



MINISTRY OF  
**HEALTH &  
WELLNESS**

**ASTHMA  
AWARENESS**



**GUIDELINE FOR  
THE CLINICAL  
MANAGEMENT  
OF ASTHMA  
IN JAMAICA**

ISSUED: MARCH 2025



MINISTRY OF  
**HEALTH &  
WELLNESS**

# GUIDELINE FOR THE CLINICAL MANAGEMENT OF ASTHMA IN JAMAICA

ISSUED MARCH 2025

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# CONTENTS



<b>INTRODUCTION</b> .....	<b>5</b>
Definition of Asthma .....	<b>6</b>
The Pathophysiology of Asthma .....	<b>6</b>
The Approach to Stepwise Asthma Management .....	<b>6</b>
<b>METHODOLOGY</b> .....	<b>9</b>
<b>DIAGNOSIS OF ASTHMA</b> .....	<b>12</b>
<b>OTHER IMPORTANT DEFINITIONS</b> .....	<b>14</b>
Asthma Severity .....	<b>14</b>
Criteria for Asthma Control .....	<b>14</b>
Classification of Severity of Asthma Exacerbation .....	<b>15</b>
Risk of Exacerbation Criteria .....	<b>16</b>
<b>PHARMACOLOGICAL MANAGEMENT</b> .....	<b>17</b>
Inhaled Corticosteroids .....	<b>17</b>
Inhaled Beta-2 agonist .....	<b>18</b>
Selection of Inhalers and Accessory Devices .....	<b>18</b>
Inappropriate or excessive PRN SABA use .....	<b>19</b>
Prescribing Advice for Asthma Inhalers .....	<b>19</b>
Inappropriate use or Excessive use of PRN ICS .....	<b>19</b>
<b>ASSESSING FUTURE RISK OF ADVERSE EFFECTS DUE TO MEDICATION</b> .....	<b>21</b>
The Impact of ICS on Linear Growth in Children .....	<b>21</b>
The Impact of ICS on Adrenal function in Children .....	<b>21</b>
The Impact of ICS on Bone Mineral Density .....	<b>21</b>
Adverse drug reactions and Safety of Leukotriene Receptor Antagonists (LTRAs) .....	<b>21</b>
<b>REFERRAL TO AN ASTHMA SPECIALIST</b> .....	<b>22</b>
<b>ASTHMA TREATMENT RECOMMENDATIONS FOR PRESCHOOL CHILDREN</b> .....	<b>23</b>
Stepwise Approach for Management of Asthma in Preschool Children .....	<b>24</b>
Step 2 Treatment Options for Preschool Children .....	<b>25</b>

Step 3 Treatment Options for Preschool Children .....	27
<b>ASTHMA TREATMENT RECOMMENDATIONS FOR SCHOOL AGED CHILDREN .....</b>	<b>29</b>
Stepwise Approach for Management of Asthma in School Aged Children .....	30
Step 1 Treatment Options for School Aged Children .....	30
Step 2 Treatment Options for School Aged Children .....	32
Step 3 Treatment options for School Aged Children .....	33
<b>ASTHMA TREATMENT RECOMMENDATIONS FOR ADOLESCENTS AND ADULTS ..</b>	<b>34</b>
Stepwise Approach for Management of Asthma in Adolescents and Adults .....	35
Step 1 Treatment Options for Adolescents and Adults .....	35
Step 2 Treatment Options for Adolescents and Adults .....	37
Step 3 Treatment Options for Adolescents and Adults .....	39
<b>GENERAL GUIDANCE FOR ALL PERSONS WITH ASTHMA .....</b>	<b>41</b>
<b>REFERRAL FOR EXPERT ADVICE AND FURTHER INVESTIGATION .....</b>	<b>43</b>
<b>REFERENCES .....</b>	<b>45</b>
<b>APPENDICES .....</b>	<b>48</b>
<b>APPENDIX 1:</b>	
ASTHMA ACTION PLAN .....	49
<b>APPENDIX 2:</b>	
ASTHMA ACTION PLAN: INSTRUCTIONS FOR PATIENTS .....	50
<b>APPENDIX 3:</b>	
ASTHMA ACTION PLAN: INSTRUCTIONS FOR CLINICIANS .....	51
<b>APPENDIX 4:</b>	
MART ASTHMA ACTION PLAN .....	52
<b>APPENDIX 5:</b>	
INSTRUCTIONS FOR USE OF MART ASTHMA ACTION PLAN FOR PATIENTS .....	53
<b>APPENDIX 6:</b>	
INSTRUCTIONS FOR USE OF MART ASTHMA ACTION PLAN FOR CLINICIANS .....	54

