

Stepwise treatment in asthma

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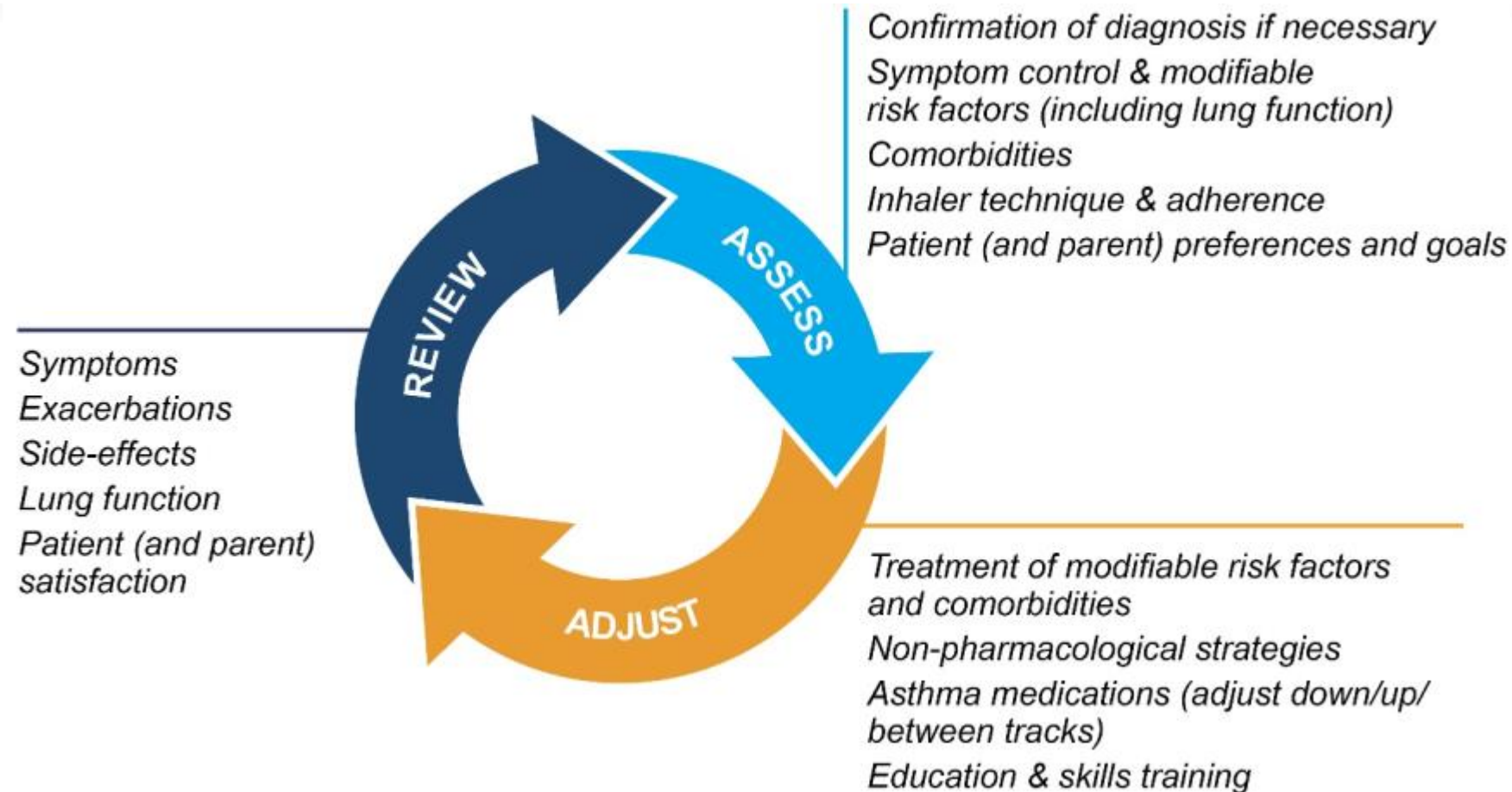
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The control-based asthma management cycle



- Asthma severity:

- Intrinsic intensity of disease
- Patients not receiving controller therapy

CLASSIFICATION OF ASTHMA SEVERITY			
PERSISTENT			
INTERMITTENT	Mild	Moderate	Severe

- Asthma control:

- Day-to-day variability of an asthmatic patient

CLASSIFICATION OF ASTHMA CONTROL		
Well-Controlled	Not Well-Controlled	Very Poorly Controlled

