Asthma

What is new in diagnosis and treatment 2023

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Global Initiative for Asthma (GINA)

What's new in GINA 2023?

GINA Global Strategy for Asthma Management and Prevention

2023:
More than 43.5 million people live with asthma in European region
Asthma remains the most common chronic illness in children and adolescents globally in world

2023 theme: Asthma care for all


no data
less than 1%
1-2%
2-3%
3-4%
4-5%
5-6%
6-7%
7-8%
8-10%
10-12.5%
12.5-15%
more than 15%

Case:
3 years boy with cough at playing but not at rest and 2 episode night awakening with cough at common cold in last year. Nl Ph/E.

Is it Asthma?
Other questions?

4 years girl with cough in one week after common cold that was diagnosed with croup in first day. Cough exacerbate with activity and wheeze in Ph/E. Nl PMH.

Asthma diagnosis?

Definition of asthma

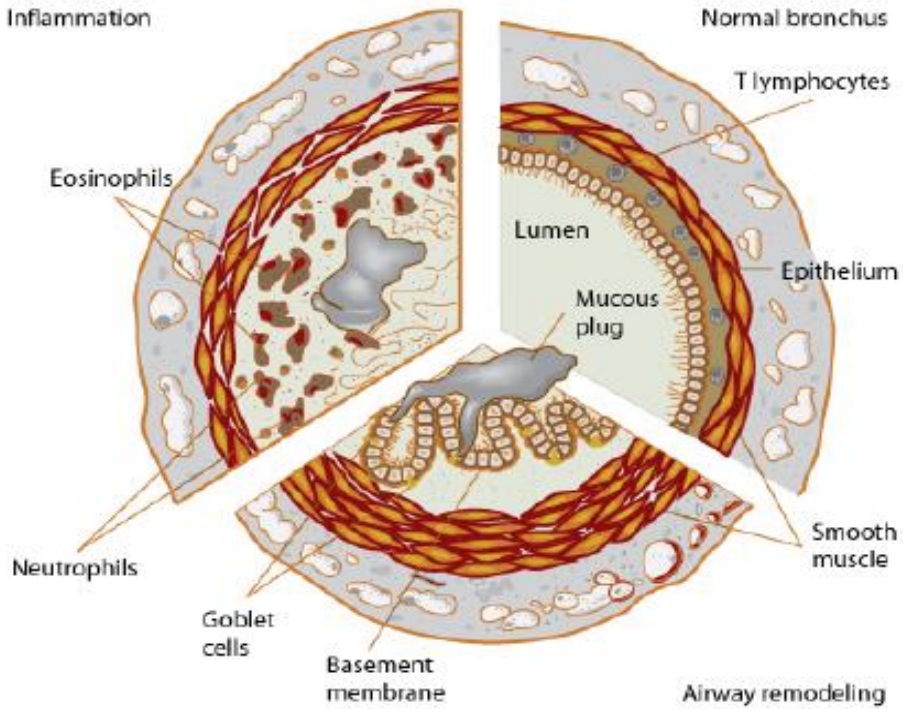
Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation.

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.

The diagnosis of asthma is based on the history of characteristic symptom patterns and evidence of variable expiratory airflow limitation. This should be documented from bronchodilator reversibility testing or other tests.

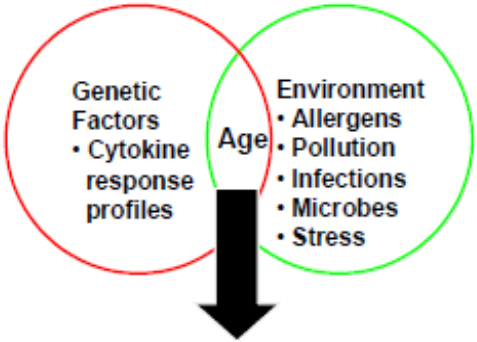
Test before treating, wherever possible, i.e. document the evidence for the diagnosis of asthma before starting ICS-containing treatment, as it is often more difficult to confirm the diagnosis once asthma control has improved.

Pathophysiology



Source: DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM: *Pharmacotherapy: A Pathophysiologic Approach, 8th Edition*: www.accesspharmacy.com

FIGURE 2–4. HOST FACTORS AND ENVIRONMENTAL EXPOSURES



Altered Innate and Adaptive Immune Responses

Lower Airway Targeting

LRI
- RSV/PIV
- Adenovirus
- Chlamydia
- Mycoplasma

Persistent wheezing and asthma

Key: LRI, lower respiratory illnesses; RSV, respiratory syncytial virus; PIV, parainfluenza virus

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
- *Decreased* probability that symptoms are due to asthma if:
  - Isolated cough with no other respiratory symptoms
  - Chronic production of sputum
  - Shortness of breath associated with dizziness, light-headedness or peripheral tingling
  - Chest pain
  - Exercise-induced dyspnea with noisy inspiration (stridor)

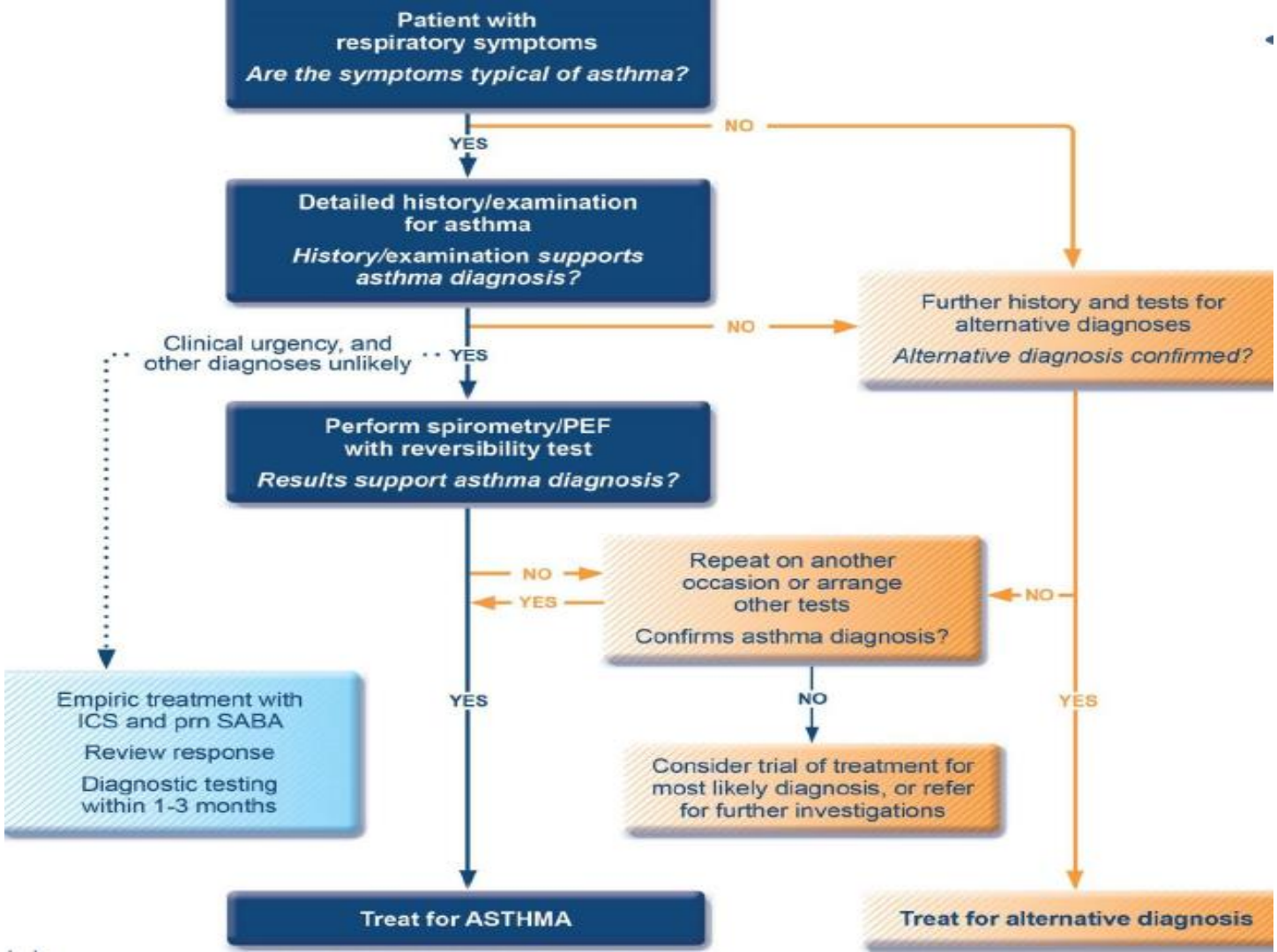
exacerbators

- Symptoms occur or worsen in the presence of:
  - Exercise
  - Viral infection
  - Animals with fur or hair
  - House-dust mites (in mattresses, pillows, upholstered furniture, carpets)
  - Mold
  - Smoke (tobacco, wood)
  - Pollen
  - Changes in weather
  - Strong emotional expression (laughing or crying hard)
  - Airborne chemicals or dusts
  - Menstrual cycles

Bronchiolitis?

