



**MAKERERE UNIVERSITY  
LUNG INSTITUTE**

# **Diagnosis and Management of Asthma in Children and Adolescents**

**Job Aid**

**Improving Access to Asthma Care for Children and  
Adolescents in Uganda (ACCA) Study**

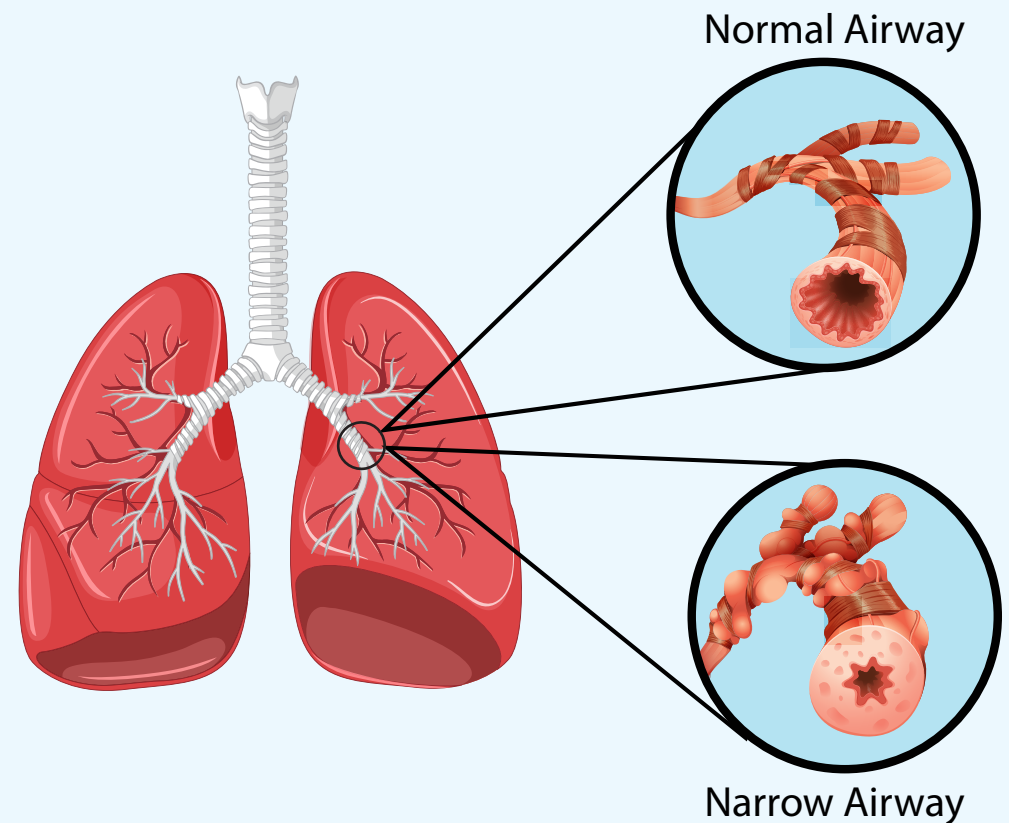
# Definition of asthma

A **heterogeneous** disease usually characterised by **airway inflammation**.

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

Airflow limitation can become persistent.

Asthma is usually associated with airway hyperresponsiveness to direct or indirect triggers.



# Asthma triggers

Viral Upper Respiratory Tract infections (URTI)

Air pollutants- tobacco smoke, smoke from cooking, burning rubbish, candles, car fumes, aerosols, etc

Food (allergies)

Seasonal changes: Rains (cold), Windy (dust), Pollen

Extreme of emotions- anger and excitement

Exercise

Extreme stress



# Features suggestive of Asthma in children 5 years and below

Feature	Characteristic suggesting asthma
Cough	<ul style="list-style-type: none"> <li>• Recurrent or persistent non-productive cough that maybe worse at night or accompanied by wheezing and breathing difficulties</li> <li>• Cough occurring with exercise, laughing, crying or exposure to smoke (tobacco or biomass smoke), especially in the absence of viral respiratory infections</li> </ul>
Wheezing	<ul style="list-style-type: none"> <li>• Recurrent wheezing, including during sleep, in presence of triggers like exercise, laughing, crying, exposure to smoke/air pollutants</li> </ul>
Difficult breathing or heavy breathing or shortness of breath	<ul style="list-style-type: none"> <li>• Occurring with exercise, laughing or crying</li> </ul>
Reduced activity	Not running or playing at the same intensity as other children. Tires earlier during walks (wants to be carried)
Past or family history	<p>Allergic diseases (dermatitis, rhinitis, food allergy)</p> <p>Asthma in first degree relatives</p>
Therapeutic trial (2-3 months) with low-dose ICS with as-needed SABA	Clinical improvement during the 2-3 months of treatment and worsening when treatment is stopped