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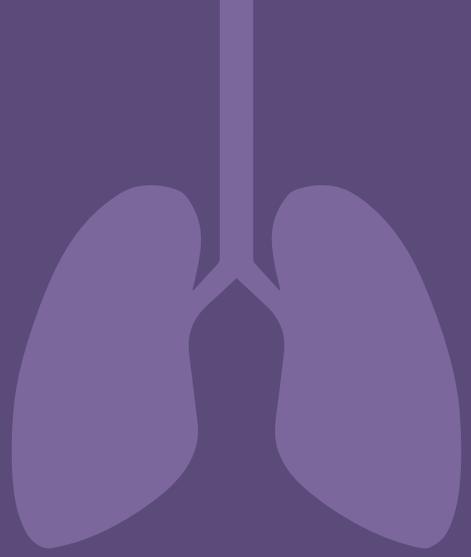
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# ABBREVIATIONS/ACRONYMS



<b>ACQ-5</b>	Asthma Control Questionnaire-5
<b>ACT</b>	Asthma Control Test
<b>ADR</b>	Adverse Drug Reaction
<b>ATS</b>	American Thoracic Society
<b>A&amp;E</b>	Accident and Emergency
<b>BID</b>	Twice a day
<b>DPI</b>	Dry Powder Inhaler
<b>ED</b>	Emergency Department
<b>ERS</b>	European Respiratory Society
<b>FABA</b>	Fast Acting Beta-2 agonist
<b>FDA</b>	Food and Drug Administration
<b>FEV1</b>	Fraction of Expired Volume in 1 second
<b>GINA</b>	Global Initiative for Asthma
<b>GDG</b>	Guideline Development Group
<b>HFA</b>	Hydrofluoroalkane
<b>ICS</b>	Inhaled Cortico Steroid
<b>LABA</b>	Long-acting Beta-2 agonist
<b>LTRA</b>	Leukotriene Receptor Antagonist
<b>MART</b>	Maintenance and Reliever Therapy
<b>MoHW</b>	Ministry of Health and Wellness
<b>MDI</b>	Metered Dose Inhaler
<b>NHLBI</b>	National Heart Lung and Blood Institute
<b>PACQLQ</b>	Pediatric Asthma Caregiver's Asthma Quality of Life Questionnaire
<b>PEFR</b>	Peak Expiratory Flow Rate
<b>PMDI</b>	Pressurised Metered Dose Inhaler
<b>PRN</b>	as needed or intermittent
<b>RTI</b>	Respiratory Tract Infection
<b>SABA</b>	Short Acting Beta-2 agonist
<b>URTI</b>	Upper Respiratory Tract Infection
<b>US</b>	United States of America
<b>VHC</b>	Valved Holding Chamber
<b>WAE</b>	Wheezing Asthma Exacerbations



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# INTRODUCTION

## Definition of Asthma

Asthma is a respiratory disease characterised by chronic airway inflammation, hyperresponsiveness, and reversible airway obstruction. Globally, it is one of the most common chronic non-communicable diseases affecting both adults and children but represents the most common chronic childhood disease (1, 2).