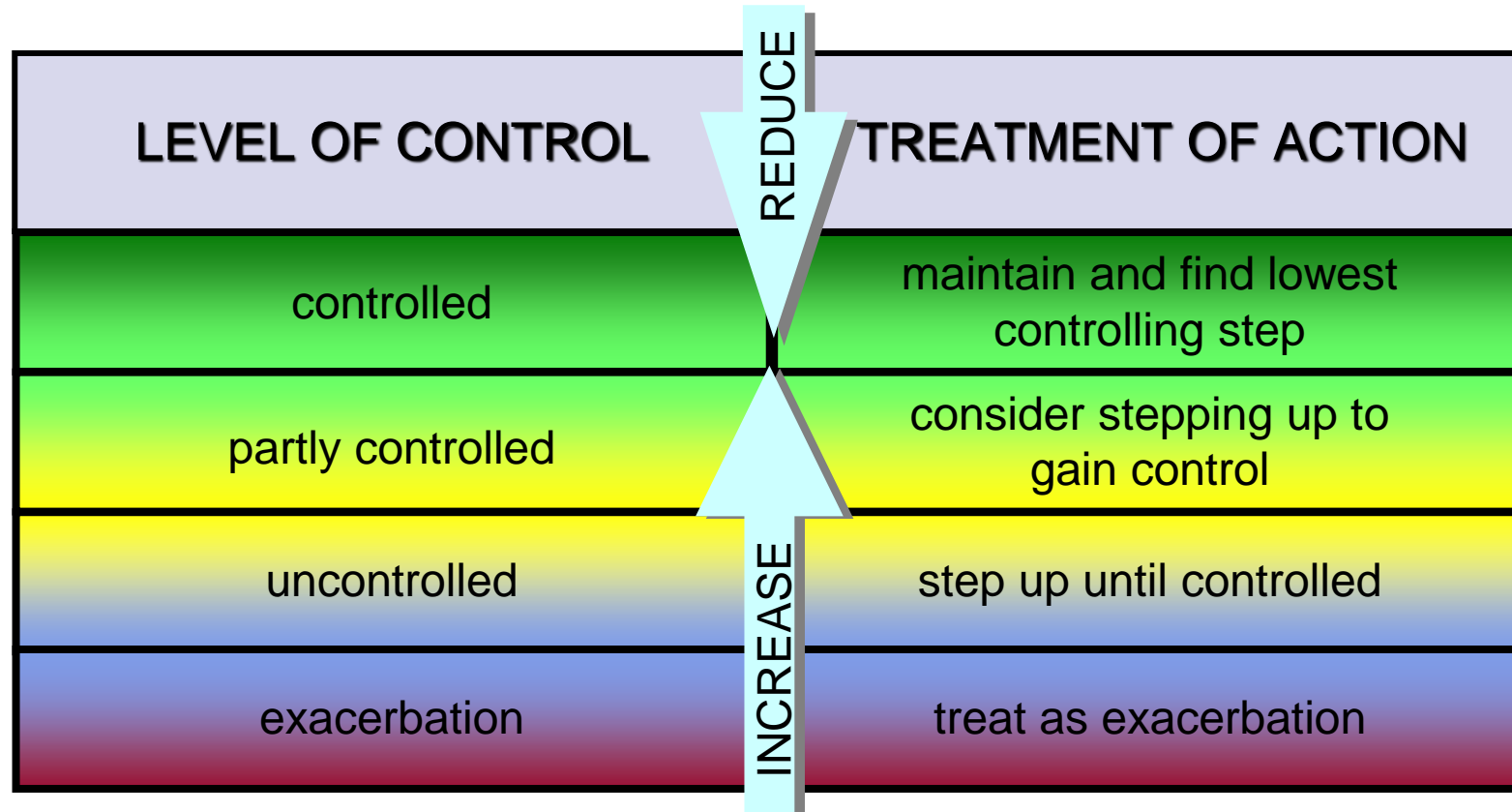
GINA assessment of asthma control

A. Symptom control

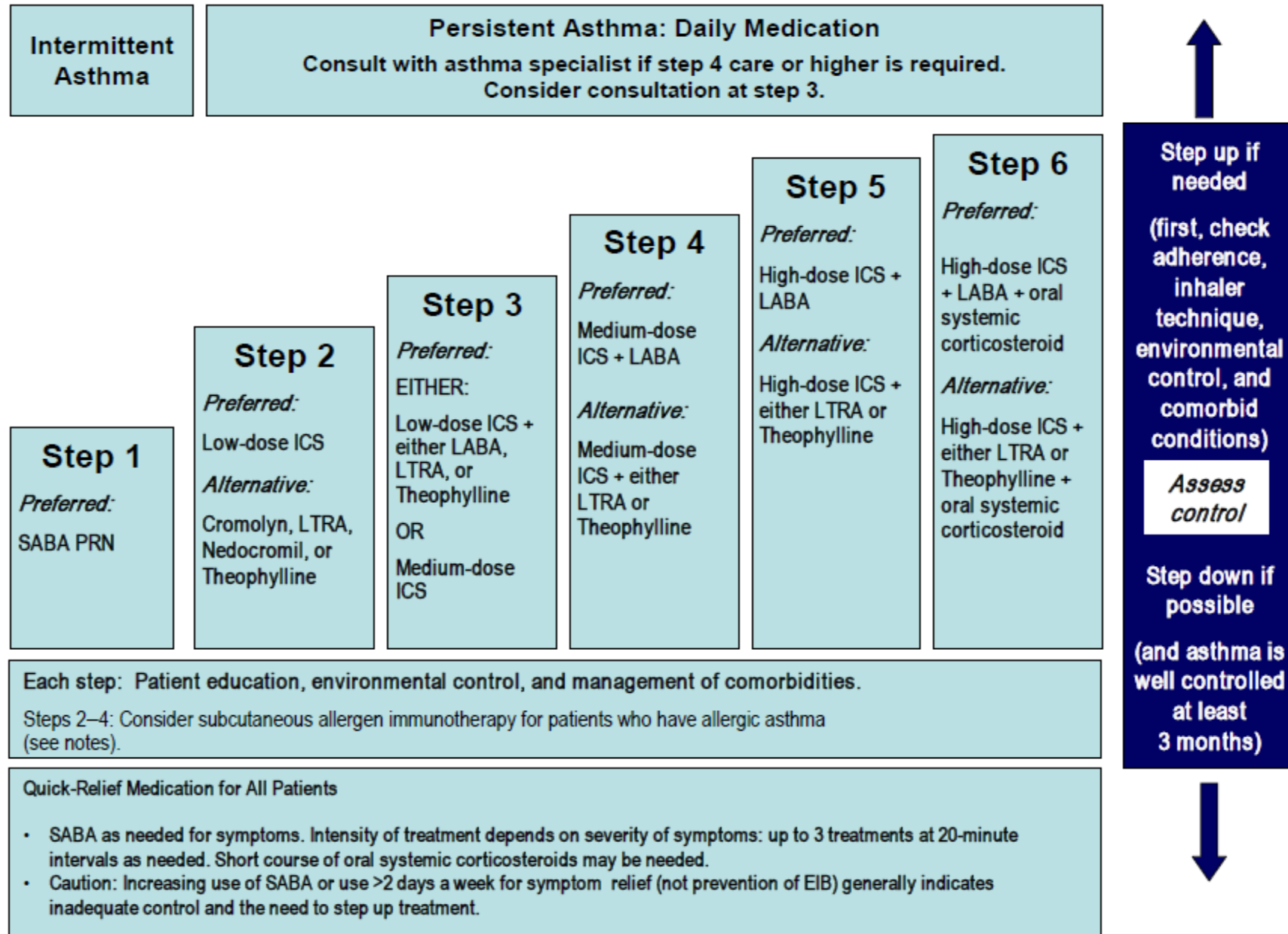
In the past 4 weeks, has the patient had:		Well-controlled	Partly controlled	Uncontrolled
• Daytime asthma symptoms more than twice a week?	Yes <input type="checkbox"/> No <input type="checkbox"/>	None of these	1-2 of these	3-4 of these
• Any night waking due to asthma?	Yes <input type="checkbox"/> No <input type="checkbox"/>			
• Reliever needed for symptoms* more than twice a week?	Yes <input type="checkbox"/> No <input type="checkbox"/>			
• Any activity limitation due to asthma?	Yes <input type="checkbox"/> No <input type="checkbox"/>			

