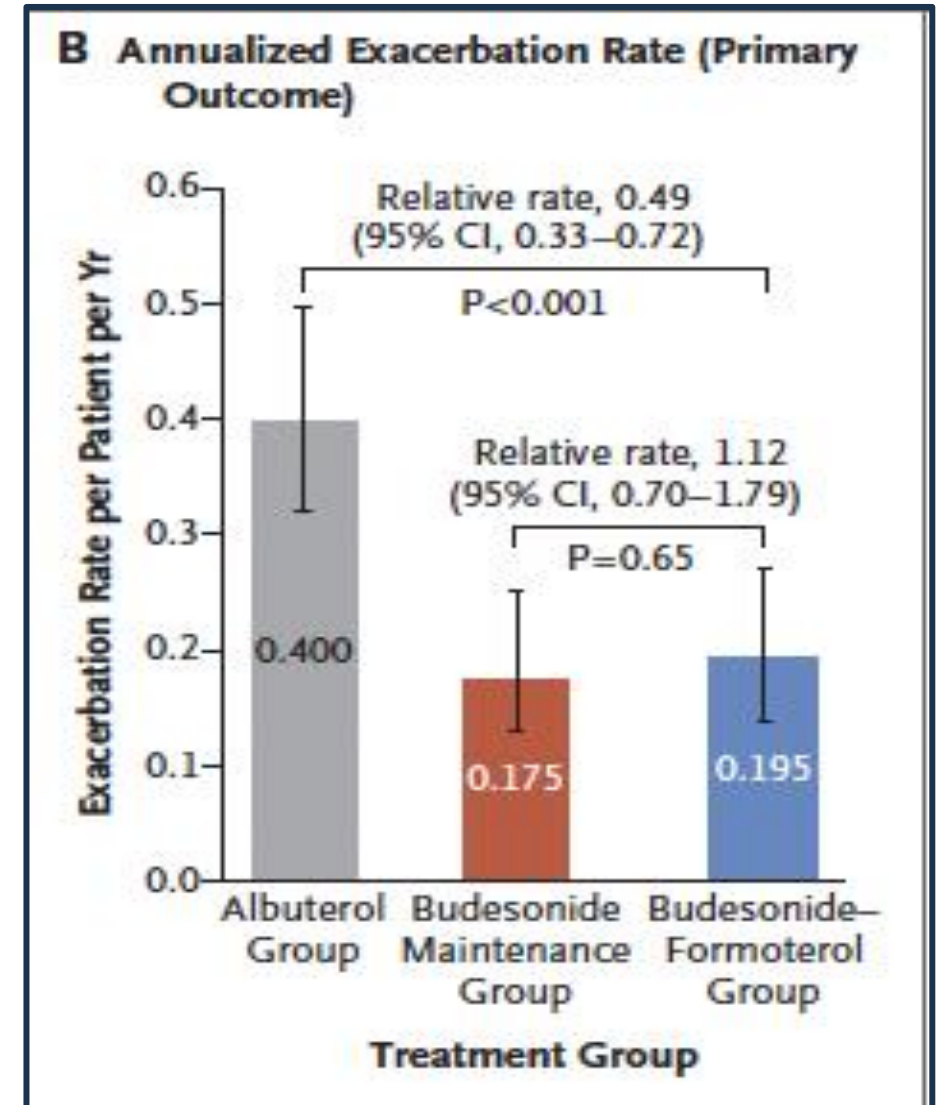
Legend:

- BUD/FORM
- BUD MAINT

Bateman, E. D., et al. (2021) Ann Am Thorac Soc 18(12): 2007-2017.