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)

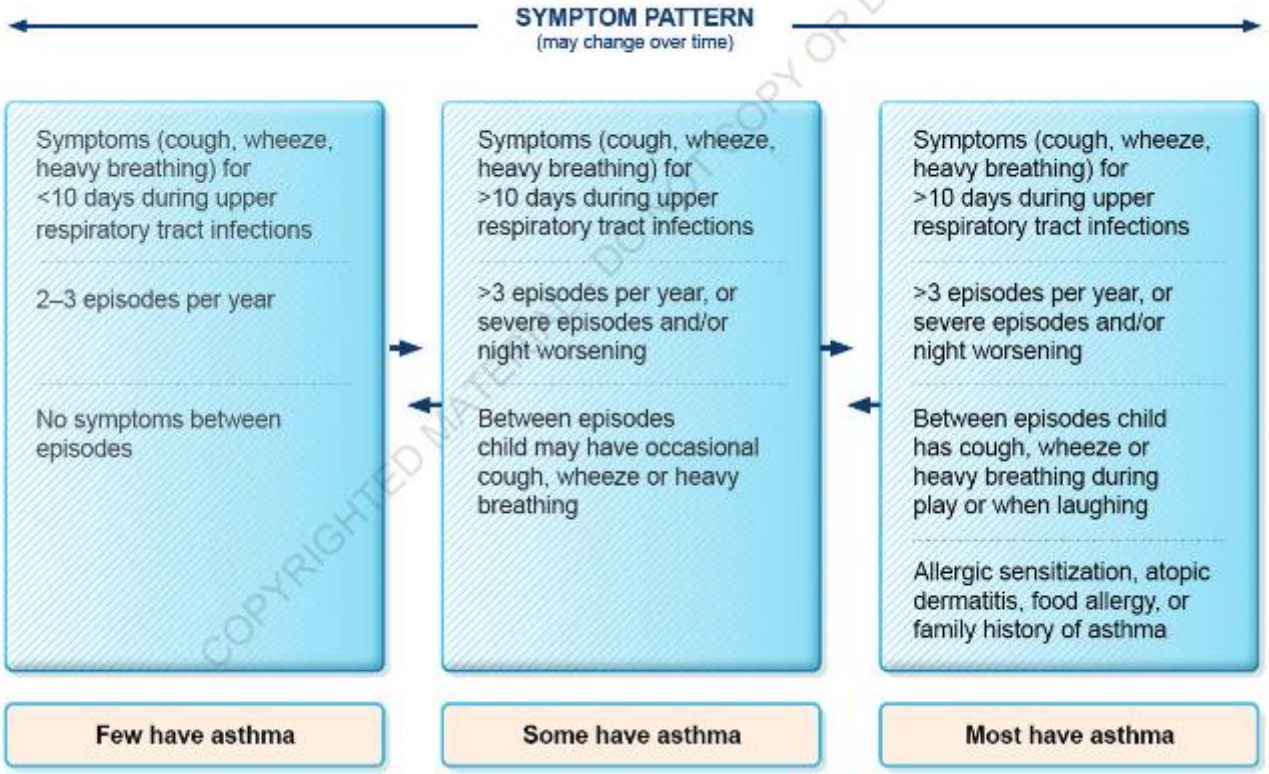

Patient with respiratory symptoms
Are the symptoms typical of asthma?
YES
NO
Detailed history/examination for asthma
History/examination supports asthma diagnosis?
NO
Further history and tests for alternative diagnoses
Alternative diagnosis confirmed?
Clinical urgency, and other diagnoses unlikely
YES
Perform spirometry/PEF with reversibility test
Results support asthma diagnosis?
NO
YES
Repeat on another occasion or arrange other tests
Confirms asthma diagnosis?
NO
Empiric treatment with ICS and prn SABA
Review response
Diagnostic testing within 1-3 months
YES
NO
YES
Consider trial of treatment for most likely diagnosis, or refer for further investigations
Treat for ASTHMA
Treat for alternative diagnosis

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')

Probability of asthma diagnosis or response to asthma treatment in children ≤5 years

Box 6-1. Probability of asthma diagnosis in children 5 years and younger



Features suggesting asthma in children ≤5 years

Feature	Characteristics suggesting asthma
Cough	Recurrent or persistent non-productive cough that may be worse at night or accompanied by some wheezing and breathing difficulties. Cough occurring with exercise, laughing, crying or exposure to tobacco smoke in the absence of an apparent respiratory infection
Wheezing	Recurrent wheezing, including during sleep or with triggers such as activity, laughing, crying or exposure to tobacco smoke or air pollution
Difficult or heavy breathing or shortness of breath	Occurring with exercise, laughing, or crying
Reduced activity	Not running, playing or laughing at the same intensity as other children; tires earlier during walks (wants to be carried)
Past or family history	Other allergic disease (atopic dermatitis or allergic rhinitis) Asthma in first-degree relatives
Therapeutic trial with low dose ICS and as-needed SABA	Clinical improvement during 2–3 months of controller treatment and worsening when treatment is stopped

Severity of asthma after diagnosis

- Intermittent

- Persistent

  mild
  moderate
  sever

Components of Severity		Classification of Asthma Severity (0–4 years of age)			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	0	1–2x/month	3–4x/month	>1x/week
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year	≥2 exacerbations in 6 months requiring oral systemic corticosteroids, or ≥4 wheezing episodes/1 year lasting >1 day AND risk factors for persistent asthma		
		← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time. → Exacerbations of any severity may occur in patients in any severity category.			
Recommended Step for Initiating Therapy (See figure 4–1a for treatment steps.)		Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	
		In 2–6 weeks, depending on severity, evaluate level of asthma control that is achieved. If no clear benefit is observed in 4–6 weeks, consider adjusting therapy or alternative diagnoses.			

GINA 2023 – Children 5 years and younger

Personalized asthma management:
Assess, Adjust, Review response

Exclude alternative diagnoses
Symptom control & modifiable risk factors
Comorbidities
Inhaler technique & adherence
Caregiver preferences and goals

Symptoms
Exacerbations
Side-effects
Risk factors
Comorbidities
Caregiver satisfaction

Treat modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications
Education & skills training

Asthma medication options:
Adjust treatment up and down for individual child's needs

	STEP 1	STEP 2	STEP 3	STEP 4
PREFERRED CONTROLLER CHOICE	*(Insufficient evidence for daily controller)*	Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for pre-school children)	Double 'low dose' ICS *(See Box 6-7)*	Continue controller & refer for specialist assessment
Other controller options (limited indications, or less evidence for efficacy or safety)	*Consider intermittent short course ICS at onset of viral illness*	*Daily leukotriene receptor antagonist (LTRA), or intermittent short course of ICS at onset of respiratory illness*	*Low dose ICS + LTRA Consider specialist referral*	*Add LTRA, or increase ICS frequency, or add intermittent ICS*
RELIEVER	As-needed short-acting beta$_2$-agonist			
CONSIDER THIS STEP FOR CHILDREN WITH:	Infrequent viral wheezing and no or few interval symptoms	Symptom pattern not consistent with asthma but wheezing episodes requiring SABA occur frequently, e.g. ≥3 per year. Give diagnostic trial for 3 months. Consider specialist referral. Symptom pattern consistent with asthma, and asthma symptoms not well-controlled or ≥3 exacerbations per year.	Asthma diagnosis, and asthma not well-controlled on low dose ICS Before stepping up, check for alternative diagnosis, check inhaler skills, review adherence and exposures	Asthma not well-controlled on double ICS

Low-dose ICS provides most of the clinical benefit for most children with asthma. Higher doses are associated with an increased risk of local and systemic side-effects, which must be balanced against potential benefits.

Inhaled corticosteroid	Low total daily dose (mcg) (age-group with adequate safety and effectiveness data)
BDP (pMDI, standard particle, HFA)	100 (ages 5 years and older)
BDP (pMDI, extrafine particle, HFA)	50 (ages 5 years and older)
Budesonide nebulized	500 (ages 1 year and older)
Fluticasone propionate (pMDI, standard particle, HFA)	50 (ages 4 years and older)
Fluticasone furoate (DPI)	Not sufficiently studied in children 5 years and younger)
Mometasone furoate (pMDI, standard particle, HFA)	100 (ages 5 years and older)
Ciclesonide (pMDI, extrafine particle, HFA)	Not sufficiently studied in children 5 years and younger

3/5 years girl with dry cough from 1 week ago in morning wake up but not at sleep and mild during day after common cold symptoms In last week with 2 days fever

Medications: syr teophyline- pelargin- montelukast-ketotifen

8 years boy with cough from 2 months ago after viral infection that Exacerbate with activity and last month had night cough also but NL Ph/E
Recurrent common colds from start of school and 3 episode same symptoms

Asthma? Severity? Treatment?

12 years boy with night and daily cough from 2 days ago with Common cold symptoms admitted in ward with asthma attack
Nl PMH just croup in 2 years old

Persistent Asthma? treatment?

Components of Severity		Classification of Asthma Severity (5–11 years of age)			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3–4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV_1 between exacerbations • FEV_1 >80% predicted • FEV_1/FVC >85%	• FEV_1 = >80% predicted • FEV_1/FVC >80%	• FEV_1 = 60–80% predicted • FEV_1/FVC = 75–80%	• FEV_1 <60% predicted • FEV_1/FVC <75%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year (see note)	≥2/year (see note) →		
		← 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 figure 4–1b for treatment steps.)		Step 1	Step 2	Step 3, medium-dose ICS option	Step 3, medium-dose ICS option, or step 4
				and consider short course of oral systemic corticosteroids	
		In 2–6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.			

FIGURE 3–4c. CLASSIFYING ASTHMA SEVERITY IN YOUTHS ≥12 YEARS OF AGE AND ADULTS

- **Classifying severity for patients who are not currently taking long-term control medications.**

Components of Severity		Classification of Asthma Severity (Youths ≥12 years of age and adults)			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment Normal FEV_1/FVC: 8–19 yr 85% 20–39 yr 80% 40–59 yr 75% 60–80 yr 70%	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3–4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not >1x/day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV_1 between exacerbations • FEV_1 >80% predicted • FEV_1/FVC normal	• FEV_1 ≥80% predicted • FEV_1/FVC normal	• FEV_1 >60% but <80% predicted • FEV_1/FVC reduced 5%	• FEV_1 <60% predicted • FEV_1/FVC reduced >5%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year (see note)	≥2/year (see note) →		
		← 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			

A reminder – the key change in GINA 2019

EDITORIAL
GINA 2019

GINA 2019: a fundamental change in asthma management

Treatment of asthma with short-acting bronchodilators alone is no longer recommended for adults and adolescents

Helen K. Reddel[1], J. Mark FitzGerald[2], Eric D. Bateman[3], Leonard B. Bacharier[4], Allan Becker[5], Guy Brusselle[6], Roland Buhl[7], Alvaro A. Cruz[8], Louise Fleming[9], Hiromasa Inoue[10], Fanny Wai-san Ko[11], Jerry A. Krishnan[12], Mark L. Levy[13], Jiangtao Lin[14], Søren E. Pedersen[15], Aziz Sheikh[16], Arzu Yorgancioglu[17] and Louis-Philippe Boulet[18]

@ERSpublications
GINA no longer recommends treating adults/adolescents with asthma with short-acting bronchodilators alone. Instead, they should receive symptom-driven (in mild asthma) or a daily corticosteroid-containing inhaler, to reduce risk of severe exacerbations. http://bit.ly/310LLzE

Cite this article as: Reddel HK, FitzGerald JM, Bateman ED, *et al.* GINA 2019: a fundamental change in asthma management. *Eur Respir J* 2019; 53: 1901046 [https://doi.org/10.1183/13993003.01046-2019].

