ASTHMA BRONCHIALE

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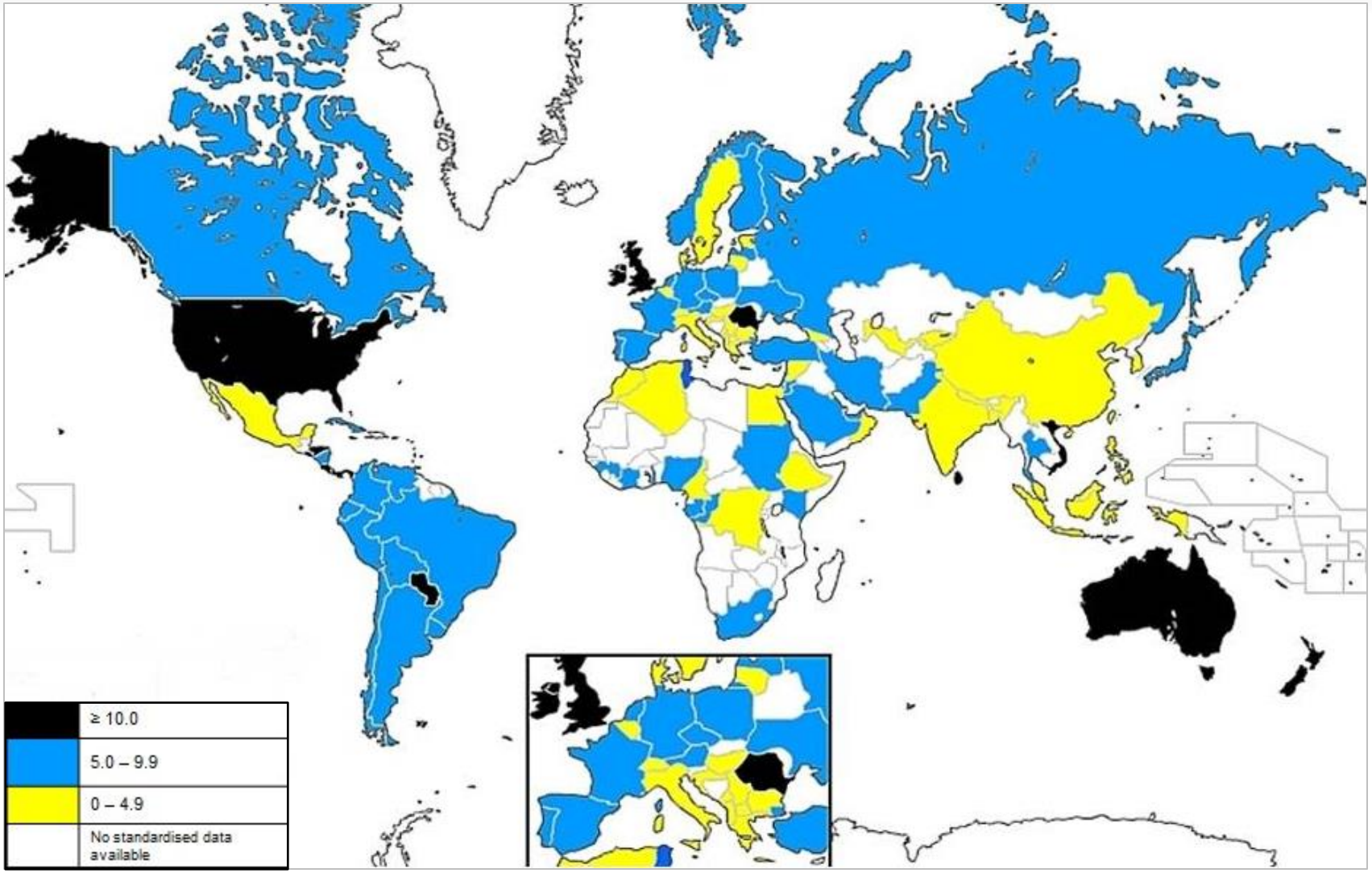
Burden of asthma

- 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
- Health care expenditure on asthma is very high

Prevalence of asthma in children aged 13-14 years



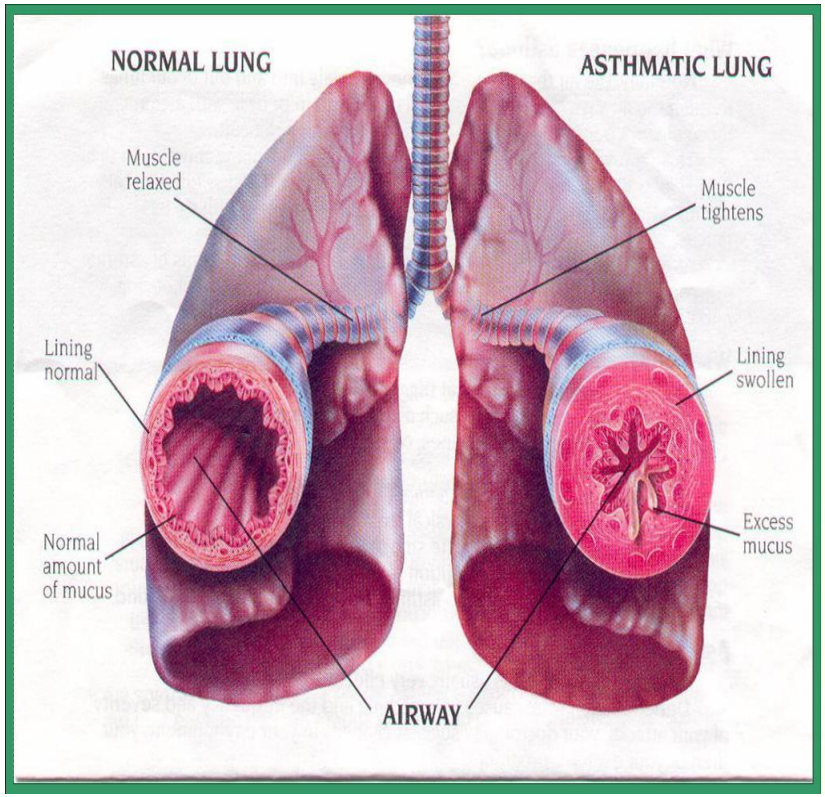
GINA 2017 Appendix Box A1-1; figure provided by R Beasley

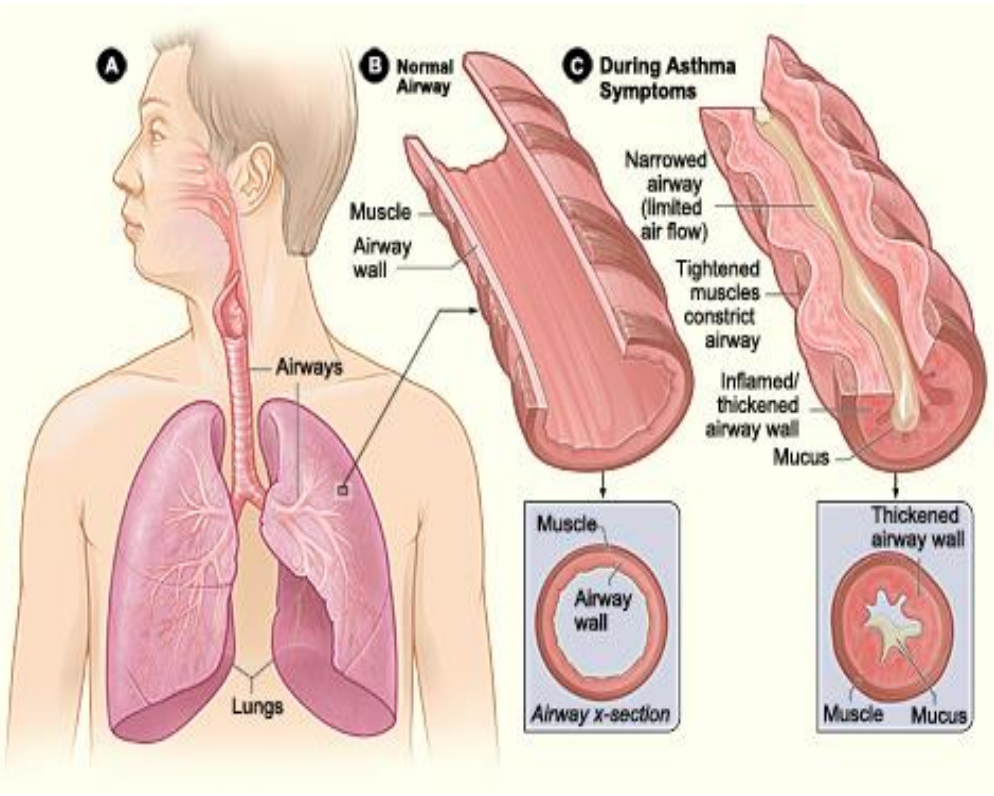
Definition and diagnosis of asthma

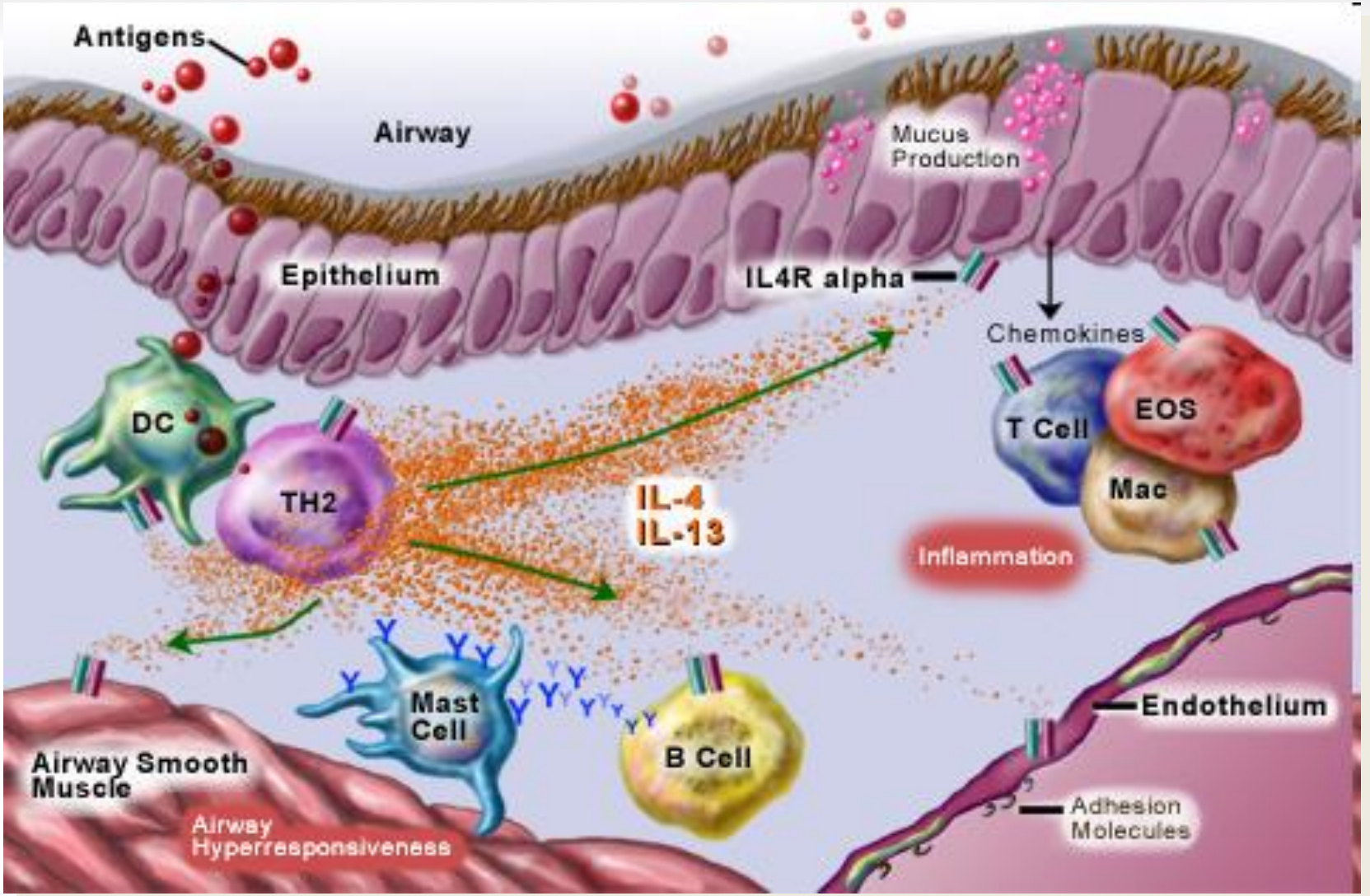
GINA Global Strategy for Asthma Management and Prevention