## The Pathophysiology of Asthma

The pathophysiology of asthma is complex and multifactorial. The most recognised risk factors include a genetic predisposition, personal or family history of atopy, and exposure to potential irritants or environmental triggers (3). Potential triggers include:

Non-allergic triggers:

- viral upper respiratory tract infections
- air pollutants (e.g., tobacco smoke, smog)
- climate/weather change
- exercise
- strong emotions
- chemical irritants (detergents, perfumes)

Allergic triggers:

- animal dander/fur
- pollen
- dust mites, cockroaches
- mould
- foods

The interplay of these risk factors results in their interaction with multiple inflammatory cells (e.g., plasma cells, Th2-lymphocytes, mast cells, basophils, eosinophils, and neutrophils) and their various inflammatory mediators produced (e.g., histamine, prostaglandins, cytokines, leukotrienes, IgE), ultimately resulting in chronic airway inflammation, bronchoconstriction, increased mucus production and in some instances airway remodelling (3).

## The Approach to Stepwise Asthma Management

Following a detailed history and examination and the assessment of all available clinical information, the clinician should estimate the severity of the patient's asthma. Treatment should start at the appropriate step based on the diagnosis that controls symptoms and improves lung function. If symptom control and improved lung function are achieved and maintained by this initial step for 3 to 6 months, then the treatment should be de-escalated (step-down treatment). If not, escalation (step-up) of treatment may be required. The goal is to first achieve control and attain normalised lung function early in the presentation with an appropriate intensive or high step regimen, sustain asthma control and lung function at that step, then step-down treatment to determine whether asthma control and normalised lung function can be maintained with less intensive medication.

At each treatment step, clinicians should use the lowest effective dose of medication within the step medication range that is effective (for prevention of exacerbations, maintaining lung function, asthma control, optimising quality of life and minimising need for rescue medications) and minimises adverse effects. If at any time a patient's symptoms become uncontrolled on their current step of treatment, then treatment should be intensified (step-up treatment) to achieve control again.

Clinicians should constantly assess, adjust, and review asthma management to improve patient outcomes (see Figure 1 below) (4).

