
بسم الله الرحمن الرحيم

* The best strategy for management of acute exacerbation of asthma is early recognition and intervention, before attacks become more severe and potentially life threatening.

The basic principles of care of Acute Asthma

1*Assess the severity of attack.

2*used inhaled **short-acting beta agonist** early and frequent and consider concomitant use of **ipratropium bromid** for severe exacerbation.

3*start **systemic glucocorticoid** if there is no an immediate and marked response.

Primary Goals Of Asthma Management In The E.D

- Correction Of Hypoxia
- Rapid Improvement Of Airflow Obstruction
- Prevention Of Progression Or Recurrence Of Symptoms

Treatment Is Based On:

- Clinical Severity On Arrival
- Response To Initial Therapy
- Presence Of Risk Factors Of Asthma Death

ASTHMA SEVERITY

علائم	خفیف	متوسط	شدید	نزدیک به نارسایی تنفسی
تکلم تنگی نفس	قادر به بیان *جمله کامل* می‌باشد بروز علائم هنگام فعالیت	*جمله* منقطع می‌گوید بروز علائم هنگام تکلم اشکال در تغذیه شیرخواران	در حد *کلمه* می‌تواند صحبت کند بروز علائم در استراحت توقف در تغذیه شیرخواران	
هوشیاری	کامل	هوشیار و آژیته	هوشیار و آژیته	خواب آلود
تعداد تنفس*	<۳۰	<۳۰	>۳۰	
استفاده از عضلات فرعی	خیر	±	+	حرکات پارادوکس سینه و شکم
تعداد نبض*	<۱۰۰	۱۰۰-۱۲۰	>۱۲۰	برادی کارد
پالس پارادوکس	ندارد	± <۲۵	+ >۲۵	به دلیل ضعف عضلات تنفسی ممکن است نباشد
PEF	>٪۸۰	٪۶۰-۸۰	<٪۶۰	
Sao_2 در هـــوای اتاق	>٪۹۵	٪۹۱-۹۵	<٪۹۰	

* در **کودکان** باید این معیارها با توجه به سن ارزیابی گردد:

*__تنگی نفس__ درحالت استراحت یا تعداد تنفس بیشتراز:

کمتر از ۲ ماه	بیشتراز ۶۰ در دقیقه
۲ تا ۱۲ ماه	بیشتراز ۵۰ در دقیقه
۱ تا ۵ سال	بیشتراز ۴۰ در دقیقه
بیشتراز ۵ سال	بیشتر از ۳۰ در دقیقه

* **ضربان قلب** بیشتراز :

شیرخواران ۲تا ۱۲ ماه	بیشتر از ۱۶۰ در دقیقه
کودکان ۱ تا ۲ سال	بیشتر از ۱۲۰ در دقیقه
کودکان ۲ تا ۸ سال	بیشتراز ۱۱۰ در دقیقه

Peak Flow

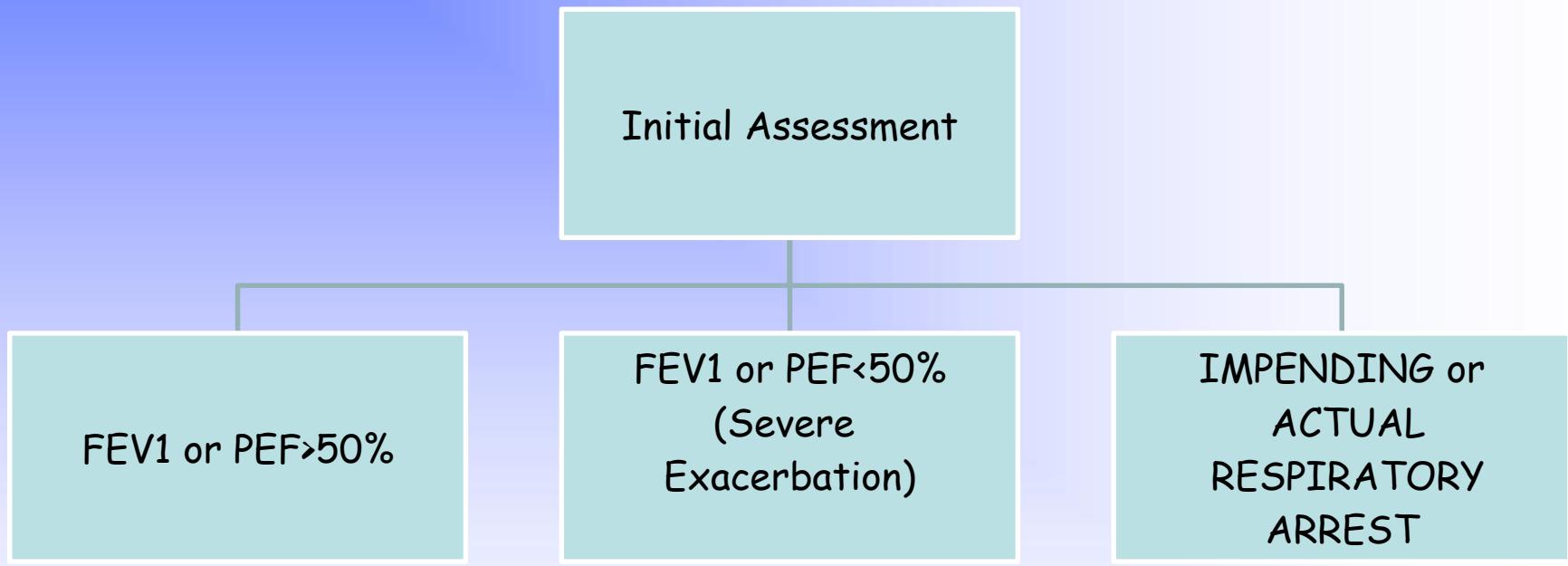
PEFM is the best method for assessment of the severity of asthma attack.