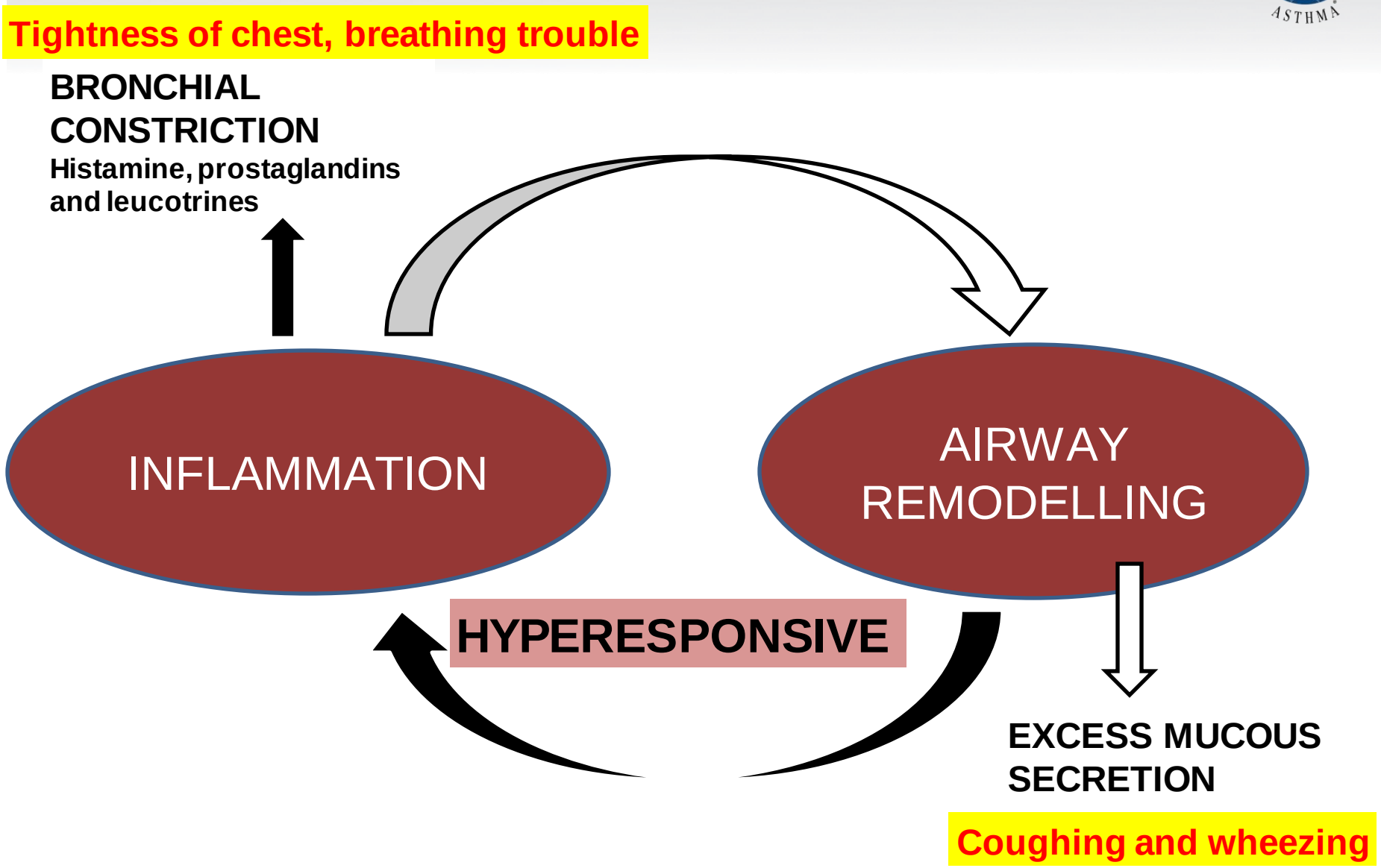
What is known about asthma?

- Asthma is a common and potentially serious chronic disease that can be controlled but not cured
- Asthma causes symptoms such as wheezing, shortness of breath, chest tightness and cough that *vary over time in their occurrence, frequency and intensity*
- Symptoms are associated with variable expiratory airflow, i.e. difficulty breathing air out of the lungs due to
  - Bronchoconstriction (airway narrowing)
  - Airway wall thickening
  - Increased mucus
- Symptoms may be triggered or worsened by factors such as viral infections, allergens, tobacco smoke, exercise and stress









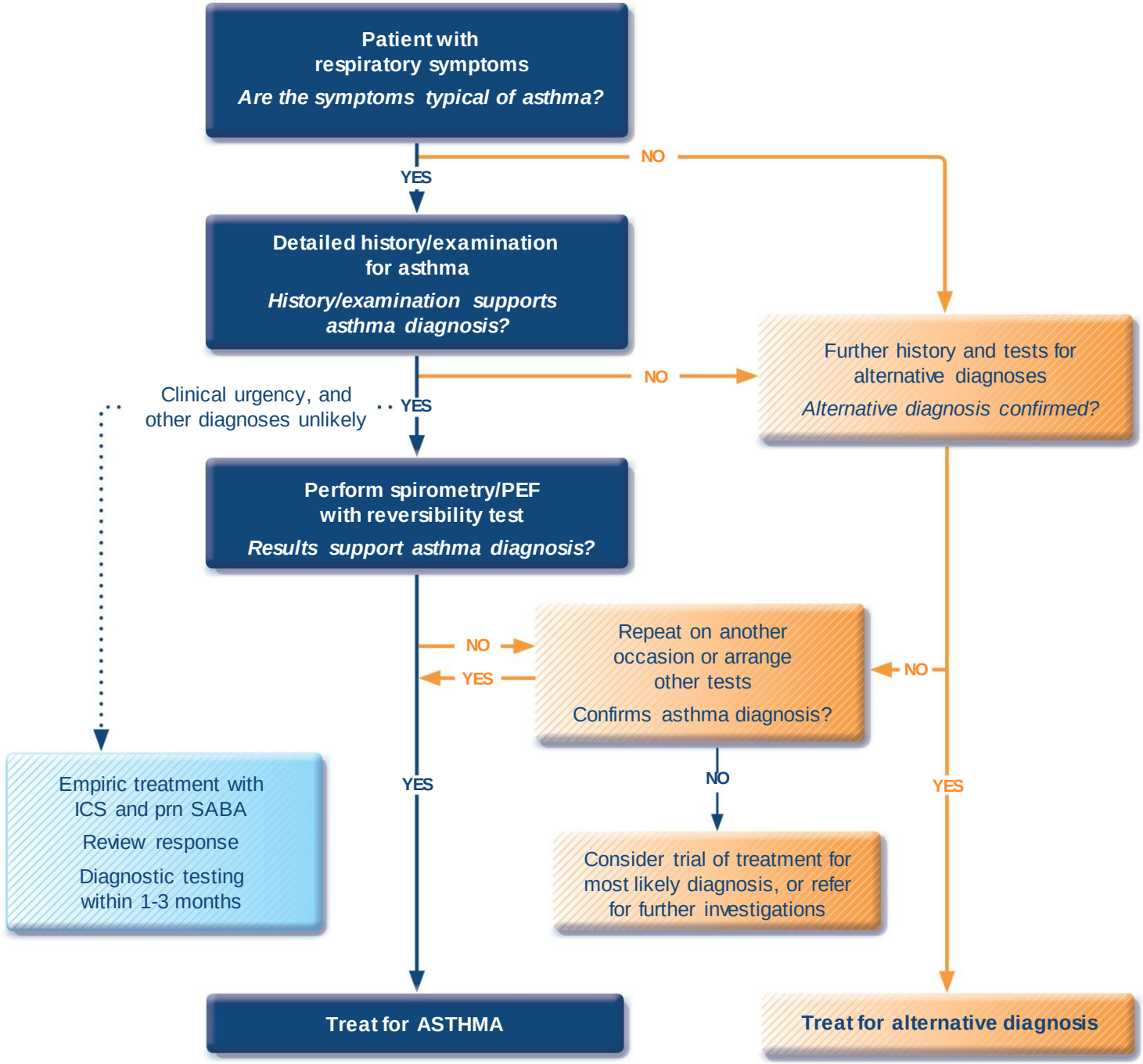
Definition of asthma

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation.

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

Diagnosis of asthma

- The diagnosis of asthma should be based on:
  - A history of characteristic symptom patterns
  - Evidence of variable airflow limitation, from bronchodilator reversibility testing or other tests



Diagnosis of asthma – symptoms

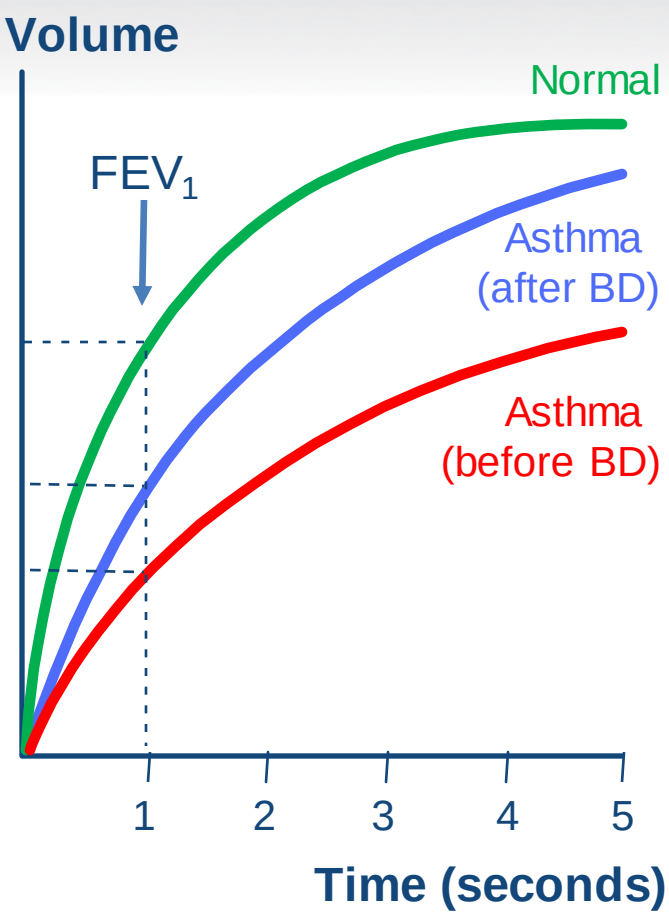
- *Increased* probability that symptoms are due to asthma if:
  - More than one type of symptom (wheeze, shortness of breath, cough, chest tightness)
  - Symptoms often worse at night or in the early morning
  - Symptoms vary over time and in intensity
  - Symptoms are triggered by viral infections, exercise, allergen exposure, changes in weather, laughter, irritants such as car exhaust fumes, smoke, or strong smells