# Making a diagnosis of asthma in children 5 years and below

## Criterion 1

- Recurrent acute wheezing episodes\* OR
- At least 1 acute wheezing episode with asthma - like symptoms\* between episodes

## Criterion 2

- No likely alternative cause for the respiratory symptoms

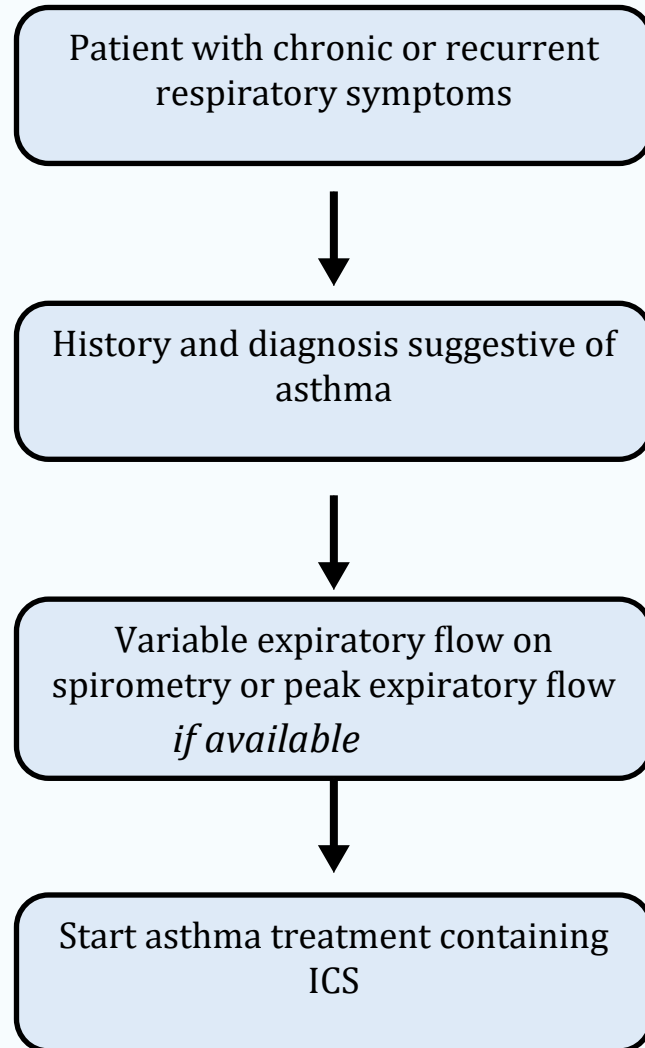
## Criterion 3

- Timely clinical response of respiratory symptoms or signs to asthma medications e.g short term response to Short-Acting Beta-Agonist (SABA) or reduction of frequency and severity of symptoms during 2-3 months of Inhaled Corticosteroids (ICS) trial

### NOTE

- To make a diagnosis of asthma, the **three criteria must be present.**
- If only one or two criteria are present, then a provisional diagnosis of asthma is made.
- Consider starting treatment and ensure periodic reassessment to document response to asthma medication and changes in symptoms over time.

# Making a diagnosis of asthma in children $\geq 6$ years and adolescents



If symptoms are not suggestive, find alternative diagnosis

If alternative diagnosis is unlikely, give empirical treatment containing ICS for 1- month and review.

# Assessment of Asthma Control

Symptom control	Level of symptom control		
	Well-controlled	Partially controlled	Uncontrolled
<p>In the past 4 weeks, has the patient had:</p> <ul style="list-style-type: none"> <li>• Daytime asthma symptoms more than twice a week? Yes <input type="checkbox"/> No <input type="checkbox"/></li> <li>• Any night waking due to asthma? Yes <input type="checkbox"/> No <input type="checkbox"/></li> <li>• Reliever needed for symptoms more than twice a week? Yes <input type="checkbox"/> No <input type="checkbox"/></li> <li>• Any activity limitation due to asthma? Yes <input type="checkbox"/> No <input type="checkbox"/></li> </ul>	None of these	1-2 of these	3-4 of these

*Ref: Global Initiative for Asthma: Global Strategy for Asthma Management and Prevention, 2025.*

# Definition of acute asthma

**Acute asthma** is also referred to as an **asthma exacerbation** or **asthma attack**

Asthma exacerbations are episodes characterized by a progressive increase in symptoms of shortness of breath, cough, wheezing or chest tightness and progressive decrease in lung function.