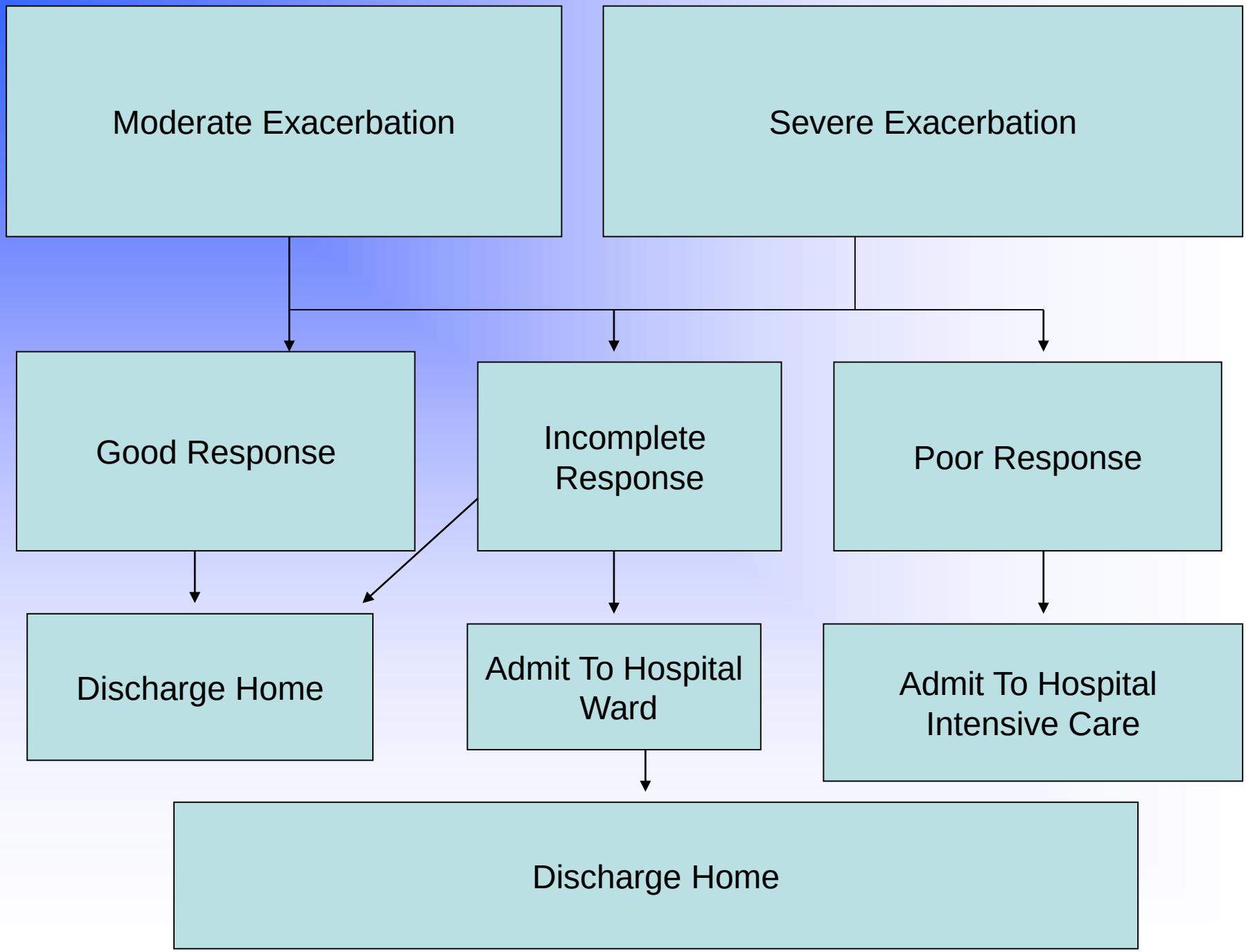
-Take less than one minute to perform

