



وزارة الصحة
Ministry of Health

Asthma Pocket Guide for Health Care Professionals Second Edition

SASIS

Saudi Allergy Asthma & Immunology Society
الجمعية السعودية للحساسية والربو والمناعة

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Disclaimer on the use of this pocket guide

The information and materials in this guide are only developed for practical purposes. Currently, we are living in an era of knowledge production, technical transformations, and innovative solutions; the matter encourages us to improve our information and develop our medical professional practices considerably. National Asthma Control Program spares no effort to support health care professionals in their clinical practices by providing them with simple, up-to-date and evidence-based information.

However, for further information and complete handy materials on diagnosis, management, and prevention of asthma, we invite our healthcare professionals to read the full version of Global Asthma Report to expand their knowledge on asthma epidemiology and get detailed information and comprehensive materials on asthma diagnosis and management from the updated version of GINA and SINA.

In our endeavors to reduce the clinical and economic burden of asthma, provide simplified medical materials for healthcare providers, and improve the patients experience, we are eager to receive feedback for better development of this Pocket Guide in our next versions.

The National Asthma Control Program

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Overview

The asthma pocket guide plays an important role in guiding healthcare professionals by providing a summary of updated evidence-based recommendations for asthma management, control, and prevention. The National Asthma Control Program (NACP) supports the development of good clinical practices based on the best available scientific guidelines suggested by the Saudi Initiative for Asthma (SINA) and the Global Initiative for Asthma (GINA). This practical Pocket Guide helps healthcare professionals to provide quality care and improve their patients' experiences.

Since the first edition of the Asthma Pocket Guide for Health Care Professionals was released in 2020, scholars and practitioners in the asthma field at national and global levels have made substantial advancements in understanding, diagnosing, managing, and treating the disease and its related risk factors. The NACP has been taking the responsibility of regularly updating the Pocket Guide based on systematic reviews conducted by a multi-disciplinary scientific committee from different agencies working in the related field.

The third edition of this guide is designed to satisfy the need for developing our national experience and to support informed and evidence-based decision making among healthcare professionals in asthma management, control and prevention. In this edition we included some remarkable findings from our national survey on allergic conditions which was conducted as a part of the Global Asthma Network (GAN) Phase I study and published in the Global Asthma Report (GAR) 2022.

Asthma Pocket Guide Scientific Committee

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Abbreviations

ACEI	Angiotensin-converting enzyme inhibitors
ACT	Asthma control test
Anti-IgE	Anti-immunoglobulin E
BMI	Body mass index
DPI	Dry Powder Inhaler
ED	Emergency department
FEV1	Forced expiratory volume in the first second
FVC	Forced vital capacity
GAR	Global Asthma Report
GAN	Global Asthma Network
GERD	Gastroesophageal reflux disease
GINA	Global Initiative for Asthma
HFA	Hydrofluoroalkane
ICS	Inhaled corticosteroids
ICU	Intensive care unit
MART	Maintenance and Reliever Therapy

IM	Intramuscular
IV	Intravenous
LABA	Long acting beta ₂ -agonists
LTRA	Leukotriene receptor antagonist
MDI	Metered dose inhaler
NCAP	The National Asthma Control Program
NSAIDS	Nonsteroidal anti-inflammatory drugs
OPD	Outpatient department
PEF	Peak expiratory flow
PEFR	Peak expiratory flow rate
PFT	Pulmonary function tests
PHCC	Primary health care clinic
PO	Per oral
RR	Respiratory Rate
SABA	Short acting beta ₂ -agonists
SINA	Saudi Initiative for Asthma

Global Burden of Asthma

Asthma remains a global chronic health issue with a significant impact on all ages of the population, especially among schoolchildren. According to the Global Burden of Disease in 2019, more than 262 million people were affected by asthma worldwide.¹ The global estimates of asthma in people aged 5-69 years showed a prevalence of 11.5% (754.6 million cases) for current wheezing, and ever wheezing 17.9% (1181.3 million cases), 5.4% (357.4 million cases) for current asthma, and ever asthma is 9.8% (645.2 million cases) in 2019 (Figure 1).² GAR 2022 highlighted that asthma continues to reduce the quality of life for people of all ages, causes premature mortality and kills more than 1000 people daily.³ The report highlighted that between one-third and half of children, adolescents and adults with asthma were affected by severe symptoms that frequently hinder their ordinary life.³ According to the GAN Phase I, the overall prevalence of current asthma symptoms was 9.1% for children (6-7 years old), 11.0% for adolescents (13-14 years old), and 6.6% for adults.³