Exacerbations occur in

- People with pre-existing diagnosis of asthma
- First presentation of asthma



Key features of acute asthma

- Inflammation (oedema)
- Smooth muscle contraction
- Airway narrowing

# Definition of asthma exacerbation in young children

**For children aged 5 years and below, consider the following symptoms:**

Cough, Shortness of breath or difficulty in breathing, Wheezing, Chest tightness.

In addition to the above symptoms, consider the following:

Early symptoms of an asthma exacerbation in **'young children'** may include the following:

- Onset of symptoms of a respiratory tract infection
- Acute or a sub-acute increase in wheeze or shortness of breath
- Increase in coughing especially during sleep
- Lethargy or reduced exercise tolerance
- Impairment of daily activities including feeding

# Physical examination

- Level of consciousness
- Vital signs: SpO<sub>2</sub>, respiratory rate, heart rate, blood pressure, temperature
- Use of accessory muscles of respiration
- Wheeze (audible and auscultatory)
- Complicating features: anaphylaxis, pneumothorax, pneumonia
- Signs of alternative conditions e.g. Foreign body aspiration
- Peak Expiratory Flow Rate (PEFR) measurement (if available) in >5 years

## Peak flow meter



# Classification of asthma exacerbations

Characteristic	Mild	Moderate	Severe	Life-threatening
<b>Mental status</b>	Not agitated	Not agitated	Agitated	Confusion/drowsiness
<b>Speech</b>	Able to talk in sentences	Talks in phrases	Talks in words (unable to complete sentences)	Not able to talk
<b>Posture</b>	Sits normally-no preferential posture	Prefers sitting to lying down	Sits hunched forward	
<b>Respiratory system</b>	SpO2 >94%	SpO2 90-94%	SpO2 <90%	SpO2 <90%
	Respiratory rate increased (but may be normal)	Respiratory rate increased	Respiratory rate increased	Respiratory rate increased or reduced (poor work of breathing)
	No use of accessory muscles	No use of accessory muscles	Use of accessory muscles	Poor respiratory effort
	Air entry is normal	Reduced air entry	Reduced air entry	Silent chest
	PEFR ≥70%	PEFR ≥50% but < 70%	PEFR ≤50%	PEFR ≤33%
<b>Cardiovascular system</b>	Pulse rate normal range	Pulse rate is Increased for age	Pulse rate is Increased for age	Bradycardia (low pulse rate) for age

# How to treat asthma exacerbation

Drug	Route	Dose	Duration	What to do if no improvement
Salbutamol	Inhaled	<p><b>a) Inhaled via a spacer with a mask (Preferred)</b></p> <ul style="list-style-type: none"> <li>➤ Children &lt;6 years – 2-4 puffs per dose</li> <li>➤ Children 6-12 years -4-6 puffs per dose</li> <li>➤ Children &gt;12 years -6-10 puffs per dose</li> </ul> <p><b>b) Nebulised</b></p> <ul style="list-style-type: none"> <li>➤ &lt;5years: Nebulised salbutamol 2.5mg in 5mls of normal saline per dose</li> <li>➤ &gt;5years: Nebulised salbutamol 5mg in 7.5 - 10mls of normal saline per dose</li> </ul> <p><b>NOTE</b> Inhaler-spacer combination is more efficacious &amp; cost-effective</p>	<p>Given 3 doses 20 minutes apart. Then reassess,</p> <p>In case of improvement, then maintain 6 - 8 hourly for 3 - 5days</p> <p>Give 3 doses 20 minutes apart, then reassess</p> <p><b>NOTE</b> "Dose" refers to the number of puffs given during that episode.</p> <p>Life-Threatening Asthma: Consider nebulisation while preparing for referral.</p>	<ul style="list-style-type: none"> <li>➤ Check inhaler technique</li> <li>➤ Check the dosage</li> <li>➤ Ensure equipment is functional, especially nebulizers</li> <li>➤ Ensure no triggers in the environment</li> </ul> <p><b>NOTE</b> If these are reviewed and still no improvement, refer immediately</p>
Prednisolone	oral	1-2mg/kg/day, max. 40mg/day	3-5days	
Oxygen therapy as needed ( if SpO <sub>2</sub> is <90% room air)				

# Discharge and Follow-up



## Discharge

- When to discharge: Normal respiratory rate, normal pulse for age, able to feed, can talk comfortably, play, and fully conscious.
- Discharge on treatment with a written Action Plan for asthma exacerbation
- Exacerbations often represent failures in chronic asthma care, so take the opportunity to review the patient's chronic asthma management
- Asthma education – emphasize treatment & appropriate inhaler technique
- Plan follow up soon – within 1-2 weeks.