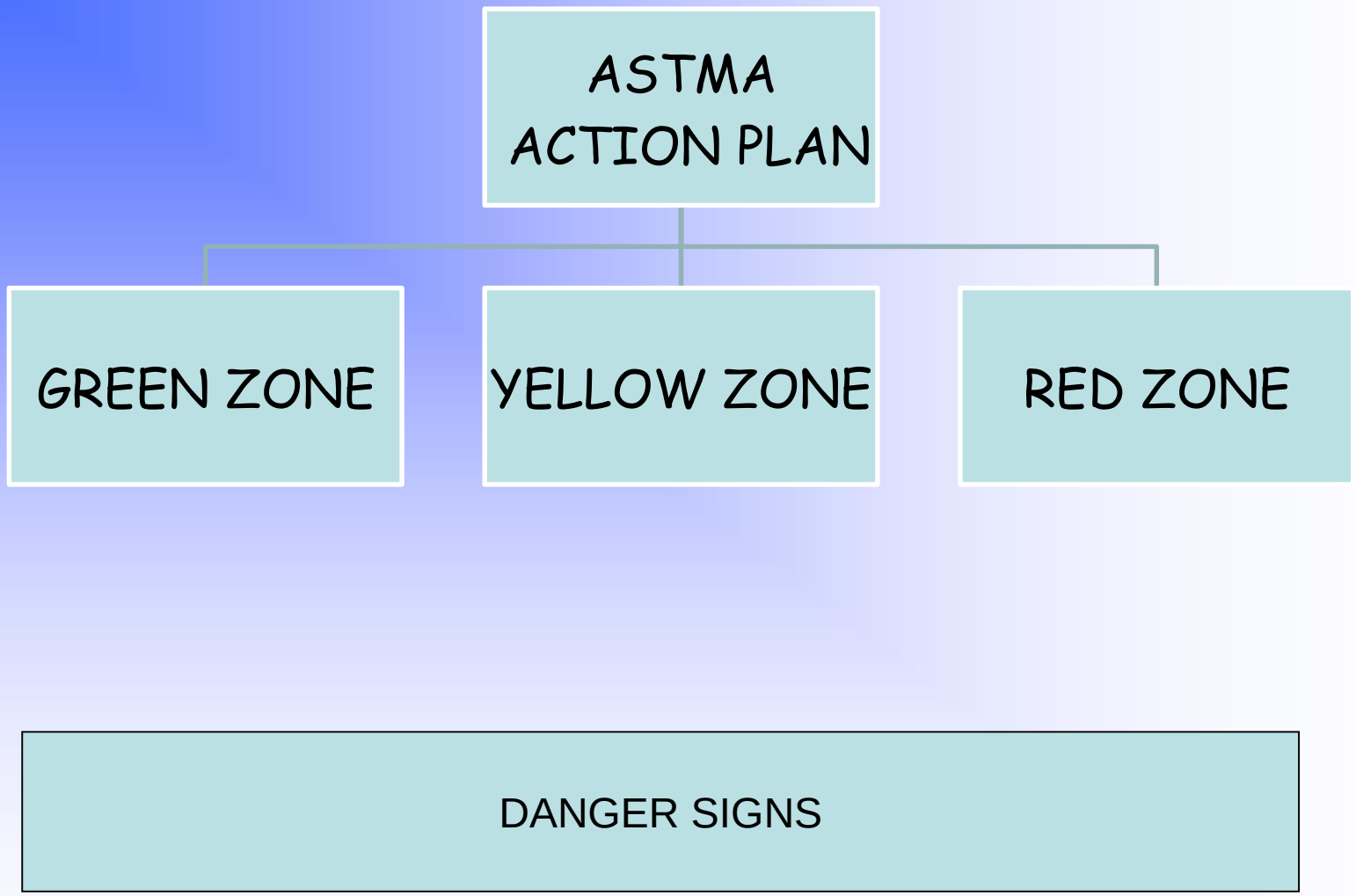
-safe

-inexpensive

-repeated over times.