Background to changes in 2019 - the risks of ‘mild’ asthma

- Patients with apparently mild asthma are at risk of serious adverse events
  - 30–37% of adults with acute asthma
  - 16% of patients with near-fatal asthma
  - 15–20% of adults dying of asthma

  } had symptoms less than weekly in previous 3 months
- Exacerbation triggers are variable (viruses, pollens, pollution, poor adherence)
- 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

Background to changes in 2019 - the risks of SABA-only treatment

- Regular or frequent use of SABA is associated with adverse effects
  - β-receptor downregulation, decreased bronchoprotection, rebound hyperresponsiveness, decreased bronchodilator response
  - Increased allergic response, and increased eosinophilic airway inflammation
- Higher use of SABA is associated with adverse clinical outcomes
  - Dispensing of ≥3 canisters per year (average 1.7 puffs/day) is associated with higher risk of emergency department presentations
  - Dispensing of ≥12 canisters per year is associated with higher risk of death

- Key changes in GINA 2021 include division of the treatment figure for adults and adolescents into two tracks.
  - Track 1 (preferred) has low-dose ICS-formoterol as the reliever at all steps: as needed only in Steps 1-2 (mild asthma), and with daily maintenance ICS-formoterol (maintenance-and-reliever therapy, "MART") in Steps 3-5.
  - Track 2 (alternative) has as-needed SABA across all steps, plus regular ICS (Step 2) or ICS-long-acting b2-agonist (Steps 3-5).

GINA 2019 – landmark changes in asthma management

- 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 ICS-containing controller treatment, to reduce the risk of serious exacerbations
  - The ICS can be delivered by regular daily treatment or, in mild asthma, by as-needed low dose ICS-formoterol

- For adults with moderate-to-severe asthma, GINA makes additional recommendations in Step 5 for add-on long-acting muscarinic antagonists and azithromycin, with add-on biologic therapies for severe asthma. For children 6-11 years, new treatment options are added at Steps 3-4.

GINA 2023 – STARTING TREATMENT

in adults and adolescents with a diagnosis of asthma

Track 1 using ICS-formoterol reliever is preferred because it reduces the risk of severe exacerbations, compared with using SABA reliever, and it is simpler for patients as it uses the same medication for reliever and maintenance treatment.

FIRST ASSESS:

- Confirm diagnosis
- Symptom control and modifiable risk factors
- Comorbidities
- Inhaler technique and adherence
- Patient preferences and goals

START HERE IF:

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

Symptoms less than 4–5 days a week

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

Symptoms most days, or waking with asthma once a week or more

STEP 3
Low dose maintenance ICS-formoterol

Daily symptoms, or waking with asthma once a week or more, and low lung function

STEP 4
Medium dose maintenance ICS-formoterol

Short course OCS may also be needed for patients presenting with severely uncontrolled asthma

STEP 5
Add-on LAMA
Refer for phenotypic assessment ± biologic therapy
Consider high dose ICS-formoterol

RELIEVER: As-needed low-dose ICS-formoterol*

START HERE IF:

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

Symptoms less than twice a month

STEP 1
Take ICS whenever SABA taken*

Symptoms twice a month or more, but less than 4–5 days a week

STEP 2
Low dose maintenance ICS

Symptoms most days, or waking with asthma once a week or more

STEP 3
Low dose maintenance ICS-LABA

Daily symptoms, or waking with asthma once a week or more, and low lung function

STEP 4
Medium/high dose maintenance ICS-LABA

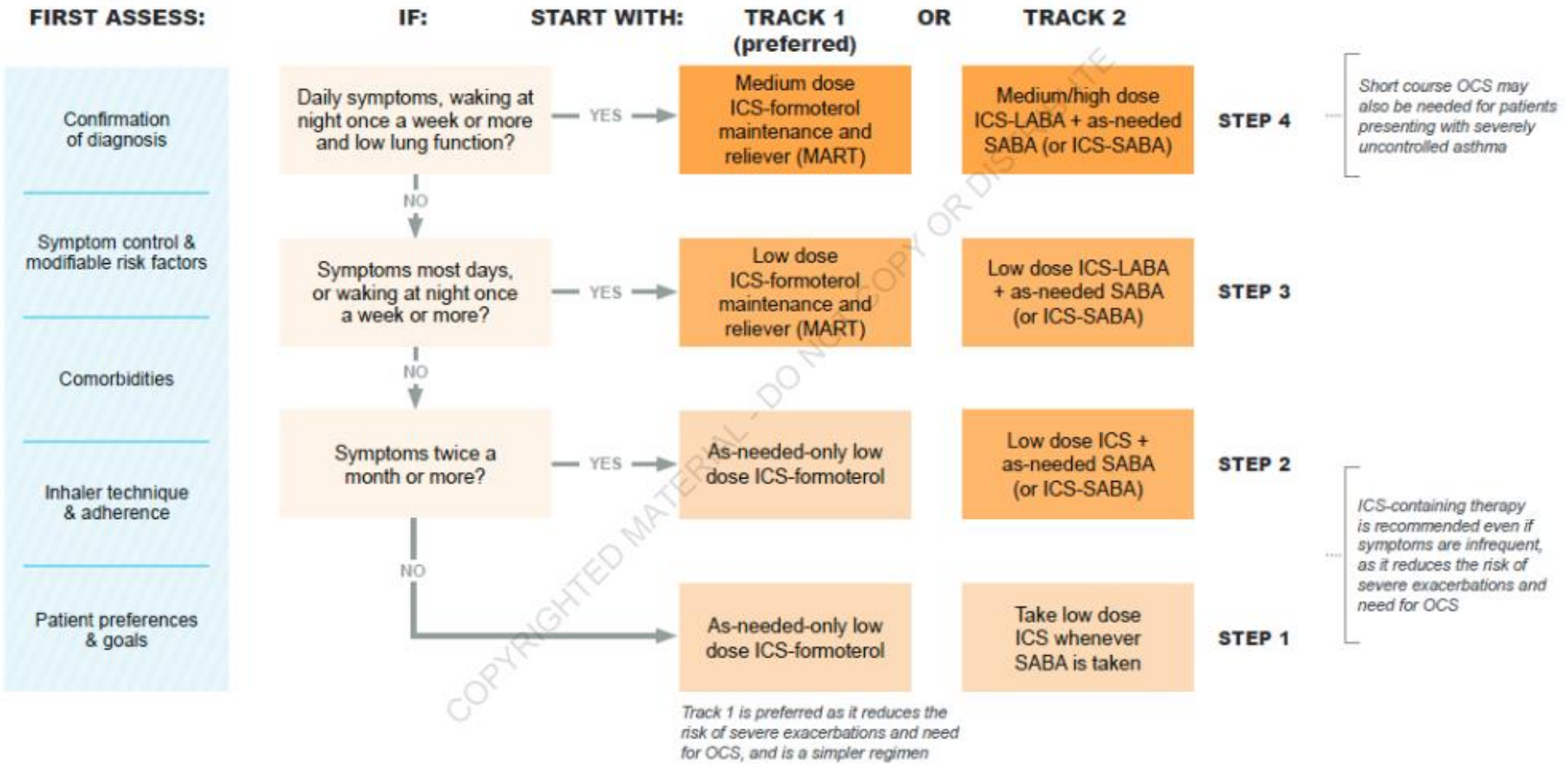
Short course OCS may also be needed for patients presenting with severely uncontrolled asthma

STEP 5
Add-on LAMA
Refer for phenotypic assessment ± biologic therapy
Consider high dose ICS-LABA

RELIEVER: As-needed SABA, or as-needed ICS-SABA*

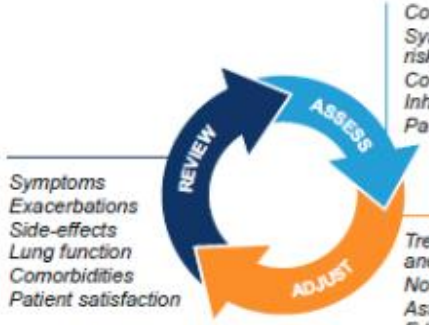
GINA 2023 – STARTING TREATMENT

in adults and adolescents 12+ years with a diagnosis of asthma



GINA 2023 – Adults & adolescents 12+ years

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



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

Symptoms
Exacerbations
Side-effects
Lung function
Comorbidities
Patient satisfaction

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications (adjust down/up/between tracks)
Education & skills training

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	STEP 3	STEP 4	STEP 5
As-needed-only low dose ICS-formoterol	Low dose maintenance ICS-formoterol	Medium dose maintenance ICS-formoterol	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

