Asthma Guideline Update AAPA 2022

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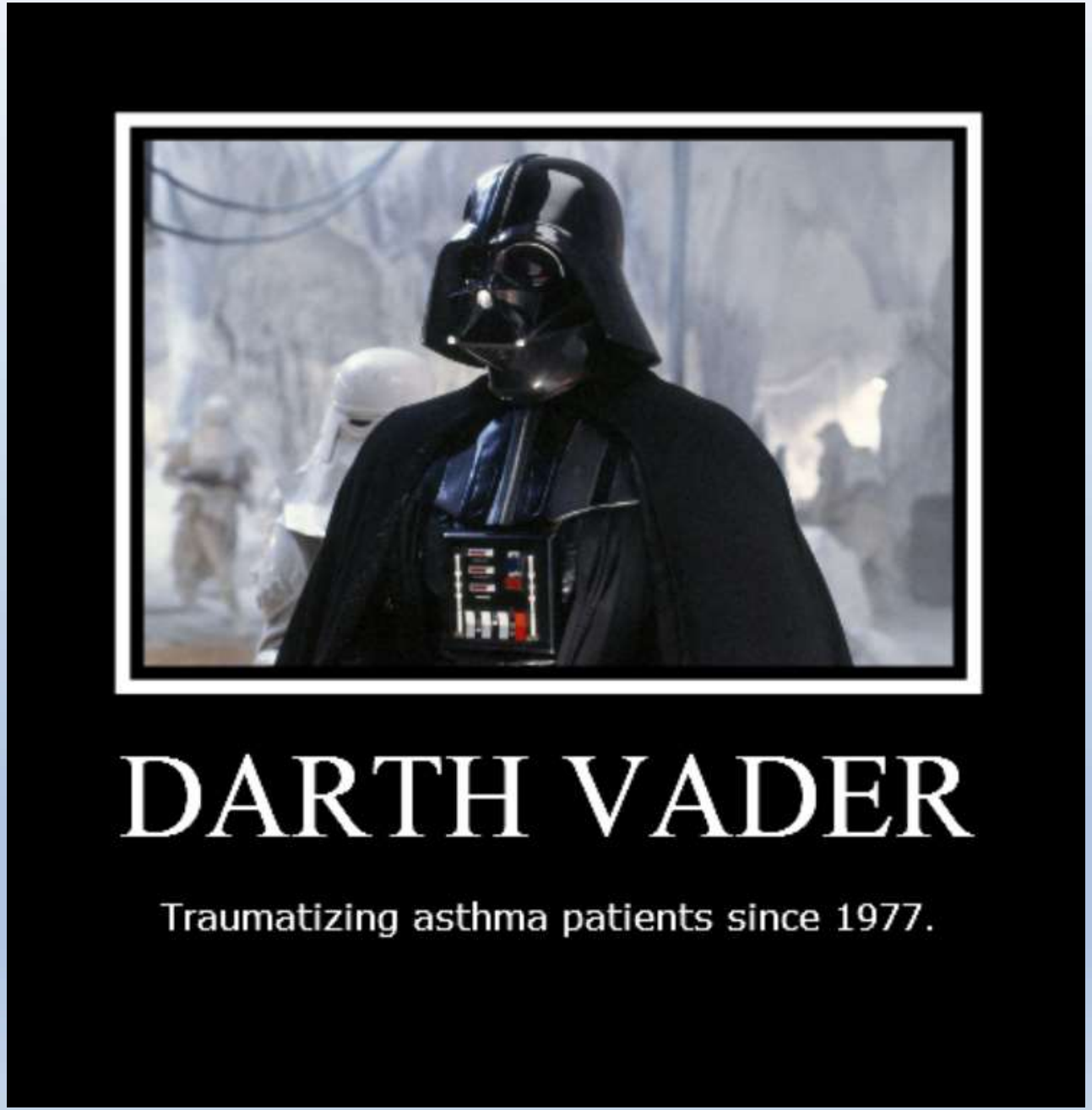
Asthma

Plan Today

Review medication classes

Talk over the guidelines

Review best practices in asthma including referrals for biologics



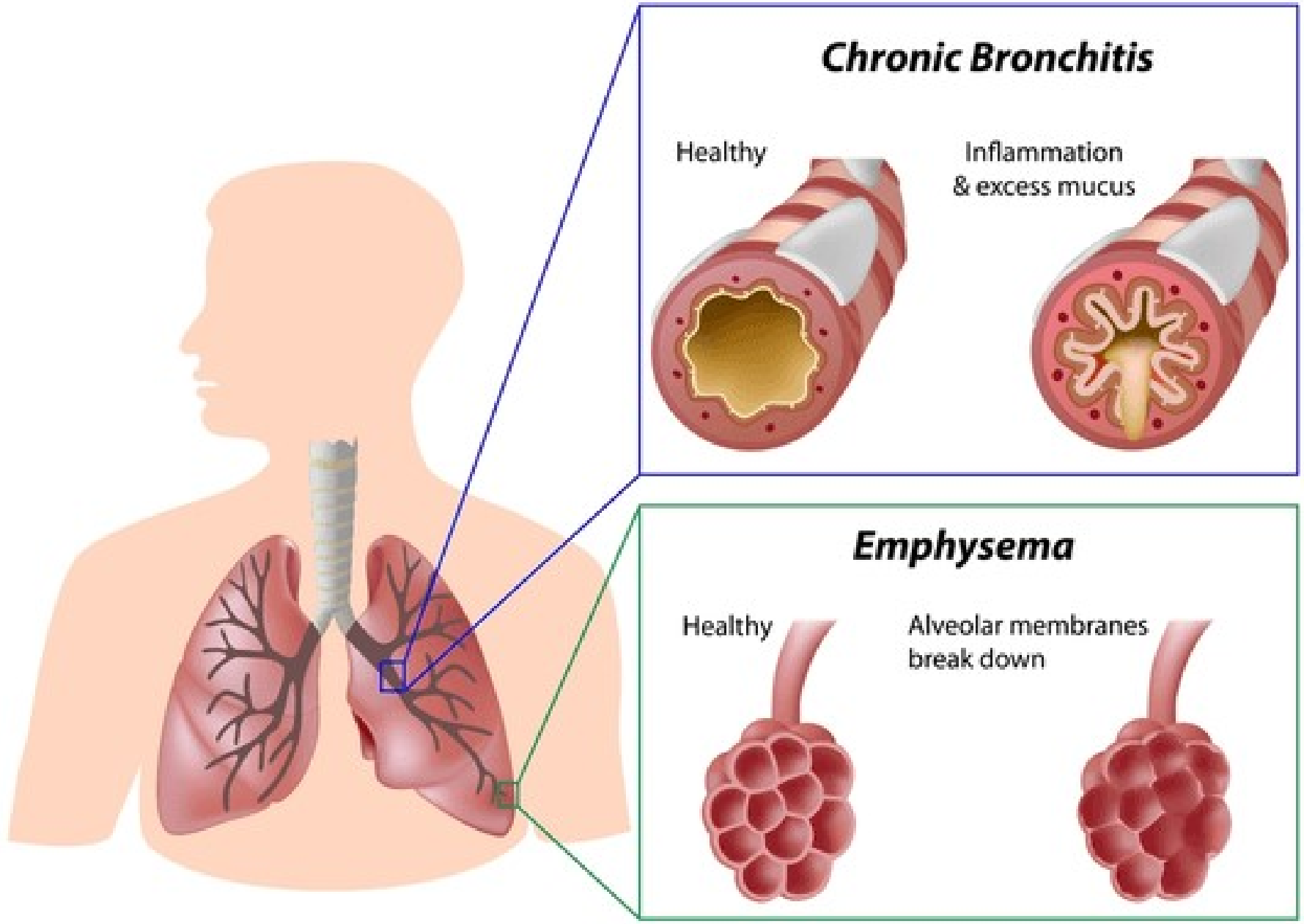
Asthma and COPD

We need to build the big picture first, before anything else. I need these two very different (but sometimes overlapping) diseases to be clear.

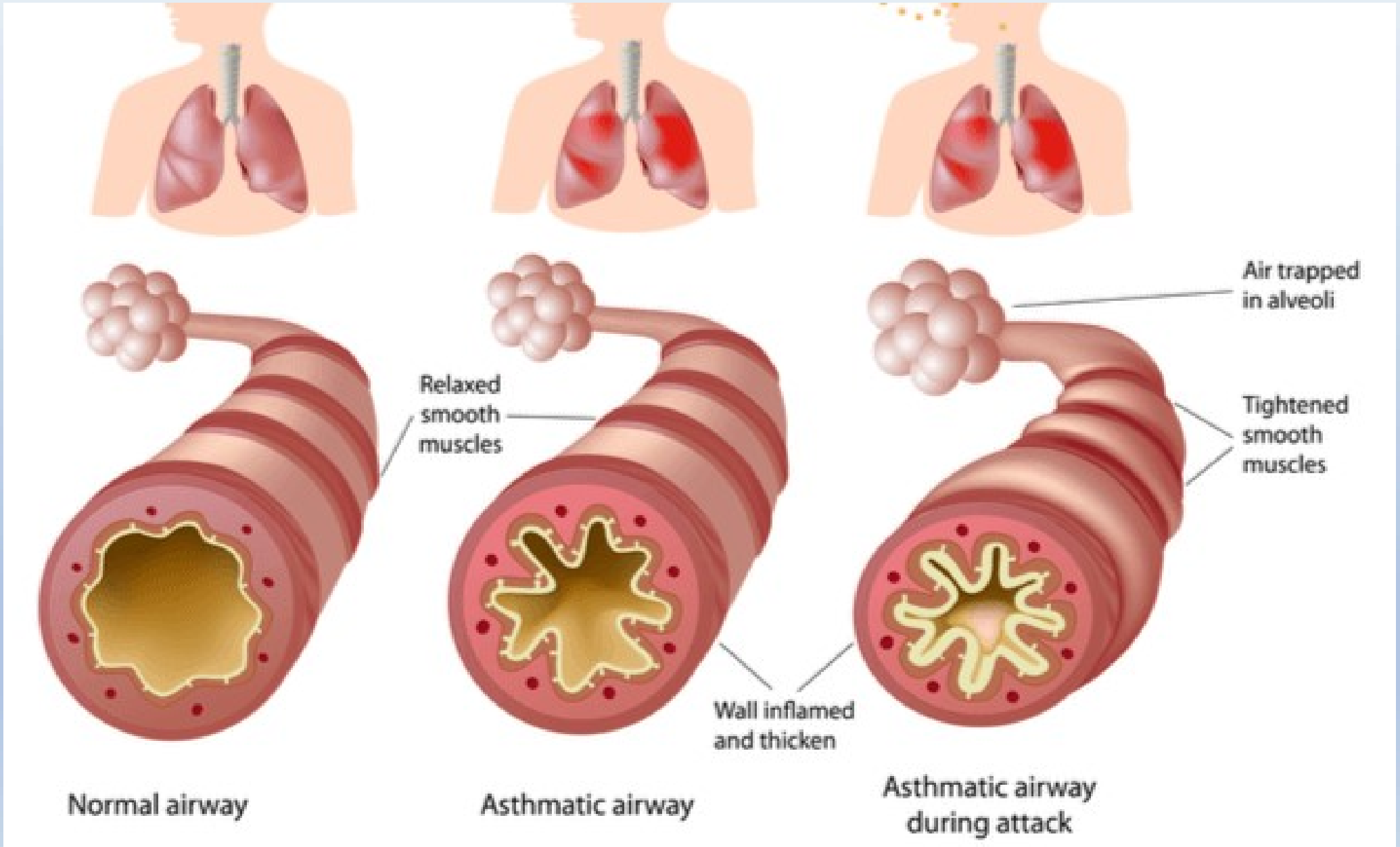
Asthma – bronchoconstriction, airway inflammation, mucous production

COPD – Tissue destruction, chronic cough, due to exposure

COPD – Think of the name. . Any thing chronic, that is obstructive, in the lungs and is terrible



Asthma – Three key features: bronchoconstriction, airway inflammation and mucous production.



Asthma

OK Big picture - - -

Asthma – the big three

COPD – exposure, tissue destruction

OK – lets focus on asthma now

Asthma

Guidelines

2007 - last time we had anything new in the US till . . . .2020.

GINA – the rest of the world has GINA, the Global Initiative for Asthma, updated every year

Burden of asthma

- Asthma is one of the most common chronic diseases worldwide with an estimated 300 million affected individuals
- Prevalence is increasing in many countries, especially in children
- Asthma is a major cause of school and work absence

- **Every day in America:**

- 40,000 people miss school or work due to asthma.
- 30,000 people have an asthma attack.
- 5,000 people visit the emergency room due to asthma.
- 1,000 people are admitted to the hospital due to asthma.
- 11 people die from asthma

Definition of asthma

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation, bronchoconstriction and increased mucous production.

It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and intensity, together with variable expiratory airflow limitation.