B. Risk factors for poor asthma outcomes

- Exacerbations
- Fixed airflow limitation
- Medication side-effects



Stepwise approach for managing asthma in children 5 – 11 years of age



Low, medium and high dose inhaled corticosteroids Children 6–11 years

Inhaled corticosteroid	Total daily dose (mcg)		
	Low	Medium	High
Beclometasone dipropionate (HFA)	50–100	>100–200	>200
Budesonide (DPI)	100–200	>200–400	>400
Budesonide (nebules)	250–500	>500–1000	>1000
Fluticasone propionate (HFA)	100–200	>200–500	>500

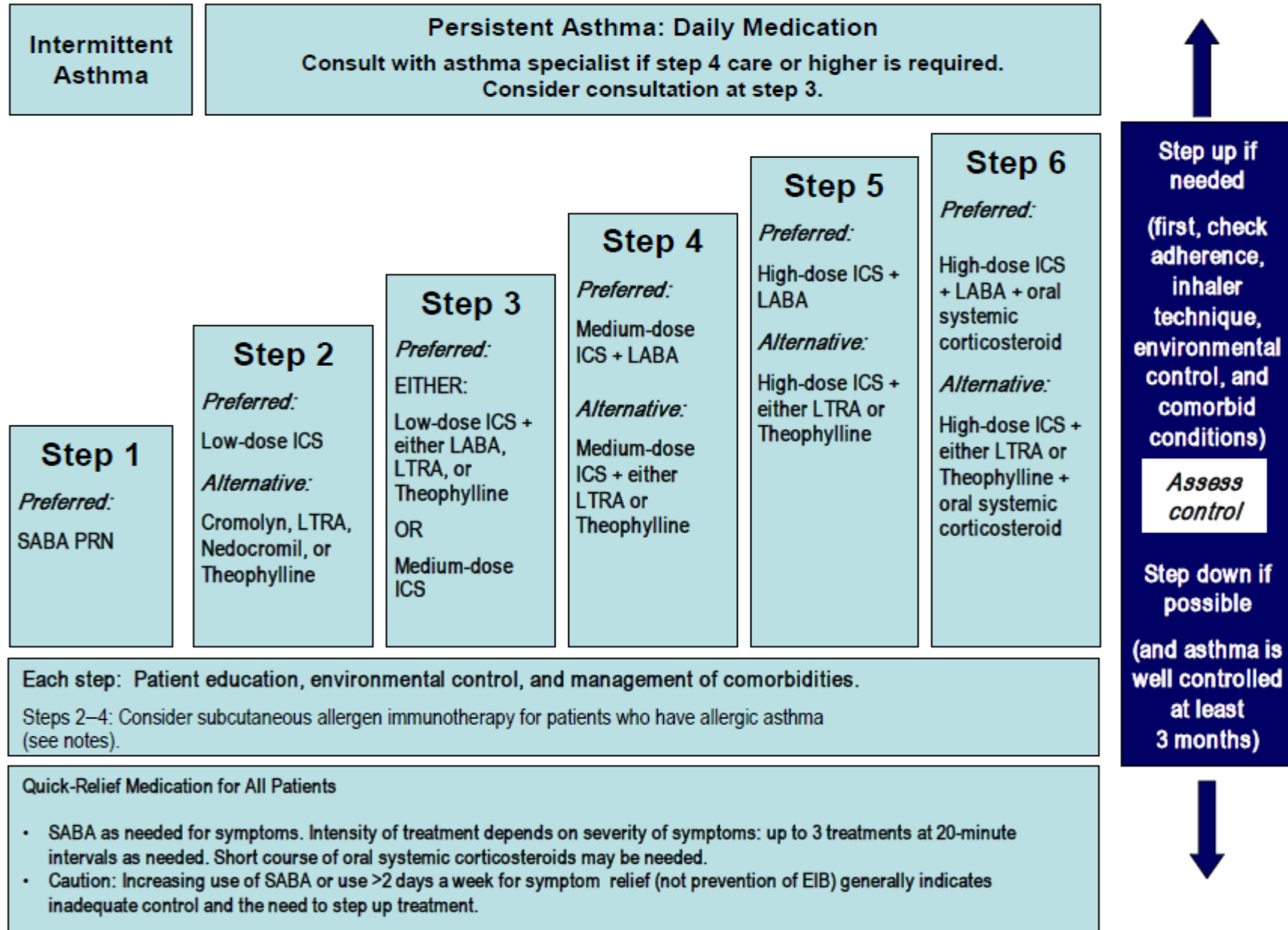
Low, medium and high dose inhaled corticosteroids Adults and adolescents (≥12 years)