PRN BUD-FORM vs Daily BUD vs PRN Albuterol in Mild Asthma (Novel START study)

- 52- wk. randomized, open label trial
- 675 pts (18-75 yrs.) mild asthma on PRN SABA
- 3 parallel groups
 - Albuterol 2 sp. (100 µg/sp) PRN
 - Budesonide 200 µg bid
 - Budesonide-formoterol 200 µg/6 µg PRN
- Primary outcome- annualized rate of asthma exacerbations
- Secondary outcome- mean dose budesonide/day:
 - BUD bid: 222 +/- 113 µg /day
 - BUD-FORK: 107 +/- 109 µg /day



FeNO reduction same in BUD-FORM and BUD bid Novel START Study

D Fraction of Exhaled Nitric Oxide

Ratio of geometric mean FeNO at 52 wk:

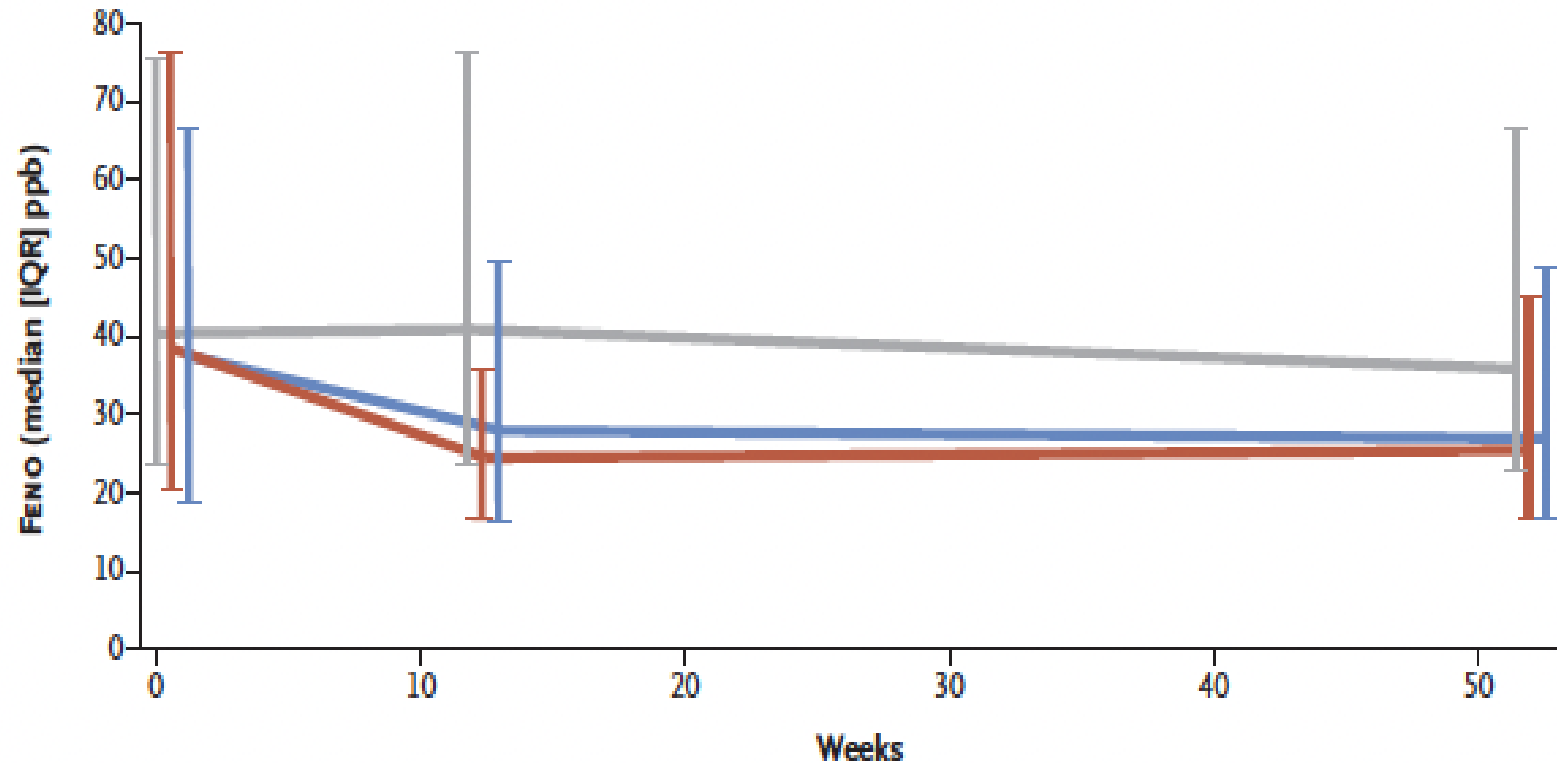
Budesonide-Formoterol Group vs. Albuterol Group, 0.83 (95% CI, 0.75-0.91)