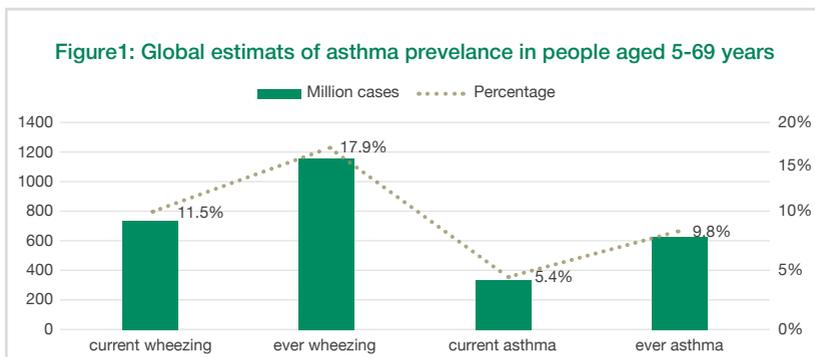


Figure 1: Global prevalence of current wheezing, ever wheezing, current asthma, and ever asthma

Source: data were extracted and processed from global, regional, and national prevalence of asthma in 2019: a systematic analysis and modelling study. J Glob Health. 2022 Jun 29;12:0405

Among the top global causes of death and disability, asthma is ranked 24th among the leading causes of years lived with disability and 34th for disability adjusted life years (DALYs).^{1,4}

The clinical and economic burden of asthma takes a tremendous toll on patients and their families, healthcare providers, and communities. Therefore, the direct and indirect costs of asthma are considered a significant source of global economic burden.⁵

The burden of asthma in KSA

In KSA, asthma still represents one of the most common chronic illnesses with substantial prevalence and significant impact on the community and health system. Findings from the most recent national survey on allergic conditions conducted by the NACP in 2020 as a part of GAN Phase I showed an overall prevalence of current asthma symptoms of 10.4% in children aged 6-7 years, 13.3% in adolescents aged 13-14 years, and 14.2% in adults.^{6,7} The burden of asthma in the country continues to affect the lives of patients and their families significantly, deteriorates working and educational attainments, and represents a major part of emergency department (ED) visits and hospitalizations (Figure 2). It is a cause of substantial burden of disease, including both premature death and reduced quality.

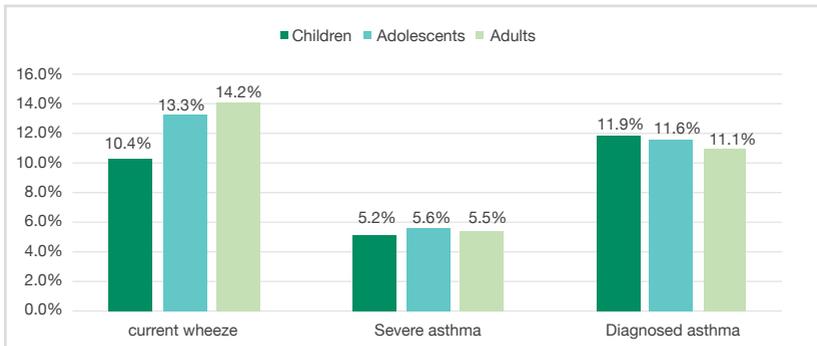


Figure 2: Prevalence of current wheeze, severe asthma, and diagnosed asthma per age group, KSA,2020

Note: Current wheezing, participants with wheeze in the past 12 months (percentages were calculated for all participants); Severe asthma, participants with wheeze in the past 12 months who had 4 or more attacks of wheeze, at least 1 night per week of sleep disturbance due to wheeze, or wheeze affecting speech; Diagnosed asthma, asthma confirmed by doctor

Approach to Suspected Asthma Patient

What is Asthma?