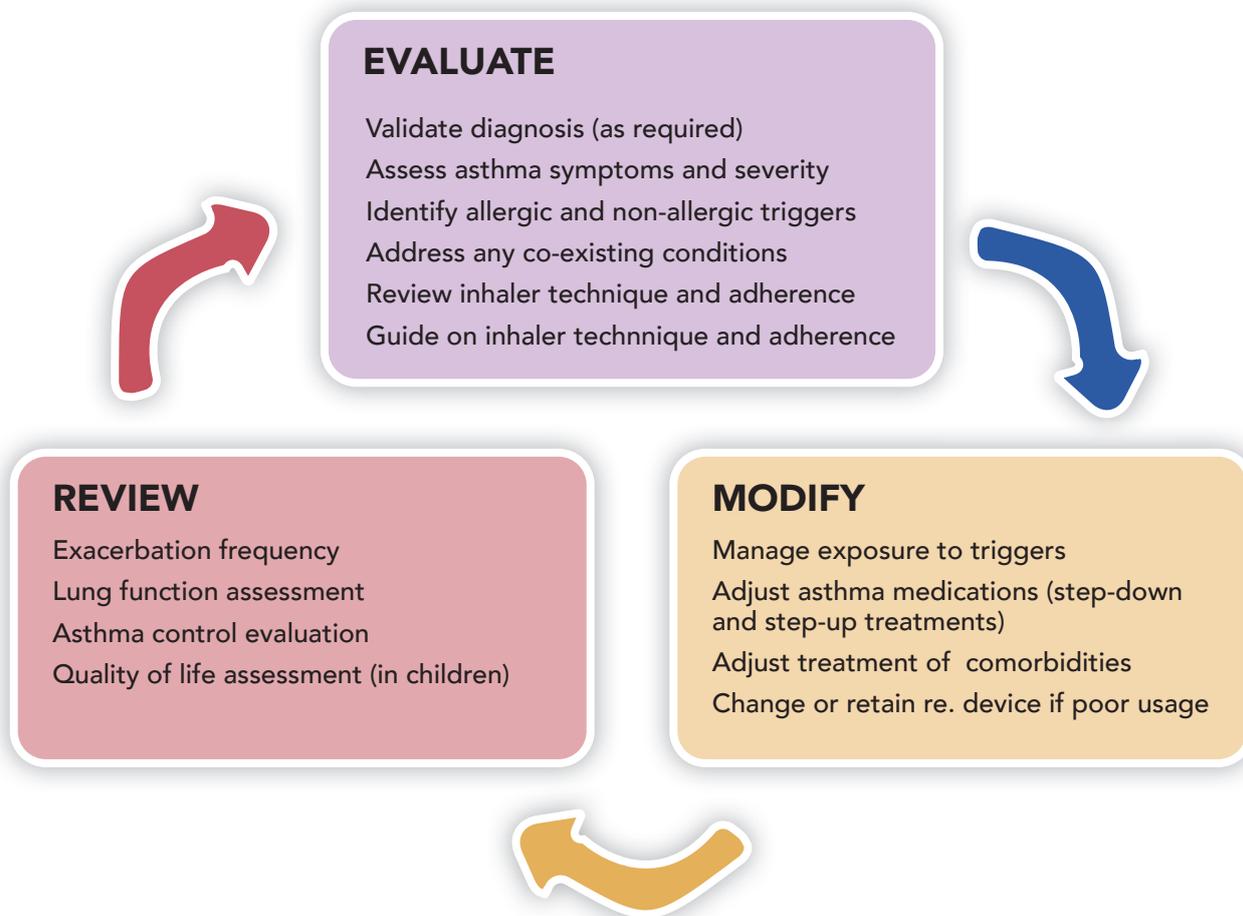


Figure 1: Asthma Management Cycle: Evaluate, Review, Modify (4)

### Preferred versus Alternative Treatment Options

Within a given step, the preferred treatment(s) refer(s) to the most effective management option(s) recommended by the Asthma Guideline Development Group. This was based on supporting evidence that was reviewed or strong panel consensus agreement that the option(s) follow(s) good (i.e., standard of care) practices.

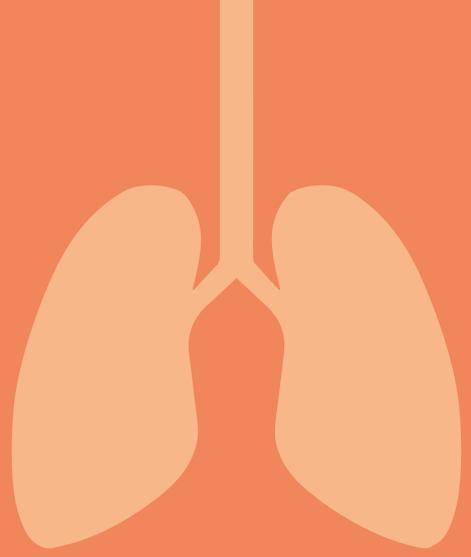
Within a given step, the alternative treatment(s) refer(s) to less effective management option(s) recommended by the Asthma Guideline Development Group based on the limited evidence available on their efficacy or anticipated undesirable effects.

### **Maintenance Therapy**

Maintenance therapy refers to medications that are scheduled daily.

### **As needed (PRN) Medications**

Medications that can be taken on an as-needed (PRN) basis for symptom relief. At times, two PRN medications are taken at the same time or concomitantly and if these are available together in a single device, this is called a combination reliever.