## At follow-up visit(s), check:

- The patient's understanding of the cause of the flare-up
- Evaluate triggers, e.g. smoke, dust exposure, and other triggers
- Adherence with medications, and understanding of their purpose
- Inhaler technique skills
- Written asthma action plan



# Caregiver message at discharge

- Discuss the asthma diagnosis and address all questions
- Discuss possible triggers .
- Rationale for treatment and follow up visit.
- Emphasize the differences between relievers and controller treatments (if prescribed) and how to differentiate them.
- Potential side effects of medications
- Prevention of symptoms and flare-ups, and the importance of controller treatment.
- How to recognize worsening asthma and what actions to take
- How and when to seek medical attention
- Encourage them to always return with their medication and a demonstration of the inhaler technique.
- Assess for understanding of the caretaker and patient (for older children and adolescents).



# USING AN INHALER AND SPACER WITH A MASK

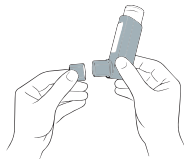
**Step 1:**  
Confirm the right medication  
and expiry date



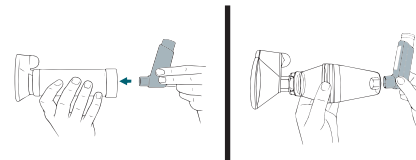
**Step 2:**  
Shake the inhaler -remember to  
shake in 180 degree arcs up to 7cycles



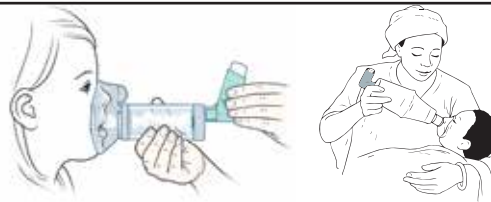
**Step 3:**  
Remove the cap of the inhaler



**Step 4:**  
Insert inhaler into the space  
provided at the bottom of the  
Spacer



**Step 5:**  
Tilt the child's neck slightly and gently. Place the mask over the  
child's mouth and nose, ensuring there is no air leakage  
(airtight seal). Then press the inhaler to release one puff of  
the medication.



**Step 6:**  
Ask the patient to breath in as deeply as they can,  
and then hold for 10 seconds, then breath out gently.  
Repeat the same procedure for each puff

**NOTE:**  
For young children who cannot follow instructions, let them breathe normally and count 4-6 breaths (breathing in and out) per puff. For patients who are very breathless and cannot hold their breath, allow them to breathe for 4-6 seconds.

## NOTE:

1. Give one puff at a time. For example, if a patient requires two puffs, give one puff, let them inhale it using the procedure described above, then give the next puff, and so on. Never give more than one puff at a time.
2. The child should be in an upright or seated position while the inhaler is being administered. Do not administer it in a lying-down position.
3. Do not allow the child to speak or count while the medicine is being administered.
4. Always use a spacer with a mask for children under 6 years.

# USING A SPACER WITH A MOUTH PIECE

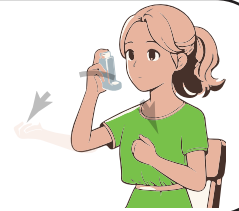
For older children and adolescents, use a spacer with a mouthpiece as shown below.



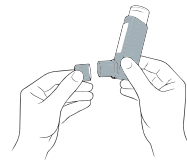
**Step 1:**  
Confirm the right medication  
and expiry date



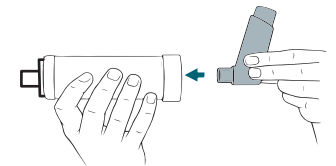
**Step 2:**  
Shake the inhaler –remember to  
shake in 180 degree arcs up to 7cycles



**Step 3:**  
Remove the cap of the inhaler



**Step 4:**  
Insert inhaler into the space  
provided at the bottom of the  
Spacer



**Step 5:**  
Place mouth piece into the patient's mouth and  
ask the patient to tightly close the mouth around the  
mouthpiece.



**Step 6:**  
Ask the patient to breath in as deeply as they can, and then hold for 10 seconds, then breath out gently.  
Repeat the same procedure for each puff