Asthma is a chronic inflammatory lung disease associated with reversible hyper-responsive airways. Asthma causes symptoms such as wheezing, shortness of breath, chest tightness and cough that vary over time in their occurrence, frequency and intensity (Table 1 Section A). Primary care physicians who care for asthma patients must have adequate knowledge of Asthma diagnosis, treatment and follow-up. When patients are already diagnosed with asthma or presenting for the first time with symptoms suggestive of asthma, such as cough, wheeze and shortness of breath, certain steps should be followed in the approach of such patients.

Management Components



01

Ascertain diagnosis of
Asthma



02

Assess the Asthma
Control



03

Set up a management
plan



04

Prescribe Appropriate
Asthma Medications



05

Conduct patient /
parent education



06

Give a follow-up
appointment

STEP 1



Ascertain Diagnosis of Asthma:

A comprehensive assessment of each patient should always be completed by the primary care physician particularly during the first visit.

The physicians are encouraged to use the initial assessment form (Table 1) which covers the essential aspects required to ascertain the diagnosis of asthma, assess the degree of asthma control, future risk for poor outcome, identify triggers, and suggest alternative diagnosis.

Table 1. Asthma patient assessment form:

Asthma features				
A	Symptoms	Shortness of breath	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		Chest tightness	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		Cough	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		Wheezing	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Variability of Symptoms	Exacerbation after exposure to triggers, e.g., weather, dust	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	Relieved after SABA use	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	More at night or early morning	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Asthma severity				
B	Asthma Symptom Severity (*Red flags warrant escalation of therapy or referral to the asthma clinic if a score 3 or more)	Frequency of symptoms 4 or more per week	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		Night waking due to symptoms once/week	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		Any limitation in activities due to Asthma?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		Reliever used for symptoms 4 or more per week	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Asthma Exacerbation assessment and others future risk	Number of ER visits due to asthma attack in the past 12 months	maximum 2 per year
		Number of short courses of systemic steroids due to asthma attack in the past 12 months	maximum 2 per year
		Number of hospitalizations due to asthma attacks in the past 12 months	maximum 1 per year
		Number of Salbutamol canisters used in the past year	maximum 3 per year
	Number of ICU admissions in the past due to asthma attack	ever	
	Daily use of oral steroids for asthma control	ever	

C	Asthma Associated diseases				
	Allergic rhinoconjunctivitis/ chronic rhinosinusitis / nasal polyps		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Eczema		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Food allergy		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
D	Asthma Medications				
	<input type="checkbox"/> SABA <input type="checkbox"/> ICS <input type="checkbox"/> ICS/LABA <input type="checkbox"/> LTRA <input type="checkbox"/> Anticholinergic <input type="checkbox"/> Biological Therapy <input type="checkbox"/> Others:				
	Adherence checked		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Technique checked		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
E	List of Possible Triggers				
	Viral respiratory infections		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Pollens		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Dust mite, Molds		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Animal dander, Secretions		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Cold weather, Raining		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Food (egg, peanut, seafood, others)		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	Smoking		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
F	Asthma symptoms related to exercise			<input type="checkbox"/> Yes <input type="checkbox"/> No	
G	Asthma symptoms related to exposure to the work environment			<input type="checkbox"/> Yes <input type="checkbox"/> No	
H	Other medication List				
	<input type="checkbox"/> NSAIDS <input type="checkbox"/> Aspirin <input type="checkbox"/> ACEI <input type="checkbox"/> Beta Blocker				
I	Co-morbid conditions				
	<input type="checkbox"/> Heart failure <input type="checkbox"/> Depression <input type="checkbox"/> Pregnancy <input type="checkbox"/> Obesity <input type="checkbox"/> GERD <input type="checkbox"/> Smoking <input type="checkbox"/> Other:				
J	Family history of Asthma or Atopy (skin, eye, nose)			<input type="checkbox"/> Yes <input type="checkbox"/> No	
K	Examination				
	Vital Signs		Pulse Blood pressure	Respiratory rate Temperature	O ₂ sat
	Chest		Use of Accessory Respiratory Muscles	<input type="checkbox"/> Yes <input type="checkbox"/> No	
			Wheezes	<input type="checkbox"/> Yes <input type="checkbox"/> No	
L	Initial Workup				
	Chest X-ray if an alternative diagnosis is considered				
	Spirometer (FEV1, FVC, FEV1/FVC) if not available, do PEFr				