Inhaled corticosteroid	Total daily dose (mcg)		
	Low	Medium	High
Beclometasone dipropionate (HFA)	100–200	>200–400	>400
Budesonide (DPI)	200–400	>400–800	>800
Fluticasone propionate (DPI or HFA)	100–250	>250–500	>500

Risk Assessment for Corticosteroid Adverse Effects

CONDITIONS		RECOMMENDATIONS
Low risk	(≤ 1 risk factor*) Low- to medium-dose ICS (see Table 169.13)	Monitor blood pressure and weight with each physician visit. Measure height annually (stadiometry); monitor periodically for declining growth rate and pubertal developmental delay. Encourage regular physical exercise. Ensure adequate dietary calcium and vitamin D with additional supplements for daily calcium if needed. Avoid smoking and alcohol. Ensure TSH status if patient has history of thyroid abnormality.
Medium risk	(If >1 risk factor,* consider evaluating as high risk) High-dose ICS (see Table 169.13) At least 4 courses of OCS/yr	As above, plus: Yearly ophthalmologic evaluations to monitor for cataracts or glaucoma Baseline bone densitometry (DEXA scan) Consider patient at increased risk for adrenal insufficiency, especially with physiologic stressors (e.g., surgery, accident, significant illness).
High risk	Chronic systemic corticosteroids (>7.5 mg daily or equivalent for >1 mo) ≥ 7 OCS burst treatments/year Very-high-dose ICS (e.g., fluticasone propionate ≥ 800 $\mu\text{g/day}$)	As above, plus: DEXA scan: if DEXA z score ≤ 1.0 , recommend close monitoring (every 12 mo) Consider referral to a bone or endocrine specialist. Bone age assessment Complete blood count Serum calcium, phosphorus, and alkaline phosphatase determinations Urine calcium and creatinine measurements Measurements of testosterone in males, estradiol in amenorrheic premenopausal women, vitamin D (25-OH and 1,25-OH vitamin D), parathyroid hormone, and osteocalcin Urine telopeptides for those receiving long-term systemic or frequent OCS treatment Assume adrenal insufficiency for physiologic stressors (e.g., surgery, accident, significant illness).

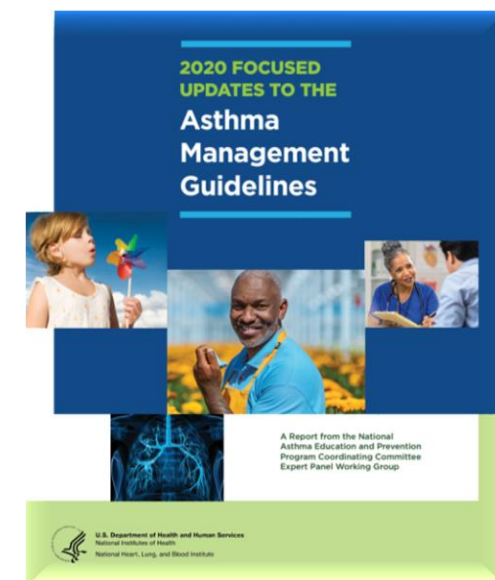
Stepwise approach for managing asthma in children 5 – 11 years of age



CLASSIFICATION OF ASTHMA SEVERITY				
	INTERMITTENT	PERSISTENT		
		Mild	Moderate	Severe
COMPONENTS OF SEVERITY				
Impairment				
Daytime symptoms	≤2 days/wk	>2 days/wk but not daily	Daily	Throughout the day
Nighttime awakenings:				
Age 0-4 yr	0	1-2x/mo	3-4x/mo	>1x/wk
Age ≥5 yr	≤2x/mo	3-4x/mo	>1x/wk but not nightly	Often 7x/wk
Short-acting β ₂ -agonist use for symptoms (not for EIB prevention)	≤2 days/wk	>2 days/wk but not daily, and not more than 1x on any day	Daily	Several times per day
Interference with normal activity	None	Minor limitation	Some limitation	Extreme limitation
Lung function:				
FEV ₁ % predicted, age ≥5 yr	Normal FEV ₁ between exacerbations >80% predicted	≥80% predicted	60–80% predicted	<60% predicted
FEV ₁ /FVC ratio [†] :				
Age 5-11 yr	>85%	>80%	75-80%	<75%
Age ≥12 yr	Normal	Normal	Reduced 5%	Reduced >5%
Risk				
Exacerbations requiring systemic corticosteroids:				
Age 0-4 yr	0-1/yr (see notes)	≥2 exacerbations in 6 mo requiring systemic CS or ≥4 wheezing episodes/yr lasting >1 day and risk factors for persistent asthma		
Age ≥5 yr	0-1/yr (see notes)	≥2/yr (see notes)	≥2/yr (see notes)	≥2/yr (see notes)
Consider severity and interval since last exacerbation.				
Frequency and severity may fluctuate over time for patients in any severity category.				
Relative annual risk of exacerbations may be related to FEV ₁ .				
RECOMMENDED STEP FOR INITIATING THERAPY				
(See Table 169.11 for treatment steps.)				
The stepwise approach is meant to assist, not replace, the clinical decision-making required to meet individual patient needs.				
All ages	Step 1	Step 2		
Age 0-4 yr			Step 3 and consider a short course of systemic CS	Step 3 and consider a short course of systemic CS
Age 5-11 yr			Step 3: medium-dose ICS option and consider a short course of systemic CS	Step 3: medium-dose ICS option or Step 4 and consider a short course of CS
In 2-6 wk, depending on severity, evaluate level of asthma control that is achieved.				
• Children 0-4 yr old: If no clear benefit is observed in 4-6 wk, stop treatment and consider alternative diagnoses or adjusting therapy accordingly.				
• Children 5-11 yr old: Adjust therapy accordingly.				