Asthma Terms/Actions/Inhaler Types

- SABA = Short Acting Beta-Agonist = Albuterol = rescue inhaler = puffer, Proair, Ventolin, Proventil
- LABA = Long Acting Beta-Agonist, Serevent, Salmeterol
- ICS = Inhaled Corticosteroid, Flovent, fluticasone, QVAR, Pulmicort
- LAMA = Long Acting Muscarinic Antagonist, Spiriva, tiotropium
- MDI = Metered Dose Inhaler
- DPI = Dry Powdered Inhaler – Advair, Breo, Trelegy

Asthma: Part 1

We have three categories of medications

Albuterol

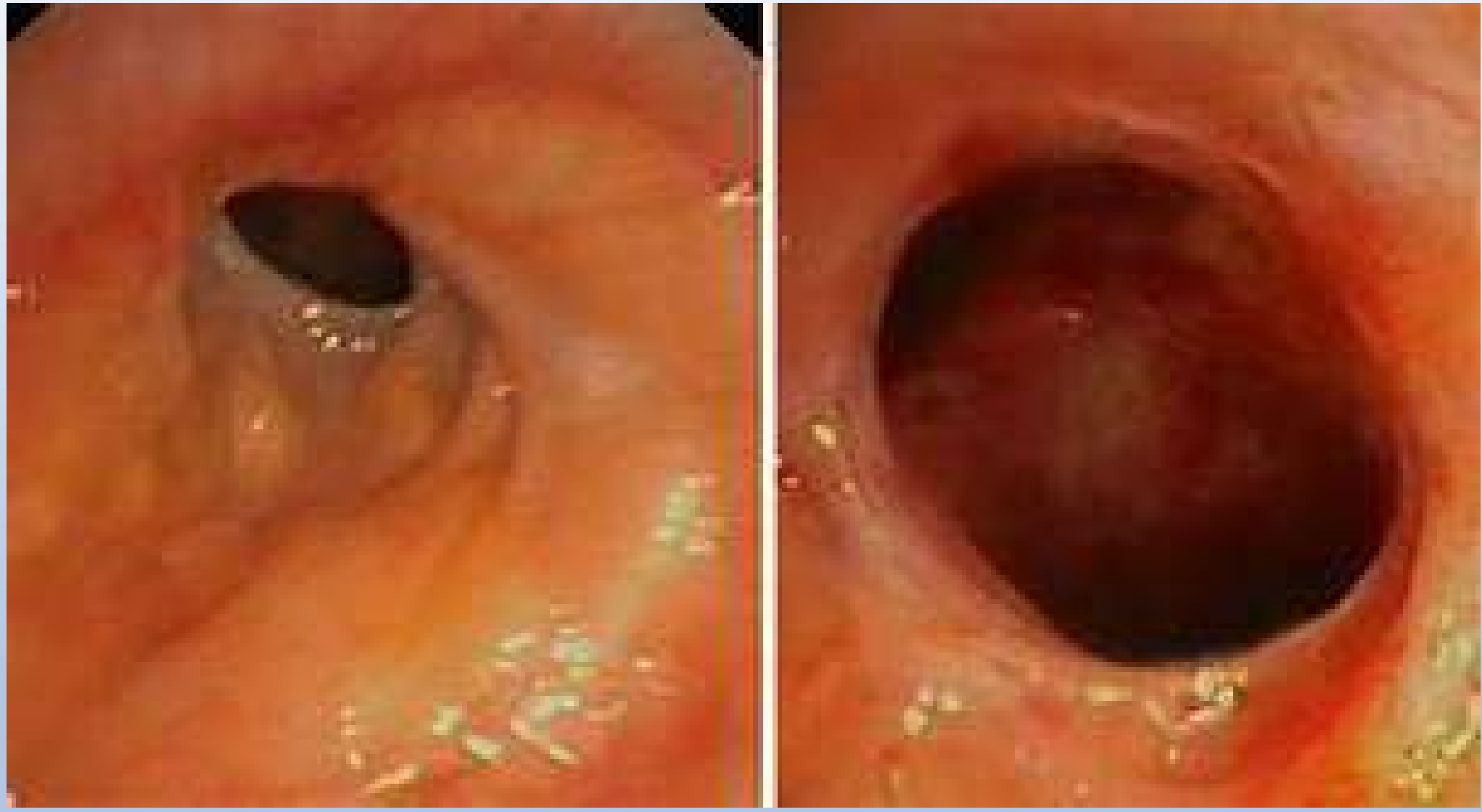
Short – SABA
Long – LABA

Bronchodilators

Medication Categories

Albuterol – short acting bronchodilator, relaxes smooth muscle. Binds to beta receptors on smooth muscle, causing about a billion things to happen that drop the calcium in the cell and it relaxes.

Salmeterol/formoterol/vilanterol – Same thing as above but lasts 12 or 24 hours



Respiratory Treatments

Allergy & Asthma Network

American College of Allergy, Asthma & Immunology

CHEST FOUNDATION

AllergyAsthmaNetwork.org
800.878.4403

SHORT-ACTING BETA$_2$-AGONIST BRONCHODILATORS

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

- **ProAir® Digihaler™** 90 mcg albuterol sulfate inhalation powder — DSB A
- **ProAir® HFA** 90 mcg albuterol sulfate — DSB A G
- **ProAir RespiClick®** 90 mcg albuterol sulfate inhalation powder — DSB A
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- **Xopenex HFA®** 45 mcg levalbuterol tartrate — A G

LONG-ACTING BETA$_2$-AGONIST 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

- **Serevent® Diskus®** 50 mcg salmeterol xinafoate inhalation powder — DSB A C
- **Striverdi® Respimat®** 2.5 mcg olodaterol hydrochloride — DSB C

INHALED CORTICOSTEROIDS

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

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MUSCARINIC ANTAGONISTS (ANTICHOLINERGIC)

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

Short-acting

- **Atrovent® HFA** 17 mcg ipratropium bromide — DSB C

Long-acting

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- **Spiriva® HandiHaler®** 18 mcg tiotropium bromide inhalation powder — C
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- **Tudorza™ Pressair™** 400 mcg aclidinium bromide inhalation powder — DSB C

COMBINATION MEDICATIONS

contain both short-acting beta$_2$-agonist and short-acting muscarinic antagonist

- **Combivent® Respimat®** 20/100 mcg ipratropium bromide and albuterol — DSB C

COMBINATION MEDICATIONS

contain both inhaled corticosteroid and long-acting beta$_2$-agonist (LABA)

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BIOLOGICS

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- mepolizumab — A
- omalizumab — A

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A minimally invasive procedure that uses heat to reduce airway smooth muscle, leading to fewer severe asthma flares, ER visits, and days lost from activities. www.btxasthma.com — A

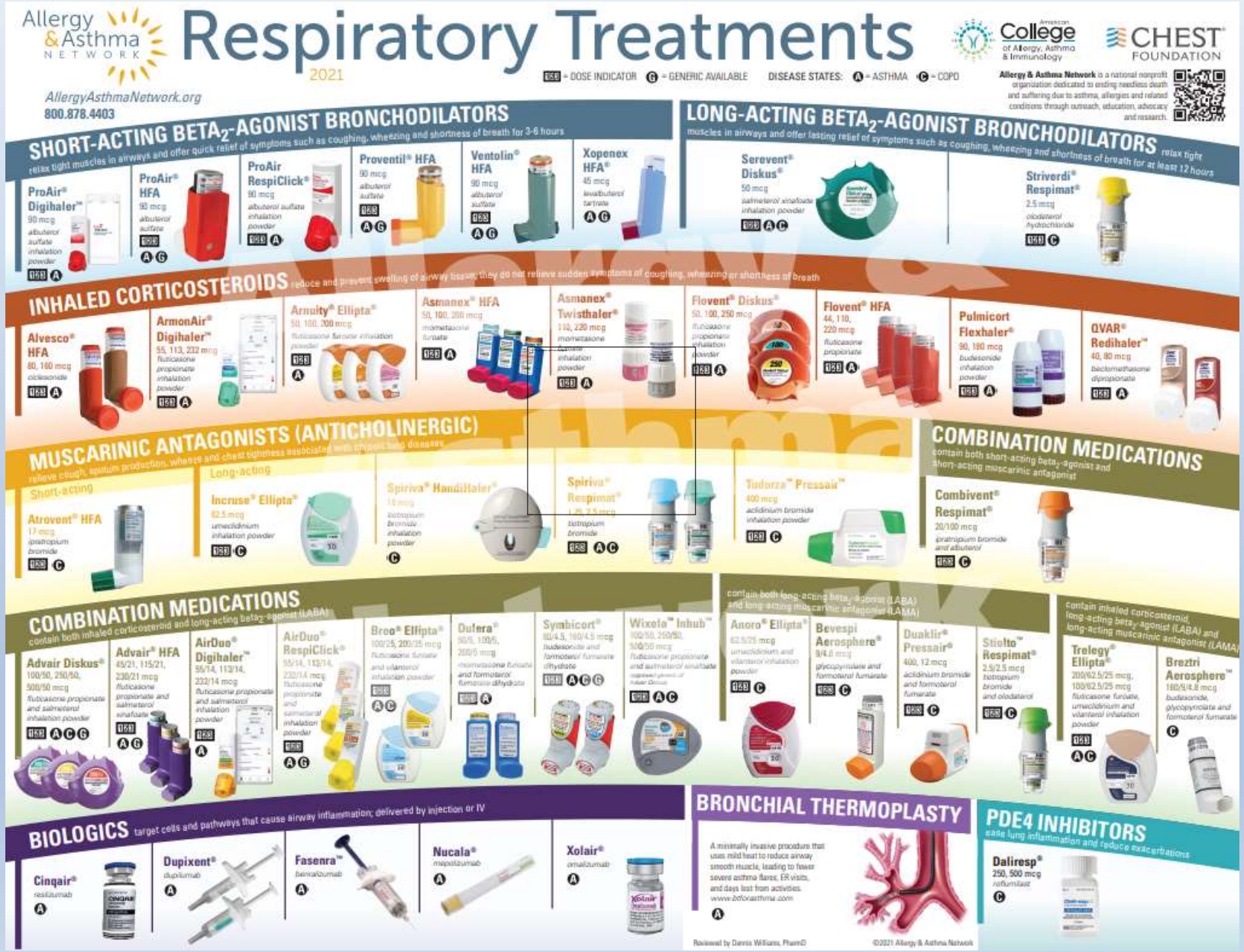
PDE4 INHIBITORS

ease lung inflammation and reduce

- **Daliresp®** 250, 500 mcg roflumilast — C

Reviewed by Dennis Williams, PharmD

https://members.allergyasthmanetwork.org/store/viewproduct.aspx?id=16386141



Asthma Part 1

We have three categories of medications

Steroids

All long acting

Reduce most every aspect of inflammation

Medication Categories: Steroids

Corticosteroids bind to the glucocorticoid receptor and mediate changes in gene expression that lead to multiple downstream effects over hours to days.

Glucocorticoids inhibit WBC movement by slowing demargination; they inhibit phospholipase A2, which decreases the formation of arachidonic acid derivatives; they inhibit NF-Kappa B and other inflammatory transcription factors; they promote anti-inflammatory genes like interleukin.

Medication Categories: Steroids

Many actions, all with a central goal of reducing inflammation at the source

Most aspects of inflammation are affected

Two side notes on steroids - - - -

Asthma Terms/Actions/Inhaler Types

Prednisone

Taper?

As you know you DON'T have to taper.

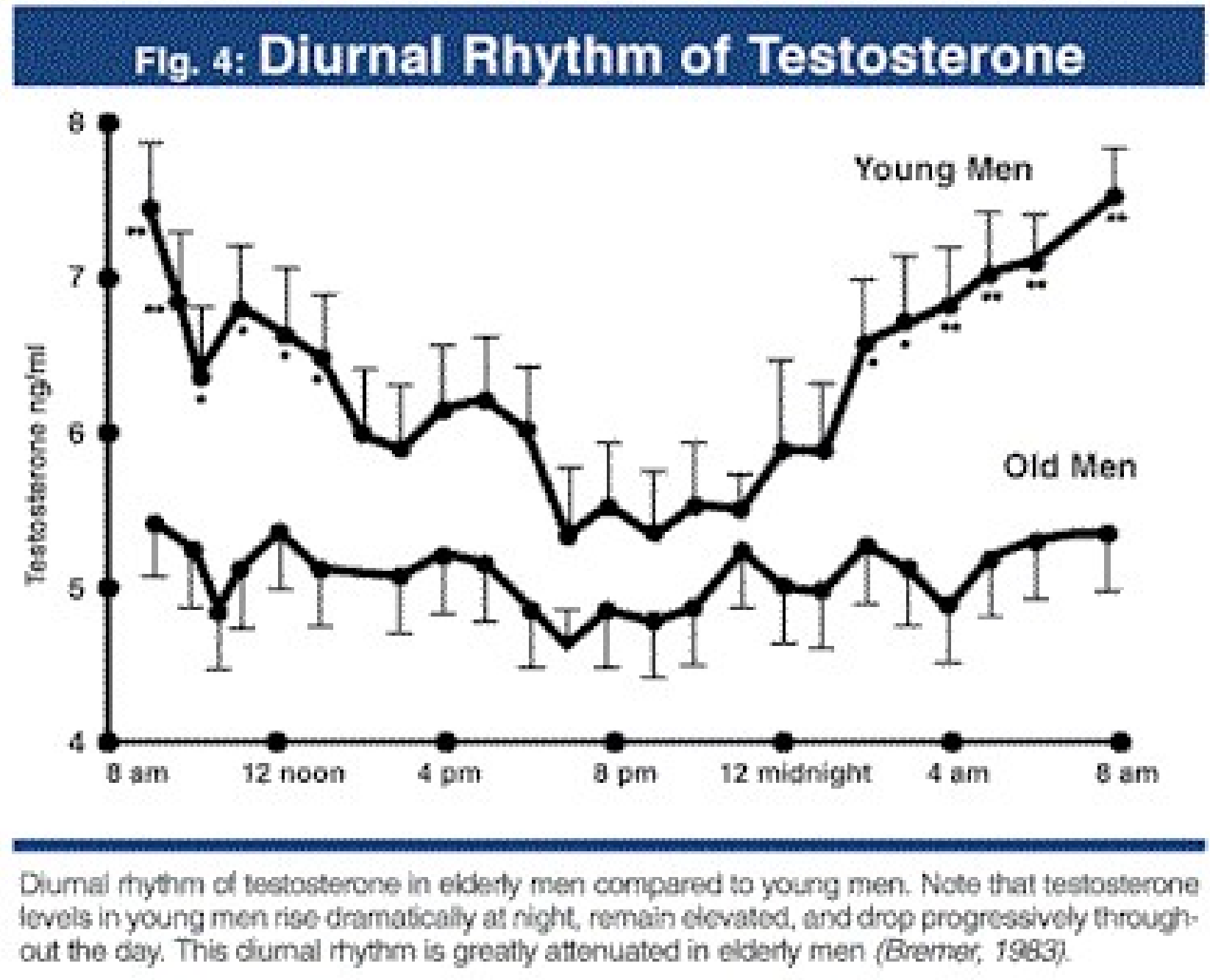
In fact, you should not be putting patients on a dose of steroid that requires a taper.

Tapering is NOT because you have to, it's because you can! You can give them less. . .takes half the dose to keep you well as it did to get you well.

This is where the PATIENT controlled taper is nice:

Take 40 mg till you are 50% better
Take 20 mg till you are back to baseline. . . .

Prednisone – diurnal variation



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

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reduce and prevent swelling

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relieve cough, sputum production, wheezing associated with chronic lung diseases

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Long-acting

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COMBINATION MEDICATIONS

short-acting muscarinic antagonist and beta$_2$-agonist

- **Combivent® Respimat®** 20/100 mcg ipratropium bromide and albuterol — C

COMBINATION MEDICATIONS

contain both inhaled corticosteroid and long-acting beta$_2$-agonist (LABA)

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PDE4 INHIBITORS

ease lung inflammation and reduce exacerbations

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Reviewed by Dennis Williams, PharmD

Asthma: Part 1

We have three categories of medications

SAMA/LAMA

Short – SAMA
Long – LAMA

Anticholinergic and constriction prevention

Medication Categories: SAMA/LAMA

Ipratropium bromide (and long-acting muscarinic antagonists) are often listed as bronchodilators?

Are they? They don't directly relax smooth muscle. . . .