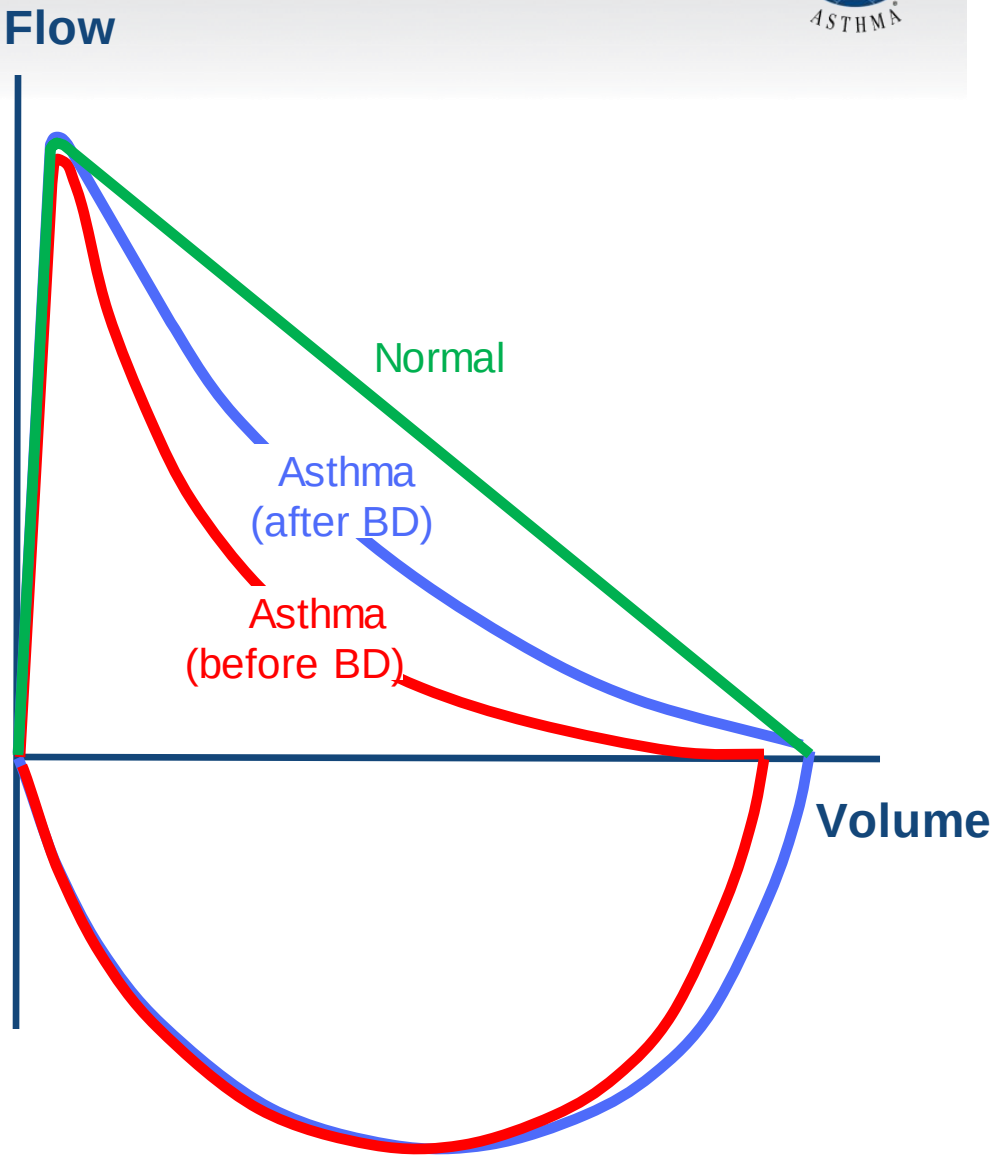



Diagnosis of asthma – variable airflow limitation

- 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

Typical spirometric tracings





Note: Each FEV_1 represents the highest of three reproducible measurements

Diagnosis of asthma – physical examination

- Physical examination in people with asthma
  - Often normal
  - The most frequent finding is wheezing on auscultation, especially on forced expiration
- Wheezing is also found in other conditions, for example:
  - Respiratory infections
  - COPD
  - Upper airway dysfunction
  - Endobronchial obstruction
  - Inhaled foreign body
- Wheezing may be absent during severe asthma exacerbations ('silent chest')

Assessment of asthma

GINA Global Strategy for Asthma Management and Prevention

Assessment of asthma

1. Asthma control - two domains
   - 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
   - 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

GINA assessment of symptom control

A. Symptom control

In the past 4 weeks, has the patient had:

- Daytime asthma symptoms more than twice a week? Yes / No
- 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

Level of asthma symptom control		
Well-controlled	**Partly controlled**	**Uncontrolled**
None of these	1-2 of these	3-4 of these

B. Risk factors for poor asthma outcomes

- Assess risk factors at diagnosis and periodically
- Measure FEV_1 at start of treatment, after 3 to 6 months of treatment to record the patient's personal best, then periodically for ongoing risk assessment

ASSESS PATIENT'S RISKS FOR:

- Exacerbations
- Fixed airflow limitation
- Medication side-effects

Assessing asthma severity

- How?
  - Asthma severity is assessed retrospectively from the level of treatment required to control symptoms and exacerbations
- When?
  - Assess asthma severity after patient has been on controller treatment for several months
  - Severity is not static – it may change over months or years, or as different treatments become available
- Categories of asthma severity
  - *Mild asthma:* well-controlled with Steps 1 or 2 (as-needed SABA or low dose ICS)
  - *Moderate asthma:* well-controlled with Step 3 (low-dose ICS/LABA)
  - *Severe asthma:* requires Step 4/5 (moderate or high dose ICS/LABA ± add-on), or remains uncontrolled despite this treatment

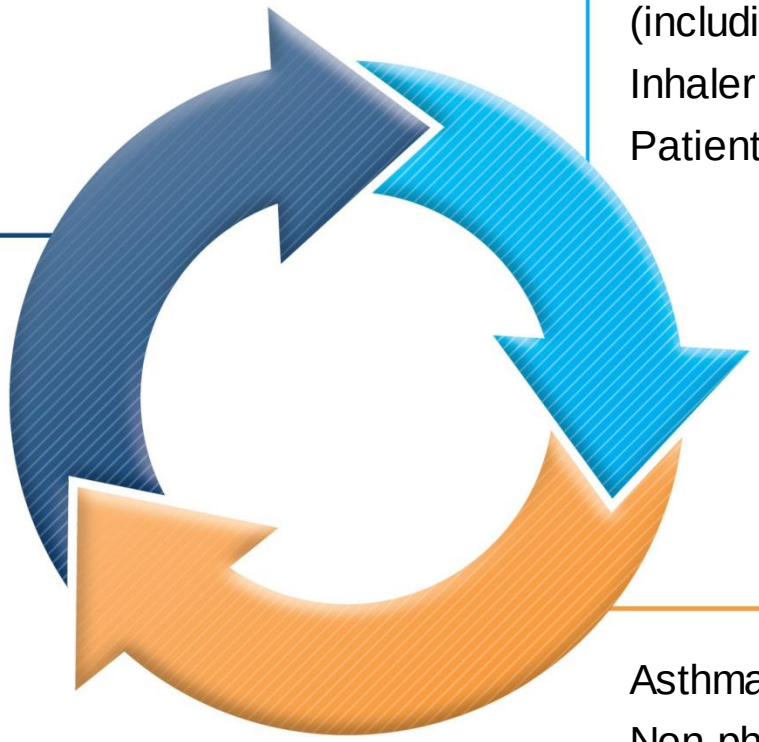
Treating asthma to control symptoms and minimize risk

GINA Global Strategy for Asthma Management and Prevention

Goals of asthma management

- The long-term goals of asthma management are
  1. **Symptom control**: to achieve good control of symptoms and maintain normal activity levels
  2. **Risk reduction**: to minimize future risk of exacerbations, fixed airflow limitation and medication side-effects
- Achieving these goals requires a partnership between patient and their health care providers

The control-based asthma management cycle



Diagnosis

Symptom control & risk factors (including lung function)

Inhaler technique & adherence

Patient preference

Symptoms

Exacerbations

Side-effects

Patient satisfaction

Lung function

Asthma medications

Non-pharmacological strategies

Treat modifiable risk factors

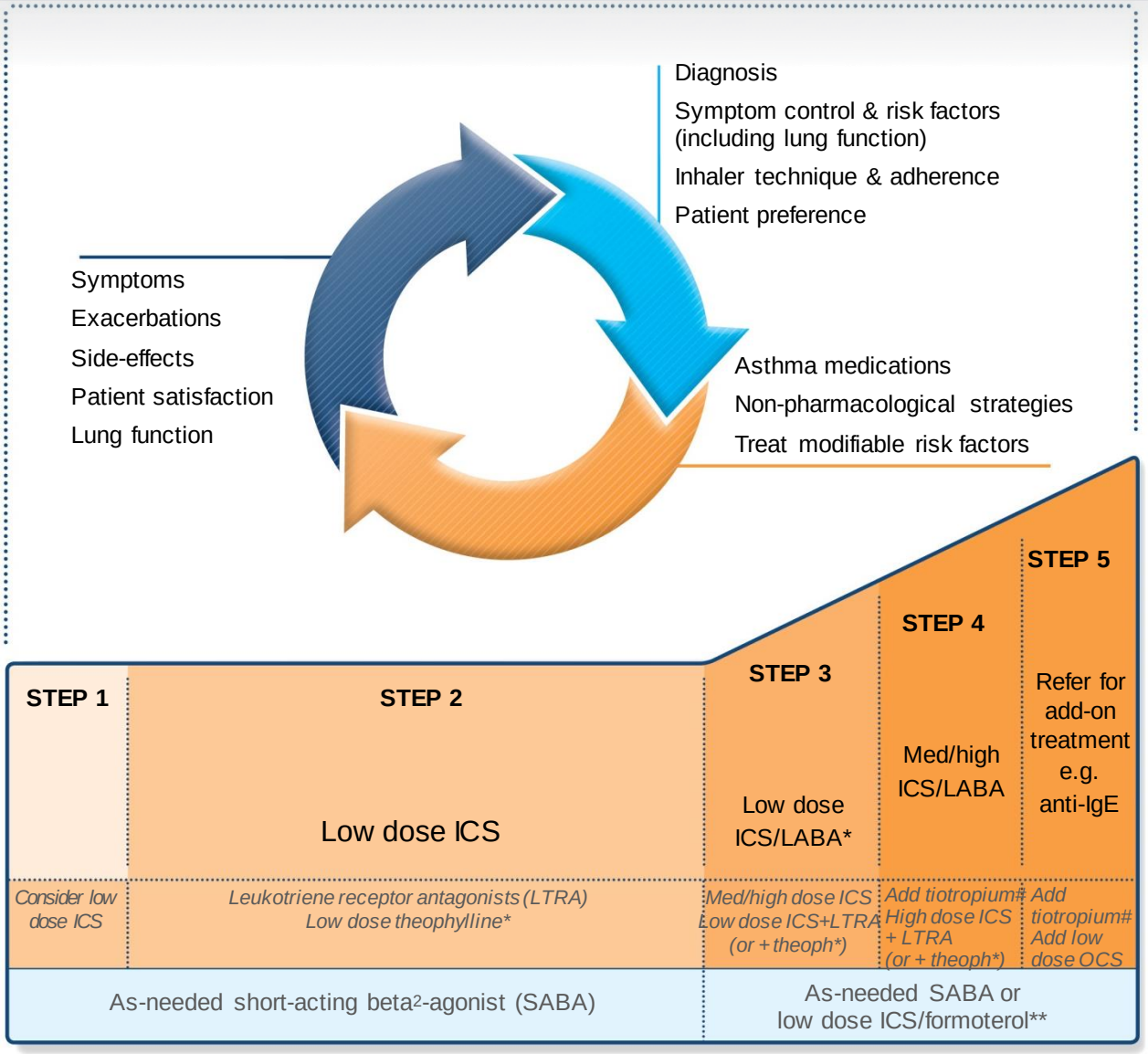
Initial controller treatment for adults, adolescents and children 6–11 years

- Start controller treatment early
  - For best outcomes, initiate controller treatment as early as possible after making the diagnosis of asthma
- Indications for regular low-dose ICS - any of:
  - Asthma symptoms more than twice a month
  - Waking due to asthma more than once a month
  - Any asthma symptoms plus any risk factors for exacerbations
- Consider starting at a higher step if:
  - Troublesome asthma symptoms on most days
  - Waking from asthma once or more a week, especially if any risk factors for exacerbations
- If initial asthma presentation is with an exacerbation:
  - Give a short course of oral steroids and start regular controller treatment (e.g. high dose ICS or medium dose ICS/LABA, then step down)

Initial controller treatment

- After starting initial controller treatment
  - Review response after 2-3 months, or according to clinical urgency
  - Adjust treatment (including non-pharmacological treatments)
  - Consider stepping down when asthma has been well-controlled for 3 months

Stepwise management - pharmacotherapy



*For children 6-11 years, theophylline is not recommended, and preferred Step 3 is medium dose ICS

**For patients prescribed BDP/formoterol or BUD/formoterol maintenance and reliever therapy

Tiotropium by soft-mist inhaler is indicated as add-on treatment for adults (≥18 yrs) with a history of exacerbations