Section A: Ascertain the degree of asthma control based on criteria in Table 2,3

Section B: red flags indicate severe asthma symptoms need step up treatment or referral

Section C: Associated factors that might prevent asthma control: allergic rhinitis, GERD

Section D: History of asthma medication

Section E: Identify possible environmental triggers that need to be avoided

Section F: Clues toward exercise-induced asthma

Section G: Clues towards occupational asthma or asthma worsening at work

Section H: List of medications that can worsen asthma symptoms or mimic asthma symptoms

Section I: Co-morbidities that need to be treated or ruled out besides asthma

Section K: The examination section should include signs of allergic rhinitis, eczema

The diagnosis of asthma can be suggested by using the following probability criteria:

Table 2. Probability of Asthma Criteria:

<p>High Probability</p> <p>More than 1 of asthma symptoms (Table 1 section A) and any of the following:</p> <ul style="list-style-type: none"> - Symptoms are provoked by triggers (Table 1 section E) - Personal history of atopic disorder (Table 1 section C) - Family history of atopic disorder and/or asthma (Table 1 section J) - Wheeze heard on auscultation (Table 1 section K) - History of improvement in (symptoms/lung function) in response to adequate therapy (Table 1 section A) 	<p>Start management</p>
<p>Low Probability</p> <ul style="list-style-type: none"> - Isolated cough in the absence of wheeze or difficulty breathing - Normal findings (physically and on spirometry) while symptomatic - No response to a trial of asthma therapy with good adherence and proper inhaler device technique - Clinical features pointing to alternative diagnosis 	<p>If there is no alternative diagnosis or unsure about the cause of the patient's symptoms refer to a specialist within the primary health care center (PHCC) or the hospital.</p>
<p>Intermediate Probability</p> <ul style="list-style-type: none"> - Contains features of both high and low probability 	<p>Trial of asthma therapy for (4-8 weeks) AND if no response or diagnosis is uncertain, THEN refer to a specialist within the PHCC or the hospital.</p>

Once the diagnosis of asthma becomes high probability, proceed to the next steps of the guideline (**Note:** The definitive diagnosis of asthma in adolescents and adults needs to be confirmed by spirometry).

STEP 2



Assess the Asthma Control:

The primary care physician should apply the appropriate asthma control test to classify the asthma control by using either the GINA Assessment of Symptoms Control during the consultation or the Asthma Control Test (ACT) questionnaire answered by the patient and/or parents while waiting to be seen by the doctor. The outcome of this step is to classify asthma control into controlled, partly controlled or uncontrolled Asthma.

Table 3. Assessment of asthma control in adults and children:

Asthma symptoms control	Asthma control level based on symptoms		
	Controlled	Partly controlled	Uncontrolled
In the past 4 weeks, the patient had:	The number of questions answered «Yes»		
- Daytime symptoms more than twice/Week? <input type="checkbox"/> Yes <input type="checkbox"/> No			
- Any night waking due to asthma? <input type="checkbox"/> Yes <input type="checkbox"/> No			
- Reliever used for symptoms more than twice /week? <input type="checkbox"/> Yes <input type="checkbox"/> No	None	1-2	3-4
- Any limitation in activities due to Asthma? <input type="checkbox"/> Yes <input type="checkbox"/> No			
ACT Score (for adults and children ≥ 5 years)	≥ 20	16-19	≤ 15
Action based on control (refer to the steps on Page 20)*	Continue the same or one step down	One step up	One or two steps up

For full version of Asthma control test :

<https://www.moh.gov.sa/HealthAwareness/MedicalTools/Pages/AsthmaCalculator.aspx>

Risk for exacerbation:

Having any of these risk factors will increase the risk of exacerbation even if the patient has mild symptoms

- Medication: High SABA use (Dispensing $\geq 3 \times$ 200-dose canisters per year); inadequate ICS or no ICS use.
- Comorbid condition (chronic sinusitis, rhinitis, GERD, obesity).
- Poor adherence or incorrect inhaler technique.
- Ongoing exposure to triggers (smoking, allergens if sensitized, air pollution).
- Major psychosocial problems.
- FEV1 $< 60\%$.
- One or more hospitalizations due to acute asthma in the past 12 months or two or more ED visits or systemic corticosteroid courses in the past 12 months.