Budesonide-Formoterol Group vs. Budesonide Maintenance Group, 1.13 (95% CI, 1.02-1.25)

— Albuterol Group

— Budesonide-Formoterol Group

— Budesonide Maintenance Group



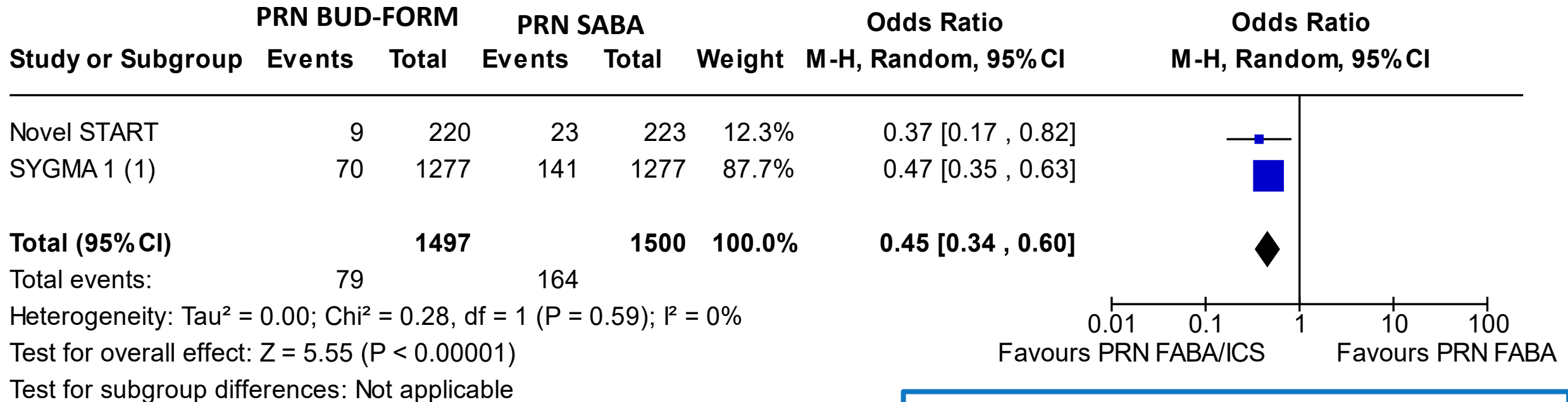
BUD/FORM PRN vs. SABA in mild asthma

Asthma exacerbations requiring systemic steroids

Cochrane Systematic Review

N=2997

Crossingham I, et al. BMJ Evid Based Med. 2022;27(3):178-84.



Fewer with BUD-FORM: OR=0.45

Footnotes

(1) Events and totals divided in half to account for being included in more than one analysis group