Stepwise management – additional components

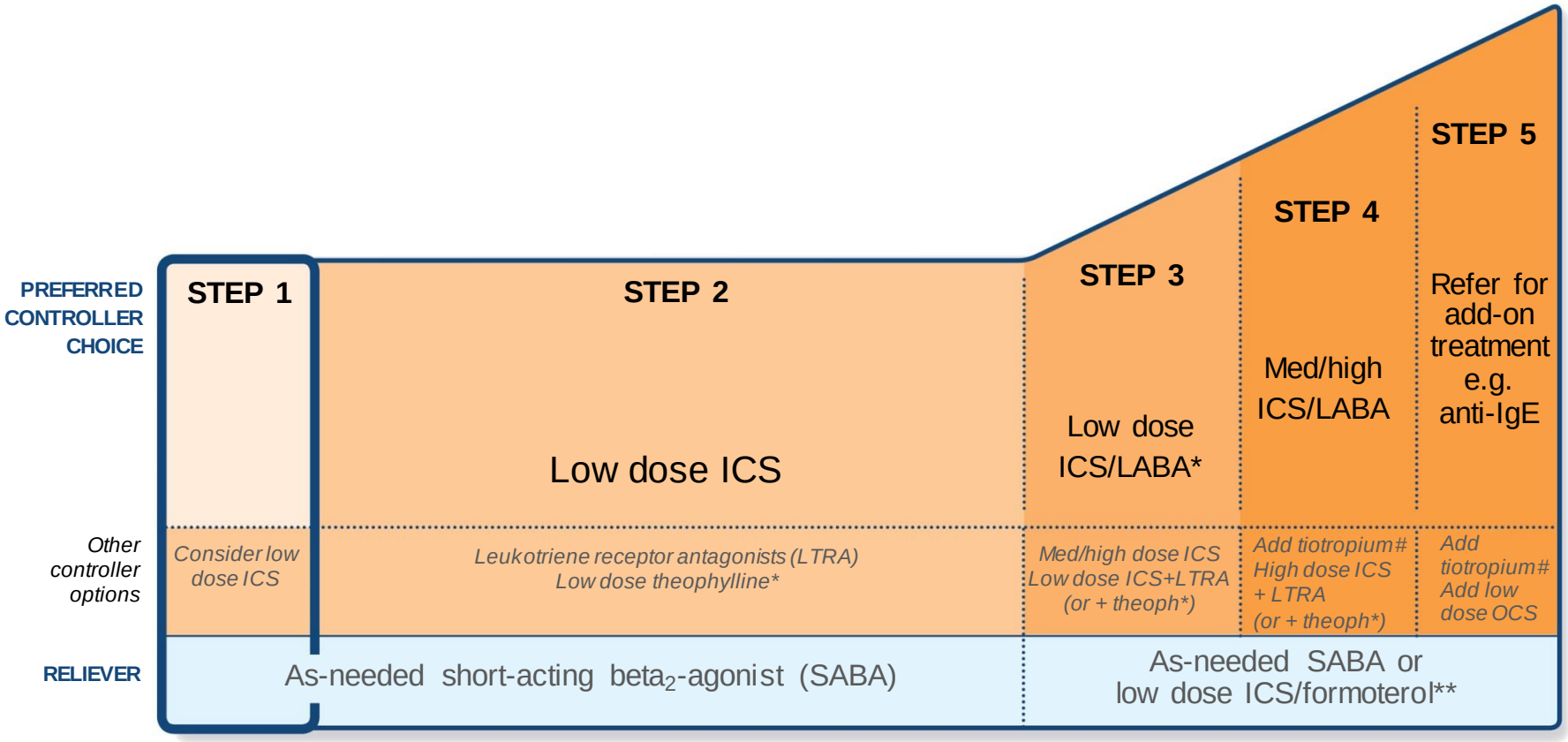
UPDATED 2017

REMEMBER TO...

- Provide guided self-management education
- Treat modifiable risk factors and comorbidities
- Advise about non-pharmacological therapies and strategies
- Consider stepping up if … uncontrolled symptoms, exacerbations or risks, but check diagnosis, inhaler technique and adherence first
- Consider adding SLIT in adult HDM-sensitive patients with allergic rhinitis who have exacerbations despite ICS treatment, provided FEV_1 is 70% predicted
- Consider stepping down if … symptoms controlled for 3 months + low risk for exacerbations. Ceasing ICS is not advised.

SLIT: sublingual immunotherapy

Step 1 – as-needed inhaled short-acting beta$_2$-agonist (SABA)



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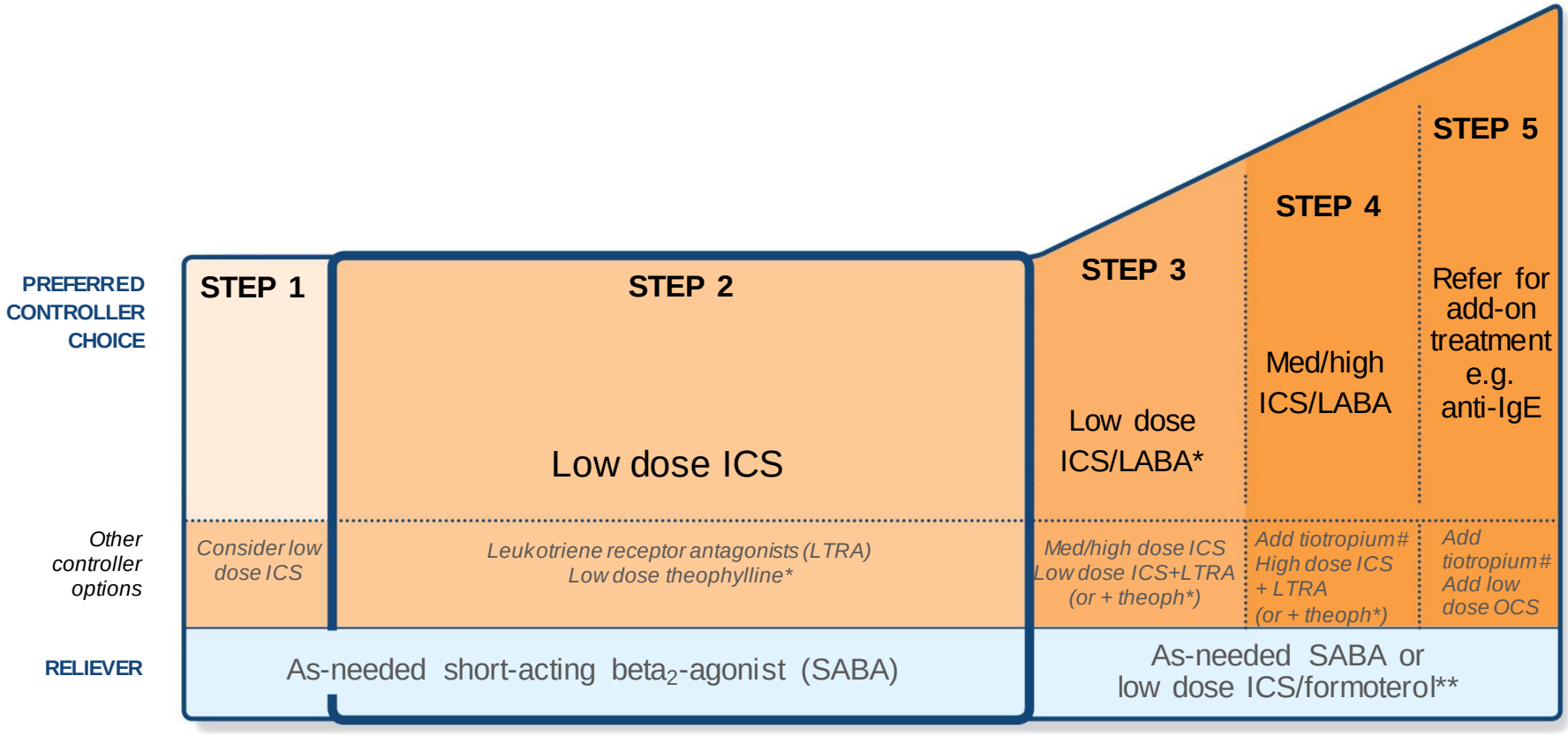
Step 2 – low-dose controller + as-needed inhaled SABA



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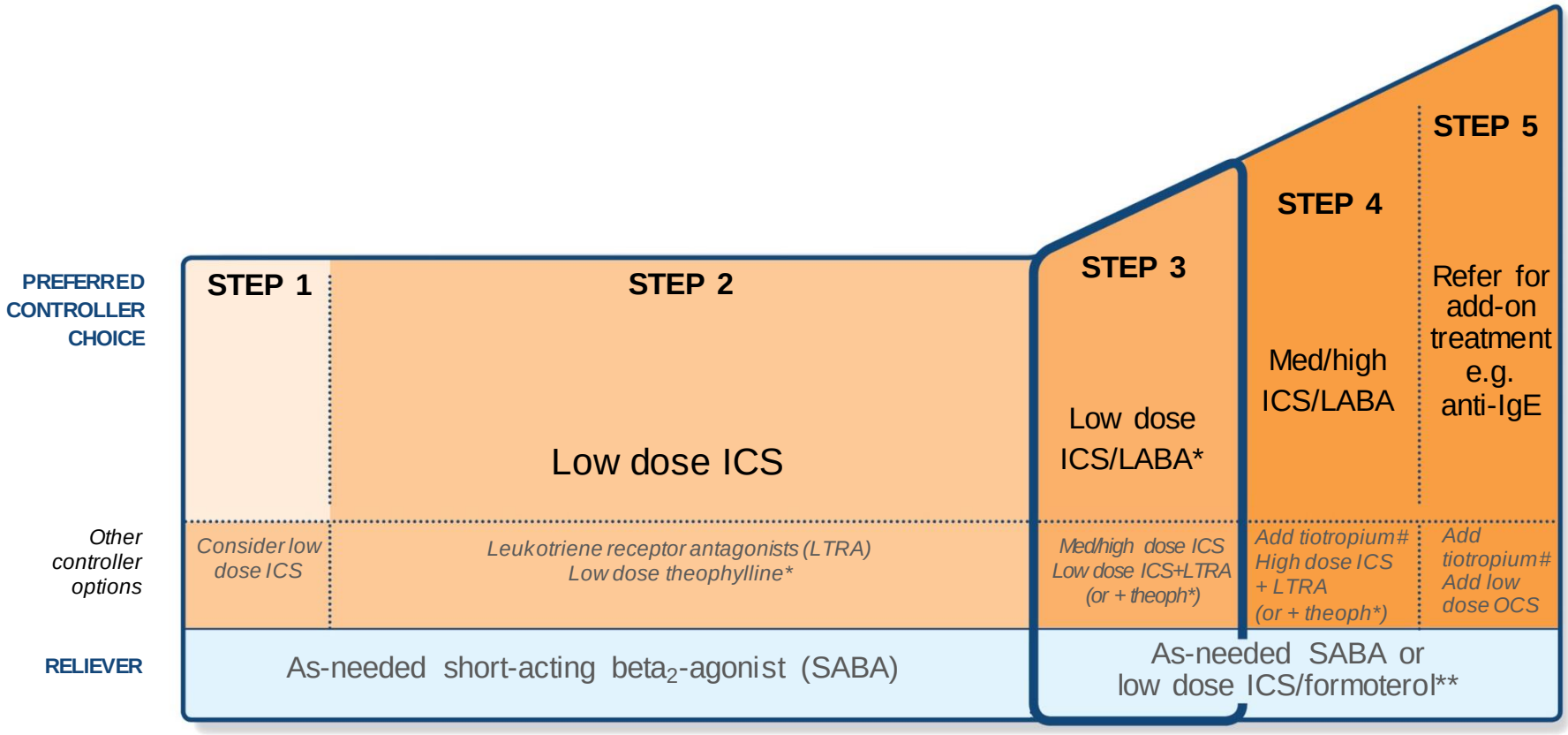
Step 3 – one or two controllers + as-needed inhaled reliever



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Step 4 – two or more controllers + as-needed inhaled reliever