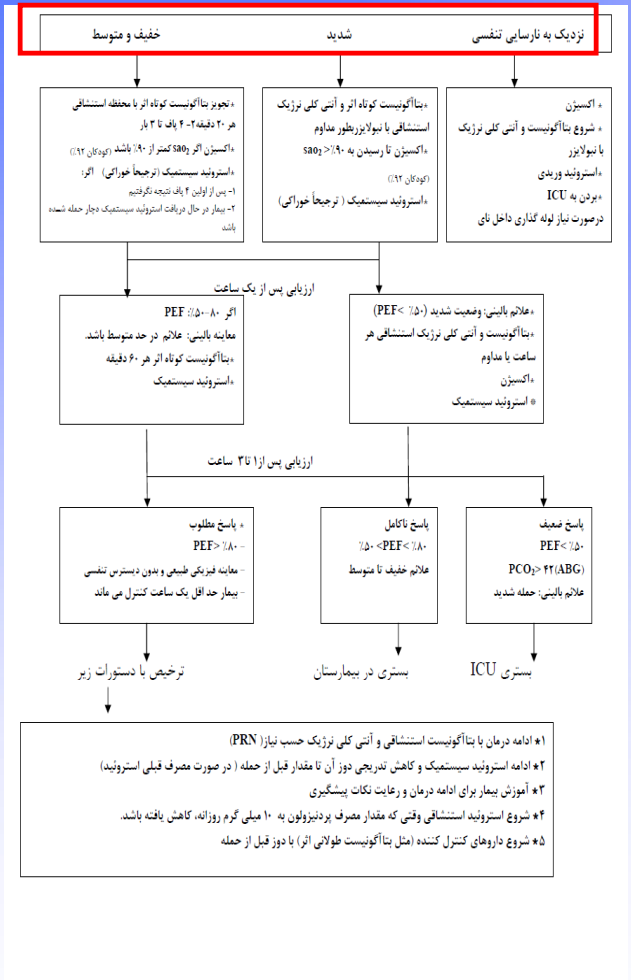

Initial Assessment
FEV1 or PEF>50%
FEV1 or PEF<50% (Severe Exacerbation)
IMPENDING or ACTUAL RESPIRATORY ARREST


Moderate Exacerbation
Severe Exacerbation
Good Response
Incomplete Response
Poor Response
Discharge Home
Admit To Hospital Ward
Admit To Hospital Intensive Care
Discharge Home


ASTMA
ACTION PLAN
GREEN ZONE
YELLOW ZONE
RED ZONE
DANGER SIGNS

Initial ED Assessment (cont.)

- Testing



- Severity of airflow obstruction
  - With FEV_1 or PEF (if patient is > 5 years)
- Oxygen saturation
- Other tests as indicated
  - **Chest x-ray** is *not* recommended during the initial assessment unless there is suspicion of a complication (e.g., pnemothorax, pneumonia, etc.)

salbutamol dosing

- 0.15 mg/kg (minimum of 2.5 mg) every 20 minutes for 1 hour then 0.15 to 0.3 mg/kg every 1-4 hours as needed
- Continuous nebs at 0.3 to 3 mg/kg/hour have been studied and found safe in children (15 mg/hr max)
- *2.5-5 mg nebulization every 20 min for 3 doses , then 2.5-10 mg every 1-4 h as needed.

steroid

The onset of action: 6h after administration.

The dose: 60 mg/day in a single or divided dose.

- Hydrocortisone 4-8 mg/kg x 1, then 2-4 mg/kg q 6°
- Methylprednisolone 2 mg/kg x1, then 0.5-1 mg/kg q 4-6°

In the absence of vomitting,oral administration can be used instead of I.V.

(highly absorbed and high bioavailability)

I.V. should be given in:

*impending or actual respiratory arrest.

*who respond poorly to oral administration.

Theophylline

- No longer first line
- May be useful adjunct-conflicting theories
- Must monitor plasma levels
  - >20 mcg/ml increases risk of seizures and arrythmias

Mast cell modifiers

- Cromolyn and nedocromil
- Block chlorine channels
  - Modulates mast cell mediator release and eosinophil recruitment
- Not indicated for acute attacks

Epinephrine

- NO! Except…

* تجویز زیر جلدی آدرنالین جایگاهی در درمان جدید آسم ندارد بجز موارد استثنائ زیر:

۱-موارد نارسائی تنفسی شدید مشرف به ایست تنفسی یا قلبی

۲-ایست قلبی- تنفسی

۳-شیرخواران بسیار کوچک که به درمان های استنشاقی پاسخ نداده ودر معرض نارسائی تنفسی هستند.

Fluid

- Judicious use of IV fluid necessary
  - Most asthmatics are dehydrated on presentations - rehydrate to euvolemia
  - Overhydration may lead to pulmonary edema
  - SIADH may be common in severe asthma

Do you use spacers or a nebulizer?

- Evidence suggests equivalence
- 5mg salbutamol nebuliser is equivalent to 20 puffs inhaler

Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma *CJ Cates, JA Crilly, BH Rowe Cochrane Database of Systematic Reviews* 2006 Issue 4

- Home made spacers better than nothing!

Home made spacers for bronchodilator therapy Zar et al Lancet 1999:354; 979 - 86

Anitcholinergics

- Competitively antagonizes acetylcholine
  - Promotes bronchodilation
- Particularly effective in combination with B-agonists
- Ipratropium (Atrovent)—most common
- Side effects
  - Dry mouth, thirst, difficulty swallowing
- Thus minimal cardiac effects
- (But you will find a fixed/dilated pupil if the nebulizer mask slips over an eye!)

Inhaled anticholinergics

Recommend the addition of ipratropium for pt with severe exacerbation who are in E.R. but not during hospitalization.

Dose: 250-500 mcg every 20 min for 3 doses then as needed.

Inhalers 8 inhalations every 20 min then as needed for up to 3h.