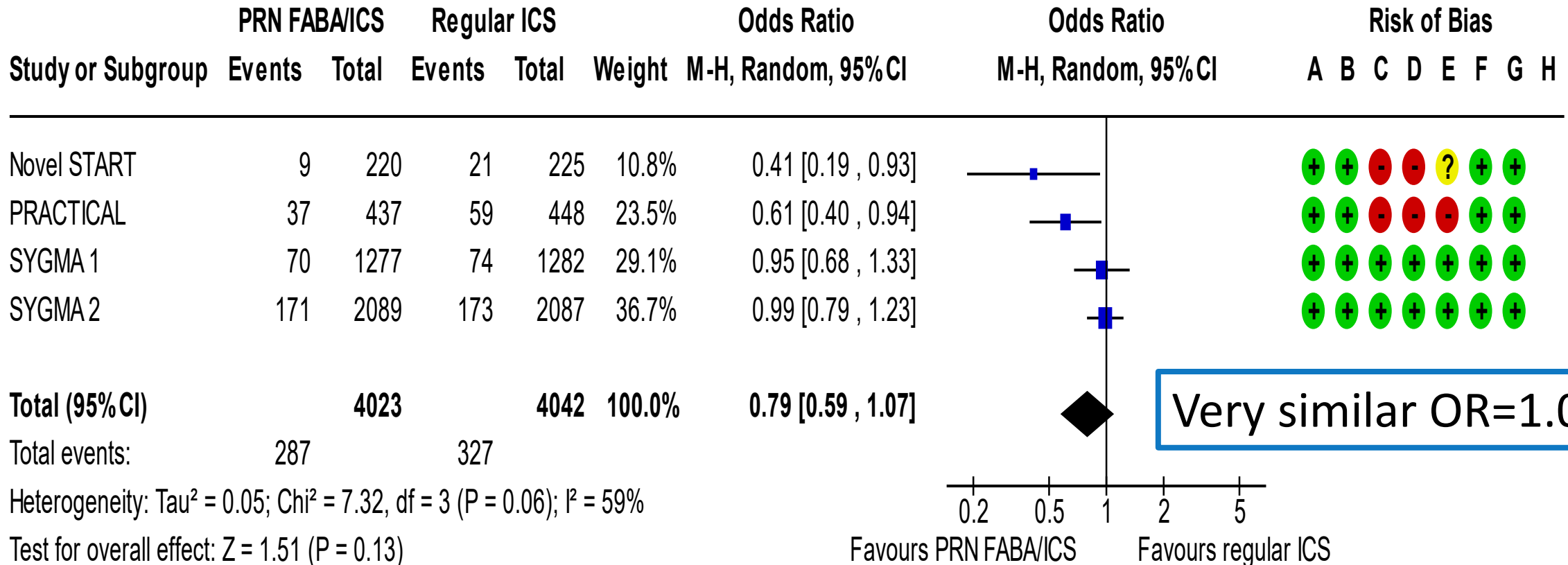
BUD/FORM PRN vs. ICS in mild asthma

Asthma exacerbations requiring systemic steroids

Cochrane Systematic Review

Crossingham I, et al. BMJ Evid Based Med. 2022;27(3):178-84.

N=8965



Heterogeneity: $\tau^2 = 0.05$; $\chi^2 = 7.32$, $df = 3$ ($P = 0.06$); $I^2 = 59\%$

Test for overall effect: $Z = 1.51$ ($P = 0.13$)

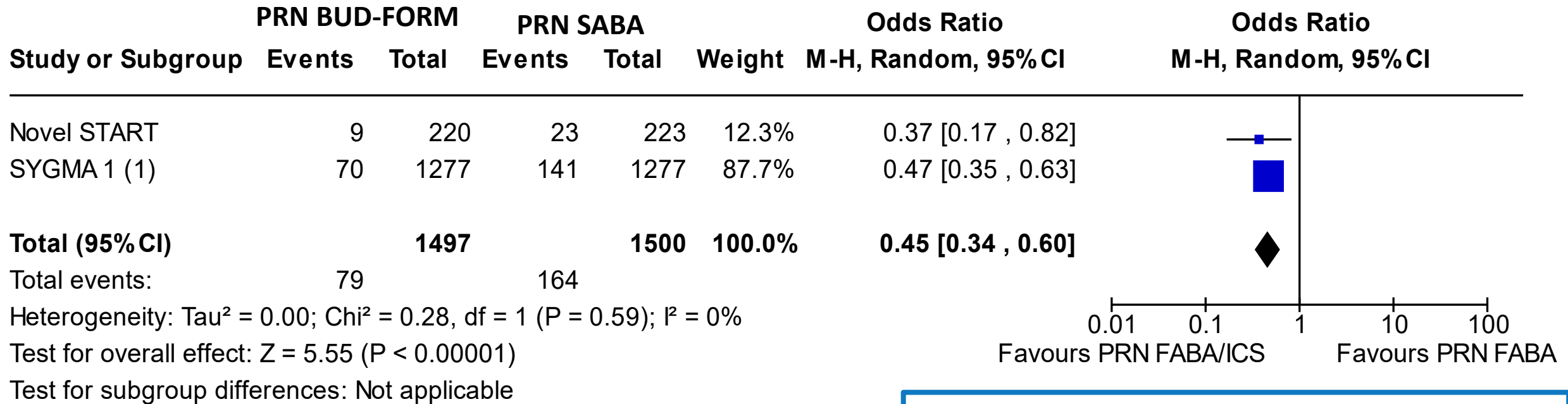
Test for subgroup differences: Not applicable

BUD/FORM PRN vs. SABA in mild asthma

Asthma exacerbations requiring systemic steroids

Cochrane Systematic Review

Crossingham I, et al. BMJ Evid Based Med. 2022;27(3):178-84.