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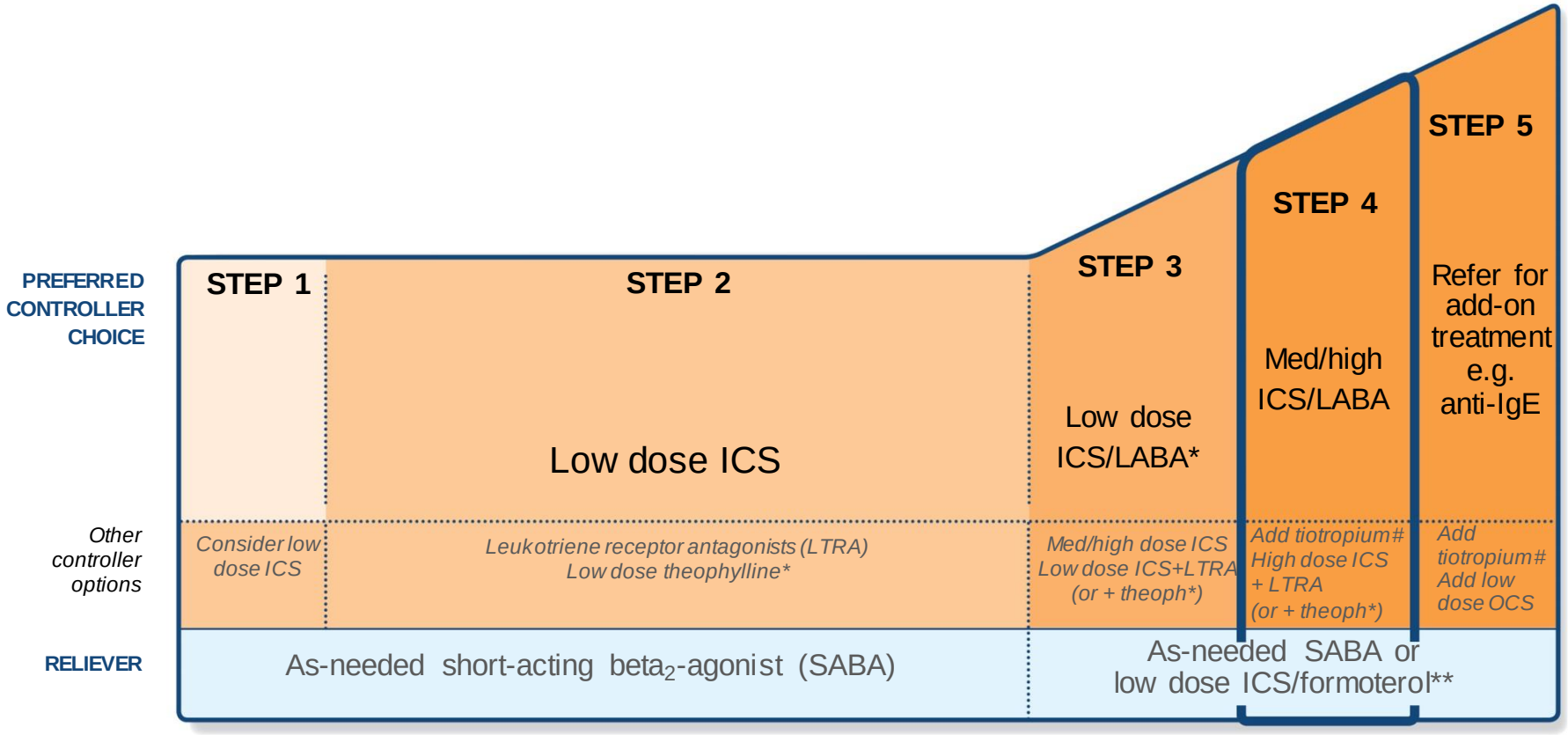

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Step 5 – higher level care and/or add-on treatment

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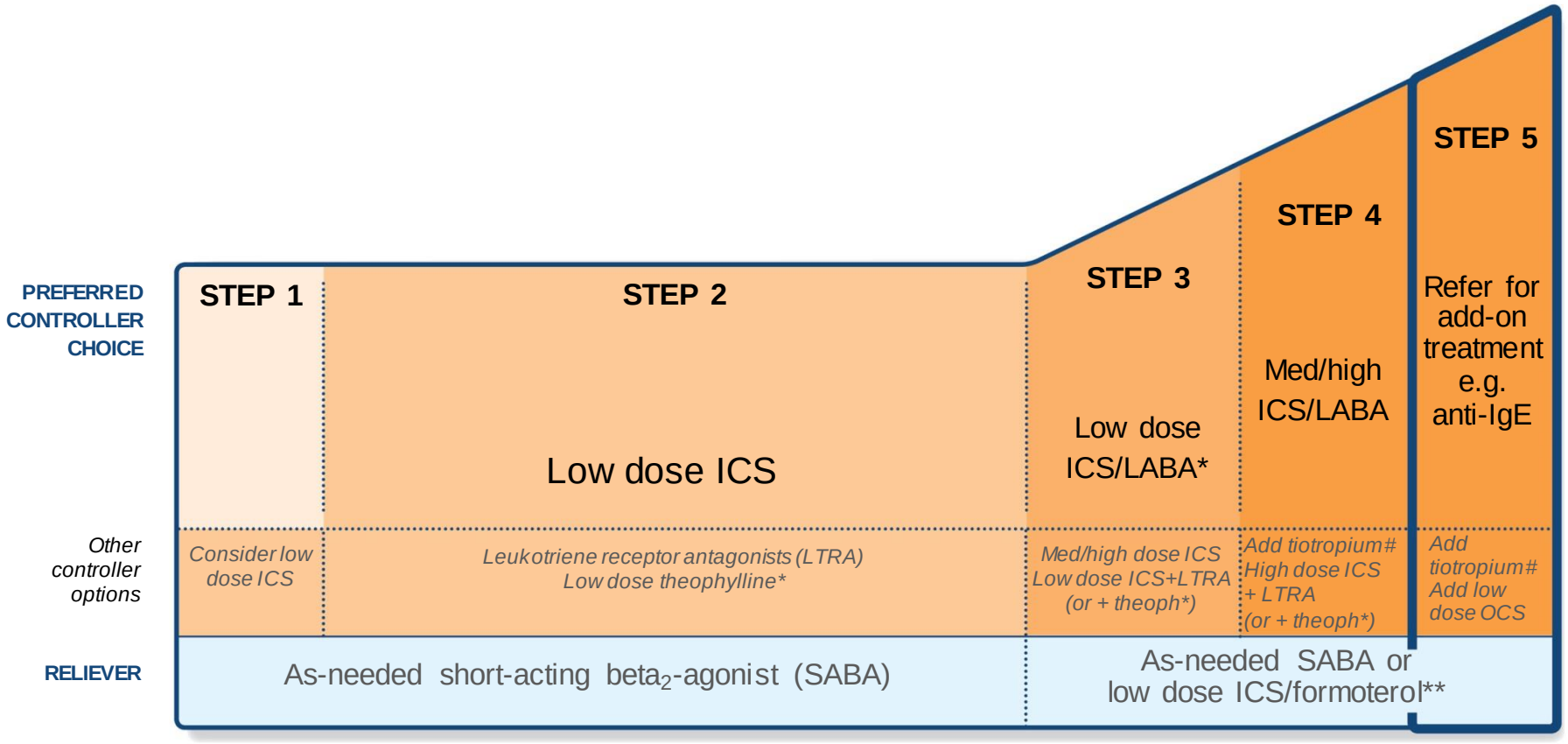

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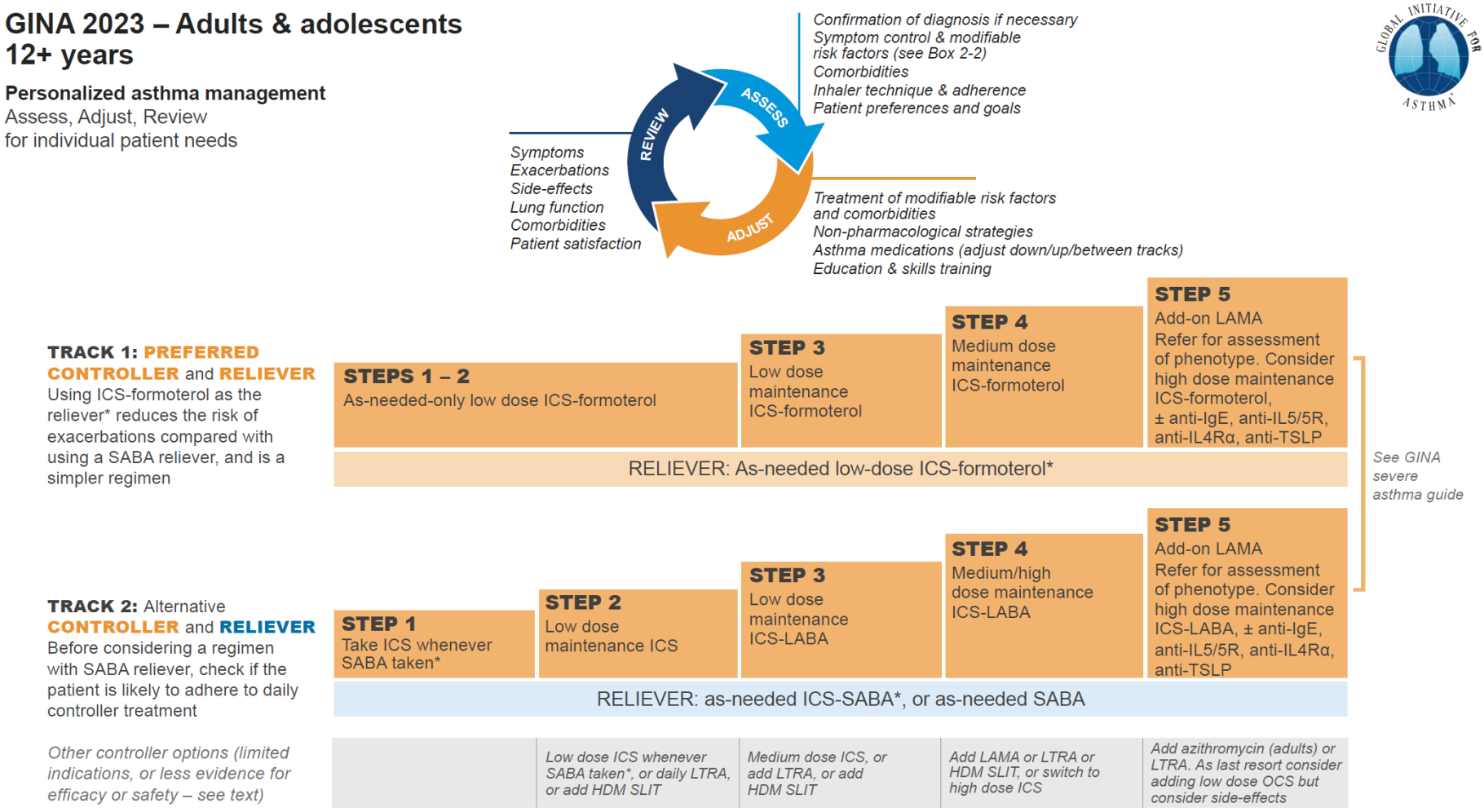
Low, medium and high dose inhaled corticosteroids Adults and adolescents (≥12 years)

Inhaled corticosteroid	Total daily dose (mcg)		
	Low	Medium	High
Beclometasone dipropionate (CFC)	200–500	>500–1000	>1000
Beclometasone dipropionate (HFA)	100–200	>200–400	>400
Budesonide (DPI)	200–400	>400–800	>800
Ciclesonide (HFA)	80–160	>160–320	>320
Fluticasone propionate (DPI or HFA)	100–250	>250–500	>500
Mometasone furoate	110–220	>220–440	>440
Triamcinolone acetonide	400–1000	>1000–2000	>2000

- This is not a table of equivalence, but of estimated clinical comparability
- Most of the clinical benefit from ICS is seen at low doses
- High doses are arbitrary, but for most ICS are those that, with prolonged use, are associated with increased risk of systemic side-effects

Update Treatment GINA 2023



*Anti-inflammatory reliever (AIR)

Box 3-12

Update Treatment GINA 2023

How to prescribe low-dose ICS-formoterol in GINA Track 1

Example: budesonide-formoterol 200/6 mcg [160/4.5 delivered dose]

- **Steps 1–2**: take 1 inhalation whenever needed for symptoms
- **Step 3**: take 1 inhalation twice a day (or once a day) PLUS 1 inhalation whenever needed for symptoms
- **Steps 4–5**: take 2 inhalations twice a day PLUS 1 inhalation whenever needed for symptoms
- As-needed doses of ICS-formoterol can also be taken before exercise *(Lazarinis et al, Thorax 2014)* or before allergen exposure *(Duong et al, JACI 2007)*

See following slides for medications, doses, and maximum number of inhalations in any day for GINA Track 1

Non-pharmacological interventions

- Avoidance of tobacco smoke exposure
- Physical activity
- Occupational asthma
- Avoid medications that may worsen asthma : NSAID, beta blocker
- Allergen avoidance

This slide shows examples of interventions with high quality evidence

Indications for considering referral, where available

- Difficulty confirming the diagnosis of asthma
  - Symptoms suggesting chronic infection, cardiac disease etc
- Suspected occupational asthma
- Persistent uncontrolled asthma or frequent exacerbations
- Risk factors for asthma-related death
- Significant side-effects (or risk of side-effects)

Asthma flare-ups (exacerbations)