COPD Medication Categories: SAMA/LAMA

Ipratropium bromide

1. Made from the combination of Isopropyl alcohol and atropine. The name comes from these two words. Isopropyl alcohol and atropine
2. Works by INCREASING the degradation of cGMP and by DECREASING Ca2+ in the cells, thus blocking contraction. They don't dilate anything really.
3. Onset of action . . . 20 minutes or so. Ipratropium half life is 2 hours.

Medication Categories: SAMA/LAMA

Why helpful if minimal bronchoconstriction?

These help block contraction but also reduce RESTING TONE.

So even if not overly constricted, can be helpful.

Minimal systemic absorption

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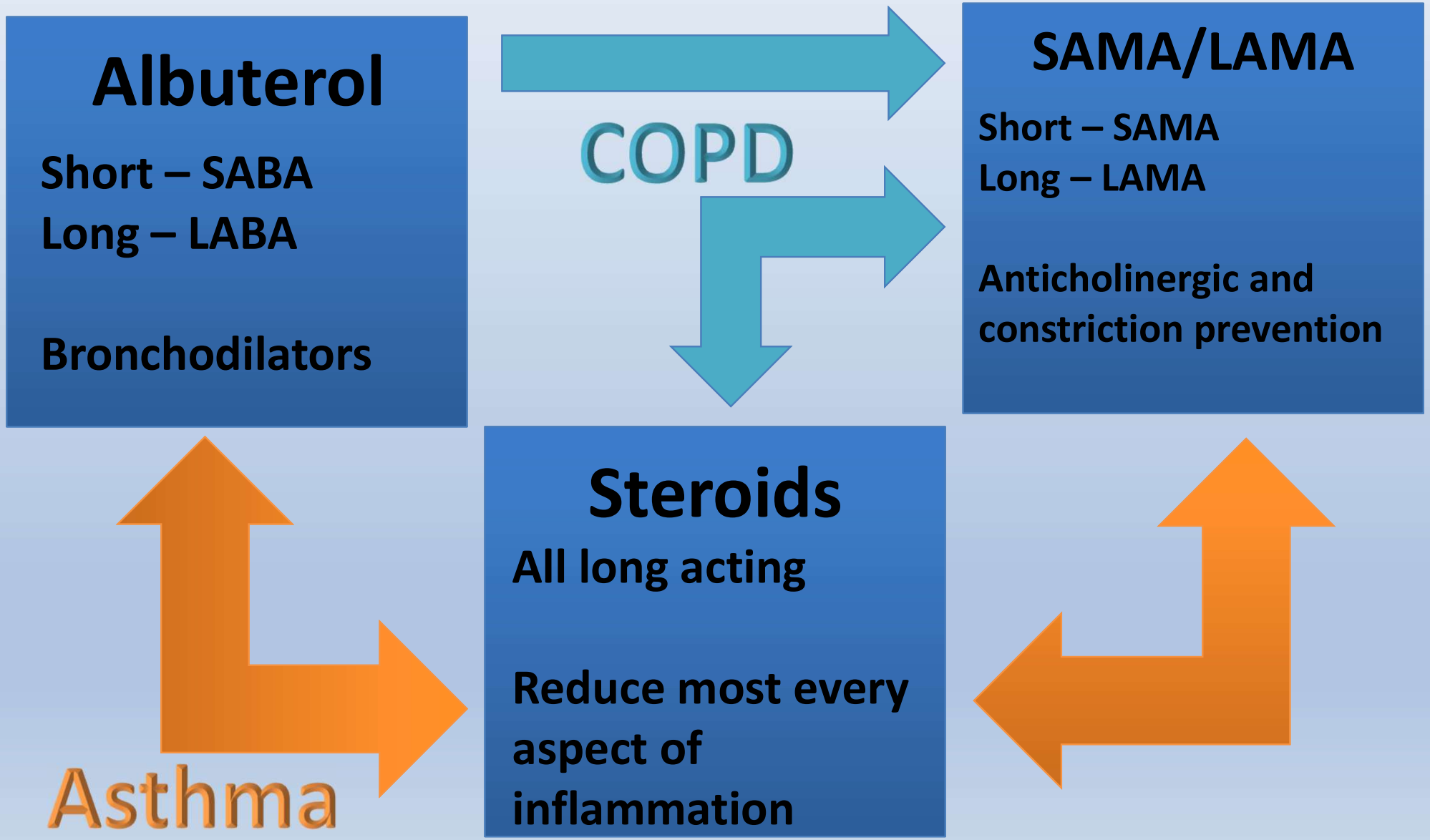

So those are the players in this very crowded game!

Now we shift gears and move onto GUIDELINES

Since the new US GUIDELINES came out in 2020 we can now say that the world (GINA) and the US (EPR4) GUIDELINES are on the same page about a good deal of things – but still differ a bit.

The FDA – not yet. Maybe not for years. . . .

So what are the main changes in the past few years?

Key changes – *Albuterol use*

Inhaled SABA has been first-line treatment for asthma for 50 years

This dates from an era when asthma was thought to be a disease of bronchoconstriction

Patient satisfaction with, and reliance on, SABA treatment is reinforced by its rapid relief of symptoms, its prominence in ED and hospital management of exacerbations, and low cost

Patients commonly believe that *"My reliever gives me control over my asthma"*, so they often don't see the need for additional treatment

Key Guideline Changes – *Albuterol use*

- Regular or frequent use of SABA is associated with adverse effects
  - β-receptor downregulation, decreased bronchoprotection, rebound hyperresponsiveness, decreased bronchodilator response *(Hancox, Respir Med 2000)*
  - Increased allergic response, and increased eosinophilic airway inflammation *(Aldridge, AJRCCM 2000)*
- Higher use of SABA is associated with adverse clinical outcomes
  - The MORE YOU Rx SABA the higher the risk of ER visits, intubation and death. Don't just "refill the puffer".

Key Guideline Changes – *Albuterol use*

- For safety, GINA no longer recommends SABA-only treatment for Step 1
  - This decision was based on evidence that SABA-only treatment increases the risk of severe exacerbations, and that adding any ICS significantly reduces the risk
- GINA now recommends that all adults and adolescents with asthma should receive symptom-driven or regular low dose ICS-containing controller treatment, to reduce the risk of serious exacerbations
- US Guidelines recommend this in STEP 2

Key changes – *SMART THERAPY*

Single Maintenance And Reliever Therapy

SABA is a fast acting agent – on fast, off fast

LABA is long acting, most LABAs take time to kick in

One exception – Formoterol, this LABA acts fast – like a SABA

That fact lead to the SMART idea. . . . .

Meta-Analysis > Eur Respir J. 2020 Sep 10;56(3):2000625. doi: 10.1183/13993003.00625-2020. Print 2020 Sep.

SMART and as-needed therapies in mild-to-severe asthma: a network meta-analysis

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Affiliations + expand

PMID: 32430423 DOI: 10.1183/13993003.00625-2020

Free article

Abstract

To date, there are no network meta-analyses comparing the impact of as-needed treatments in asthma, including the single maintenance and reliever therapy (known as "SMART" or "MART"; for simplicity, SMART will be used hereafter) and the use of inhaled corticosteroid (ICS)/long-acting β_2-agonist (LABA) combination exclusively on an as-needed basis. Therefore, we performed a systematic review and network meta-analysis concerning the efficacy and safety of SMART and as-needed therapies in asthma. Data from 32 096 asthmatic patients were extracted from 21 studies, lasting from 6 to 12 months. In adult mild-to-moderate asthmatic patients low-dose SMART and as-needed low-dose ICS/LABA combination were significantly (relative effect <0.78; $p<0.05$) more effective than the other as-needed therapies in reducing the risk of exacerbation, and both were ranked as the first treatment option reaching the first quartile of the surface under the cumulative ranking curve analysis (SUCRA). In adult moderate-to-severe asthmatic patients, low-dose to medium-dose SMART and high-dose ICS/LABA+as-needed short-acting β_2-agonist were equally effective in reducing the risk of severe asthma exacerbation ($p>0.05$), although only low- to medium-dose SMART was ranked as the first treatment option (first SUCRA quartile). Overall, these treatments were well tolerated, and effective also on lung function and disease control. This study supports SMART and as-needed therapies as a suitable therapeutic option for asthma, by providing the most effective positioning of each specific treatment according to the disease severity.

Key changes – *SMART THERAPY*

Single Maintenance And Reliever Therapy

This is NOT FDA approved but is recommended in all guideline based therapy

Very reasonable to try this, just document the medical decision making and that the patient has not had severe acute exacerbations

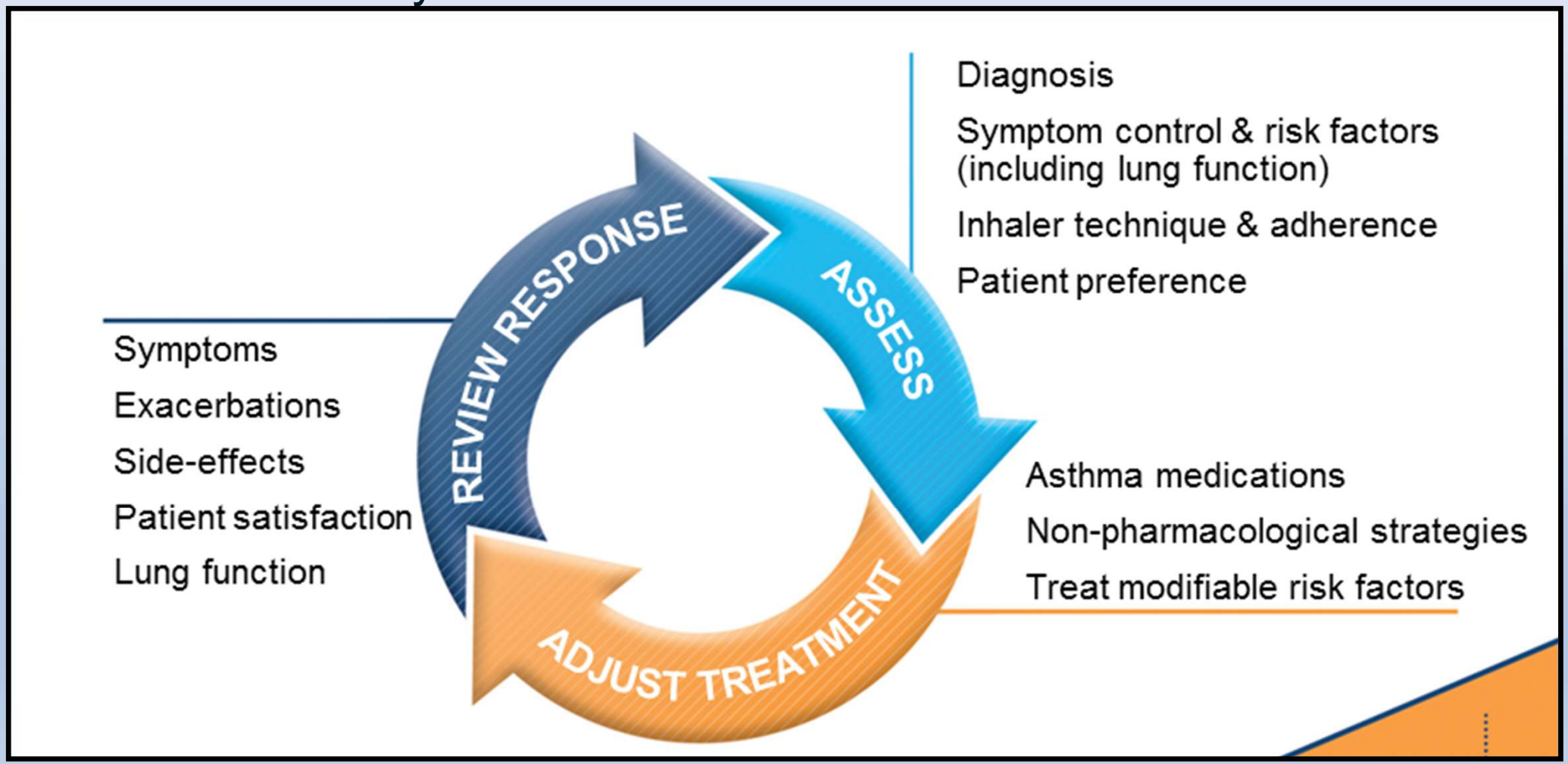
Dose – 2 puffs anytime, up to 12 a day.

Look at the GINA Guidelines

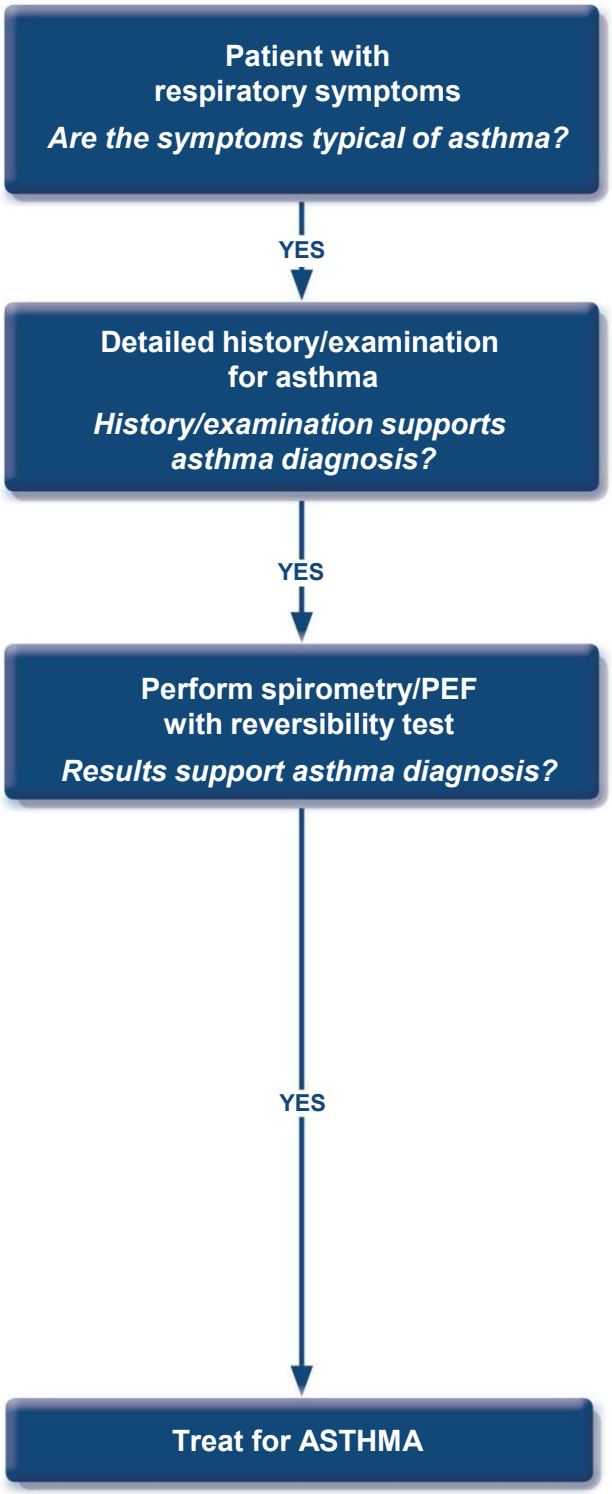
- Using GINA Guidelines – they are the best
- Updated twice a year if needed
- International
- Non-asthma specialist focus but good for specialty as well
- https://ginasthma.org/