Discharge to Home

Continue treatment with inhaled $beta_2$-gonist

Continue oral corticosteroids for 3 –10 days

- Consider starting patients with persistent asthma on inhaled corticosteroids (ICS)
  - Start this therapy before the course of oral corticosteroid is completed due to its gradual therapeutic effects
- ***Or*** encourage patients with persistent asthma to continue using already prescribed ICS

High Risk Patients

۱- سابقه حمله آسم مرگبار(fatal- near fatal) که نیازمند به لوله گذاری (intubation) و یا تهویه مکانیکی شده باشد. این امراحتمال نیاز به لوله گذاری مجدد را در حمله های بعدی بسیار بالامی برد .

۲- سابقه بستری دربیمارستان یا بخش اورژانس در طی سال گذشته بخاطر این بیماری داشته باشد.

۳- کسیکه در حال مصرف استروئید خوراکی بوده و یا اخیراً مصرف آن را متوقف کرده است.

۴- کسیکه اخیراً استروئید استنشاقی را قطع کرده است.

۵- کسیکه بسیار وابسته به مصرف بتاآگونیست استنشاقی کوتاه اثر بطور منظم می باشد. بخصوص کسانیکه مصرف این دارو درآنها بیش از یک افشانه سالبوتامول درماه است.

۶- سابقه بیماری روانی یا مشکلات خانوادگی و اجتماعی در فرد ، شامل استفاده از آرام بخش ها

۷- سابقه عدم همکاری در اجرای توصیه های درمانی (low compliance)

موارد ارجاع فوری

در موارد زیر سریعاً باید بیمار به مرکز درمانی مجهز ارجاع گردد:

* بیمار از نظر سابقه بیماری در گروه در معرض خطر(High risk)باشد.

* حمله آسم از نوع شدید و مقاوم به درمان باشد، یعنی پس از درمان اولیه بابتاآگونیست ،PEF کمتر از ۵۰ درصد باقی بماند.

* پاسخ فوری به برونکودیلاتور نداشته ویا زودتر از ۳ ساعت علائم عود کند.

* پس از ۲ تا۶ ساعت از شروع استروئید بهبودی حاصل نشود.

* حال عمومی بیمار علیرغم درمان کافی روبه بدتر شدن باشد.

* شیرخواران و کودکان خردسال در حملات آسم در معرض خطر بیشتری هستند.درموارد شدید پس ازشروع درمان اولیه ، بدون تاخیر وی را به بیمارستان اعزام کنید.

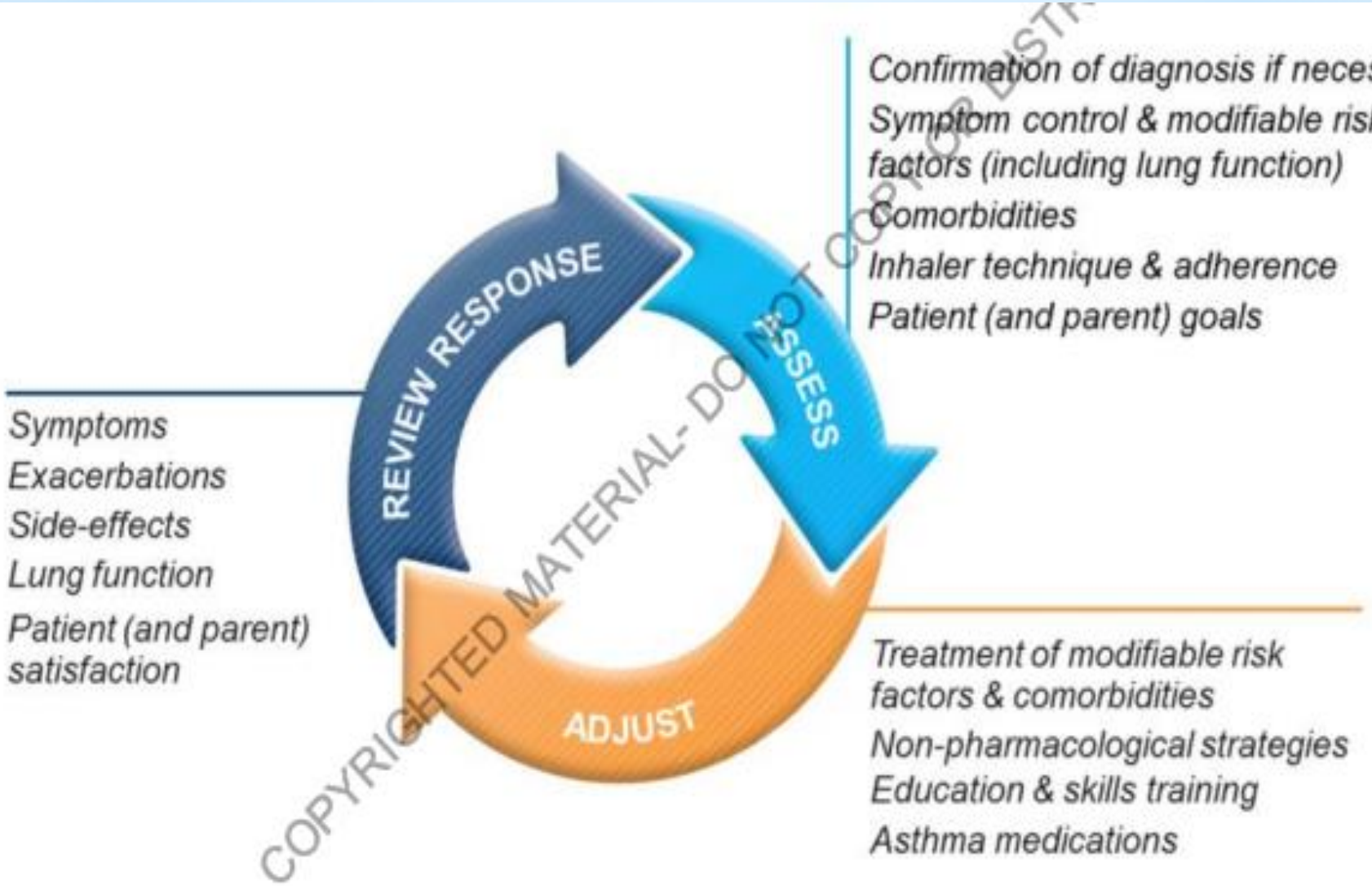
نکته :در این شرایط توصیه می شود تا رسیدن بیمار به مرکز درمانی مجهزتر، بایدعلاوه بر شروع درمان با استروئید ، به بیمار هر ۲۰ دقیقه۴-۲ پاف سالبوتامول بامحفظه مخصوص در ساعت اول داده شود.