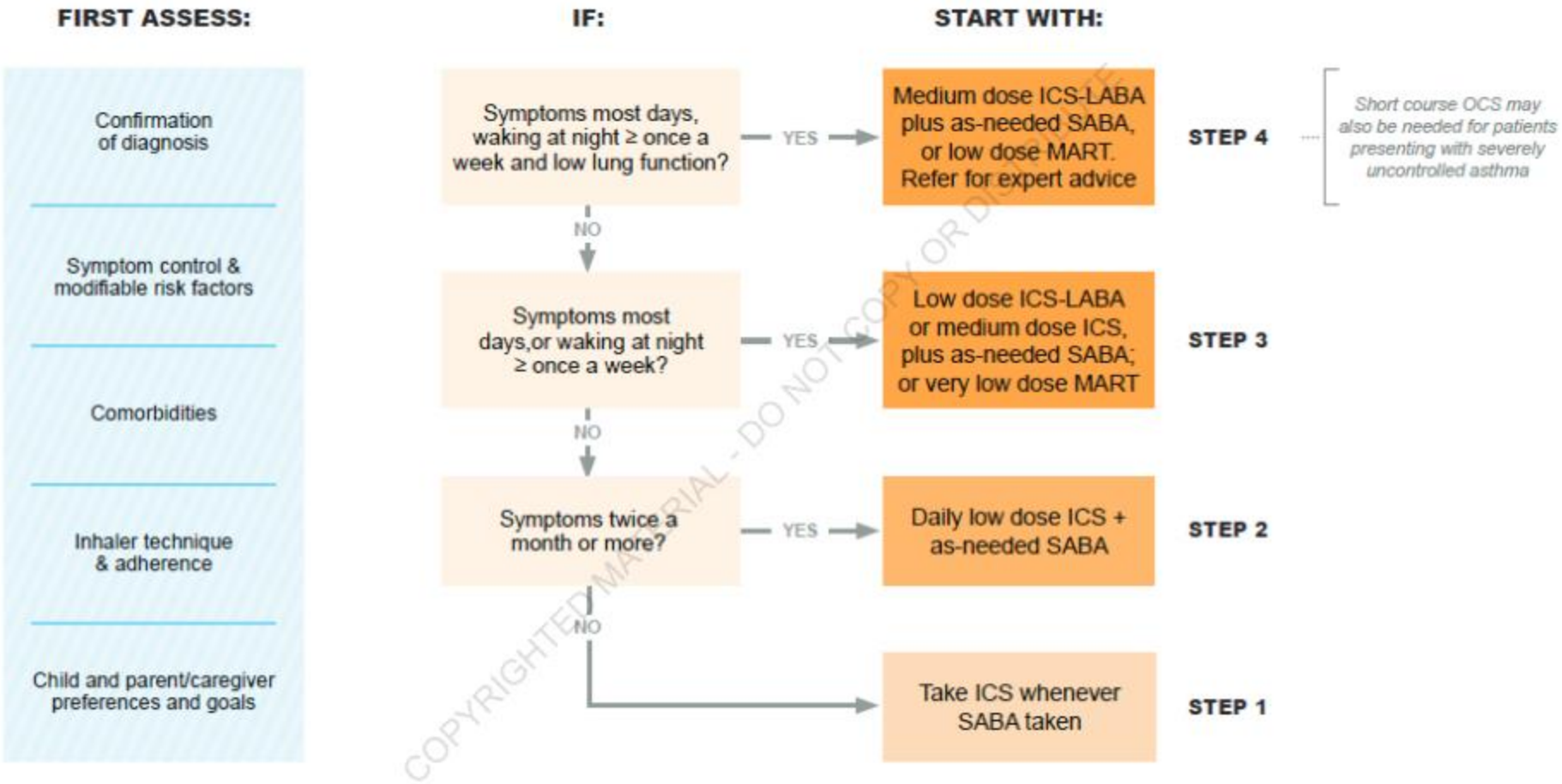
STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Take ICS whenever SABA taken*	Low dose maintenance ICS	Low dose maintenance ICS-LABA	Medium/high dose maintenance ICS-LABA	Add-on LAMA Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

RELIEVER: as-needed SABA, or as-needed ICS-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*

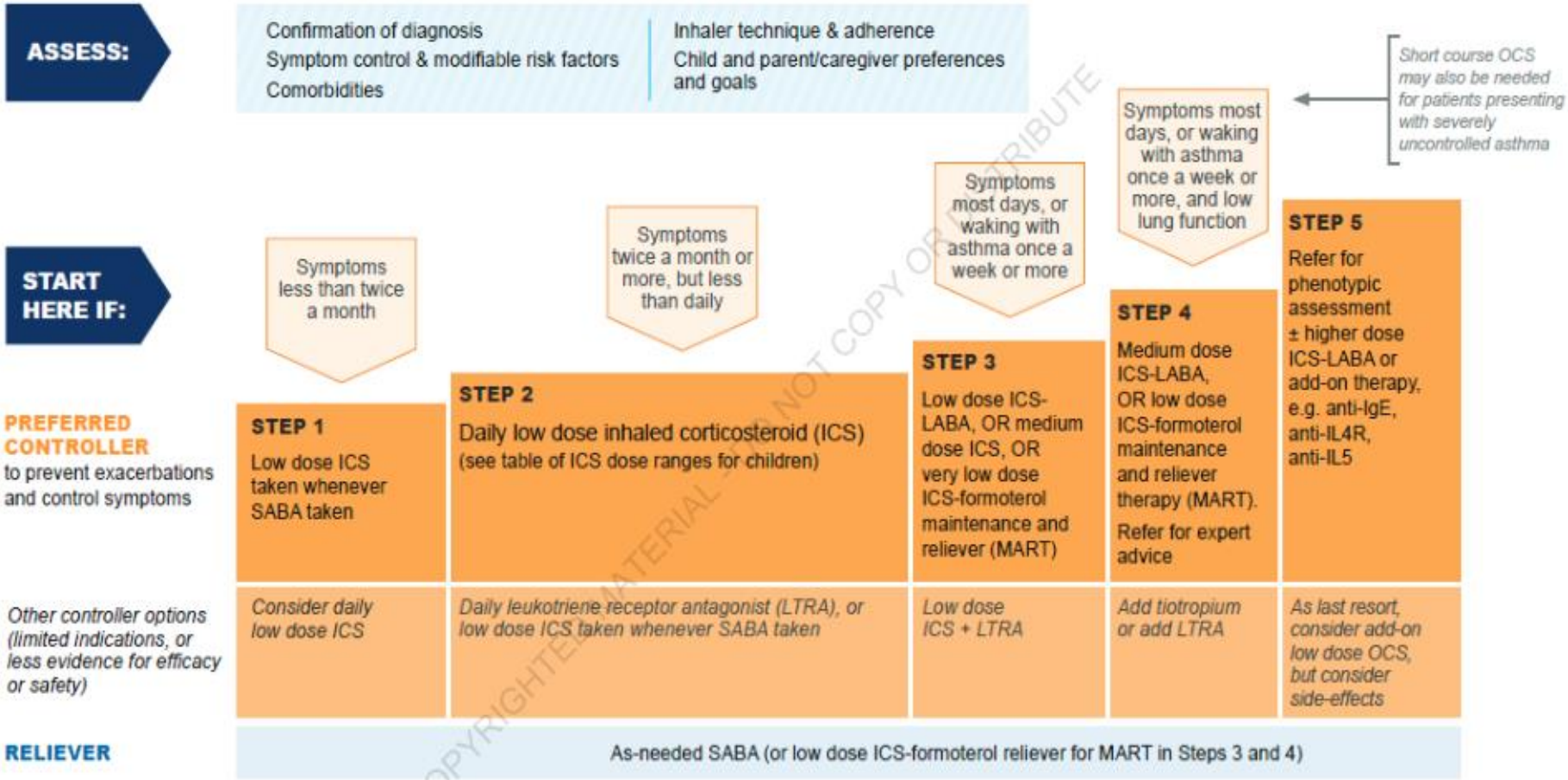
GINA 2023 – SUGGESTED INITIAL CONTROLLER TREATMENT

in CHILDREN 6–11 years with a diagnosis of asthma



GINA 2023 – STARTING TREATMENT

Children 6–11 years with a diagnosis of asthma



Adults and adolescents (12 years and older)			
Inhaled corticosteroid (alone or in combination with LABA)	**Total daily ICS dose (mcg) – see notes above**		
	Low	**Medium**	**High**
Beclometasone dipropionate (pMDI, standard particle, HFA)	200–500	>500–1000	>1000
Beclometasone dipropionate (DPI or pMDI, extrafine particle, HFA)	100–200	>200–400	>400
Budesonide (DPI, or pMDI, standard particle, HFA)	200–400	>400–800	>800
Ciclesonide (pMDI, extrafine particle, HFA)	80–160	>160–320	>320
Fluticasone furoate (DPI)	100		200
Fluticasone propionate (DPI)	100–250	>250–500	>500
Fluticasone propionate (pMDI, standard particle, HFA)	100–250	>250–500	>500
Mometasone furoate (DPI)	Depends on DPI device – see product information		
Mometasone furoate (pMDI, standard particle, HFA)	200–400		>400
Children 6–11 years – see notes above (for children 5 years and younger, see Box 6-7, p.184)			
Beclometasone dipropionate (pMDI, standard particle, HFA)	100–200	>200–400	>400
Beclometasone dipropionate (pMDI, extrafine particle, HFA)	50–100	>100–200	>200
Budesonide (DPI, or pMDI, standard particle, HFA)	100–200	>200–400	>400
Budesonide (nebules)	250–500	>500–1000	>1000
Ciclesonide (pMDI, extrafine particle*, HFA)	80	>80–160	>160
Fluticasone furoate (DPI)	50		n.a.
Fluticasone propionate (DPI)	50–100	>100–200	>200
Fluticasone propionate (pMDI, standard particle, HFA)	50–100	>100–200	>200
Mometasone furoate (pMDI, standard particle, HFA)	100		200

As-needed ICS-formoterol – maximum daily dose?

- As-needed low dose budesonide-formoterol
  - Prescribed in maintenance and reliever therapy (Steps 3–5), or as-needed only (Steps 1–2), or within an asthma action plan
  - From product information, the maximum recommended total in one day is 72 mcg formoterol (12 inhalations of budesonide-formoterol Turbuhaler 200/6 mcg)

- As-needed low dose beclometasone-formoterol
  - Prescribed in maintenance and reliever therapy (Steps 3–5), or within an asthma action plan
  - From product information, the maximum recommended total in one day is 48 mcg formoterol (6 inhalations of beclometasone-formoterol pMDI100/6 mcg)

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
   - 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

Box 2-2. GINA assessment of asthma control in adults, adolescents and children 6–11 years

A. Asthma symptom control

In the past 4 weeks, has the patient had:		Well controlled	Partly controlled	Uncontrolled
• Daytime asthma symptoms more than twice/week?	Yes☐ No☐	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes☐ No☐			
• SABA* reliever for symptoms more than twice/week?	Yes☐ No☐			
• Any activity limitation due to asthma?	Yes☐ No☐			

B. Risk factors for poor asthma outcomes

Assess risk factors at diagnosis and periodically, particularly for patients experiencing exacerbations.