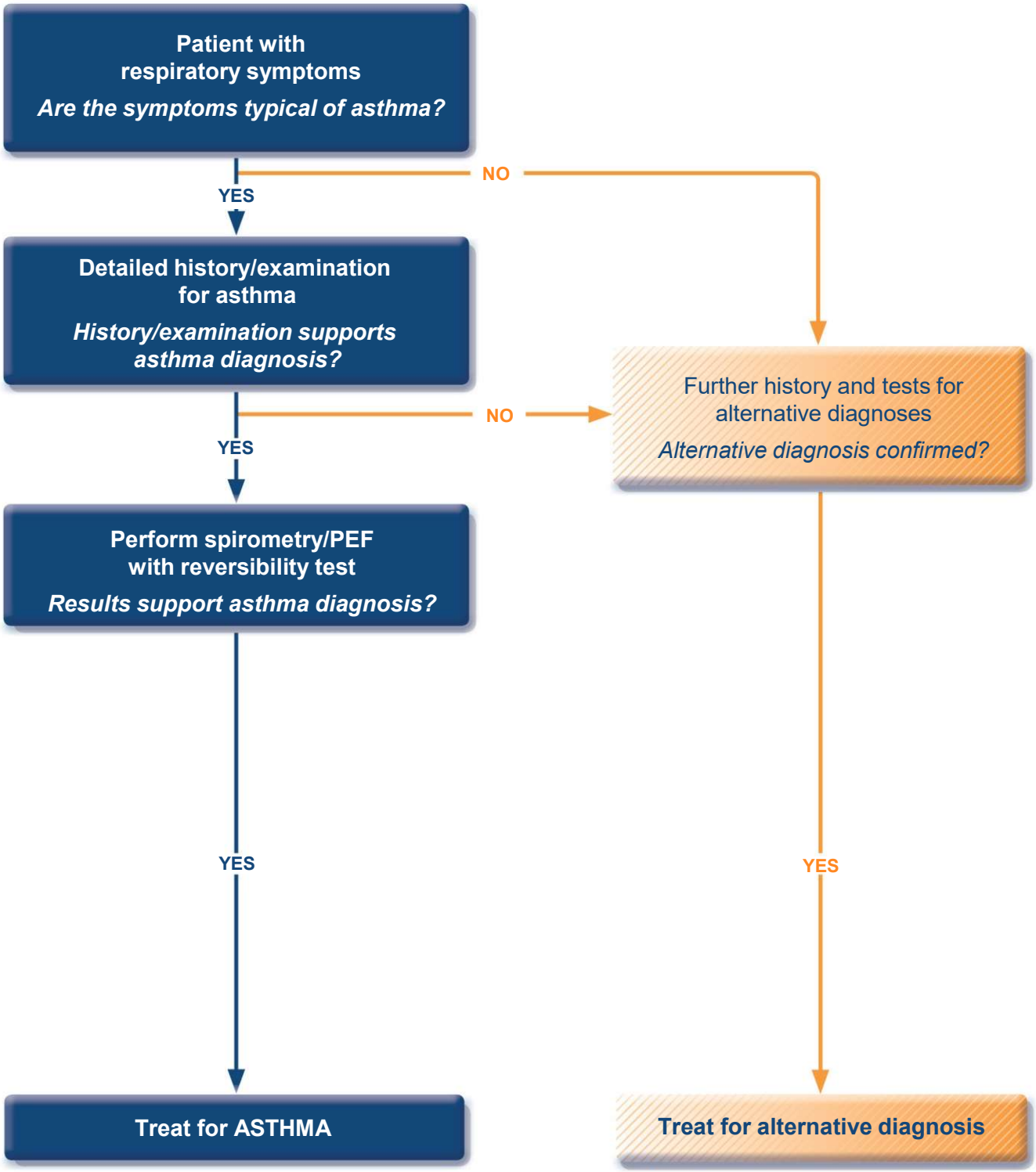
The cycle of asthma

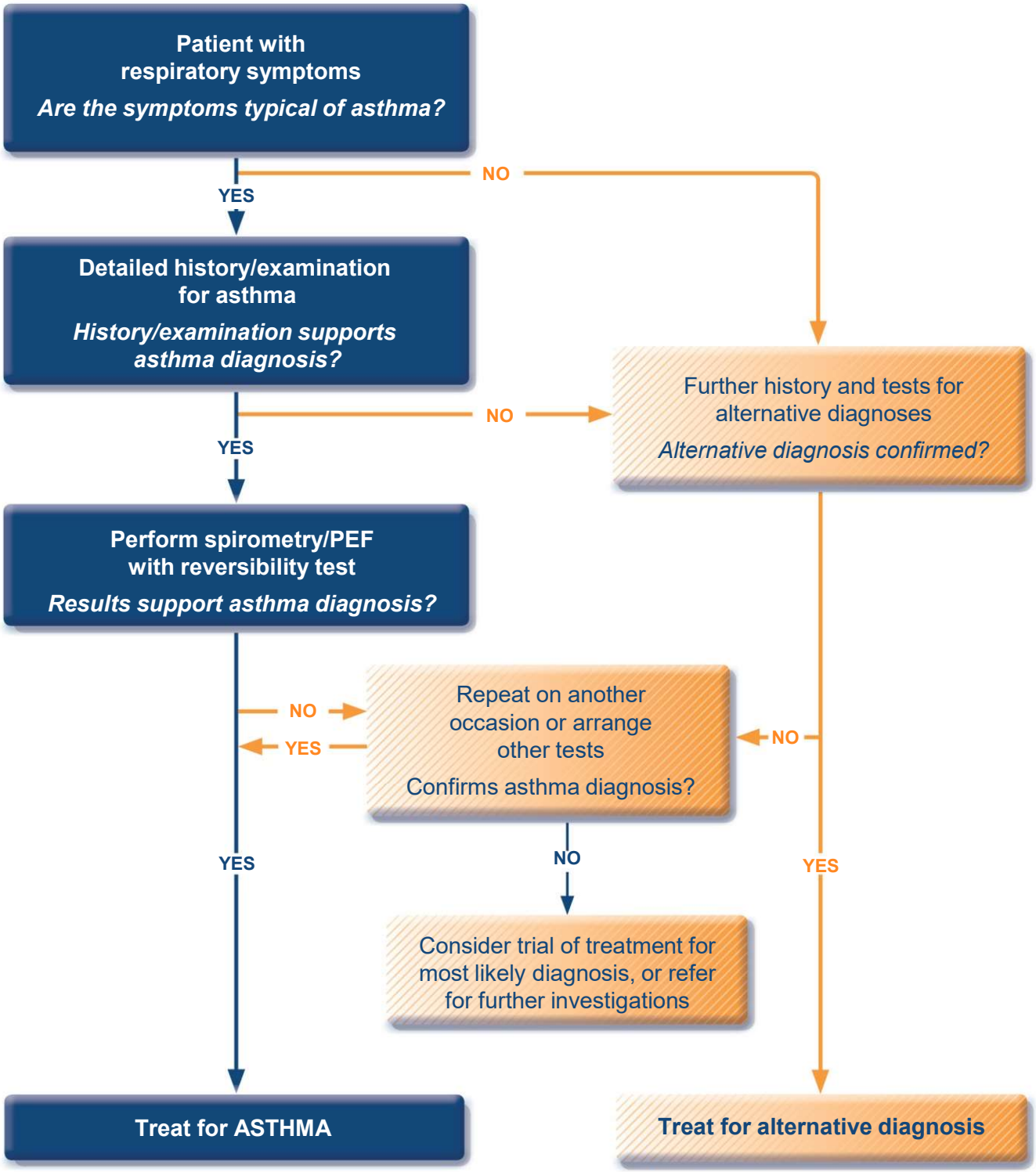
- This is the cycle of asthma. . . .

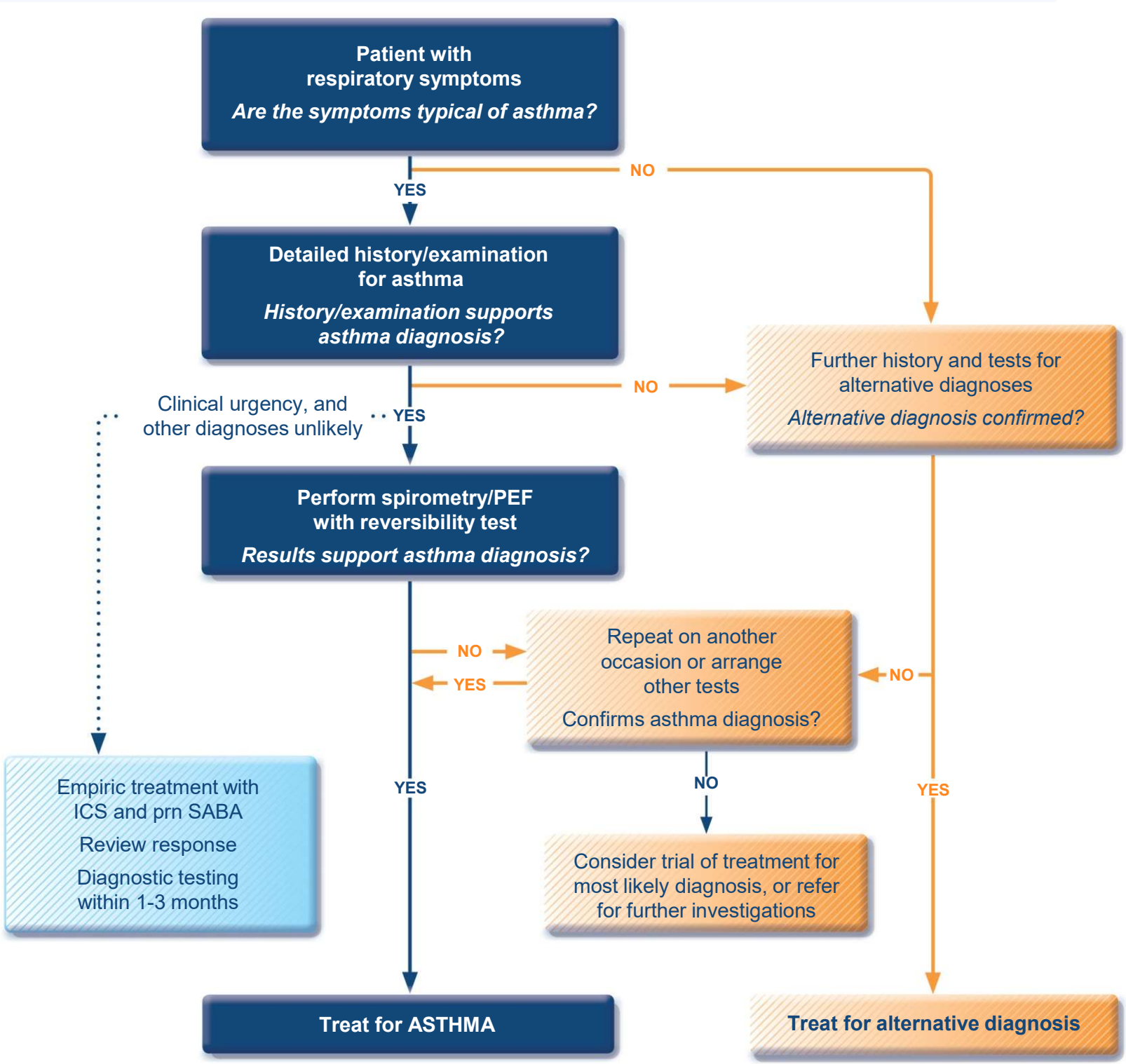


Diagnosis of asthma (be brave!)







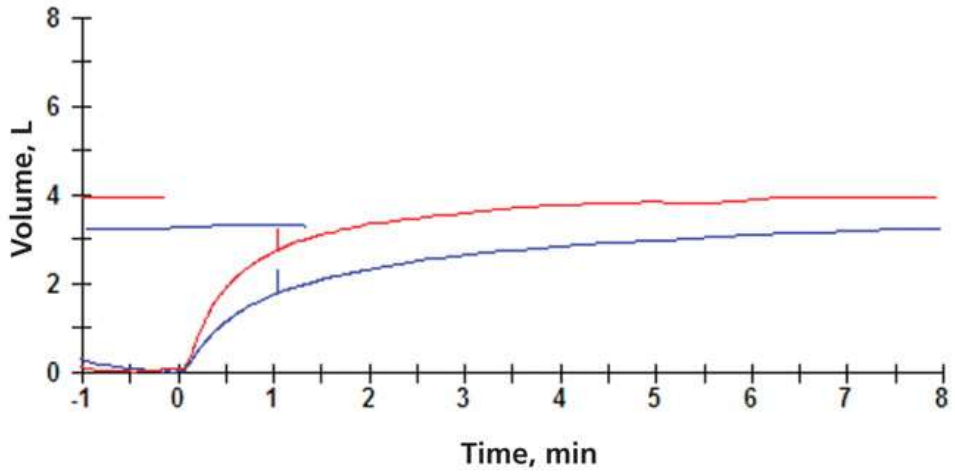


Diagnosis of asthma – variable airflow limitation

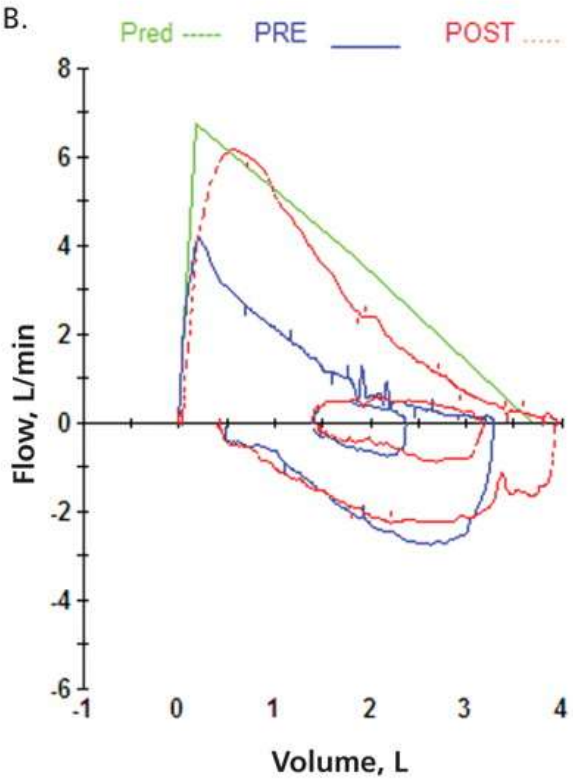
- Confirm presence of airflow limitation
  - Document that FEV_1/FVC is reduced (at least once, when FEV_1 is low)
  - FEV_1/ FVC ratio is normally >0.75 – 0.80 in healthy adults, and >0.90 in children
- Confirm variation in lung function is greater than in healthy individuals
  - The greater the variation, or the more times variation is seen, the greater probability that the diagnosis is asthma
  - **Excessive bronchodilator reversibility (adults: increase in FEV_1 >12% and >200mL; children: increase >12% predicted)**
  - Excessive diurnal variability from 1-2 weeks' twice-daily PEF monitoring (daily amplitude x 100/daily mean, averaged)
  - **Significant increase in FEV_1 or PEF after 4 weeks of controller treatment**
  - If initial testing is negative:
    - Repeat when patient is symptomatic, or after withholding bronchodilators
    - Refer for additional tests (especially children ≤5 years, or the elderly)

PFT with Reversibility

A.