*** Need to eliminate or minimize the modifiable risk factors to achieve the desirable asthma outcome.**

STEP 3



Set up a Management Plan:

Once the diagnosis and the asthma control are ascertained, a management plan should be initiated and must aim at the following:

- A.** Control asthma symptoms.
- B.** Maintain normal daily and exercise activities on minimal asthma controller medications.
- C.** Prevent or minimize ED visits.

The management plan should cover the following aspects:

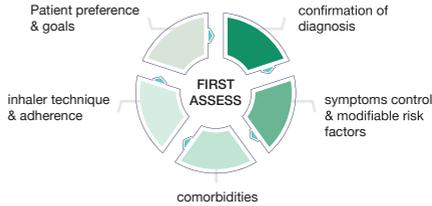
- 1.** Inform the patient /parent about the diagnosis.
- 2.** Education about asthma possible triggers.
(Table 1 section E).
- 3.** Available options of medications.
- 4.** The Proper technique of using an inhaler device, please see the link
<https://youtu.be/lcS-AMn4dCc?si=1qkN-bUY6ilakszvm>
- 5.** How can the patient/parent minimize exacerbations?
- 6.** How do the patient/parent deal with worsening symptoms (action plan)?
- 7.** How would the patient/parent communicate with the treating physician?
- 8.** How frequently is the patient going to be seen in the clinic?

The last part of the management plan is to give the patient/ parent a chance to ask further questions.

STEP 4

Prescribe Appropriate Asthma Medications:

Adults and children ≥ 6 years



IF	Start with	TRACK 1	TRACK 2	STEP
Symptoms less than twice a week	➔ Yes	As needed only low dose ICS-formoterol*	Low dose ICS **	Step 1 & 2
NO ↓				
Symptoms most days or waking at night once a week	➔ Yes	low dose ICS-formoterol maintenance and reliever (MART)	Low dose ICS-LABA + as needed ICS-SABA***	Step 3
NO ↓				
Daily symptoms or waking at night twice a week	➔ Yes	Medium ICS-formoterol maintenance and reliever (MART)	Medium dose ICS-LABA + as needed ICS-SABA	Step 4
		short course OCS may also be needed with patients presenting with severely uncontrolled asthma		
		Refer patient to specialist for phenotypic assessment and/or biological treatment		Step 5

If not controlled move to next step

*Using SABA alone associated with more exacerbations, hospitalizations and mortalities

**Can use Leukotriene if ICS not tolerated

***As needed SABA with ICS only if ICS-Formoterol combination is not available

Asthma management in Children less than 6 years

- A.** Assess control using asthma symptoms control questions in Table 3.
- B.** Treatment:
1. If asthma is uncontrolled or partly controlled start with low dose ICS such as fluticasone propionate 50-100 mcg/day or budesonide nebulization 250-500 mcg/day. Alternatively, in partly controlled children, LTRA 4 mg/day (granules in ≥ 6 months or chewable tablets in ≥ 2 years) may be used.
 2. If still not well controlled after three months, double the ICS dose or add LTRA.
 3. If still not well controlled after three months refer to a specialist, or earlier if necessary.

There is not enough data on most ICS in this age group. Also, LABAs are not approved for this age group.

Table 4. Low, medium and high doses of inhaled corticosteroids *

Adults and adolescents inhaled corticosteroid	Total daily ICS dose (mcg)		
	Low	Medium	High
BDP (HFA)	100-200	>200-400	>400
Budesonide (DPI or pMDI , HFA)	200-400	>400-800	>800
Fluticasone furoate (DPI)	100		200
Fluticasone propionate (DPI)	100-250	>250-500	>500
Fluticasone propionate (pMDI, HFA)	100-250	>250-500	>500
Children 6-11 years inhaled corticosteroid	Total daily ICS dose (mcg)		
	Low	Medium	High
Budesonide (DPI or pMDI , HFA)	100-200	>200-400	>400
Budesonide (nebulas)	250-500	>500-1000	>1000
Fluticasone propionate (DPI)	50-100	100-200<	200<
Fluticasone propionate (pMDI, HFA)	50-100	100-200<	200<

* Based on MOH formulary medication

Low-dose ICS provides most of the clinical benefits for most patients. However, ICS responsiveness varies between patients, so some patients may need **medium dose ICS** if asthma is uncontrolled despite good adherence and correct inhaler technique with low dose ICS.