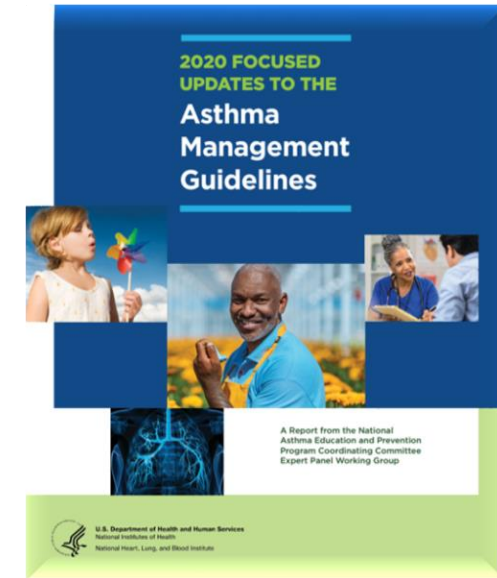
AGES 0-4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	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						



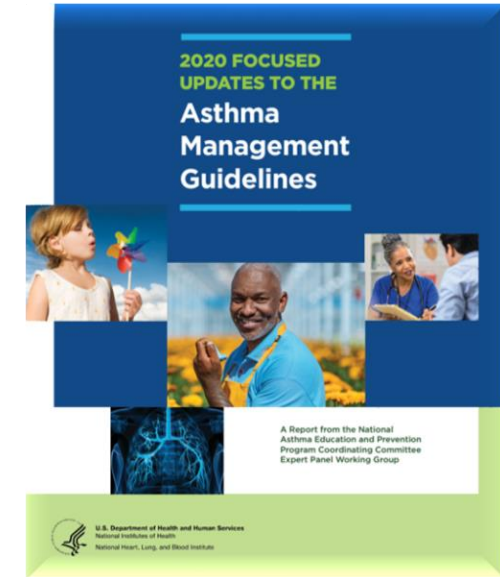
AGES 5-11 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	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						



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						

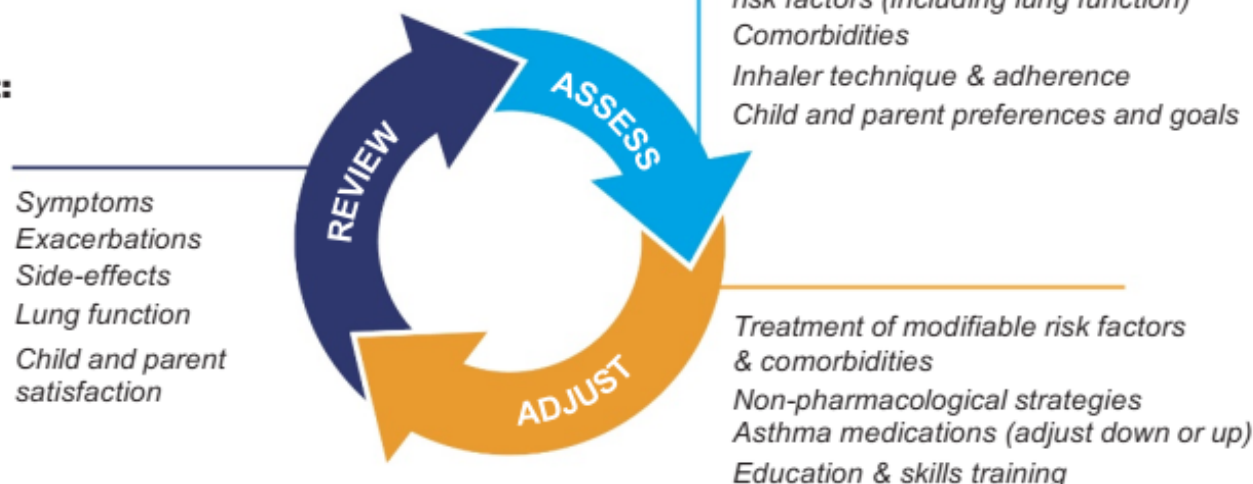


Children 6-11 years



Personalized asthma management:

Assess, Adjust, Review



Asthma medication options:

Adjust treatment up and down for individual child's needs

PREFERRED CONTROLLER

to prevent exacerbations and control symptoms

Other controller options

RELIEVER

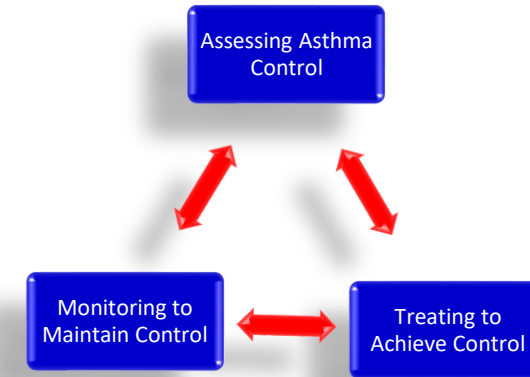
	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
	Low dose ICS taken whenever SABA taken	Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for children)	Low dose ICS-LABA, OR medium dose ICS, OR very low dose* ICS-formoterol maintenance and reliever (MART)	Medium dose ICS-LABA, OR low dose† ICS-formoterol maintenance and reliever therapy (MART). Refer for expert advice	Refer for phenotypic assessment ± higher dose ICS-LABA or add-on therapy, e.g. anti-IgE
Other controller options	Consider daily low dose ICS	Daily leukotriene receptor antagonist (LTRA), or low dose ICS taken whenever SABA taken	Low dose ICS + LTRA	Add tiotropium or add LTRA	Add-on anti-IL5, or add-on low dose OCS, but consider side-effects
RELIEVER	As-needed short-acting beta2-agonist (or ICS-formoterol reliever for MART as above)				

*Very low dose: BUD-FORM 100/6 mcg

†Low dose: BUD-FORM 200/6 mcg (metered doses).

Monitoring is essential to:

- Maintain control
- Establish lowest step/dose treatment



2 to 6 weeks after initial visit

Every **3 months** thereafter

Stepping down treatment when asthma is controlled

- Full benefit : 3 month
- ICS+LABA: reduce ICS 50% while continuing LABA
- If controlled: stop LABA

Approaches to Stepping Up Therapy

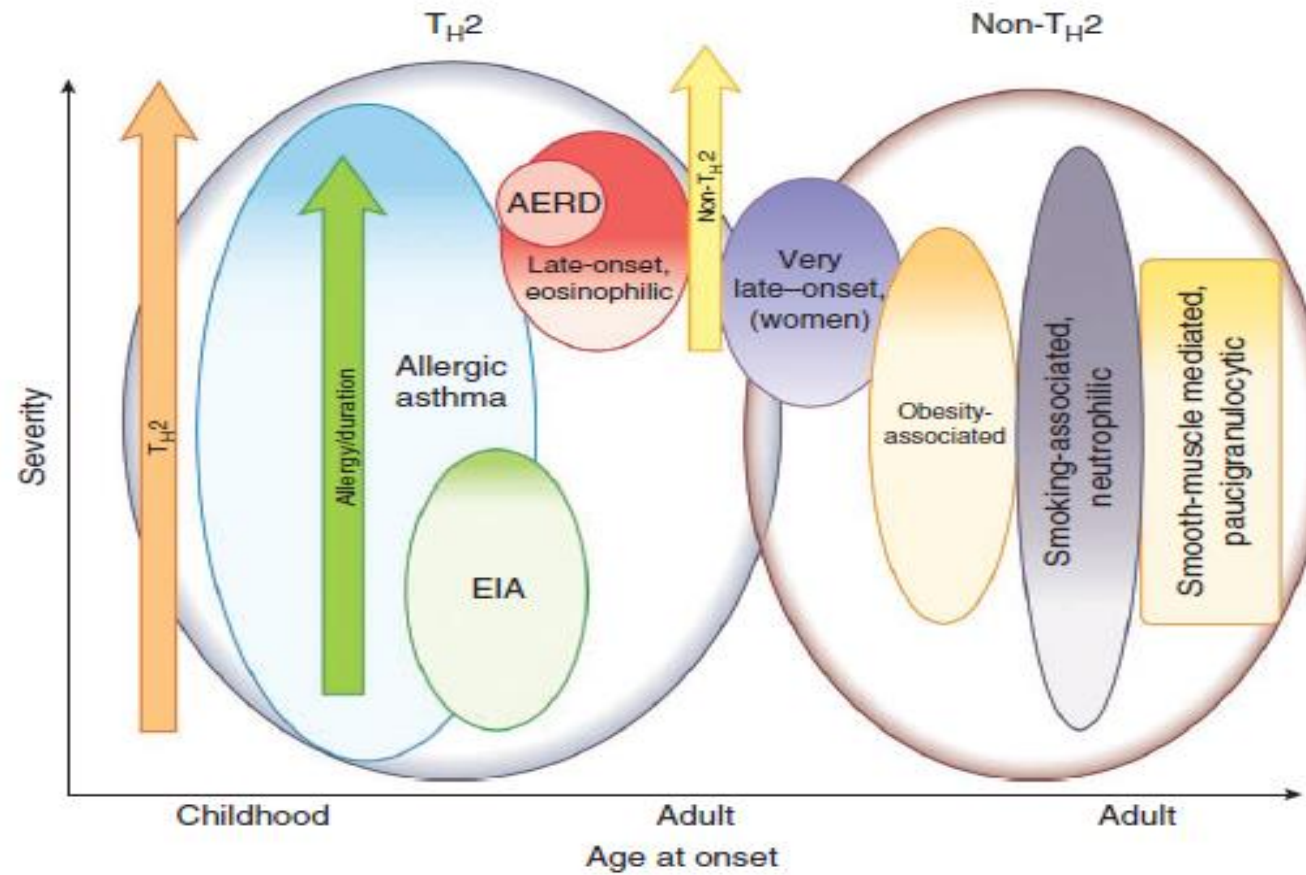
Step-Up Long-Term (SLT)	Step-Up Short-Term (SST)	Step-Up Intermittent (SUI)
Increase in therapy for uncontrolled asthma (weeks)	Increase in therapy for brief loss of control (days)	Increase in therapy for variable symptoms (day-to-day)
Persistent loss of control	Brief loss of control (upper respiratory tract infections, pet exposure)	Mild symptoms
Step-down therapy when control achieved after 3-6 months	Step-down therapy when control achieved after 3-10 days	Intermittent use