B.

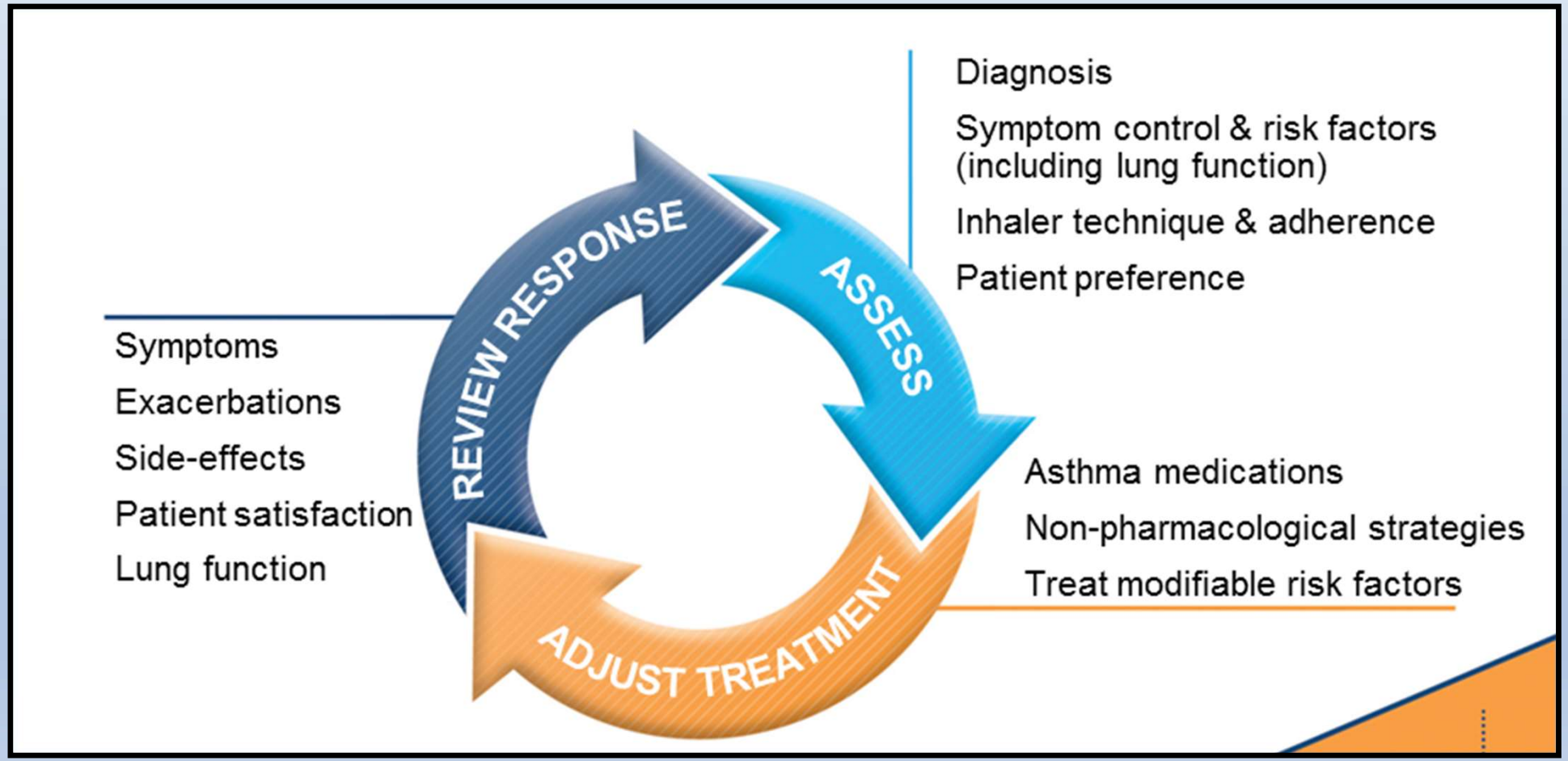


C.

Spirometry measure	Predicted	Before bronchodilator		After bronchodilator		
		Best	% of predicted	Best	% of predicted	% change
FVC, L	3.70	3.30	89	3.95	107	20
FEV_1, L	2.94	1.80	61	2.76	94	53
Ratio FEV_1/FVC, %	80	55	NA	70	NA	NA

Note: FEV_1 = forced expiratory volume in 1 second, FVC = forced vital capacity, NA = not applicable.

Assessment of asthma



Keep it simple!

Determine if they are in control or not. . . .

What is good asthma control?

- Minimal daytime and night time symptoms
- Can do what they want to
- No severe flares
- Minimal SABA use, ask about this
  - WHY do they reach for the inhaler
  - WHAT makes them think “I need my puffer”

Rule of 2s – no more than twice a week and no more than 2 inhalers a year

Assessment of asthma

1. Asthma control
   - Assess symptom control over the last 4 weeks
   - Assess risk factors for poor outcomes, including low lung function
2. Treatment issues
   - Check inhaler technique and adherence
   - Ask about side-effects
   - Does the patient have a written asthma action plan?
   - What are the patient's attitudes and goals for their asthma?
3. Comorbidities
   - Think of rhinosinusitis, GERD, obesity, obstructive sleep apnea, depression, anxiety
   - These may contribute to symptoms and poor quality of life

Assessment of symptom control

A. Symptom control		Level of asthma symptom control		
In the past 4 weeks, has the patient had:		**Well-controlled**	**Partly controlled**	**Uncontrolled**
• Daytime asthma symptoms more than twice a week?	Yes❑ No❑	None of these	1-2 of these	3-4 of these
• Any night waking due to asthma?	Yes❑ No❑			
• Reliever needed for symptoms* more than twice a week?	Yes❑ No❑			
• Any activity limitation due to asthma?	Yes❑ No❑			

FOR PATIENTS:

Take the Asthma Control Test™ (ACT) for people 12 yrs and older.

Know your score. Share your results with your doctor.

Step 1 Write the number of each answer in the score box provided.

Step 2 Add the score boxes for your total.

Step 3 Take the test to the doctor to talk about your score.

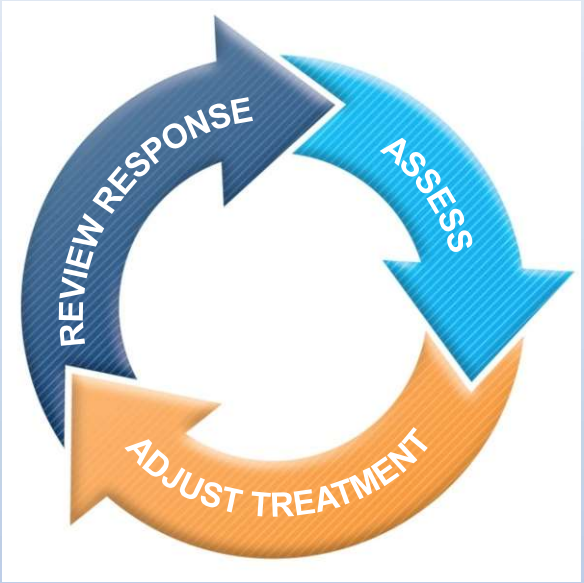
									SCORE
1. In the past **4 weeks**, how much of the time did your **asthma** keep you from getting as much done at work, school or at home?	All of the time	1	Most of the time	2	Some of the time	3	A little of the time	4	None of the time	5	
2. During the past **4 weeks**, how often have you had shortness of breath?	More than once a day	1	Once a day	2	3 to 6 times a week	3	Once or twice a week	4	Not at all	5	
3. During the past **4 weeks**, how often did your **asthma** symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?	4 or more nights a week	1	2 or 3 nights a week	2	Once a week	3	Once or twice	4	Not at all	5	
4. During the past **4 weeks**, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?	3 or more times per day	1	1 or 2 times per day	2	2 or 3 times per week	3	Once a week or less	4	Not at all	5	
5. How would you rate your **asthma** control during the **past 4 weeks**?	Not controlled at all	1	Poorly controlled	2	Somewhat controlled	3	Well controlled	4	Completely controlled	5	
											TOTAL

If your score is 19 or less, your asthma may not be controlled as well as it could be. Talk to your doctor.

FOR PHYSICIANS:

Treating to control symptoms and minimize risk

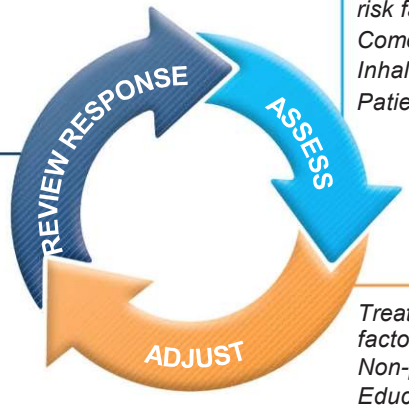
- Establish a patient-partnership
- Manage asthma in a continuous cycle:
  - **Assess**
  - **Adjust** treatment (pharmacological and non-pharmacological)
  - **Review** the response
- Teach and reinforce essential skills
  - Inhaler skills
  - Adherence
  - Guided self-management education
    - Written asthma action plan
    - Self-monitoring
    - Regular medical review



Box 3-5A

Adults & adolescents 12+ years

Personalized asthma management:
Assess, Adjust, Review response



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

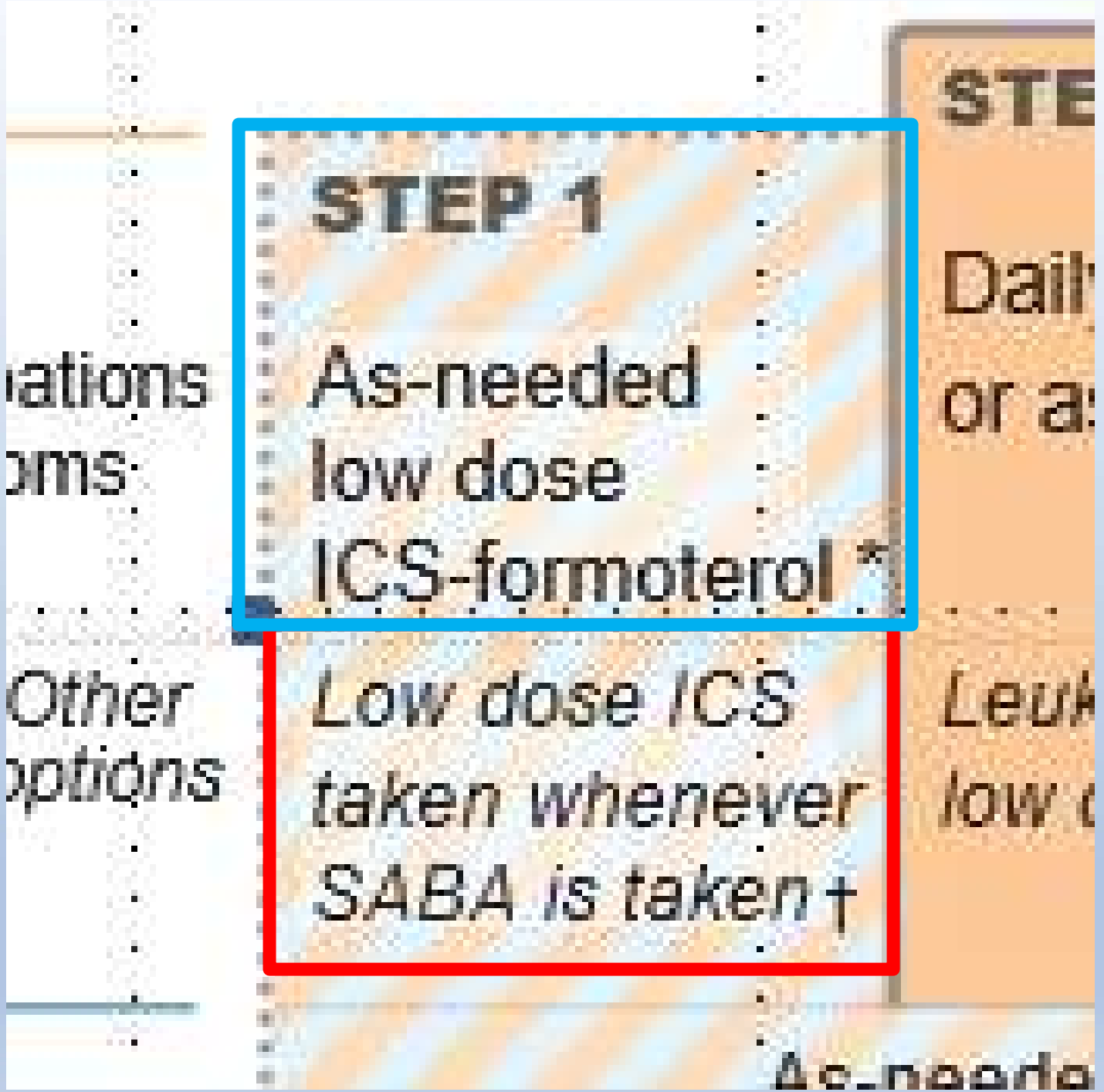
Symptoms
Exacerbations
Side-effects
Lung function
Patient satisfaction