Measure FEV_1 at start of treatment, after 3–6 months of ICS-containing treatment to record the patient's personal best lung function, then periodically for ongoing risk assessment.

Factors that increase the risk of exacerbations *even if the patient has few asthma symptoms*†	*Medications*	High SABA use (≥3 x 200-dose canisters/year associated with increased risk of exacerbations, increased mortality particularly if ≥1 canister per month)[74,75,99,100]
		Inadequate ICS: not prescribed ICS, poor adherence,[101] or incorrect inhaler technique[102]
	Other medical conditions	Obesity,[103,104] chronic rhinosinusitis,[104] GERD,[104] confirmed food allergy,[105] pregnancy[106]
	Exposures	Smoking,[107] e-cigarettes,[108] allergen exposure if sensitized,[107] air pollution[109-112]
	Psychosocial	Major psychological or socioeconomic problems[113,114]
	Lung function	Low FEV1 (especially <60% predicted),[107,115] high bronchodilator responsiveness[104,116,117]
	Type 2 inflammatory markers	Higher blood eosinophils,[104,118,119] elevated FeNO (in adults with allergic asthma taking ICS)[120]
	Exacerbation history	Ever intubated or in intensive care unit for asthma,[121] ≥1 severe exacerbation in last 12 months[122,123]
b. Risk factors for developing persistent airflow limitation		
	History	Preterm birth, low birth weight and greater infant weight gain,[124] chronic mucus hypersecretion[125,126]
	Medications	Lack of ICS treatment in patient with history of severe exacerbation[127]
	Exposures	Tobacco smoke,[125] noxious chemicals; occupational or domestic exposures[49]
	Investigation findings	Low initial FEV[1],[126] sputum or blood eosinophilia[126]

Assessment of symptom control

- Frequency of SABA use is included in symptom control assessment
  - Higher SABA use is associated with worse outcomes, even in patients taking ICS

Box 2-2. GINA assessment of asthma control in adults, adolescents and children 6–11 years

A. Asthma 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/week?	Yes☐ No☐	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes☐ No☐			
• Reliever (SABA) for symptoms more than twice/week?*	Yes☐ No☐			
• Any activity limitation due to asthma?	Yes☐ No☐			

- Our current view is that frequency of ICS-formoterol use should not be included in symptom control assessment, particularly in patients not taking maintenance ICS
  - The as-needed ICS-formoterol is providing the patient's controller therapy
  - Further data awaited: this issue will be reviewed again next year

Acute Asthma and Action Plan

Case

7 years boy with dry cough post common cold from last day that
Exacerbate with exercise and night wake up with cough.
No HX of previous asthma

What to do?

Medications:
syr salbutamol- spray salbutamol Q 6 h- spray fluticasone125 BID- syr Neotadin

In 3 week spray salbutamol continue Q 12 h and fluticasone also

Case

12 years girl known case of asthma on symbicort 160 that suddenly developed cough and dyspnea from yesterday and difficulty for exercise

What to do?

Rationale for change in recommendation about controller therapy in asthma action plans

For the last 10 years, most guidelines recommended treating worsening asthma with SABA alone until OCS were needed, but ...

- Most exacerbations are characterised by increased inflammation
- Most evidence for self-management involved doubling ICS dose
  - Outcomes were consistently better if the action plan prescribed both increased ICS, and OCS
- Lack of generalisability of placebo-controlled RCTs of doubling ICS
  - Participants were required to be highly adherent
  - Study inhalers were not started, on average, until symptoms and airflow limitation had been worsening for 4-5 days.
- Severe exacerbations are reduced by short-term treatment with
  - Quadrupled dose of ICS
  - Quadrupled dose of budesonide/formoterol
  - Early small increase in ICS/formoterol (maintenance & reliever regimen)
- Adherence by community patients is poor
  - Patients commonly take only 25-35% of prescribed controller dose
  - Patients often delay seeking care for fear of being given OCS

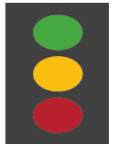
- Regular use of SABA, even 2-4 times per day for 1-2 weeks, is associated with:
  - b2- receptor downregulation
  - loss of bronchodilator response,
  - increased airway hyperresponsiveness
  - increased airway inflammation.
- Importantly, from a cognitive and behavioral perspective, starting treatment with SABA alone trains the patient to regard it as their main asthma treatment, increasing the challenges for adherence with any subsequent advice to take ICS every day even when asymptomatic.

Massachusetts Asthma Action Plan

Name:		Date:
Birth Date:	Doctor/Nurse Name:	Doctor/Nurse Phone #:
Patient Goal:	Parent/Guardian Name & Phone #:	
Important! Avoid things that make your asthma worse:		

Personal Best Peak Flow: _____

The colors of a traffic light will help you use your asthma medicine.



GREEN means Go Zone!
Use controller medicine.

YELLOW means Caution Zone!
Add quick-relief medicine.

RED means Danger Zone!
Get help from a doctor.

GO — You're doing well!

You have *all* of these:
- Breathing is good
- No cough or wheeze
- Sleep through the night
- Can go to school and play

Use these daily controller medicines

Peak flow from ___ to ___	MEDICINE/ROUTE	HOW MUCH	HOW OFTEN/WHEN

CAUTION — Slow Down!

You have *any* of these:
- First signs of a cold
- Cough
- Mild wheeze
- Tight chest
- Coughing, wheezing or trouble breathing at night

Continue with green zone medicine and add:

Peak flow from ___ to ___	MEDICINE/ROUTE	HOW MUCH	HOW OFTEN/WHEN

CALL YOUR DOCTOR/NURSE: _____

DANGER — Get Help!

Your asthma is getting worse fast:
- Medicine is not helping
- Breathing is hard and fast
- Nose opens wide
- Ribs show
- Can't talk well

Take these medicines and call your doctor now.

Peak flow from ___ to ___	MEDICINE/ROUTE	HOW MUCH	HOW OFTEN/WHEN

GET HELP FROM A DOCTOR NOW! Do not be afraid of causing a fuss. Your doctor will want to see you right away. It's important! If you cannot contact your doctor, go directly to the emergency room and bring this form with you. DO NOT WAIT.

Make an appointment with your doctor/nurse within two days of an ER visit or hospitalization.

برنامه درمانی آسم
Asthma Action plan

نام و نام‌خانوادگی: تاریخ تولد: تاریخ مراجعه:
مقدار ایده‌آل پیک‌فلومتری: تاریخ آخرین تزریق واکسن آنفلوانزا:

این برنامه شامل سه مرحله است که با توجه به علائم و نشانه‌های آسم در هر مرحله شما می‌توانید درمان مناسب را بکار برید.
بدیهی است محتوای این برنامه فقط برای شما طراحی شده است و قابل استفاده برای دیگران نمی‌باشد.

مرحله سبز (کم خطر): داروهای کنترلی خود را طبق دستور زیر استفاده نمایید. (اسپری‌ها حتماً با محفظه استفاده شود)

ندادشتن سرفه، خس‌خس سینه و تنگی‌نفس
انجام فعالیت روزانه و ورزش بدون محدودیت و سرفه
خواب راحت، بدون سرفه و تنگی‌نفس
مصرف اسپری سالبوتامول ۲ بار یا کمتر در هفته
مقدار پیک فلومتری بیشتر از .....

نام دارو	مقدار مصرف	زمان مصرف

در صورت بروز سرفه هنگام ورزش از اسپری سالبوتامول به مقدار ..... پاف نیم ساعت قبل از ورزش استفاده شود.

مرحله زرد (احتیاط): داروهای کنترلی را ادامه دهید و از داروهای برطرف‌کننده سریع علائم استفاده نمایید.

بروز سرفه، خس‌خس سینه و تنگی‌نفس
شروع علائم سرماخوردگی
محدودیت فعالیت روزانه و تشدید سرفه و تنگی نفس هنگام ورزش و بازی
بیدارشدن از خواب به علت سرفه و تنگی‌نفس
مصرف اسپری سالبوتامول ۳ بار یا بیشتر در هفته
مقدار پیک فلومتری بین ..... و .....

۱. اسپری سالبوتامول ..... پاف هر ۲۰ دقیقه ۳ بار طی یک ساعت
– در صورت برطرف‌شدن علائم بعد از یک ساعت درمان مرحله سبز را ادامه دهید.
– در صورتی که بعد از یک ساعت علائم برطرف‌نشد طبق دستور زیر عمل کنید:
۲. قرص پردنیزولون ..... میلی‌گرمی طبق دستور زیر:

قرص پردنیزولون	روز ۱	روز ۲	روز ۳	روز ۴	روز ۵	روز ۶	روز ۷
صبح							
شب							

۳. اسپری سالبوتامول ..... پاف هر ..... ساعت به مدت ..... روز
– سایر داروها:
۴. مراجعه به اورژانس: در صورتی که علائم در طی ..... ساعت برطرف‌نشد به اورژانس مراجعه شود.

مرحله قرمز(خطرناک): داروهای کنترلی و داروهای برطرف‌کننده سریع علائم را استفاده نمایید و فوراً به اورژانس مراجعه نمایید.

سرفه‌های مکرر، تنگی‌نفس و خس‌خس شدید سینه
اشکال در نفس کشیدن، تنفس‌های کوتاه و سریع
کبودشدن لب‌ها و ناخن‌ها
عدم توانایی صحبت‌کردن و راه‌رفتن
عدم پاسخ به درمان
مقدار پیک فلومتری کمتر از .....