Long-term Management of Asthma

* The long-term goals of asthma management are
* risk reduction and symptom control.

* The aim is
* reduce the burden to the patient
* reduce their risk of asthma-related death exacerbations
* airway damage
* medication side-effects.

* Asthma management involves a continuous cycle to assess, adjust treatment and review response



* Importantly, every patient should also be trained in essential skills and guided asthma self management, including:
* • Asthma information
* • Inhaler skills
* • Adherence
* • Written asthma action plan
* • Self-monitoring of symptoms and/or peak flow
* • Regular medical review

*

Before starting initial controller treatment

- Record evidence for the diagnosis of asthma, if possible
- Document symptom control and risk factors
- Assess lung function, when possible
- Train the patient to use the inhaler correctly, and check their technique
- Schedule a follow-up visit.

After starting initial controller treatment

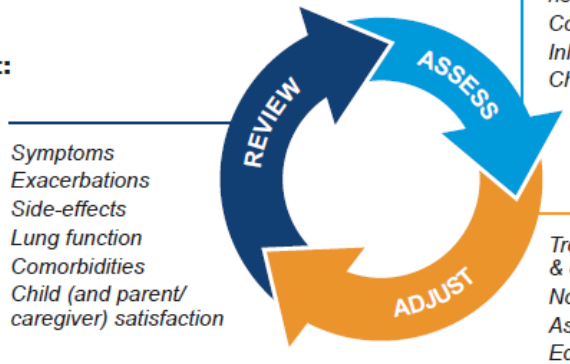
- Review response after 2–3 months, or according to clinical urgency
- Consider step down when asthma has been well-controlled for 3 months

Step	Age (years)	Medication and device (check patient can use inhaler)	Metered dose (mcg/inhalation)	Delivered dose (mcg/inhalation)	Dosage
Steps 1–2 (AIR-only)	6–11	(No evidence)	-	-	-
	12–17 ≥18	Budesonide-formoterol DPI	200/6	160/4.5	**1 inhalation whenever needed**
Step 3 MART	6–11	Budesonide-formoterol DPI	100/6	80/4.5	**1 inhalation once daily**, PLUS 1 inhalation whenever needed
	12–17 ≥18	Budesonide-formoterol DPI	200/6	160/4.5	**1 inhalation once or twice daily,** PLUS 1 inhalation whenever needed
	≥18	BDP-formoterol pMDI	100/6	84.6/5.0	
Step 4 MART	6–11	Budesonide-formoterol DPI	100/6	80/4.5	**1 inhalation twice daily**, PLUS 1 inhalation whenever needed
	12–17 ≥18	Budesonide-formoterol DPI	200/6	160/4.5	**2 inhalations twice daily**, PLUS 1 inhalation whenever needed
	≥18	BDP-formoterol pMDI	100/6	84.6/5.0	
Step 5 MART	6–11	(No evidence)	-	-	-
	12–17 ≥18	Budesonide-formoterol DPI	200/6	160/4.5	**2 inhalations twice daily**, PLUS 1 inhalation whenever needed
	≥18	BDP-formoterol pMDI	100/6	84.6/5.0	