High-dose ICS is needed by very few patients, and its long-term use is associated with an increased risk of local and systemic side effects.

This is not a table of equivalence but of estimated clinical comparability based on available studies and product information.

- There was an FDA-boxed warning about montelukast in March 2020 regarding the risk of serious neuropsychiatric events, including suicidality in adults and children. Before prescribing the medication, please discuss it with the patient/parent and monitor for symptoms afterward.

STEP 5



Conduct patient /parent education:

1. The patient or parents should understand the nature of asthma as a chronic disease that requires close monitoring and a great degree of compliance with medical instructions.
2. The patient or parent must be instructed on how to use their asthma medications, the importance of adherence and the appropriate technique.
3. The patient or parents must demonstrate the appropriate inhaler technique before leaving the clinic.
4. The patient or parents should be educated on how to use a self-management plan.
5. The patient or parents should be encouraged to avoid exposure to triggers. Complete avoidance of environmental tobacco smoke is strongly. For more information visit asthma health education web page :

<https://www.moh.gov.sa/awarenessplatform/ChronicDisease/Pages/Asthma.aspx>

(Box 1)

1. Environmental allergens, indoor, e.g., mold, house-dust mites, cockroaches, and animal dander, should be avoided if the patient is sensitized.
2. For dust mite sensitizations (in humid climates), Wash bed linen and blankets weekly with hot water (≥ 60 C). For cockroach sensitization, use insecticides and avoid leaving food exposed overnight.
3. Exercise: Take a bronchodilator inhaler before exercise.
4. Irritants: tobacco smoke. Avoid both active and passive smoking.
5. Drugs, e.g., Aspirin and other NSAIDs (in patients with aspirin-exacerbated respiratory disease), beta-blockers including eye drops. Etc. Caution with these medications (weigh risks and benefits).
6. Food and food additives. Avoid if known to cause asthma in the patient.
7. Weather changes, exposure to cold air or rain.

STEP 6**Give a follow-up appointment:**

- A.** The follow-up frequency depends on the degree of asthma control. After starting treatment, the patient needs to be seen within 1-3 months. Once asthma is controlled, clinic visits are scheduled every 3-6 months. Pregnant women should have frequent follow-up visits (every 4-6 weeks).
- B.** After an acute exacerbation, the patient needs to be seen within one week.
- C.** At each follow-up visit, conduct the following:
 - 1.** Review ACT score and assess the degree of asthma control.
 - 2.** Check the inhaler technique and correct it if it is not proper.
 - 3.** Assess adherence: check the frequency of asthma therapy use in the past two weeks and check the inhaler's counter if available.
 - 4.** Review the avoidance of exposure to triggers (occupational and environmental control measures).
 - 5.** Check for comorbid conditions, e.g., chronic rhinosinusitis, obesity, anxiety and depression.
 - 6.** Spirometry or peak flow testing
 - 7.** Adjust asthma medications if necessary.
 - 8.** Refer to the asthma specialist clinic whenever indicated.

Referral criteria to an asthma specialist:

Children and adults with asthma or suspected asthma should be referred to the asthma clinic for the following indications:

- 1.** Persistent uncontrolled asthma
(Asthma severity step 5, see page 25).
- 2.** Any red flags for severe asthma that persist after 3 months of treatment initiation. (red flags table 1. B asthma severity).
- 3.** If suspected asthma is not confirmed, especially in normal pulmonary function tests.
- 4.** Evaluation of inhalant (e.g., pollens or animal dander) sensitization to confirm the triggers and to provide education regarding avoidance measures or possible allergy*.
- 5.** Patients with major comorbidities that need management by specialists.
- 6.** Exercise-induced symptoms that are atypical or not responding to pre-treatment with bronchodilators.