Choosing between controller options

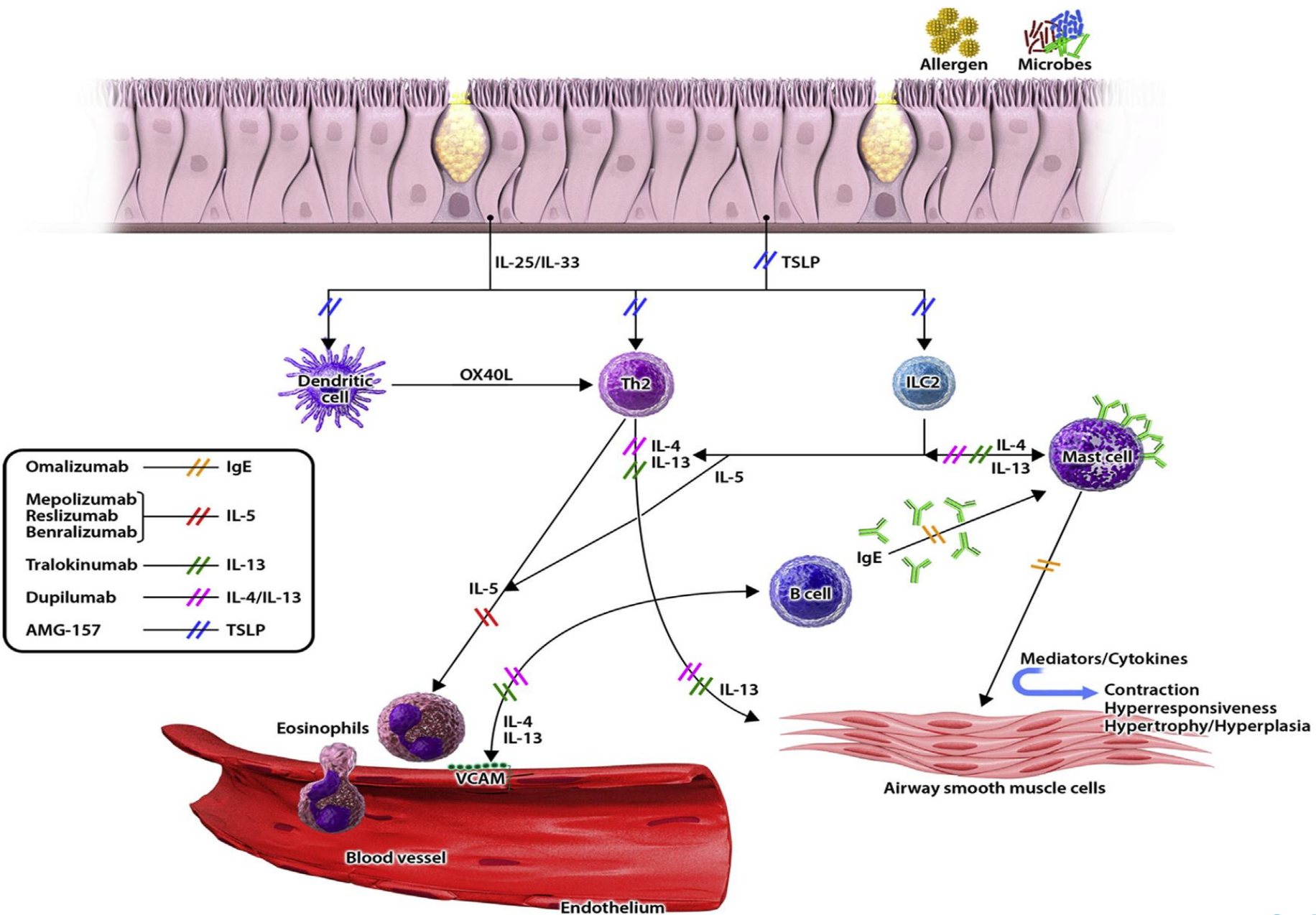


Population-level decisions

Individual patient decisions



Wenzel SE. Asthma phenotypes: the evolution from clinical to molecular approaches.
Nat Med. 2012 May 4;18(5):716-25



Therapeutic targets for type 2-high inflammation in asthmatic patients

Asthma Management

- 1- Develop Patient/Doctor Partnership
- 2- Identify / Reduce Exposure to Risk Factors
- 3- Assess, Treat and Monitor Asthma
- 4- Manage Asthma Exacerbations
- 5- Special Considerations

Develop Patient/Doctor Partnership

- Clear communication
- Educate continually
- Include the family
- Information about asthma
- Action plan



Asthma Action Plan

For: _____ Doctor: _____ Date: _____
 Doctor's Phone Number: _____ Hospital/Emergency Department Phone Number: _____

GREEN ZONE

Doing Well

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

And, if a peak flow meter is used,

Peak flow: more than _____
 (80 percent or more of my best peak flow)

My best peak flow is: _____

Before exercise ☐ _____ ☐ 2 or ☐ 4 puffs _____ 5 minutes before exercise

Take these long-term control medicines each day (include an anti-inflammatory).

Medicine	How much to take	When to take it
_____	_____	_____
_____	_____	_____
_____	_____	_____

YELLOW ZONE

Asthma Is Getting Worse

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

-Or-

Peak flow: _____ to _____
 (50 to 79 percent of my best peak flow)

First
Second

Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.

_____ (short-acting beta₂-agonist) ☐ 2 or ☐ 4 puffs, every 20 minutes for up to 1 hour
☐ Nebulizer, once

If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:

☐ Continue monitoring to be sure you stay in the green zone.