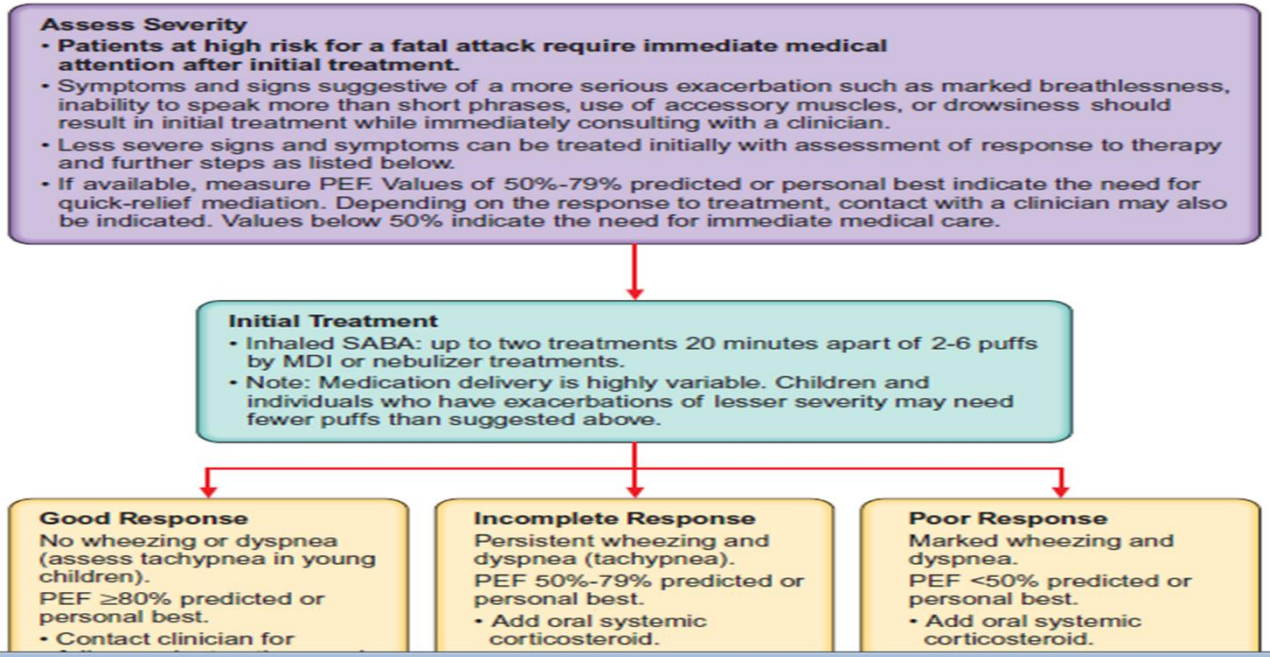
– تماس سریع با اورژانس و انتقال فوری بیمار به مرکز درمانی
– تا زمان رسیدن به اورژانس از داروی زیر استفاده نمایید:
– اسپری سالبوتامول ..... پاف هر ۱۰ دقیقه

Box 6-11. Indications for immediate transfer to hospital for children 5 years and younger

Immediate transfer to hospital is indicated if a child ≤5 years with asthma has ANY of the following:

- At initial or subsequent assessment
  - Child is unable to speak or drink
  - Cyanosis
  - Respiratory rate >40 per minute
  - Oxygen saturation <92% when breathing room air
  - Silent chest on auscultation
- Lack of response to initial bronchodilator treatment
  - Lack of response to 6 puffs of inhaled salbutamol [albuterol] (2 separate puffs, repeated 3 times) over 1–2 hours
  - Persisting tachypnea* despite three administrations of inhaled SABA, even if the child shows other clinical signs of improvement
- Social environment that limits delivery of acute treatment, or parent/caregiver unable to manage acute asthma at home

Home Management of asthma exacerbation



Home Management of asthma exacerbation

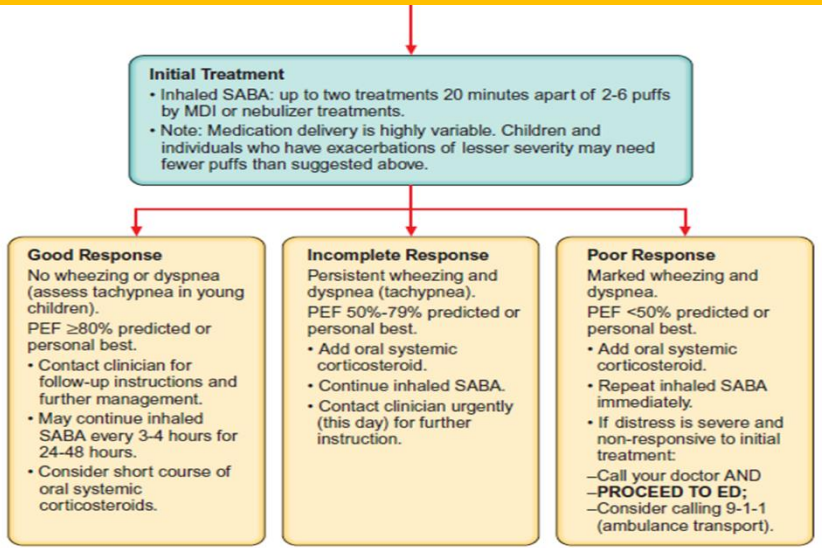


Figure 56-1 Management of asthma exacerbations: Home treatment. *ED*, Emergency department; *MDI*, metered-dose inhaler; *PEF*, peak expiratory flow; *SABA*, short-acting β_2-agonist (quick-relief inhaler). *(From National Asthma Education and Prevention Program. Expert panel report 3: guidelines for the diagnosis and management of asthma. Full report 2007. Washington D.C.: US Government Printing Office; 2007.)*

Case 2

12 years girl known case of asthma on symbicort 160 spray that suddenly developed cough and dyspnea from yesterday and difficulty for exercise

After 12 hours at home with Quadrupled dose of MT spray still have cough and dyspnea but at all feel better; so decide to go to emergency unit.

What to do in primary care? What is attack staging?

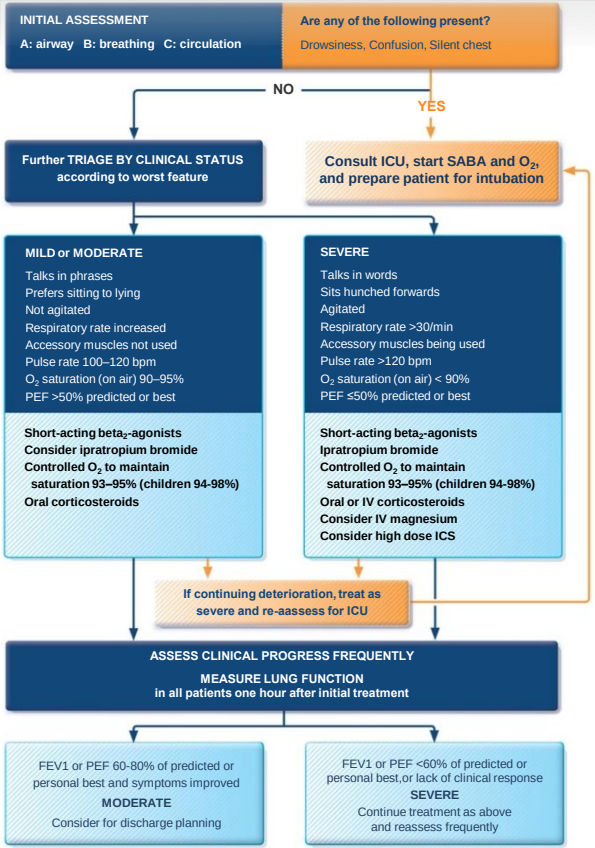
Table 138-4 FORMAL EVALUATION OF ASTHMA EXACERBATION SEVERITY IN THE URGENT OR EMERGENCY CARE SETTING*

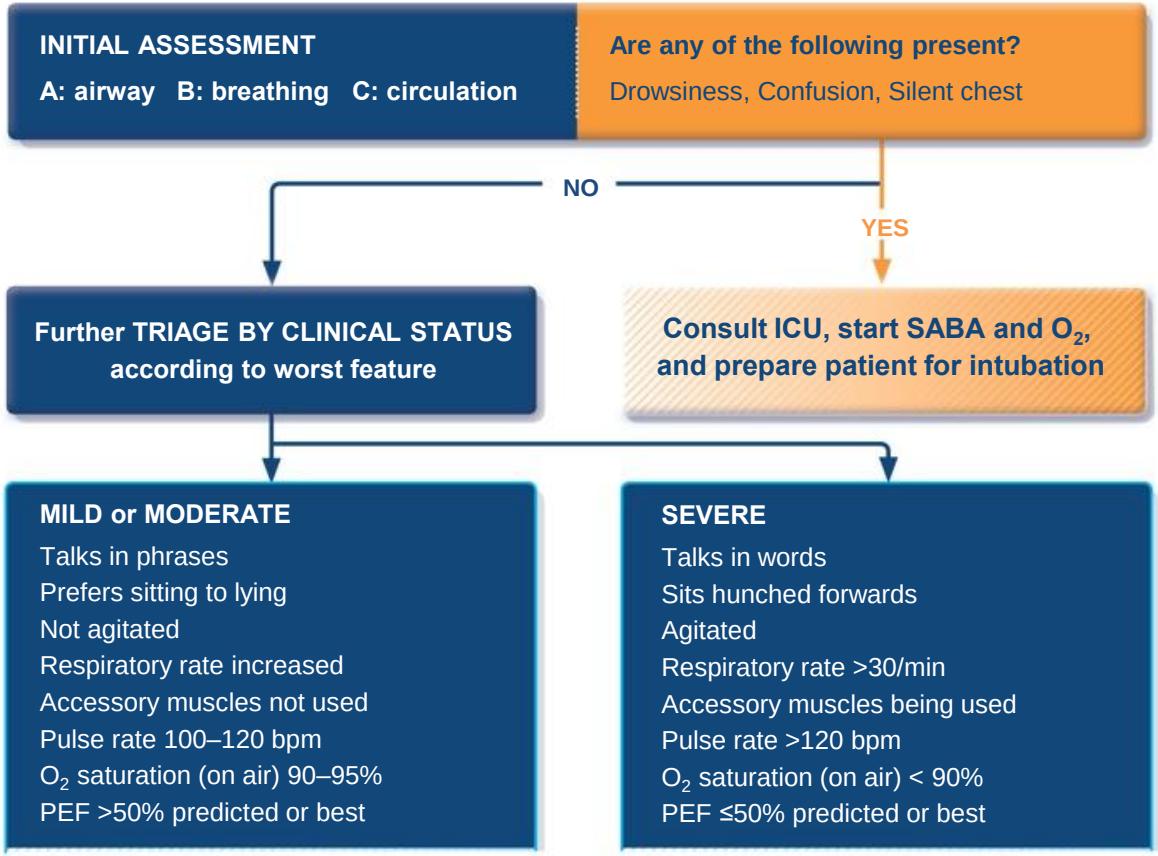
	MILD	MODERATE	SEVERE	SUBSET: RESPIRATORY ARREST IMMINENT
SYMPTOMS				
Breathlessness	While walking	While at rest (infant—softer, shorter cry, difficulty feeding)	While at rest (infant—stops feeding)	
	Can lie down	Prefers sitting	Sits upright	
Talks in	Sentences	Phrases	Words	
Alertness	May be agitated	Usually agitated	Usually agitated	Drowsy or confused
SIGNS				
Respiratory rate†	Increased	Increased	Often >30 breaths/min	
Use of accessory muscles; suprasternal retractions	Usually not	Commonly	Usually	Paradoxical thoracoabdominal movement
Wheeze	Moderate; often only end-expiratory	Loud; throughout exhalation	Usually loud; throughout inhalation and exhalation	Absence of wheeze
Pulse rate (beats/min)‡	<100	100-120	>120	Bradycardia
Pulsus paradoxus	Absent <10 mm Hg	May be present 10-25 mm Hg	Often present >25 mm Hg (adult) 20–40 mm Hg (child)	Absence suggests respiratory muscle fatigue
FUNCTIONAL ASSESSMENT				
Peak expiratory flow (value predicted or personal best)	≥70%	Approx. 40-69% or response lasts <2 hr	<40%	<25%§
Pao_2 (breathing air) *and/or*	Normal (test not usually necessary)	≥60 mm Hg (test not usually necessary)	<60 mm Hg; possible cyanosis	
Pco_2	<42 mm Hg (test not usually necessary)	<42 mm Hg (test not usually necessary)	≥42 mm Hg; possible respiratory failure	
Sao_2 (breathing air) at sea level	>95% (test not usually necessary)	90-95% (test not usually necessary)	<90%	
	Hypercapnia (hypoventilation) develops more readily in young children than in adults and adolescents			