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

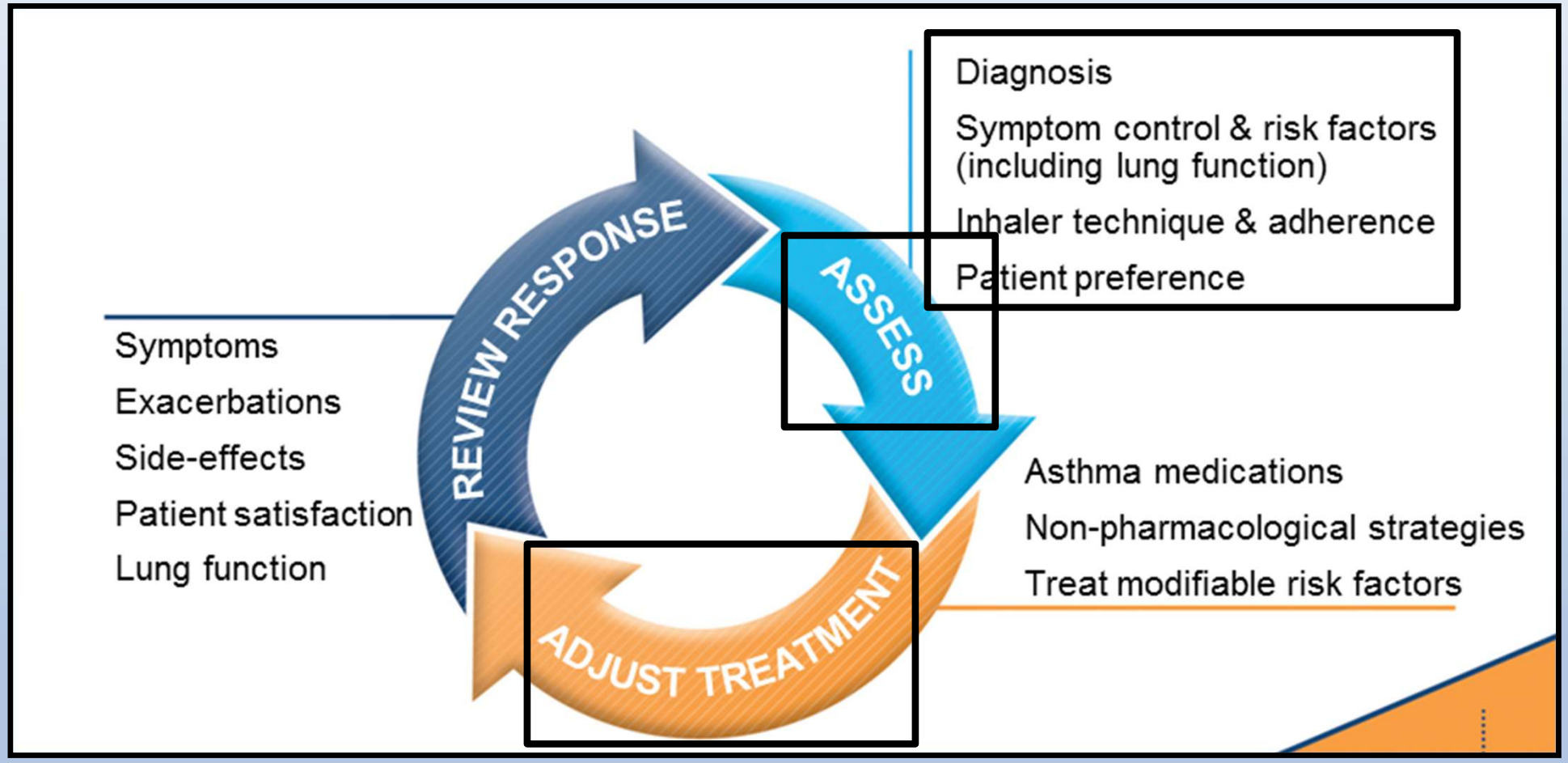
Asthma medication options:
Adjust treatment up and down for individual patient needs

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
PREFERRED CONTROLLER to prevent exacerbations and control symptoms	As-needed low dose ICS-formoterol *	Daily low dose inhaled corticosteroid (ICS), or as-needed low dose ICS-formoterol *	Low dose ICS-LABA	Medium dose ICS-LABA	High dose ICS-LABA Refer for phenotypic assessment ± add-on therapy, e.g.tiotropium, anti-IgE, anti-IL5/5R, anti-IL4R
Other controller options	*Low dose ICS taken whenever SABA is taken †*	*Leukotriene receptor antagonist (LTRA), or low dose ICS taken whenever SABA taken †*	*Medium dose ICS, or low dose ICS+LTRA #*	*High dose ICS, add-on tiotropium, or add-on LTRA #*	*Add low dose OCS, but consider side-effects*
PREFERRED RELIEVER	As-needed low dose ICS-formoterol *		As-needed low dose ICS-formoterol ‡		
Other reliever option	*As-needed short-acting β_2 -agonist (SABA)*				

* Off-label; data only with budesonide-formoterol (bud-form)
† Off-label; separate or combination ICS and SABA inhalers
‡ Low-dose ICS-form is the reliever for patients prescribed bud-form or BDP-form maintenance and reliever therapy
# Consider adding HDM SLIT for sensitized patients with allergic rhinitis and FEV >70% predicted


STEP 1
As-needed
low dose
ICS-formoterol *
Low dose ICS
taken whenever
SABA is taken †

Step 1 to Step 2



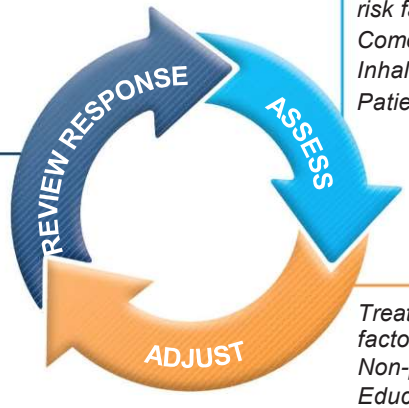
Box 3-5A

Adults & adolescents 12+ years

Personalized asthma management:
Assess, Adjust, Review response

‘Controller’ treatment means the treatment taken to prevent exacerbations

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



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

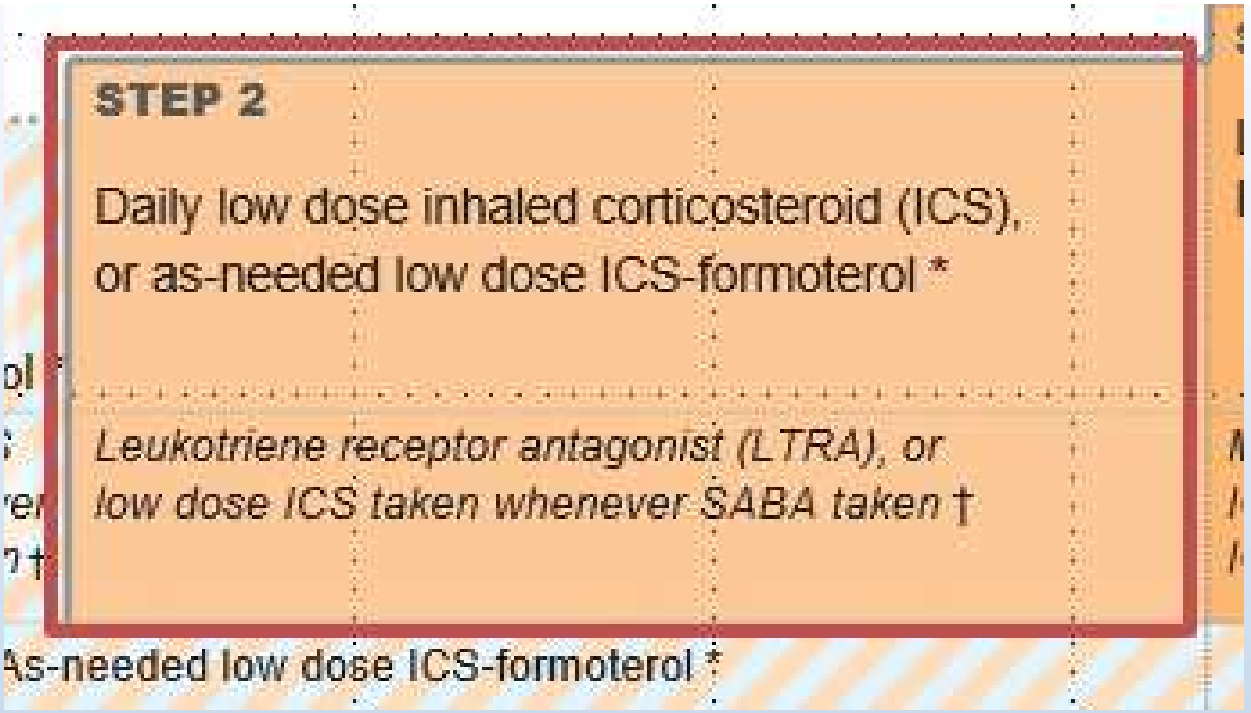
Symptoms
Exacerbations
Side-effects
Lung function
Patient satisfaction

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

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
PREFERRED CONTROLLER to prevent exacerbations and control symptoms	As-needed low dose ICS-formoterol *	Daily low dose inhaled corticosteroid (ICS), or as-needed low dose ICS-formoterol *	Low dose ICS-LABA	Medium dose ICS-LABA	High dose ICS-LABA Refer for phenotypic assessment ± add-on therapy, e.g.tiotropium, anti-IgE, anti-IL5/5R, anti-IL4R
Other controller options	*Low dose ICS taken whenever SABA is taken †*	*Leukotriene receptor antagonist (LTRA), or low dose ICS taken whenever SABA taken †*	*Medium dose ICS, or low dose ICS+LTRA #*	*High dose ICS, add-on tiotropium, or add-on LTRA #*	*Add low dose OCS, but consider side-effects*
PREFERRED RELIEVER	As-needed low dose ICS-formoterol *		As-needed low dose ICS-formoterol ‡		
Other reliever option	*As-needed short-acting β_2 -agonist (SABA)*				

* Off-label; data only with budesonide-formoterol (bud-form)
† Off-label; separate or combination ICS and SABA inhalers
‡ Low-dose ICS-form is the reliever for patients prescribed bud-form or BDP-form maintenance and reliever therapy
# Consider adding HDM SLIT for sensitized patients with allergic rhinitis and FEV >70% predicted

Start to look for ALLERGY symptoms, SINUSITIS symptoms, GERD symptoms

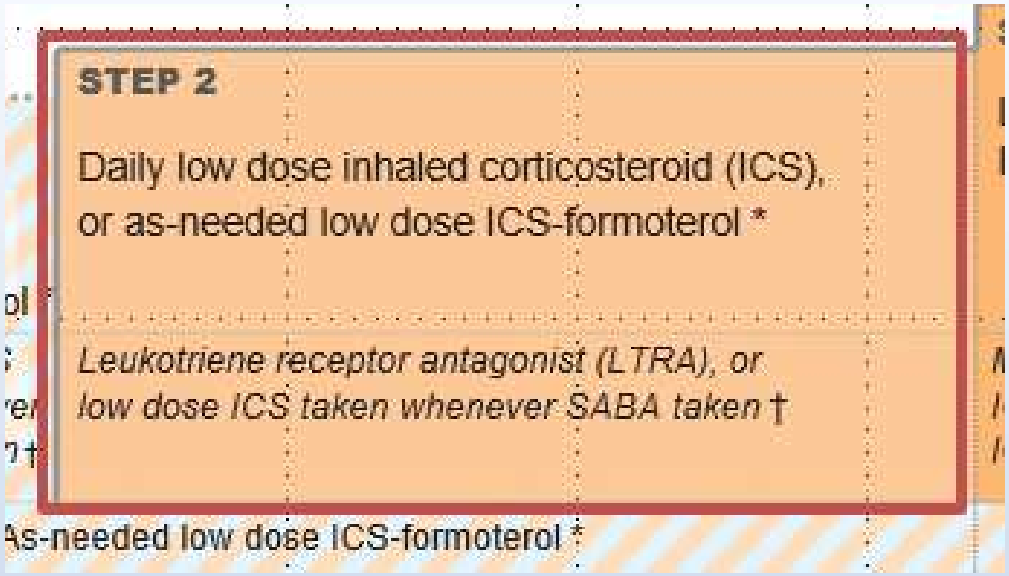


Step 2

If PRN SMART Therapy or PRN SABA with ICS, next step is to change this to DAILY

Add in Montelukast if they have any ATOPY

Make sure. . . Inhaler use, they can afford, GERD



Step 2

Montelukast – especially effective for asthma when there are allergies present

Recommendation – mood changes are a risk, unclear suicide connection. Use caution in those with a history of depression or suicide ideation.

It does spare steroids however, many find that this is an alternative to inhaled steroids.