Fewer with BUD-FORM: OR=0.45

Footnotes

(1) Events and totals divided in half to account for being included in more than one analysis group

Generalizability for use of budesonide-formoterol MDI in US

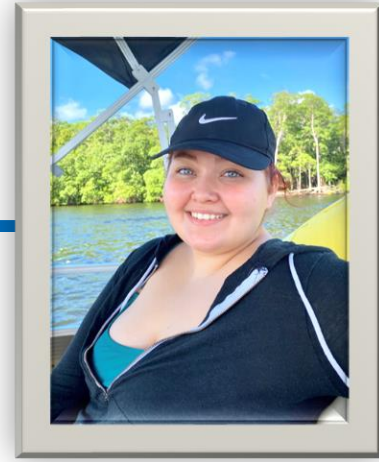
For Step 1 and 2 Treatment

- All recent major studies used BUD/FORM used Turbohaler, which is not available in the United States, however:
 - 2013 SMART trial using BUD/FORM MDI (303 subjects) showed similar results¹
 - 2013 SMART trial using Beclomethasone-formoterol (1714 subjects) showed class effect²
- Adherence to ICS with SABA rescue is higher in RCT than clinical practice³
 - 56-79% RCT
 - 15-54% Clinical practice
 - Therefore BUD/FORM compared to ICS + SABA is likely to yield even better results in your patients
 - PRN BUD/FORM may reduce need to move up to Step 3 therapy as SMART ICS/FORM reduces need to move from Step 3 ICS/LABA + SABA to Step 4 ICS/LABA + SABA. ³

1. Patel, M., et al. (2013). Lancet Respir Med 1(1): 32-42. 3. Beasley, R., et al: (2023). JACI:IP. 11(3): 762-772 e761.

2. Papi, A., et al. (2013). Lancet Respir Med 1(1): 23-31.

ICS/formoterol reliever therapy works for everyone



- Severe exacerbation rate reduction when using ICS/formoterol does not vary with age, sex, ethnicity, smoking status, exacerbation history, baseline SABA use, level of asthma control, lung function, blood eosinophil level or FeNO!
- Applicable to mild, moderate, and severe asthma