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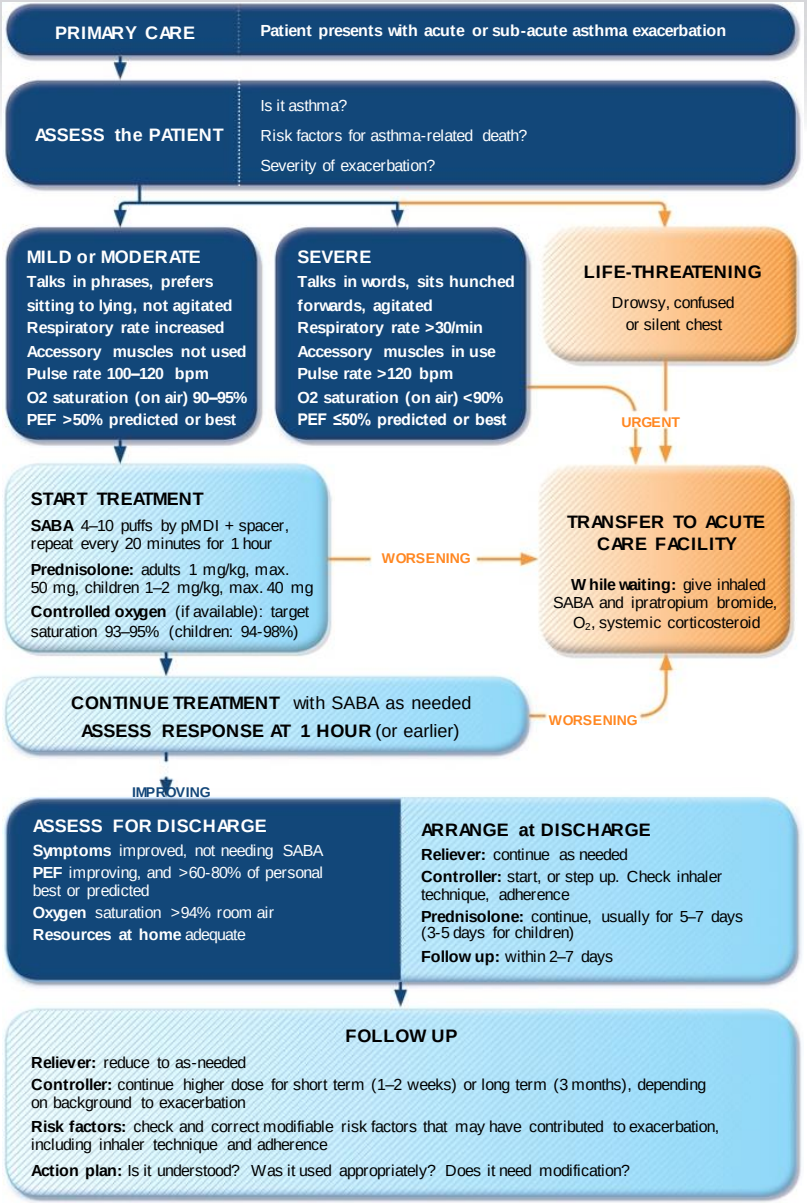
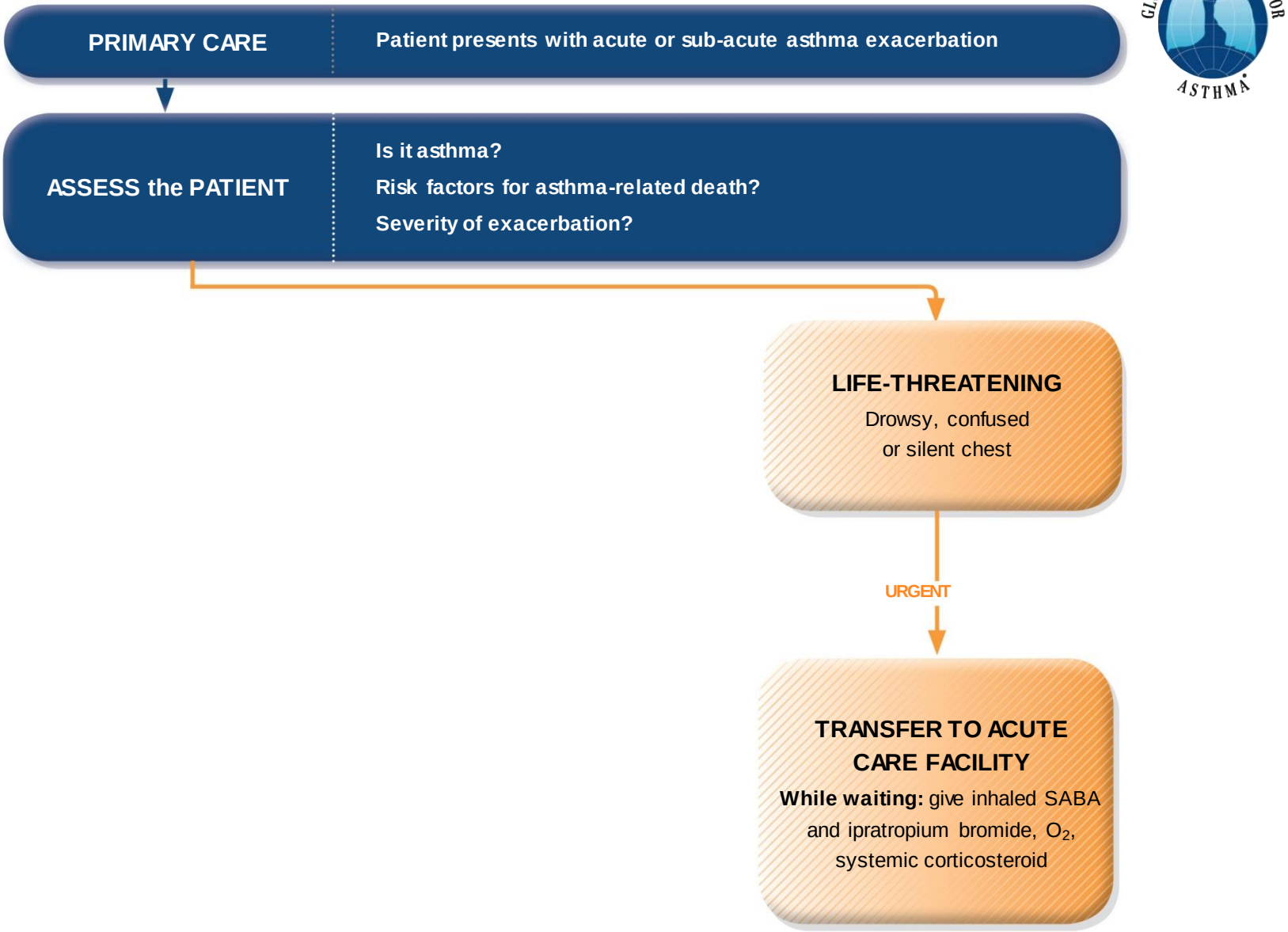
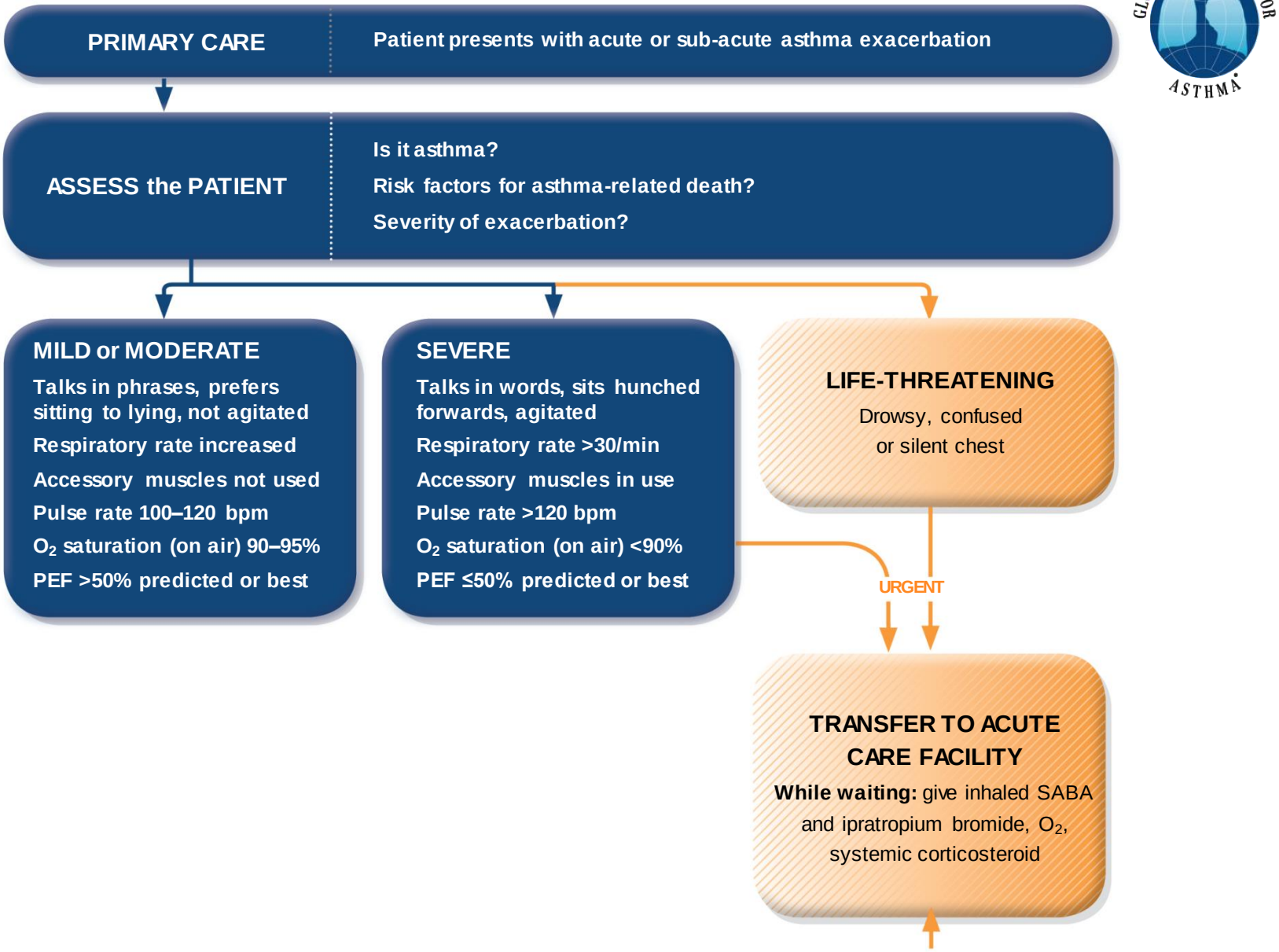
Definition and terminology