*Notes:
- The presence of several parameters, but not necessarily all, indicates the general classification of the exacerbation.
- Many of these parameters have not been systematically studied, especially as they correlate with each other. Thus, they serve only as general guides.
- The emotional impact of asthma symptoms on the patient and family is variable but must be recognized and addressed and can affect approaches to treatment and follow-up.

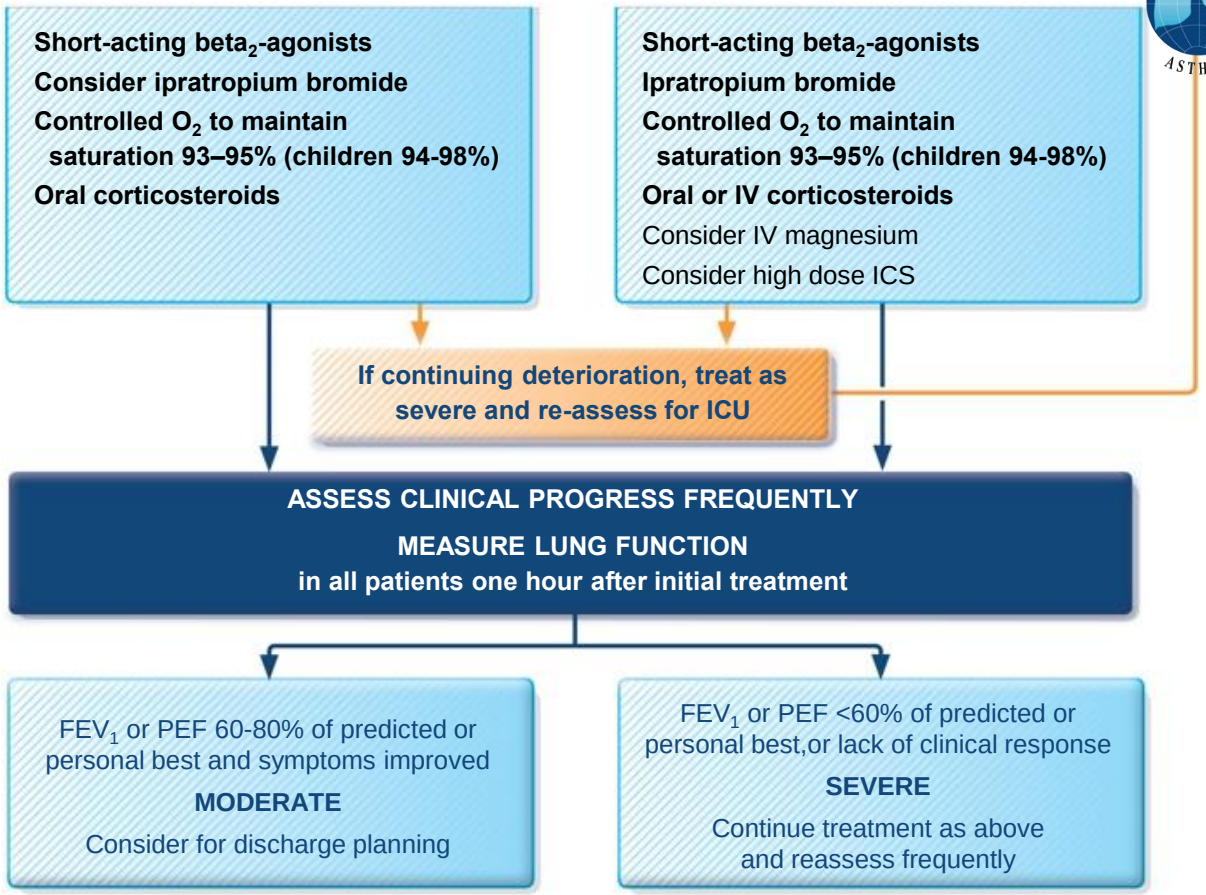
†Normal breathing rates in awake children by age: <2 mo, <60 breaths/min; 2-12 mo, <50 breaths/min; 1-5 yr, <40 breaths/min; 6-8 yr, <30 breaths/min.
‡Normal pulse rates in children by age: 2-12 mo, <160 beats/min; 1-2 yr, <120 beats/min; 2-8 yr, <110 beats/min.
§Peak expiratory flow testing may not be needed in very severe attacks.
Modified from EPR—3. Expert panel report 3: guidelines for the diagnosis and management of asthma. NIH Publication No. 07-4051, Bethesda, MA, 2007, U.S. Department of Health and Human Services; National Institutes of Health, National Heart, Lung, and Blood Institute; National Asthma Education and Prevention Program. www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm.

Managing exacerbations in acute care settings





MILD or MODERATE	SEVERE
Talks in phrases	Talks in words
Prefers sitting to lying	Sits hunched forwards
Not agitated	Agitated
Respiratory rate increased	Respiratory rate >30/min
Accessory muscles not used	Accessory muscles being used
Pulse rate 100–120 bpm	Pulse rate >120 bpm
O_2 saturation (on air) 90–95%	O_2 saturation (on air) < 90%
PEF >50% predicted or best	PEF ≤50% predicted or best
Short-acting beta$_2$-agonists	**Short-acting beta$_2$-agonists**
Consider ipratropium bromide	**Ipratropium bromide**
Controlled O_2 to maintain saturation 93–95% (children 94-98%)	**Controlled O_2 to maintain saturation 93–95% (children 94-98%)**
Oral corticosteroids	**Oral or IV corticosteroids**
	Consider IV magnesium
	Consider high dose ICS



Dosages of Drugs for Asthma Exacerbations

TABLE 56-1 Dosages of Drugs for Asthma Exacerbations

Medications	DOSAGES: Children*	DOSAGES: Adults	Comments
INHALED SHORT-ACTING β_2-AGONISTS			
ALBUTEROL			
Nebulizer solution (0.63 mg/3 mL, 1.25 mg/3 mL, 2.5 mg/3 mL, 5.0 mg/mL)	0.15 mg/kg (minimum dose, 2.5 mg) every 20 min for 3 doses, then 0.15-0.3 mg/kg up to 10 mg every 1-4 h as needed, or 0.5 mg/kg/h by continuous nebulization	2.5-5 mg every 20 min for 3 doses, then 2.5-10 mg every 1-4 h as needed, or 10-15 mg/h continuously	Only selective β_2-agonists are recommended. For optimal delivery, dilute aerosols to minimum of 3 mL at gas flow of 6-8 L/min. Use large-volume nebulizers for continuous administration; may mix with ipratropium nebulizer solution
MDI (90 µg/puff)	4-8 puffs every 20 min for 3 doses, then every 1-4 h inhalation maneuver as needed; use VHC; add mask for children <4 yr	4-8 puffs every 20 min up to 4 h, then every 1-4 h as needed	In mild-to-moderate exacerbations, MDI plus VHC is as effective as nebulized therapy with appropriate administration technique and coaching by trained personnel.
BITOLTEROL			
Nebulizer solution (2 mg/mL)	See albuterol dose; thought to be half as potent as albuterol on mg basis	See albuterol dose	Has not been studied in severe asthma exacerbations; do not mix with other drugs
MDI (370 µg/puff)	See albuterol MDI dose	See albuterol MDI dose	Has not been studied in severe asthma exacerbations
LEVALBUTEROL (R-ALBUTEROL)			
Nebulizer solution (0.63 mg/3 mL, 1.25 mg/0.5 mL, 1.25 mg/3 mL)	0.075 mg/kg (minimum dose, 1.25 mg) every 20 min for 3 doses, then 0.075-0.15 mg/kg up to 5 mg every 1-4 h as needed	1.25-2.5 mg every 20 min for 3 doses, then 1.25-5 mg every 1-4 h as needed	Levalbuterol administered in one half (mg) of the albuterol dose provides comparable efficacy and safety; has not been evaluated by continuous nebulization
MDI (45 µg/puff)	See albuterol MDI dose	See albuterol MDI dose	