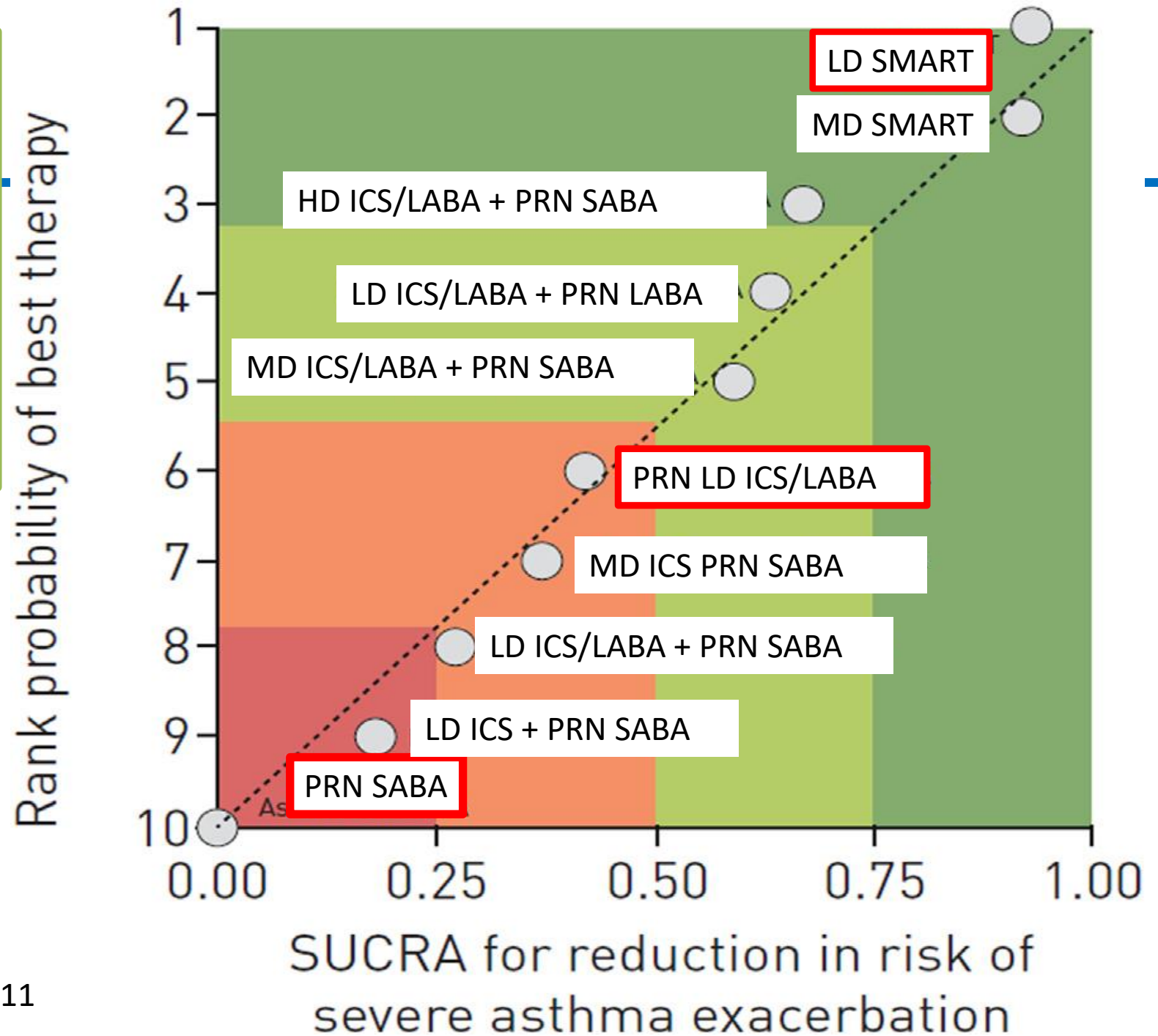
Beasley, R., et al: (2023). JACI:IP. 11(3): 762-772 e761.

Hardy, J., et al. (2019). Lancet 394(10202): 919-928.

Pavord, I. D., (2020). Lancet Respir Med 8(7): 671-680.

Preventing Asthma Exacerbations in adults and adolescents:

Ranking of therapeutic efficacy based upon network meta-analysis



STEP 2 - 5 Treatment

SABA or Formoterol?

Added to ICS as combination inhaler
for adults

Why is GINA Track 1 with ICS-formoterol preferred over GINA Track 2 (ICS-SABA) for adults? **Weight of Evidence**

- **Steps 1–2:** weight of evidence for effectiveness and safety favors budesonide/formoterol compared with SABA alone, or low-dose ICS plus as-needed SABA
 - **Budesonide/formoterol: 4x12 month studies, (n~10,000)¹**
 - **As-needed combined inhaler with ICS-SABA: only one 6-month RCT (n=455)²**

Why is GINA Track 1 with ICS-formoterol preferred over GINA Track 2 (ICS-SABA) for adults? **Weight of Evidence**

- **Steps 3–5:** weight of evidence for effectiveness and safety of **MART** versus regimens with as-needed SABA
 - MART study patients (**n~30,000**)^{1,2}
 - As-needed combination inhaler with ICS-SABA: One RCT (**n=3,132**) vs as-needed SABA³

1. Sobieraj, D. M., et al. (2018). JAMA 319(14): 1485-1496. 2. Cates, C. (2013). Paediatr Respir Rev **14**(1): 25-26.
3. Papi, A., (2022). N Engl J Med 386(22): 2071-2083.