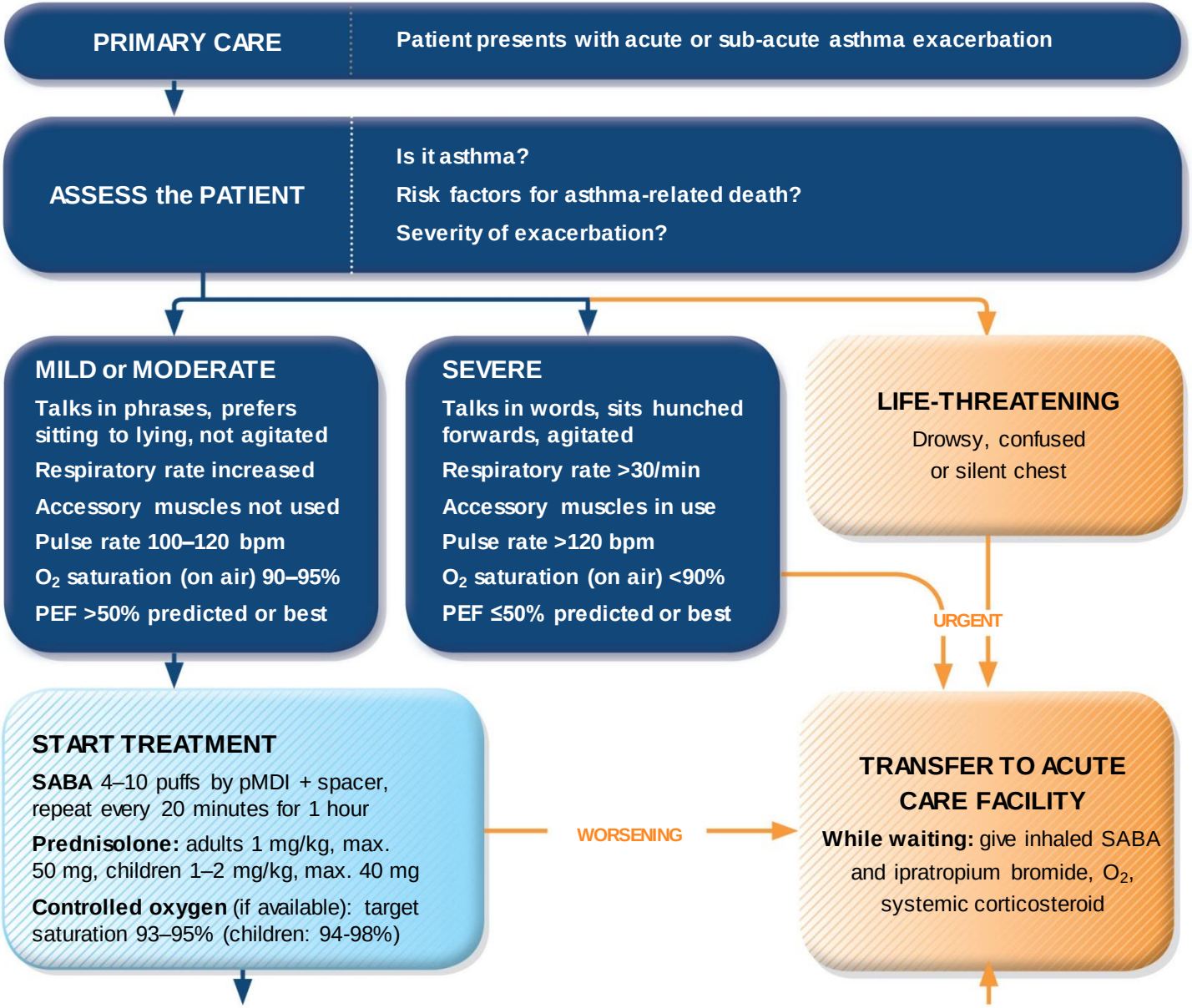
- A flare-up or exacerbation is an acute or sub-acute worsening of symptoms and lung function compared with the patient's usual status
- Terminology
  - 'Flare-up' is the preferred term for discussion with patients
  - 'Exacerbation' is a difficult term for patients
  - 'Attack' has highly variable meanings for patients and clinicians
  - 'Episode' does not convey clinical urgency
- Consider management of worsening asthma as a continuum
  - Self-management with a written asthma action plan
  - Management in primary care
  - Management in the emergency department and hospital
  - Follow-up after any exacerbation