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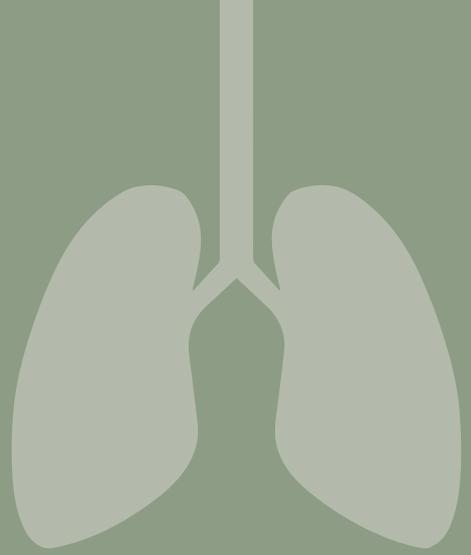
# METHODOLOGY

These guidelines were developed using GRADE (Grading of Recommendations, Assessment, Development, and Evaluations) methodology. The GRADE approach is “a system for rating the quality of a body of evidence which offers a transparent and structured process for developing and presenting evidence summaries and for carrying out the steps involved in developing recommendations” (23).

Following the principles of this methodology, an Asthma Guideline Development Group (GDG) was formed consisting of twelve multidisciplinary members. The GDG agreed to focus on management of asthma in patients of all age groups and severities. The focus, however, was on the maintenance of asthma control in the outpatient setting rather than the management of acute exacerbations. Treatment options were examined for pre-school children, school aged children, adolescents, and adults with very mild, mild, and moderate asthma, for Steps 1 to 3.

The NHLBI 2020 and GINA 2022 guidelines on asthma management were compared, and corresponding rationales were examined. Independent systematic reviews retrieved from PubMed were also used where evidence from the guidelines were not offered. The recommendations were rated by level of evidence according to the GRADE approach.

In this user manual, we use the terms ‘should’ and ‘may’ to indicate the strength of recommendations. ‘Should’ refers to preferred treatments, supported by either strong evidence or strong panel consensus. ‘May’ is used for management options recommended by the GDG that are based on limited evidence or potential undesirable effects.



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# DIAGNOSIS OF ASTHMA

The diagnosis of asthma should ideally be made in a patient who is currently not on any inhaler therapy. Most international guidelines recommend the use of the characteristic history of variable respiratory symptoms and evidence of expiratory airflow limitation for asthma diagnosis. According to the advice and specifications of these international guidelines, GINA 2022, NICE 2017, NHLBI 2007, spirometry testing should be done by a trained provider to evaluate expiratory airflow limitation, if spirometry is available.

Some international guidelines include Fractional Exhaled Nitric Oxide testing (FeNO) and peak flow rate (PEFR) variability monitoring as supportive diagnostic tests. FeNO is used in the diagnostic algorithm for special circumstances when spirometry is unclear/inconclusive and not congruent with clinical impression (5, 6). PEFR variability may be used in specific circumstances when other diagnostic tests are unclear in those over 5 years old (4, 6, 7). According to the NICE 2017 guideline,  $\geq 20\%$  variability in PEFR should be regarded as a positive test for diagnosis of asthma (6). Although the peak flow metre may be less expensive than spirometer equipment, inaccurate recordings and decreased compliance may limit its use as a diagnostic test. However, the peak flow variability can be an important tool in assessing asthma control (Please see Criteria for Asthma Control on page 14).

### **Diagnosis of Asthma without Spirometry**

The World Health Organization (WHO) Package of Essential Non-communicable (PEN) disease interventions for primary care utilises a clinical assessment checklist to first assess if a patient is likely to be diagnosed with asthma. The checklist determines an initial diagnosis of asthma in a patient with cough, difficulty breathing, chest tightness and/or wheezing. The assessment is as follows (8):

A patient presents with cough, difficulty breathing, tight chest, and/or wheezing; assess if they have:

- Previous diagnosis of asthma
- Symptoms since childhood or early adulthood
- History of hay fever, eczema, and/or allergies
- Intermittent symptoms with asymptomatic periods in between
- Symptoms worse at night or early morning
- Symptoms triggered by respiratory infections, exercise, weather changes or stress
- Symptoms respond to salbutamol

If most of the list is positive, then the diagnosis of asthma is likely.

The above checklist can be used in conjunction with GINA 2022 guideline patterns of respiratory symptoms to further rule in or rule out asthma as a differential diagnosis (4).