FDA requires Boxed Warning about serious mental health side effects for asthma and allergy drug montelukast (Singulair); advises restricting use for allergic rhinitis

Risks may include suicidal thoughts or actions

3-4-2020 FDA Drug Safety Communication

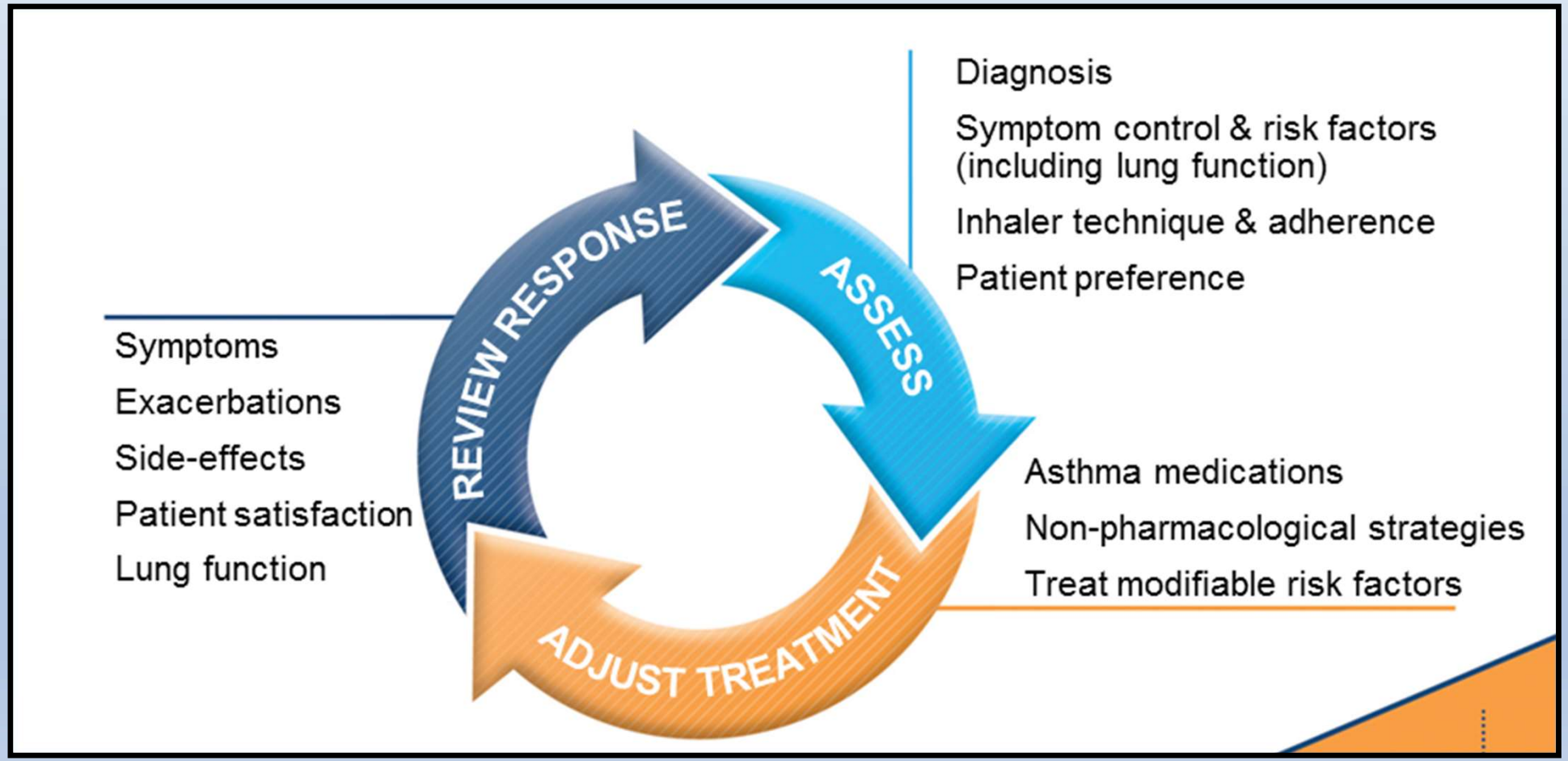
What safety concern is FDA announcing?

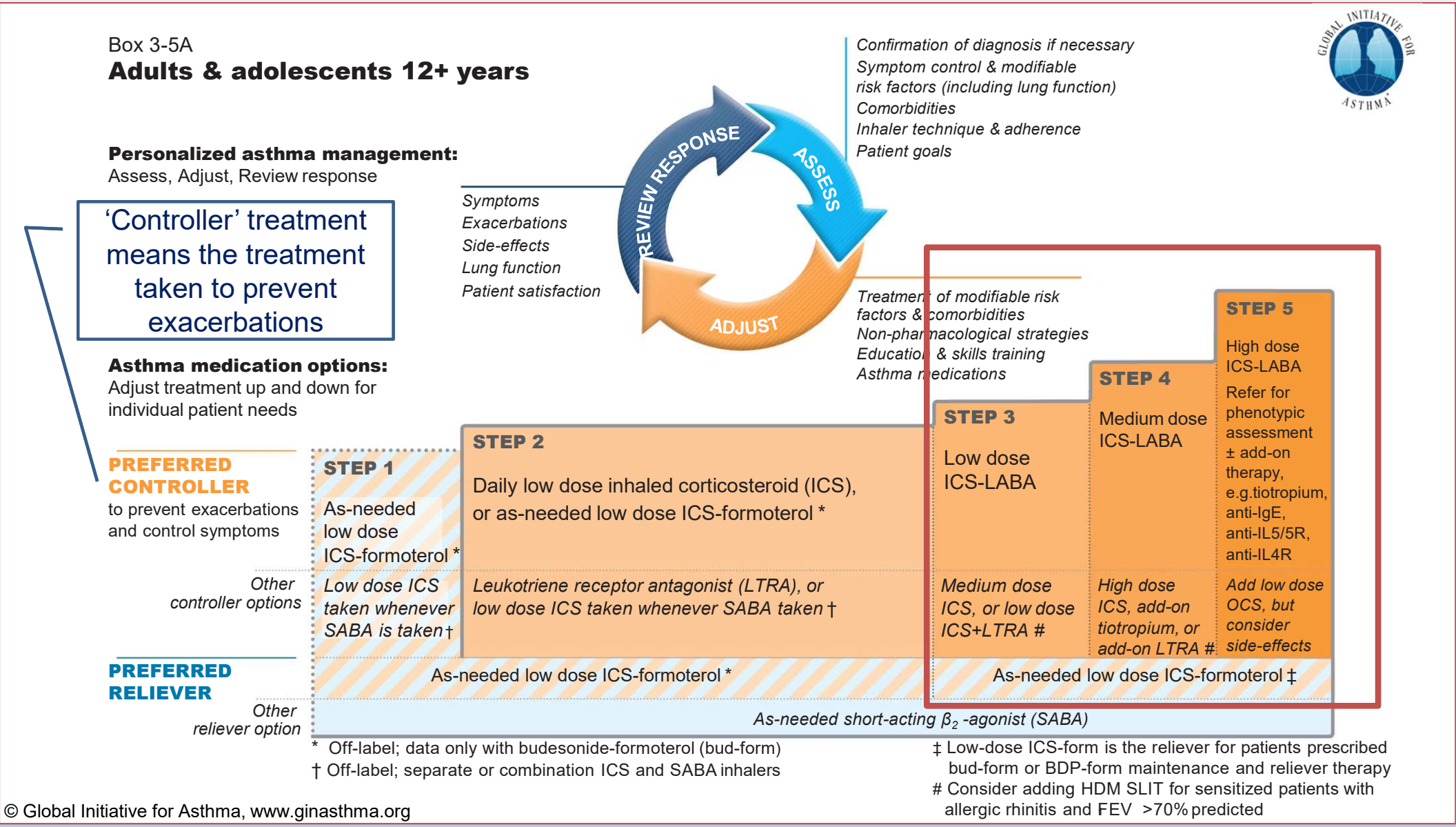
The U.S. Food and Drug Administration (FDA) is strengthening existing warnings about serious behavior and mood-related changes with montelukast (Singulair and generics), which is a prescription medicine for asthma and allergy.

We are taking this action after a review of available information led us to reevaluate the benefits and risks of montelukast use. Montelukast prescribing information already includes warnings about mental health side effects, including suicidal thoughts or actions; however, many health care professionals and patients/caregivers are not aware of the risk. We decided a stronger warning is needed after conducting an extensive review of available information and convening a panel of outside experts, and therefore determined that a *Boxed Warning* was appropriate.

Because of the risk of mental health side effects, the benefits of montelukast may not outweigh the risks in some patients, particularly when the symptoms of disease may be mild and adequately treated with other medicines. For allergic rhinitis, also known as hay fever, we have determined that montelukast should be reserved for those who are not treated effectively with or cannot tolerate other allergy medicines. For patients with asthma, we recommend that health care professionals consider the benefits and risks of mental health side effects before prescribing montelukast.

Step 2 to Step 3





Again: co-morbid conditions, check inhaler technique, add in a spacer. If older. . can they inhale?

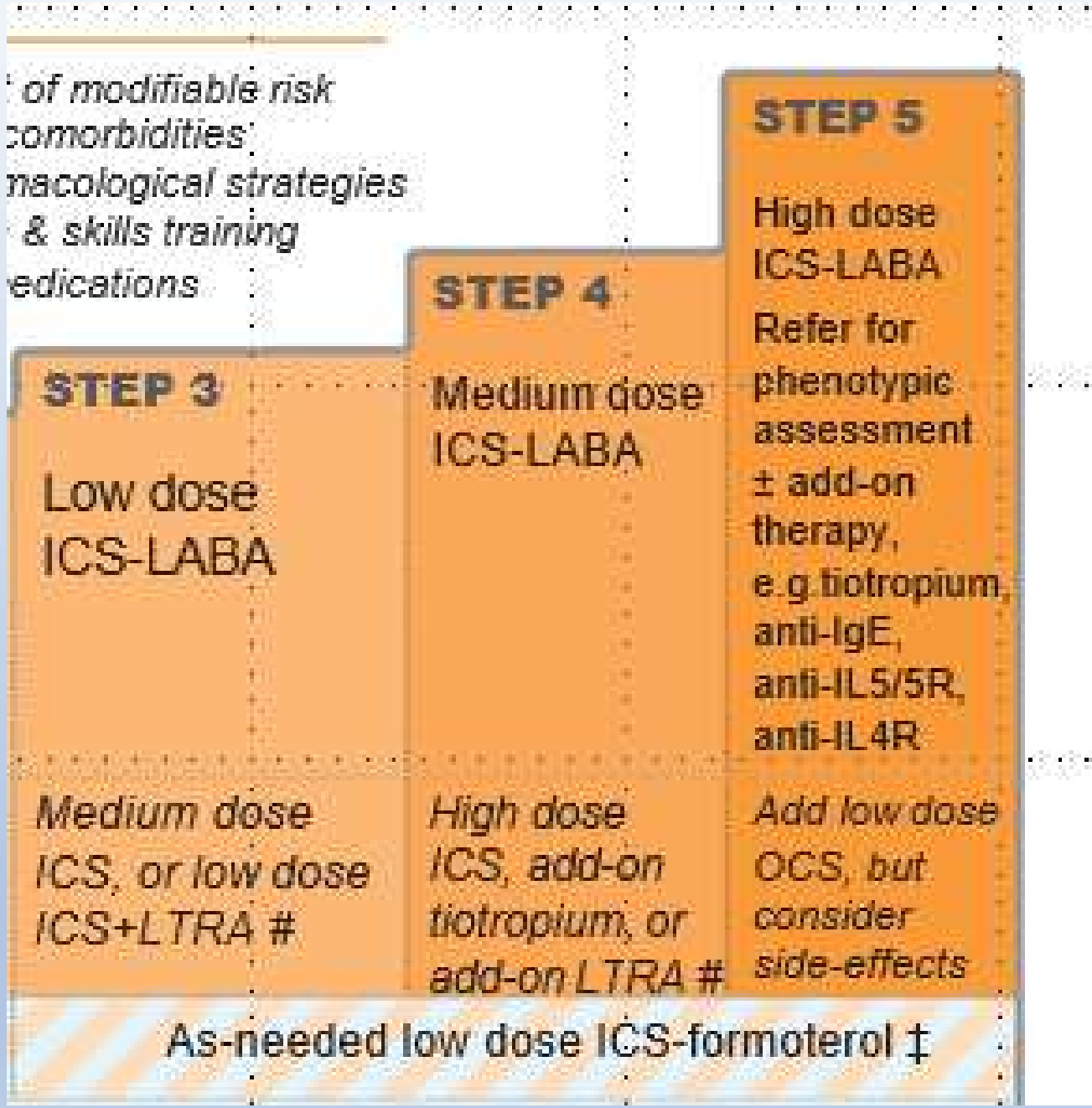
Step 3-5

Increase dose, strength and number of inhalations

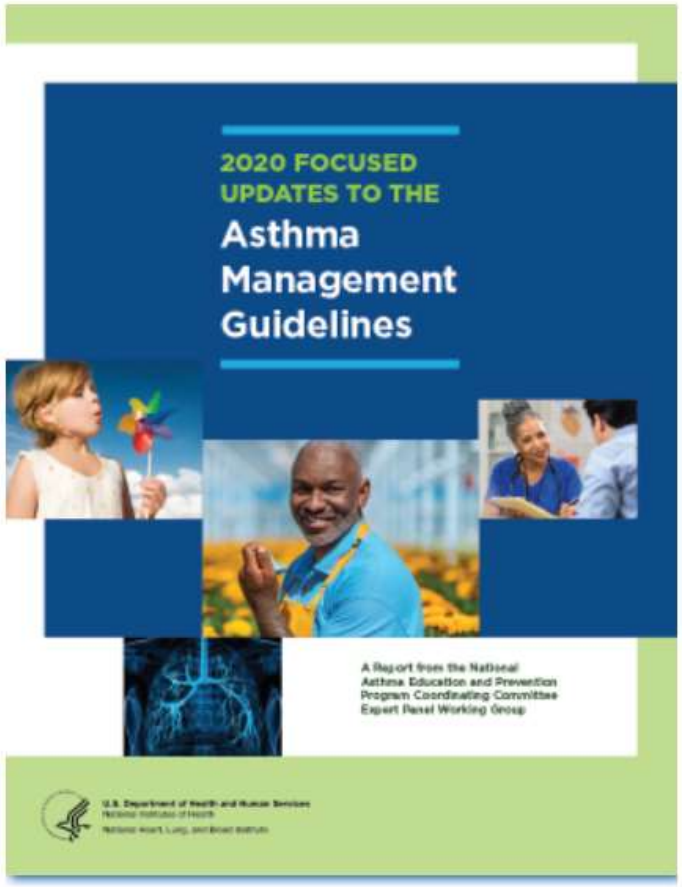
Be sure to check inhaler technique, affordability, and that the diagnosis is correct.