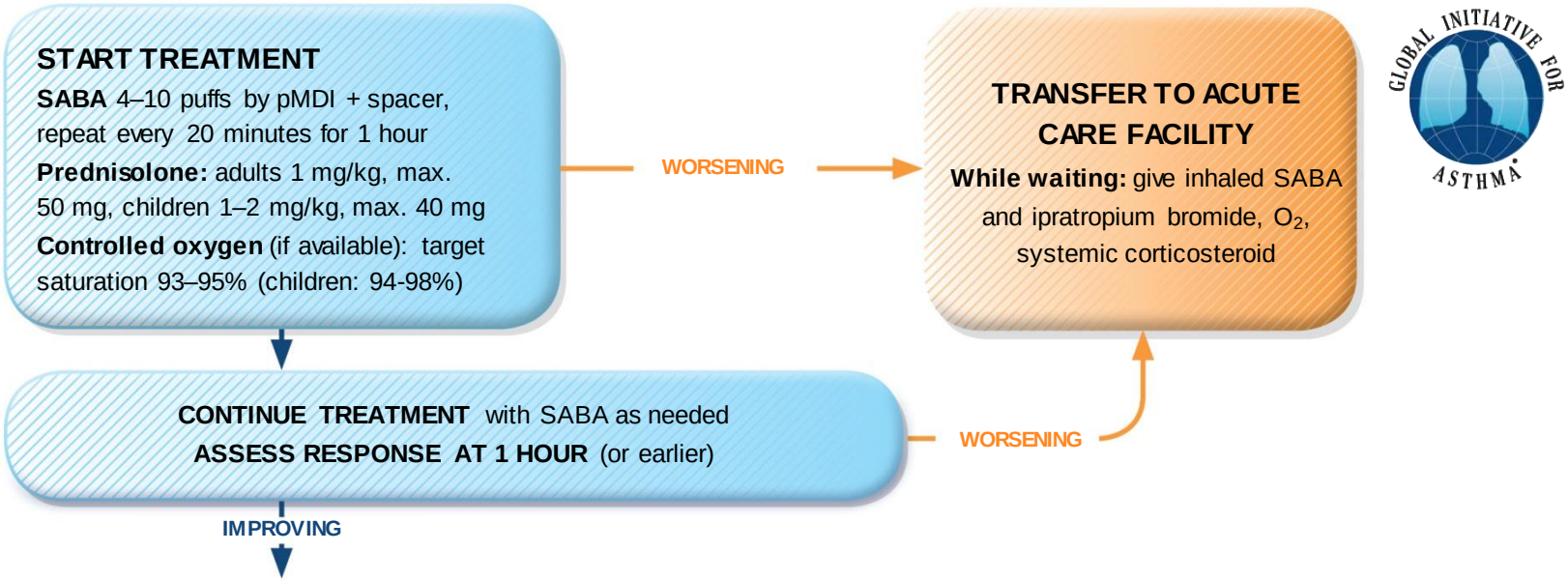
Managing exacerbations in primary care

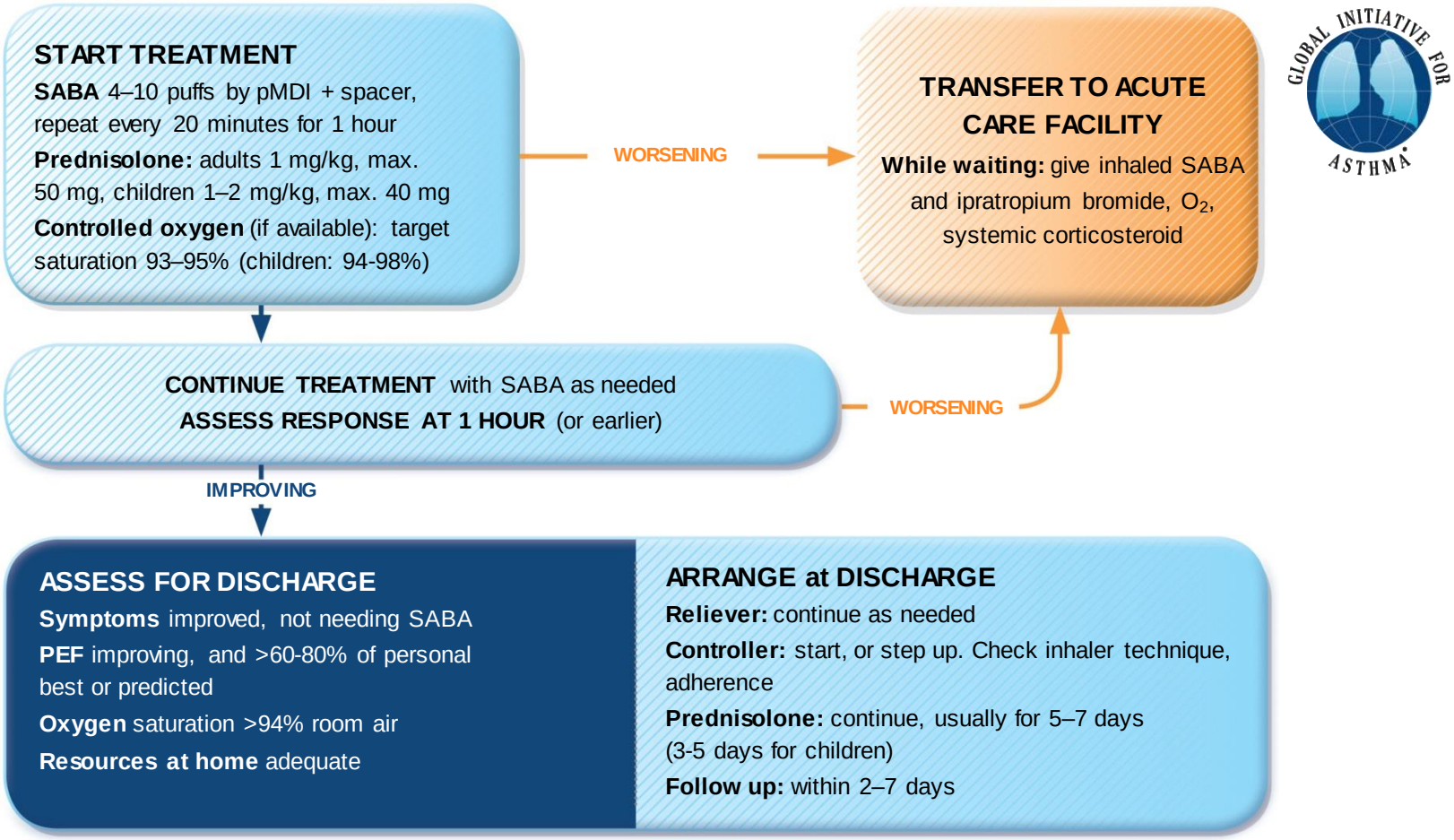


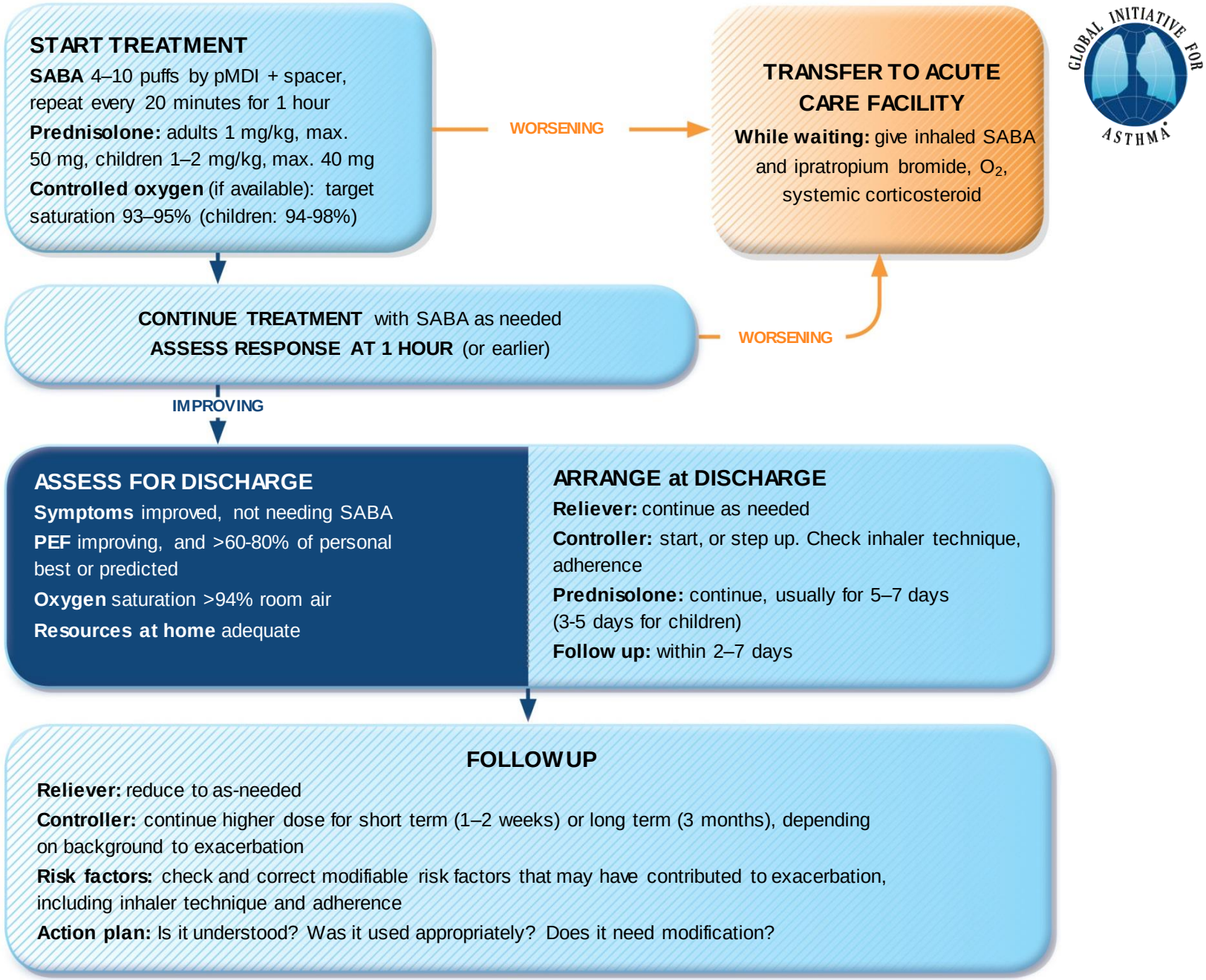




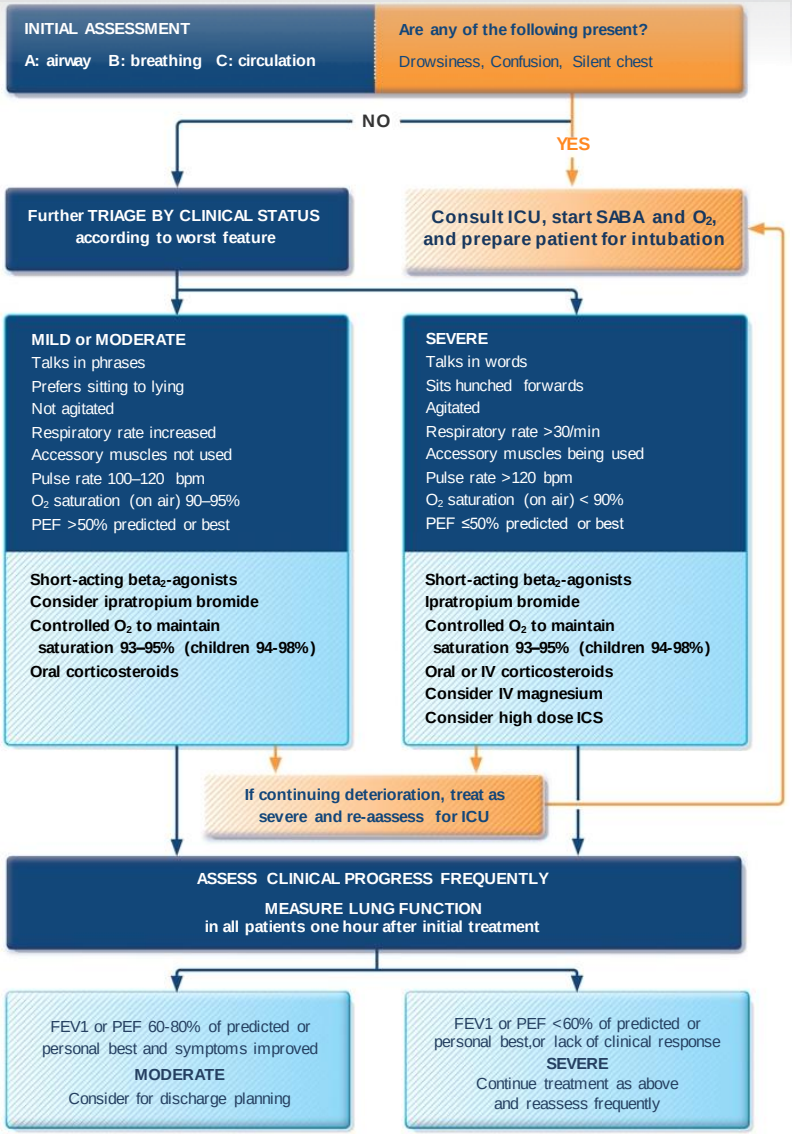


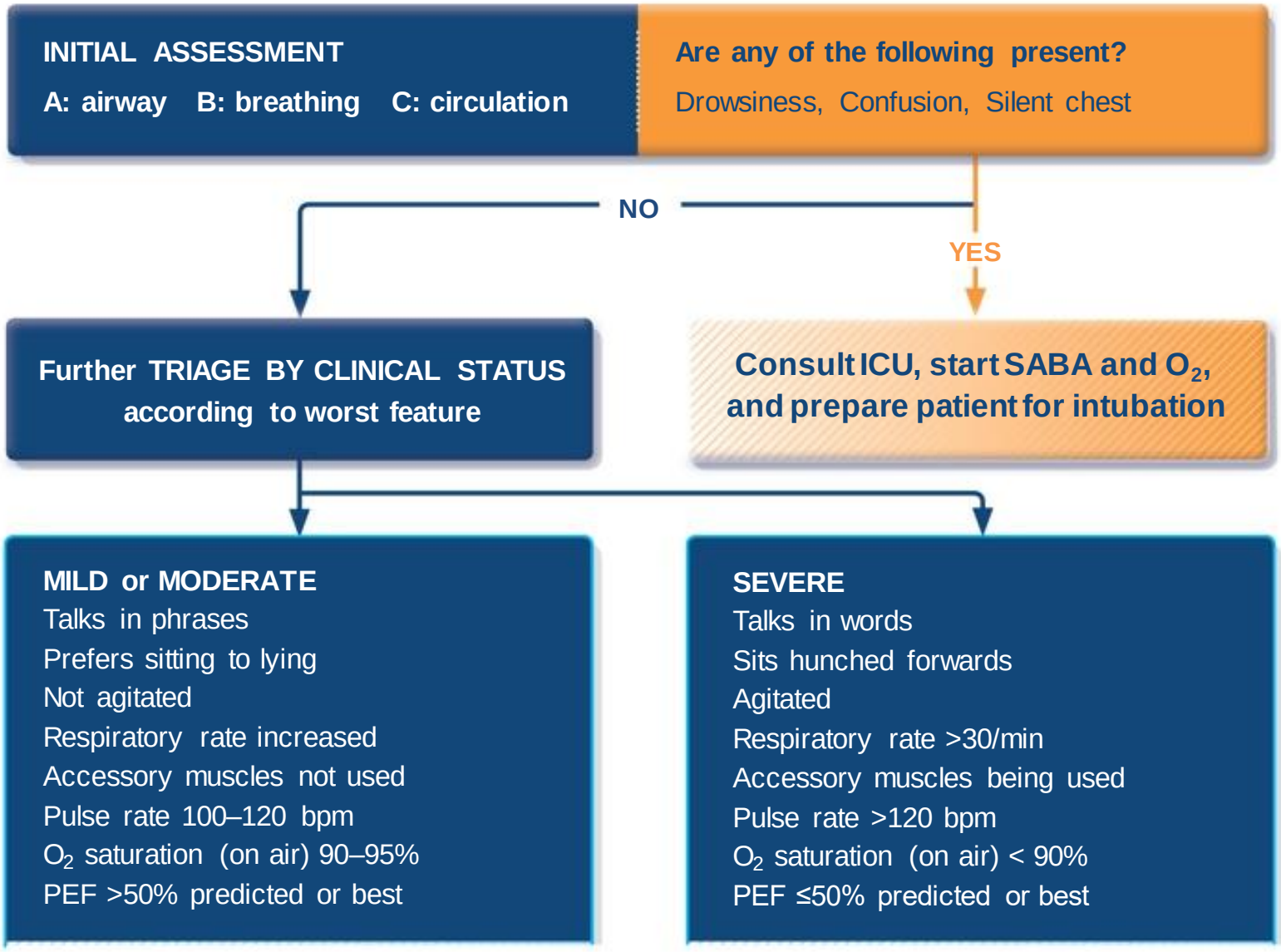






Managing exacerbations in acute care settings





MILD or MODERATE

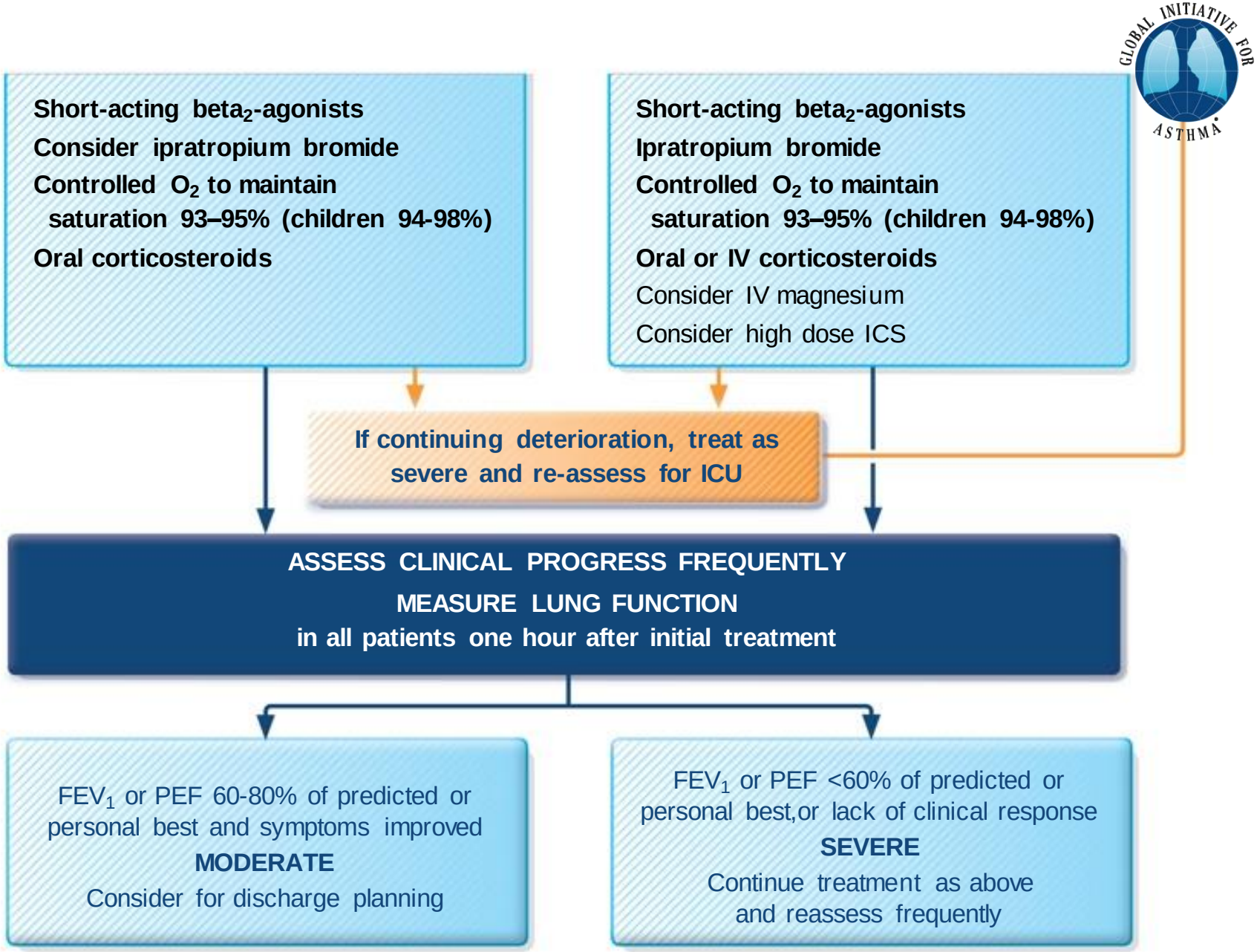
Talks in phrases
Prefers sitting to lying
Not agitated
Respiratory rate increased
Accessory muscles not used
Pulse rate 100–120 bpm
O_2 saturation (on air) 90–95%
PEF >50% predicted or best

Short-acting beta$_2$-agonists
Consider ipratropium bromide
Controlled O_2 to maintain saturation 93–95% (children 94-98%)
Oral corticosteroids

SEVERE

Talks in words
Sits hunched forwards
Agitated
Respiratory rate >30/min
Accessory muscles being used
Pulse rate >120 bpm
O_2 saturation (on air) < 90%
PEF ≤50% predicted or best

Short-acting beta$_2$-agonists
Ipratropium bromide
Controlled O_2 to maintain saturation 93–95% (children 94-98%)
Oral or IV corticosteroids
Consider IV magnesium
Consider high dose ICS



Primary prevention of asthma

- The development and persistence of asthma are driven by gene-environment interactions
- For children, a 'window of opportunity' exists *in utero* and in early life, but intervention studies are limited
- For intervention strategies including allergen avoidance
  - Strategies directed at a single allergen have not been effective
  - Multifaceted strategies may be effective, but the essential components have not been identified
- Current recommendations are
  - Avoid exposure to tobacco smoke in pregnancy and early life
  - Encourage vaginal delivery
  - Advise breast-feeding for its general health benefits
  - Where possible, avoid use of paracetamol (acetaminophen) and broad-spectrum antibiotics in the first year of life

www.ginasthma.org

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