DPI: dry powder inhaler; pMDI: pressurized metered dose inhaler. For budesonide-formoterol pMDI with 3 mcg [2.25 mcg] formoterol, use double number of puffs

GINA 2023 – Children 6–11 years

Personalized asthma management:
Assess, Adjust, Review



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

Symptoms
Exacerbations
Side-effects
Lung function
Comorbidities
Child (and parent/ caregiver) satisfaction

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

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

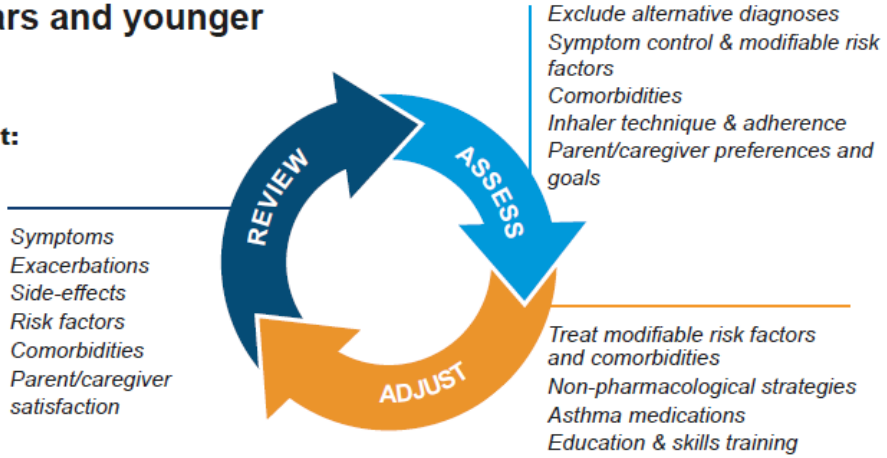
	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
PREFERRED CONTROLLER to prevent exacerbations and control symptoms	Low dose ICS taken whenever SABA taken*	Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for children)	Low dose ICS-LABA, OR medium dose ICS, OR very low dose ICS-formoterol 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, anti-IL4Rα, anti-IL5
Other controller options (limited indications, or less evidence for efficacy or safety)	*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*	*As last resort, consider add-on low dose OCS, but consider side-effects*
RELIEVER	As-needed SABA (or ICS-formoterol reliever* in MART in Steps 3 and 4)				

*Anti-inflammatory relievers (AIR)

Box 3-13

GINA 2023 – Children 5 years and younger

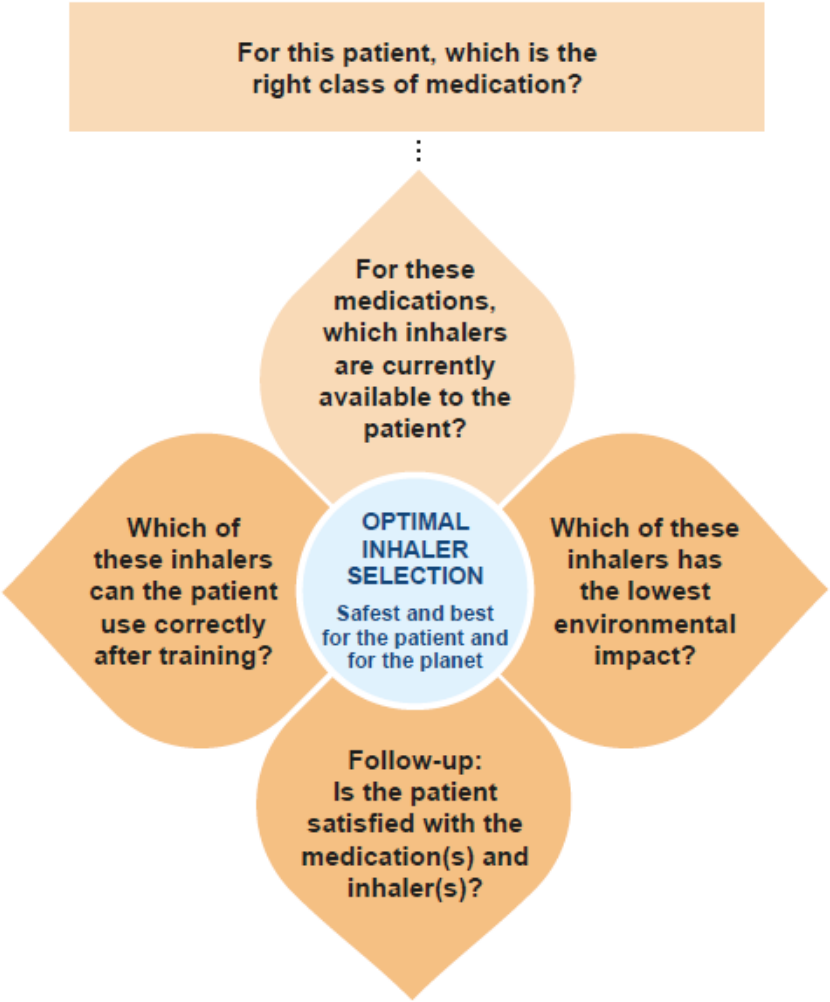
Personalized asthma management:
Assess, Adjust, Review response