They are as follows:

Patterns of respiratory symptoms which increase the probability that a patient has asthma include:

- The presence of more than one type of respiratory symptom (especially in adult patients)
- Exacerbations of symptoms occur at night or early morning
- Severity and timing of symptoms vary
- Symptoms are caused by predictable triggers

Patterns of respiratory symptoms which decrease the probability that respiratory symptoms are due to asthma include:

- Isolated cough only, with absence of other respiratory symptoms
- Chronic production of sputum
- The presence of chest pain
- Shortness of breath associated with dizziness, light-headedness, or peripheral tingling (paraesthesia)
- Exercise-induced asthma with noisy inspiration

To diagnose asthma, one of the 2 following Peak Expiratory Flow tests can be used (8):

1. Demonstrate Bronchodilator Response using Peak Expiratory Flow Rate

- First, measure peak expiratory flow rate (PEFR).
- Then give 2 puffs of salbutamol and measure PEFR again after 15 minutes.
- Asthma diagnosis is likely if the PEFR improves by 20%.

2. Demonstrate Peak Expiratory Flow Variability

- Calculated as the difference between the patient's highest and lowest PEF rate values divided by their mean over a two-week period multiplied by 100, for morning and night.
- A value of more than 20% variability is a positive test (6).

# OTHER IMPORTANT DEFINITIONS



## Asthma Severity

The severity of asthma refers to the intensity of treatment required to achieve the patient's best control of their asthma. The current definitions of asthma severity, recommended by ATS/ERS Task Force and included in most asthma guidelines, suggest that severity should be assessed retrospectively from the level of treatment required to control the patient's symptoms and exacerbations (9) i.e., after at least several months of treatment (after at least 3 to 6 months as per GINA 2022) (4). This classification would apply to all age groups; it is as follows (9):

Very Mild Asthma <sup>1</sup>	Mild Asthma	Moderate Asthma	Severe Asthma <sup>2</sup>
Asthma that is well controlled with PRN SABA	Asthma that is well controlled with: <ul style="list-style-type: none"> <li>• low dose ICS &amp; PRN SABA</li> <li>or</li> <li>• PRN ICS-formoterol</li> </ul>	Asthma that is well controlled with: <ul style="list-style-type: none"> <li>• low-to-moderate dose ICS - LABA &amp; PRN SABA</li> <li>or</li> <li>• ICS-formoterol as MART</li> </ul>	Requiring high intensity treatment (high-dose ICS-LABA +/- oral corticosteroids and/ or other treatment (leukotriene modifier/ theophylline/ LAMA/ biologics) to achieve control
Abbreviations: ICS, inhaled corticosteroids; LABA, long-acting beta-2 agonists; PRN, as needed/intermittent; SABA, short acting beta-2 agonist <sup>1</sup> Very mild asthma is only used for children in this guideline. <sup>2</sup> This step needs to be managed by a specialist.			

Please note that the term Intermittent Asthma is no longer used due to:

- concerns of patient misperception of not having asthma
- Lack of evidence-based distinction from mild asthma

It is now known that patients with so-called "intermittent" asthma can have severe or fatal exacerbations and that their risk is substantially reduced by ICS containing treatment compared to SABA alone.

## Criteria for Asthma Control

A patient with asthma is controlled if over the past 4 weeks:

Daytime symptoms	<2 days per week
Nighttime symptoms	no night awakening due to asthma
Activity Limitations	No activity limitation due to asthma (includes absence from work or school due to asthma)
Exacerbations	No clinical evidence of asthma exacerbation
FEV <sub>1</sub> or PEF <sub>R</sub>	>90% of personal best FEV <sub>1</sub> or PEF <sub>R</sub> (if unavailable/not applicable, use activity levels)
PEF diurnal variation	<10-15% PEF diurnal variation (if unavailable/not applicable, use activity levels)
FEV <sub>1</sub> , forced expiratory volume in 1 second; PEF, peak expiratory flow	

A patient with asthma is well controlled when all the above criteria are met and uncontrolled if any one of these are absent.