Why is GINA Track 1 with ICS-formoterol preferred over GINA Track 2 (ICS-SABA) for adults?

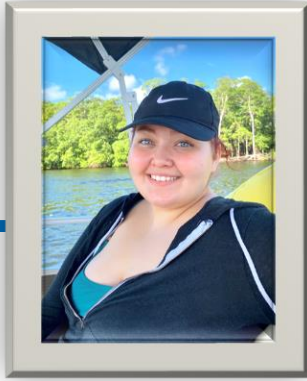
Which components in 1 inhaler are preferred?

- **ICS-SABA** cannot be used for maintenance and reliever therapy
- Both the **ICS** and the **formoterol** components contribute to reduction in severe exacerbations^{1,2,3}
- Safety of ICS-formoterol established for up to total 12 inhalations in any day, in large studies

1. Tattersfield, A. E., et al. (2001). Lancet 357(9252): 257-261 2. Pauwels, R. A., et al. (2003). Eur Respir J 22(5): 787-794.
3. Rabe, K. F., (2006). Lancet 368(9537): 744-753.

Rebuttal

Why is GINA Track 1 with ICS-formoterol preferred?



Simplicity is preferred

- **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



When to consider ICS-SABA (combination device) for rescue treatment

When ICS/Formoterol is not available

When ICS/Formoterol is too expensive

In children, particularly in GINA Level 1 and 2

Practical advice for GINA Track 1

Do not combine BUD-FORM with another ICS-LABA

- There is no evidence or safety

BUD-FORM may be used to prevent exercise asthma

- Provides better protection than SABA¹
- Provides long-term protection similar protection as ICS + SABA¹

How to prescribe BUD 200 µg-FORM 6 µg

- 1 sp. PRN as reliever (AIR) and 1 sp. BID for maintenance (MART)
- Maximum of 12 sp./day (72 µg of FORM) on temporary basis
- Limit to 6 sp. on a single occasion

Practical advice for GINA Track 1

Educate patients on effectiveness, safety, and to stop using SABA

- In the PRACTICAL study, 69% patients said **ICS-formoterol worked as fast as, or faster than, their previous SABA**¹

Advise patients to have two combination inhalers (if possible), 1 at home, 1 in bag/pocket

Advise patients to rinse and spit out after maintenance doses, but this is not needed with reliever doses

- No increased incidence of candidiasis in RCTs with this recommendation (n~40,000)

Practical advice for GINA Track 1

Use an action plan customized to MART

Maintenance ICS-formoterol inhalations PLUS **as-needed** ICS-formoterol inhalations

PRN ICS-formoterol **reduces the risk of progressing to a severe exacerbation** needing oral corticosteroids^{1,2}

Additional practical advice for MART available in JACI IP 2022³

1. Bousquet, J., L. (2007). *Respir Med* **101**(12): 2437-2446.
2. O'Byrne, P. M., (2021). " *Lancet Respir Med* **9**(2): 149-158
3. *Reddel et al, JACI in Practice 2022; 10: S31-s38*

Action plan for MART with ICS-formoterol



A Practical Guide to Implementing SMART in Asthma Management

Helen K. Reddel, MB, BS, PhD^{a,b}, Eric D. Bateman, MB, ChB, MD^{b,c}, Michael Schatz, MD, MS^c, Jerry A. Krishnan, MD, PhD^d, and Michelle M. Cloutier, MD^e *Sydney, Australia; Cape Town, South Africa; San Diego, California; Chicago, Ill; and Farmington, Conn*

Reddel et al, *JACI in Practice* 2022; 10: S31-s38

This article includes a writable action plan template that can be modified for other combination ICS-formoterol inhalers, and for as-needed-only ICS-formoterol

For additional action plans with ICS-formoterol reliever, see National Asthma Council Australia Action plan library www.nationalasthma.org.au/health-professionals/asthma-action-plans

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 (if used) Doctor's phone: _____

Normal mode

My SMART Asthma Treatment is:

- budesonide/formoterol 160/4.5 (12 years or older)
- 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 or older) or more than 4 inhalations a day (if aged 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.