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

Box 6-6



Difficult-to-treat and severe asthma

- Changes in GINA 2023
  - Double-blind study of withdrawal of mepolizumab in adults with severe eosinophilic asthma found more exacerbations in those who ceased mepolizumab than those who continued treatment *(Moore et al, ERJ 2022)*
  - Mepolizumab (anti-IL5) added as a Step 5 option for children 6–11 years with severe eosinophilic asthma *(Jackson et al, Lancet 2022)*
- Regardless of regulatory approvals, GINA recommends biologic therapy for asthma **only** if asthma is severe, and **only** if treatment has been optimized
- Head-to-head studies are needed
- Non-asthma indications for biologic therapy are mentioned only if the condition is relevant to asthma management, or if it is commonly associated with asthma
- Severe asthma guide published mid-2023 in large format

*Stepping up asthma treatment

* • Sustained step-up (for at least 2–3 months): if symptoms and/or exacerbations persist despite 2–3 months of controller treatment, assess the following common issues before considering a step-up
* o Incorrect inhaler technique
* o Poor adherence
* o Modifiable risk factors, e.g. smoking
* o Are symptoms due to comorbid conditions, e.g. allergic rhinitis

Stepping down treatment when asthma is well-controlled

* Consider stepping down treatment once good asthma control has been achieved and maintained for 3 months,
* to find the lowest treatment that controls both symptoms and exacerbations, and minimizes side-effects.

* • Choose an appropriate time for step-down

(no respiratory infection, patient not travelling, not pregnant)

* • Document baseline status

(symptom control and lung function)

provide a written asthma action plan, monitor closely, and book a follow-up visit

*

• Step down through available formulations to reduce the ICS dose by 25–50% at 2–3 month intervals

What Every Asthmatic should know?

Am I using my inhaler correctly?

Which inhaler should I take regularly?

Which inhaler should I take occasionally?

What would happen if I took too little or too much medicine?

What are the warning signs of an attack of worsening asthma

?

What makes my asthma worse?

What should I do if my medicine doesn't work?

What should I do if I get an attack?

THE MEDICATIONS

- Route of administration
- Controller Medications: Corticosteroids, Leukotriene modifiers, Cromones, Methylxanthines, LABA, Long-acting oral B2-agonists.
- Reliever Medications: B2-agonists, Anticholinergic agents.

راهنمای دوز روزانه استروئید استنشاقی

استروئید	دوز کم	دوز متوسط	دوز بالا
Beclometasone میکرو گرم ۸۴-۴۲	۳۳۶- -۸۴	۶۷۲-۳۳۶	>۶۷۲
Budesonide هر DPI ۲۰۰ میکرو گرم محلول ۵۰۰ و ۲۵۰ در هر ویال	۴۰۰-۲۰۰ میکرو گرم QD-۵۰۰-میکروگرم	۸۰۰-۴۰۰ ۱۰۰۰	<۸۰۰
Flunisolide 250 میکرو گرم	۷۵۰-۵۰۰	۱۲۵۰-۱۰۰۰	>۱۲۵۰
Fluticasone ۲۲۰،۱۱۰-۴۴	۱۷۶-۸۸	۴۴۰-۱۷۶	> ۴۴۰
Triamcinolone ۱۰۰	۸۰۰-۴۰۰	۱۲۰۰-۸۰۰	< ۱۲۰۰

ASTHMA PREVENTION

PRIMARY PREVENTION

- POTENTIAL MEASURES TO BE APPLIED PRENATALLY
- ENVIROMENTAL TOBACOO SMOKE

SECONDARY PREVENTION

- H1 ANTIHISTAMINES
- IMMUNOTHERAPY
- EARLY CESSATION OF EXPOSURE

TERTIARY PREVENTION

- AVOIDANCE OF INDOOR ALLERGENS
- AVOIDANCE OF OUTDOOR ALLERGENS
- AVOIDANCE OF POLLUTANTS
- AVOIDANCE OF OCCUPATIONAL EXPOSURE
- FOOD AVOIDANCE
- AVOIDANCE OF CERTAIN DRUGS
- VACCINATION

Failure to respond to treatment

WRONG TREATMENT

e.g Antibiotics

Antihistamines

Sedatives

Cough medicines.

WRONG DIAGNOSIS

e.g chronic bronchitis
wheezy bronchitis
Recurrent UTI
Lung cancer
Heart failure.

INSUFFICIENT TREATMENT

Bronchodilators only

Too low a dose of inhaled corticosteroid

Oral corticosteroid required.

TREATMENT NOT PROPERLY TAKEN

Inhaler technique

Irregular prophylaxis