Dosages of Drugs for Asthma Exacerbations

SYSTEMIC (INJECTED) β_2-AGONSTS			
Epinephrine 1:1000 (1 mg/mL)	0.01 mg/kg up to 0.3-0.5 mg every 20 min for 3 doses SQ	0.3-0.5 mg every 20 min for 3 doses SQ	No proven advantage of systemic therapy over aerosol
Terbutaline (1 mg/mL)	0.01 mg/kg every 20 min for 3 doses SQ, then every 2-6 h as needed	0.25 mg every 20 min for 3 doses SQ	No proven advantage of systemic therapy over aerosol
ANTICHOLINERGICS			
IPRATROPIUM BROMIDE			
Nebulizer solution (0.25 mg/mL)	0.25-0.5 mg every 20 min for 3 doses, then as needed	0.5 mg every 20 min for 3 doses, then as needed	May mix in same nebulizer with albuterol; should not be used as first-line therapy; should be added to SABA therapy for severe exacerbations; addition of ipratropium not shown to provide further benefit after patient is hospitalized
MDI (18 µg/puff)	4-8 puffs every 20 min as needed up to 3 h	8 puffs every 20 min as needed up to 3 h	Should use with VHC and face mask for children <4 yr; studies have examined ipratropium bromide MDI for up to 3 h
IPRATROPIUM WITH ALBUTEROL			
Nebulizer solution (each 3-mL vial contains 0.5 mg ipratropium bromide and 2.5 mg albuterol)	1.5 mL every 20 min for 3 doses, then as needed	3 mL every 20 min for 3 doses, then as needed	May be used for up to 3 h in initial management of severe exacerbations; addition of ipratropium to albuterol not shown to provide further benefit after patient is hospitalized
MDI (each puff contains 18 µg ipratropium bromide and 90 µg of albuterol)	4-8 puffs every 20 min as needed up to 3 h	8 puffs every 20 min as needed up to 3 h	Should use with VHC and face mask for children <4 yr

Dosages of Drugs for Asthma Exacerbations

TABLE 56-1 Dosages of Drugs for Asthma Exacerbations—cont'd

Medications	DOSAGES: Children*	DOSAGES: Adults	Comments
SYSTEMIC CORTICOSTEROIDS†			
Prednisone Methylprednisolone Prednisolone	1 mg/kg in 2 divided doses (maximum, 60 mg/day) until PEF is 70% of predicted or personal best	40-80 mg/day in 1 or 2 divided doses until PEF reaches 70% of predicted or personal best	For outpatient burst, use 40-60 mg in single dose or 2 divided doses for total of 5-10 days in adults (children: 1-2 mg/kg/day maximum, 60 mg/day for 3-10 days)

From National Asthma Education and Prevention Program. Expert panel report 3: guidelines for the diagnosis and management of asthma. Full report 2007. Washington D.C.: US Government Printing Office; 2007.

ED, Emergency department; *ICs*, inhaled corticosteroids; *MDI*, metered-dose inhaler; *PEF*, peak expiratory flow; *SABA*, short-acting β_2-agonists; *VHC*, valved holding chamber.

*Children ≤12 years of age.

†Dosages and comments apply to all three corticosteroids. There is no known advantage for higher doses of corticosteroids in severe asthma exacerbations, nor is there any advantage for intravenous administration over oral therapy if gastrointestinal transit time or absorption is not impaired. The total course of systemic corticosteroids for an asthma exacerbation requiring an ED visit or hospitalization may be 3 to 10 days. For corticosteroid courses of less than 1 week, there is no need to taper the dose. For slightly longer courses (e.g., up to 10 days), there probably is no need to taper, especially if patients are concurrently taking ICs. The ICs can be started at any point in the treatment of an asthma exacerbation.

Nebulizer pulmicort?

Magnesium Sulfate

- This agent has immediate bronchodilator effects

  and mild anti inflammatory effects.
- magnesium is safe and effective in patients with severe exacerbations.
- guidelines recommend consideration of intravenous $MgSO_4$ in patients who have life-threatening exacerbations

- and in those whose exacerbations remains in the severe category after 1 hour of intensive conventional therapy.

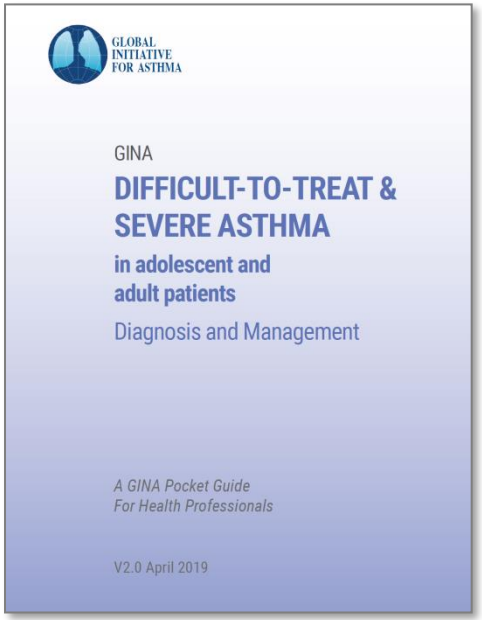
The recommended dose of magnesium sulfate is

2 gr given intravenously over 20 minutes in adults

And 25 to 100 mg/kg in children (total maximum dose of 2 g)

Difficult-to-treat and severe asthma

- Pocket guide v2.0 published April 2019
  - A practical guide for primary and specialist care
  - Includes a decision tree about assessment and management of adults and adolescents with uncontrolled asthma or exacerbations despite Step 4-5 treatment
  - Includes strategies for clinical settings in which biologic therapy is not available or affordable
- Content also included in full GINA 2020 report
- Aim is to produce a similar pocket guide for children in 2020



Assess and treat severe asthma phenotypes *cont'd*

Continue to optimize management as in section **3** (including inhaler technique, adherence, comorbidities)

6b Consider *add-on biologic Type 2* targeted treatments

- Consider add-on Type 2-targeted biologic for patients with exacerbations or poor symptom control on high dose ICS-LABA, who:
  - have eosinophilic or allergic biomarkers, or
  - need maintenance OCS
- Consider **local payer eligibility criteria** and **predictors of response** when choosing between available therapies
- Also consider cost, dosing frequency, route (SC or IV), patient preference

Which biologic is appropriate to start first?

Anti-IgE

*Is the patient eligible for **anti-IgE** for severe allergic asthma?*

- Sensitization on skin prick testing or specific IgE
- Total serum IgE and weight within dosage range
- Exacerbations in last year

What factors may predict good asthma response to anti-IgE?

- Blood eosinophils ≥260/µl ++
- FeNO ≥20 ppb +
- Allergen-driven symptoms +
- Childhood-onset asthma +

no / no

Anti-IL5 / Anti-IL5R

*Is the patient eligible for **anti-IL5 / anti-IL5R** for severe eosinophilic asthma?*

- Exacerbations in last year
- Blood eosinophils ≥300/µl

What factors may predict good asthma response to anti-IL5/5R?

- Higher blood eosinophils +++
- More exacerbations in previous year +++
- Adult-onset of asthma ++
- Nasal polyposis ++

no / no

Anti-IL4R

*Is the patient eligible for **anti-IL4R***

… for severe eosinophilic asthma?

- Exacerbations in last year
- Blood eosinophils ≥150/µl or FeNO ≥25 ppb

… or because of need for maintenance OCS?

What factors may predict good asthma response to anti-IL4R?

- Higher blood eosinophils +++
- Higher FeNO +++

Anti-IL4R may also be used to treat

- Moderate/severe atopic dermatitis
- Nasal polyposis

Eligible for none?
Return to section **6a**

Choose one if eligible; trial for at least 4 months and assess response

Good asthma response?

- *yes* → Good response to T2-targeted therapy
- *unclear* → Extend trial to 6-12 months
- *no* → **STOP add-on**

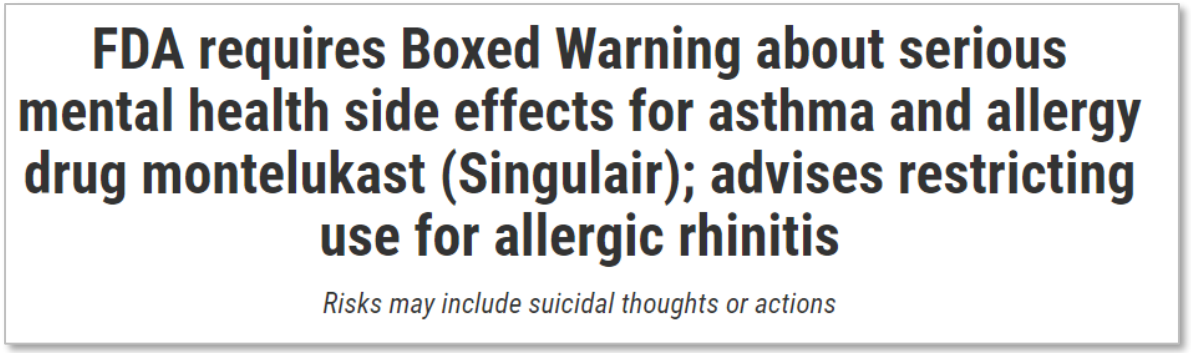
STOP add-on

Consider switching to a different Type 2-targeted therapy, if eligible

no → Little/no response to T2-targeted therapy

Adverse effects with montelukast

- FDA boxed warning in March 2020 about risk of serious neuropsychiatric events, including suicidality, with montelukast
  - Includes suicidality in adults and adolescents
  - Nightmares and behavioral problems in children
- Before prescribing montelukast, health professionals should consider its benefits and risks, and patients should be counselled about the risk of neuropsychiatric events



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

در این بازار عطاران

مرو هرسو چو بی کاران

به دکان کسی بنشین

که در دکان شکر دارد

مولانا

Questions?

GINA Global Strategy for Asthma Management and Prevention