*** Patients should be referred to an allergist.**

Acute Asthma

- Asthma patients should be evaluated based on combining clinical examination and measuring flow rates (FEV1 or PEFr) as appropriate. Table 5 is used to guide the therapy in ED.
- Any patient with severe or life-threatening exacerbation should be immediately given the recommended medications and urgently transferred to the tertiary hospital.
- Patients with anaphylaxis as the cause of acute asthma (with urticarial/ angioedema or hypotension/syncope) should receive epinephrine (1:1000) IM (0.3 mg for ≥ 30 kg or 0.15 mg for 10-30 kg) immediately.
- Thunder storms during the heavy pollination seasons (i.e., the transition from winter to summer and vice versa) could lead to a significant rise in the rate of severe asthma exacerbations. On the other hand, sand storms alone usually worsen symptoms but not severe exacerbations.

Table 5. Classification of Acute Asthma Severity

Symptoms and Signs		Initial PEF (or FEV1)	Clinical Course
Mild	<ul style="list-style-type: none"> - Dyspnea only with activity (assess tachypnea in young children) - No accessory muscle uses - End expiratory wheezing - O2 sat>95% 	PEF \geq 75% predicted or personal best	Administer inhaled or nebulized SABA +Repeat if necessary
Moderate	<ul style="list-style-type: none"> - Dyspnea interferes with or limits usual activity - Accessory muscle use - Expiratory wheezing - O2 sat 90%-95% 	PEF 50-74% predicted or personal best	<ul style="list-style-type: none"> - It may require an ED referral - Administer inhaled - or nebulized SABA, repeat every 20 min for 1 hour - Oral systemic corticosteroids
Severe	<ul style="list-style-type: none"> - Dyspnea at rest interferes with conversation - Accessory muscle use - Inspiratory/Expiratory - Wheezing - O2 sat<90% 	PEF <50% predicted or personal best	<ul style="list-style-type: none"> - Requires ED referral and likely hospitalization - Please refer to the next section for management
Life-threatening	<ul style="list-style-type: none"> - Too dyspneic to speak: perspiring - Drowsy or confused - Silent chest 	PEF < 25% predicted or personal best	<ul style="list-style-type: none"> - Requires ED/ hospitalization and likely ICU - Please refer to the next section for management

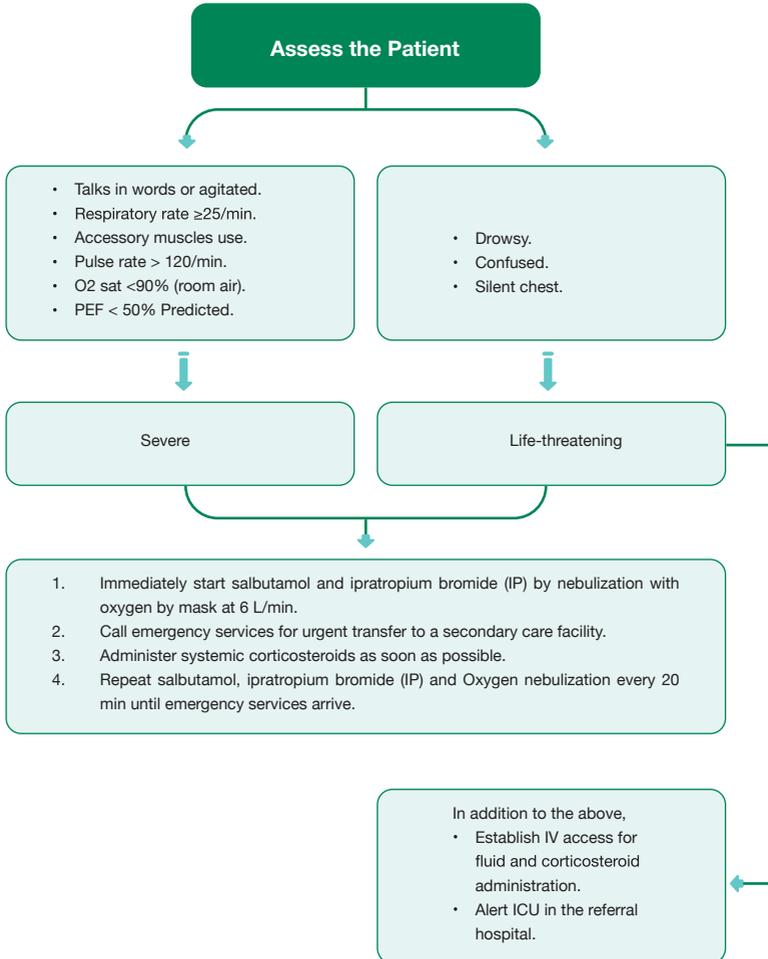
Table 6. Medication Doses in Acute Asthma