-Or-

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:

☐ Take: _____ (short-acting beta₂-agonist) ☐ 2 or ☐ 4 puffs or ☐ Nebulizer

☐ Add: _____ (oral steroid) _____ mg per day For _____ (3–10) days

☐ Call the doctor ☐ before/ ☐ within _____ hours after taking the oral steroid.

RED ZONE

Medical Alert!

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

-Or-

Peak flow: less than _____
 (50 percent of my best peak flow)

Take this medicine:

☐ _____ (short-acting beta₂-agonist) ☐ 4 or ☐ 6 puffs or ☐ Nebulizer

☐ _____ (oral steroid) _____ mg

Then call your doctor NOW. Go to the hospital or call an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

DANGER SIGNS ■ Trouble walking and talking due to shortness of breath
 ■ Lips or fingernails are blue

■ Take ☐ 4 or ☐ 6 puffs of your quick-relief medicine AND
 ■ Go to the hospital or call for an ambulance _____ NOW!
 (phone)

See the reverse side for things you can do to avoid your asthma triggers.

How To Control Things That Make Your Asthma Worse

This guide suggests things you can do to avoid your asthma triggers. Put a check next to the triggers that you know make your asthma worse and ask your doctor to help you find out if you have other triggers as well. Then decide with your doctor what steps you will take.

Allergens

Animal Dander

Some people are allergic to the flakes of skin or dried saliva from animals with fur or feathers.

The best thing to do:

- Keep furry or feathered pets out of your home.
- If you can't keep the pet outdoors, then:
 - Keep the pet out of your bedroom and other sleeping areas at all times, and keep the door closed.
 - Remove carpets and furniture covered with cloth from your home. If that is not possible, keep the pet away from fabric-covered furniture and carpets.

Dust Mites

Many people with asthma are allergic to dust mites. Dust mites are tiny bugs that are found in every home—in mattresses, pillows, carpets, upholstered furniture, bedcovers, clothes, stuffed toys, and fabric or other fabric-covered items.

Things that can help:

- Encase your mattress in a special dust-proof cover.
- Encase your pillow in a special dust-proof cover or wash the pillow each week in hot water. Water must be hotter than 130° F to kill the mites. Cold or warm water used with detergent and bleach can also be effective.
- Wash the sheets and blankets on your bed each week in hot water.
- Reduce indoor humidity to below 60 percent (ideally between 30–50 percent). Dehumidifiers or central air conditioners can do this.
- Try not to sleep or lie on cloth-covered cushions.
- Remove carpets from your bedroom and those laid on concrete, if you can.
- Keep stuffed toys out of the bed or wash the toys weekly in hot water or cooler water with detergent and bleach.

Cockroaches

Many people with asthma are allergic to the dried droppings and remains of cockroaches.

The best thing to do:

- Keep food and garbage in closed containers. Never leave food out.
- Use poison baits, powders, gels, or paste (for example, boric acid). You can also use traps.
- If a spray is used to kill roaches, stay out of the room until the odor goes away.

Indoor Mold

- Fix leaky faucets, pipes, or other sources of water that have mold around them.
- Clean moldy surfaces with a cleaner that has bleach in it.

Pollen and Outdoor Mold

- What to do during your allergy season (when pollen or mold spore counts are high):
 - Try to keep your windows closed.
 - Stay indoors with windows closed from late morning to afternoon, if you can. Pollen and some mold spore counts are highest at that time.
 - Ask your doctor whether you need to take or increase anti-inflammatory medicine before your allergy season starts.

Irritants

Tobacco Smoke

- If you smoke, ask your doctor for ways to help you quit. Ask family members to quit smoking, too.
- Do not allow smoking in your home or car.

Smoke, Strong Odors, and Sprays

- If possible, do not use a wood-burning stove, kerosene heater, or fireplace.
- Try to stay away from strong odors and sprays, such as perfume, talcum powder, hair spray, and paints.

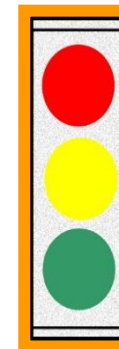
Other things that bring on asthma symptoms in some people include:

Vacuum Cleaning

- Try to get someone else to vacuum for you once or twice a week, if you can. Stay out of rooms while they are being vacuumed and for a short while afterward.
- If you vacuum, use a dust mask (from a hardware store), a double-layered or microfilter vacuum cleaner bag, or a vacuum cleaner with a HEPA filter.

Other Things That Can Make Asthma Worse

- Sulfites in foods and beverages: Do not drink beer or wine or eat dried fruit, processed potatoes, or shrimp if they cause asthma symptoms.
- Cold air: Cover your nose and mouth with a scarf on cold or windy days.
- Other medicines: Tell your doctor about all the medicines you take. Include cold medicines, aspirin, vitamins and other supplements, and nonselective beta-blockers (including those in eye drops).



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Factors Involved in Non-Adherence

Medication Usage

- Difficulties with **inhalers**
- Complicated **regimens**
- **side effects**
- **Cost**

Non-Medication Factors

- Misunderstanding/lack of **information**
- **Fears** about side-effects
- Inappropriate **expectations**
- **Underestimation** of severity
- **Cultural** factors
- **Poor communication**

Conclusions

well-planned treatment strategy

- 1. Partnerships between physician and patients**
- 2. Education**
- 3. Action plan**
- 4. Drug therapy**
- 5. Improving adherence**

A close-up photograph of several pink tulip buds against a solid blue background. The tulips are covered in fine water droplets, giving them a fresh, dewy appearance. The focus is sharp on the tulip in the lower foreground, while the others are slightly blurred. The green stems and leaves of the tulips are visible, extending from the bottom right towards the center.

*Thanks for your
attention*