Repeat PFTs if unsure

Time for a referral



US Guidelines
Very similar to GINA



NHLBI PUBLICATIONS AND RESOURCES

2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group

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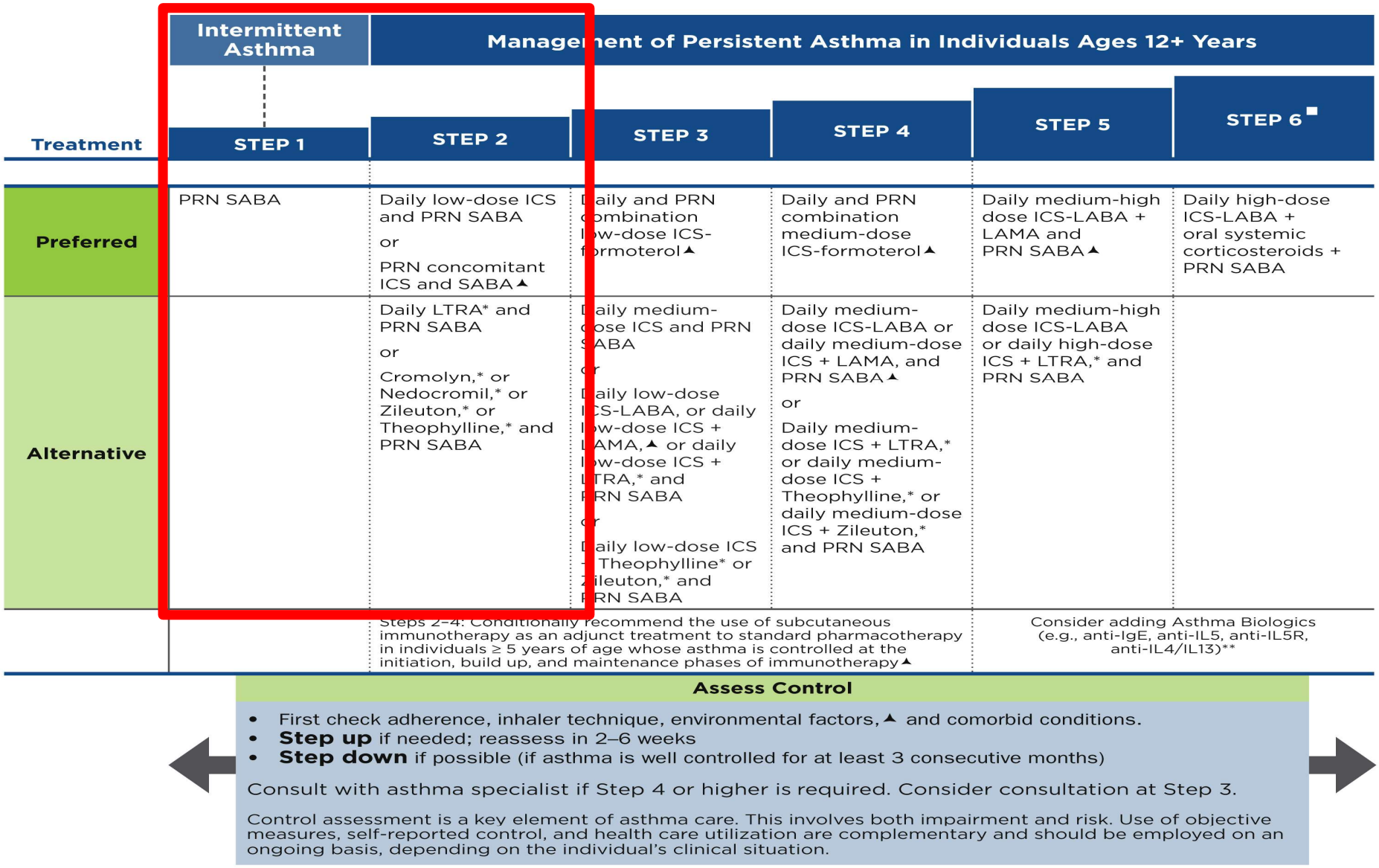
This 2020 report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group presents focused updates to the previous 2007 asthma management guidelines on six priority topics. **Note: The ages 0-4 stepwise approach table was updated in February 2021, and the reprints of the 2020 Focused Updates to the Asthma Management Guidelines from the Journal of Allergy and Clinical Immunology do not reflect the updated table.*

AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA



Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta$_2$-agonist; LAMA, long-acting muscarinic antagonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta$_2$-agonist

Treatment	STEP 1	STEP 2
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA▲
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA

ement of Persistent Asthma in Individuals Ages 12+ Years

STEP 3	STEP 4	STEP 5	STEP 6 ■
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
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	

Increase dose or frequency of steroids/LABA and/or add that third category- LAMA

NOTES FOR INDIVIDUALS AGES 12+ YEARS DIAGRAM

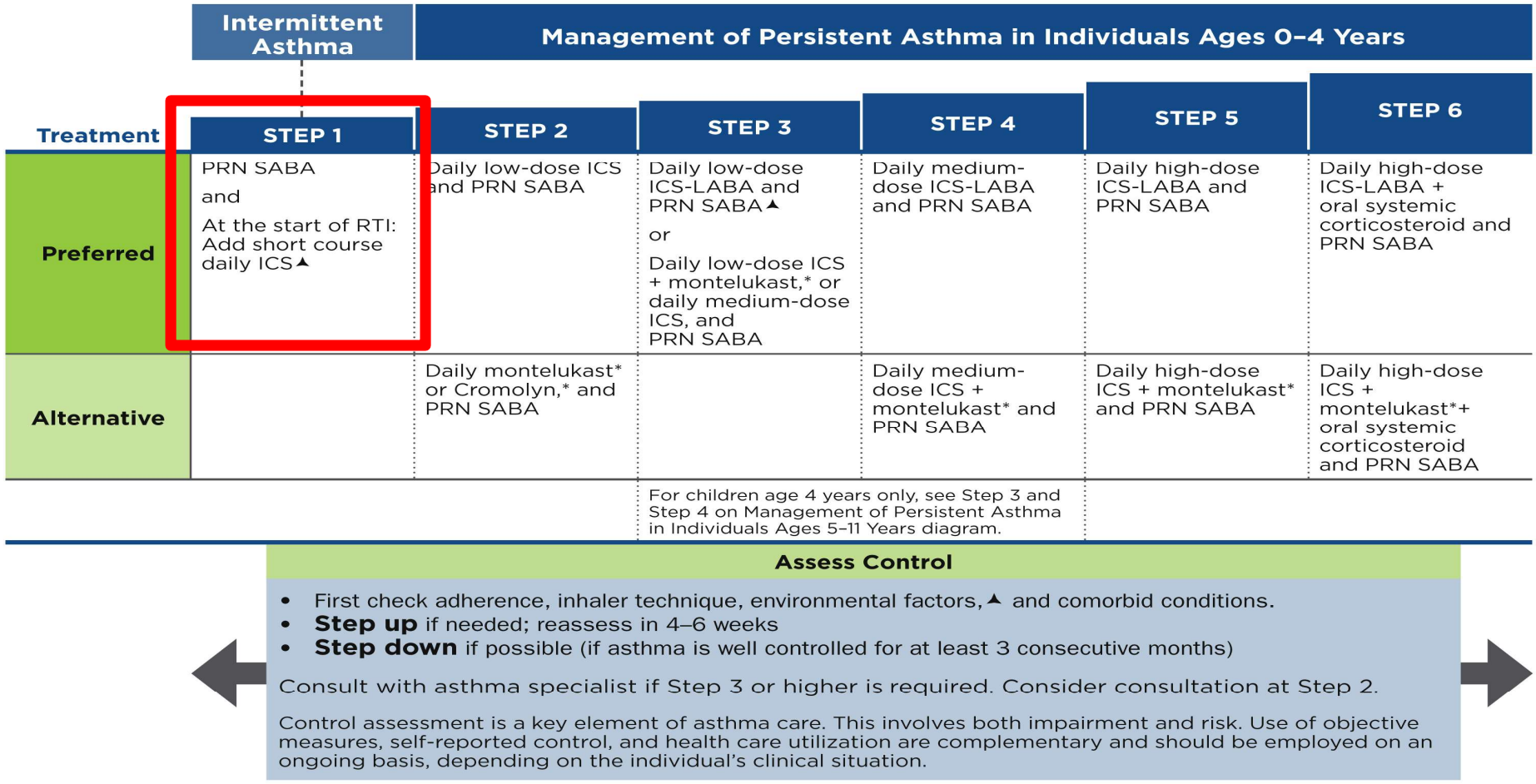
Quick-relief medications	Use SABA as needed for symptoms. The intensity of treatment depends on the severity of symptoms: up to 3 treatments at 20-minute intervals as needed. In steps 3 and 4, the preferred option includes the use of ICS-formoterol 1 to 2 puffs as needed up to a maximum total daily maintenance and rescue dose of 12 puffs (54 mcg).▲ **Caution:** Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and may require a step up in treatment.
Each step: Assess environmental factors, provide patient education, and manage comorbidities▲	• In individuals with sensitization (or symptoms) related to exposure to pests‡: conditionally recommend integrated pest management as a single or multicomponent allergen-specific mitigation intervention.▲ • In individuals with sensitization (or symptoms) related to exposure to identified indoor allergens, conditionally recommend a multi-component allergen-specific mitigation strategy.▲ • In individuals with sensitization (or symptoms) related to exposure to dust mites, conditionally recommend impermeable pillow/mattress covers only as part of a multicomponent allergen-specific mitigation intervention, but not as a single component intervention.▲
Notes	• The terms ICS-LABA and ICS-formoterol indicate combination therapy with both an ICS and a LABA, usually and preferably in a single inhaler. • Where formoterol is specified in the steps, it is because the evidence is based on studies specific to formoterol. • In individuals ages 12 years and older with persistent allergic asthma in which there is uncertainty in choosing, monitoring, or adjusting anti-inflammatory therapies based on history, clinical findings, and spirometry, FeNO measurement is conditionally recommended as part of an ongoing asthma monitoring and management strategy that includes frequent assessment. • Bronchial thermoplasty was evaluated in Step 6. The outcome was a conditional recommendation against the therapy.
Abbreviations	EIB, exercise-induced bronchoconstriction; FeNO, fractional exhaled nitric oxide; ICS, inhaled corticosteroid; LABA, long-acting beta2-agonist; SABA, inhaled short-acting beta2-agonist. ▲Updated based on the 2020 guidelines. ‡ Refers to mice and cockroaches, which were specifically examined in the Agency for Healthcare Research and Quality systematic review.

IVIDUALS AGES 12+ YEARS DIAGRAM

ons

- Use SABA as needed for symptoms. The intensity of treatment depends on the severity of symptoms: up to 3 treatments at 20-minute intervals as needed.
- In steps 3 and 4, the preferred option includes the use of ICS-formoterol 1 to 2 puffs as needed up to a maximum total daily maintenance and rescue dose of 12 puffs (54 mcg).▲
- **Caution:** Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and may require a step up in treatment.

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



Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta$_2$-agonist; SABA, inhaled short-acting beta$_2$-agonist; RTI, respiratory tract infection; PRN, as needed

▲ Updated based on the 2020 guidelines.

* Cromolyn and montelukast were not considered for this update and/or have limited availability for use in the United States. The FDA issued a Boxed Warning for montelukast in March 2020.

Reviewing response and adjusting treatment

- GERD, chronic sinusitis, rhinitis all make asthma worse. Tip of the day – ipratropium bromide nasal is amazing
- How often do you need to see them?
  - Q3M following med changes
  - Q1M during pregnancy
  - Q6M normally
  - Q12M for stable for a year or more
- Note on pregnancy – inhaled steroids should not be stopped, if they need them don't stop them.
- Step up or down?
  - Yes, after 3 months or so you can adjust if needed

Check adherence with asthma medications

- Poor adherence:
  - Is very common: it is estimated that 50% of adults and children do not take controller medications as prescribed
  - Contributes to uncontrolled asthma symptoms and risk of exacerbations and asthma-related death
- Contributory factors
  - Unintentional (e.g. forgetfulness, cost, confusion) and/or
  - Intentional (e.g. no perceived need, fear of side-effects, cultural issues, cost)
- How to identify patients with low adherence:
  - Ask an empathic question, e.g. "*Do you find it easier to remember your medication in the morning or the evening?*", or "*Would you say you are taking it 3 days a week, or less, or more?*"
  - Check prescription date, label date and dose counter
  - Ask patient about their beliefs and concerns about the medication

Reviewing response and adjusting treatment

- The EXACERBATION!
- If they have an significant increase in SABA, wheezing, dyspnea then treatment is indicated
- Options include:
- Increasing the meds they have
- Adding in oral antibiotic (macrolide) or prednisone
- Kids – ½-1 mg per kg is often enough (QD is OK)
- Adults 40 mg x 2 days, 20 mg x 3 days (QD is OK)
- Consider nebulized therapy
- In the end try to figure out why this happened. . . .

A Note on Nebulizers

- Nebulizers are a known quantity – this can be helpful
- Avoid reliance on them for those school age and older but don’t be afraid to keep them around
- If using budesonide its ok to add albuterol/ipratropium in the same treatment
- Over 2 years should be both albuterol/ipratropium, under 2 it’s anyone's guess.
- OK to give ½ treatment before bed etc
- For little ones – have a favorite game on moms phone!

Biologics -

- **Often are life changing**
  - **Patients with high eosinophils or IgE do especially well**
  - **Refer patients early if they are struggling and on high dose daily inhalers**

Asthma Action Plan for Home & School

Allergy & Asthma NETWORK

Name: Birthdate:

Asthma Severity: ☐ Intermittent ☐ Mild Persistent ☐ Moderate Persistent ☐ Severe Persistent
☐ He/she has had many or severe asthma attacks/exacerbations

☺ Green Zone

Have the child take these medicines every day, even when the child feels well.

Always use a spacer with inhalers as directed.

Controller Medicine(s): _____

_____

Controller Medicine(s) Given in School: _____

Rescue Medicine: Albuterol/Levalbuterol _____ puffs every four hours as needed

Exercise Medicine: Albuterol/Levalbuterol _____ puffs 15 minutes before activity as needed

😐 Yellow Zone

Begin the sick treatment plan if the child has a cough, wheeze, shortness of breath, or tight chest. Have the child take all of these medicines when sick.

Rescue Medicine: Albuterol/Levalbuterol _____ puffs every 4 hours as needed

Controller Medicine(s):

☐ Continue Green Zone medicines: _____

☐ Add: _____

_____

☐ Change: _____

If the child is in the **yellow** zone more than **24** hours or is getting worse, follow **red** zone and call the doctor right away!

☹ Red Zone

If breathing is hard and fast, ribs sticking out, trouble walking, talking, or sleeping.
Get Help Now

Take rescue medicine(s) now

Rescue Medicine: Albuterol/Levalbuterol _____ puffs every _____

Take: _____

_____

If the child is not better right away, call 911
Please call the doctor any time the child is in the red zone.

Asthma Triggers: (List)

School Staff: Follow the Yellow and Red Zone plans for rescue medicines according to asthma symptoms.
Unless otherwise noted, the only controllers to be administered in school are those listed as "given in school" in the green zone.

☐ Both the asthma provider and the parent feel that the child may carry and self-administer their inhalers
☐ School nurse agrees with student self-administering the inhalers

Asthma Provider Printed Name and Contact Information:	Asthma Provider Signature: Date:

Parent/Guardian: I give written authorization for the medications listed in the action plan to be administered in school by the nurse or other school members as appropriate. I consent to communication between the prescribing health care provider/clinic, the school nurse, the school medical advisor and school-based health clinic providers necessary for asthma management and administration of this medication.

Parent/guardian signature:	School Nurse Reviewed:

An Asthma Action Plan:

https://www.allergyasthmanetwork.org/cms/wp-content/uploads/2014/07/Asthma-Action-Plan-English.pdf

Inhaler technique videos:

https://www.bing.com/videos/search?q=how+to+use+a+ventolin+inhaler+properly&&view=detail&mid=42D0422123954963F5E942D0422123954963F5E9&&FORM=VRDGAR

With a spacer

https://www.youtube.com/watch?v=von7cyXcj2c&t=109s

BB1

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BB1 Brian Bizik, 2/7/2021