Medication	Child dose	Adult dose
Oxygen	<ul style="list-style-type: none"> - Low-flow oxygen is recommended to maintain saturation $\geq 94\%$ - Low-flow oxygen is recommended to maintain saturation $\geq 93\%$ 	<ul style="list-style-type: none"> - Low-flow oxygen is recommended to maintain saturation $\geq 93\%$ - Providing 28% oxygen is better than 100% oxygen
Salbutamol - Nebulizer solution - MDI (100 mcg/Puff)	<ul style="list-style-type: none"> - 2.5 mg/dose if ≤ 20 kg body weight - 5 mg/dose if > 20 kg body weight - 4 Puffs/dose ≤ 20 kg - 8 Puffs/dose > 20 kg 	<ul style="list-style-type: none"> - 5 mg/dose - 8 Puffs/dose
Ipratropium bromide - Nebulizer solution - MDI (18 mcg/Puff)	<ul style="list-style-type: none"> - 0.25 mg/dose - 4 Puffs/dose 	<ul style="list-style-type: none"> - 0.5 mg/dose - 8 Puffs/dose
- Prednisone (PO) - Prednisolone (PO) - Methylprednisolone (IV)	<ul style="list-style-type: none"> - 1- 2 mg/kg (max. 40 mg/ day) for 5 days 	<ul style="list-style-type: none"> - 50 mg /day for 5 days - It is recommended to be started as soon as possible, preferably within 1 hour of presentation in moderate or severe asthma exacerbation - It is usually not necessary to taper the dose unless the duration exceeds 2 weeks

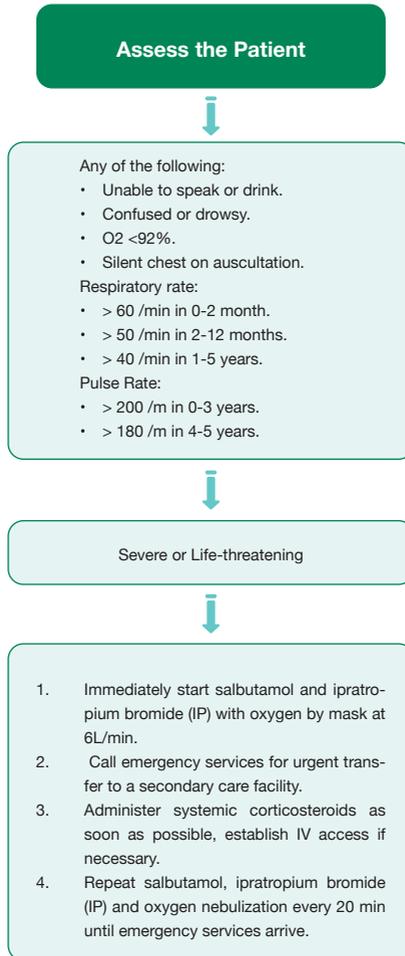
Acute Asthma patients with the following history are at increased risk of death:

- Previous intubation or ICU admission.
- Two or more hospitalizations or more than 3 ED visits in the past year.
- Use of > 1 canister of SABA/month.
- Current use or recent stopping of chronic oral glucocorticoids.
- Major psychosocial problems or psychiatric disease.

Management of Severe and Life-Threatening Acute Asthma in the Primary Care Setting (Adults and Children ≥ 6 years)



Management of Severe and Life-Threatening Acute Asthma in the Primary Care Setting (Children ≤ 5 years)



***For medication doses, please refer to Table 6 in the previous section**

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