**Peak Expiratory Flow Rate (PEFR):** This is a simple and reliable test of lung function that is used to determine and quantify airway obstruction. The PEFR rate has a positive correlation with the forced expiratory volume in one second (FEV<sub>1</sub>).

**PEF Diurnal variation:** Calculated as the difference between the patient’s highest and lowest PEF rate values divided by their mean over a two-week period multiplied by 100 for morning and night.

### Classification of Severity of Asthma Exacerbation

The NHLBI 2007 recommends the following lung function measurements, symptoms, signs, and clinical courses to classify the severity of asthma exacerbation.

**Table 2: Classifying Asthma Exacerbations in the Urgent or Emergency Care Setting by NHLBI 2007 Guidelines (5)**

	Symptoms and Signs	Initial PEF (or FEV <sub>1</sub> )	Clinical Course
Mild	Dyspnoea only with activity (assess tachypnoea in young children)	PEF ≥ 70 percent predicted or personal best	<ul style="list-style-type: none"> <li>• Usually cared for at home</li> <li>• Prompt relief with inhaled SABA</li> <li>• Possible short course of oral systemic corticosteroids</li> </ul>
Moderate	Dyspnoea interferes with or limits usual activity	PEF 40-69 percent predicted or personal best	<ul style="list-style-type: none"> <li>• Usually requires office or A&amp;E visit</li> <li>• Relief from frequent inhaled SABA</li> <li>• Oral systemic corticosteroids: some symptoms last for 1-2 days after treatment is begun</li> </ul>
Severe	Dyspnoea at rest; interferes with conversation	PEF <40 percent predicted or personal best	<ul style="list-style-type: none"> <li>• Usually requires an A&amp;E visit and likely hospitalisation.</li> <li>• Partial relief from frequent inhaled SABA</li> <li>• Oral systemic corticosteroids: some symptoms last &gt;3 days after treatment is begun</li> <li>• Adjunctive therapies are helpful</li> </ul>
Subset: Life threatening	Too dyspnoeic to speak; diaphoresis	PEF <25 percent predicted or personal best	<ul style="list-style-type: none"> <li>• Requires A&amp;E visit, hospitalisation, and possible ICU admission</li> <li>• Minimal or no relief from frequent inhaled SABA</li> <li>• Intravenous corticosteroids</li> <li>• Adjunctive therapies are helpful</li> </ul>

**Abbreviations:** A&E: accident and emergency; FEV<sub>1</sub>: forced expiratory volume in 1 second; ICU: intensive care unit; PEF: peak expiratory flow; SABA: short acting beta-2 agonist

Adapted from National Asthma Education and Prevention Programme, *Third Expert Panel on the Diagnosis and Management of Asthma. Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. Bethesda (MD); page 375 (5)*

## **Risk of Exacerbation Criteria**

The presence of any one of the following risk factors put patients at higher risk of exacerbation even if they have a few symptoms:

- Medications – Inappropriate or excessive SABA use (See section on Inappropriate or excessive SABA use)
- Inaccurate technique for medication administration
- History of severe exacerbations requiring either systemic steroids, A&E visits and/or hospitalisations.
- Uncontrolled asthma (as per Criteria for Asthma Control on page 14)
- Comorbidities (e.g., chronic rhinosinusitis, confirmed food allergies, obesity)
- Potential irritants/environmental exposure – smoking (tobacco, marijuana), e-cigarettes, aeroallergens, air pollutants
- Socioeconomic burdens which may make adherence difficult
- Psychological issues which may impact on adherence

# PHARMACOLOGICAL MANAGEMENT



## Inhaled Corticosteroids

A pooled analysis revealed a significant overall improvement in lung function in patients treated with fluticasone compared to those receiving clinically equivalent doses of budesonide. However, lung function was similar in patients with fluticasone propionate when compared to beclomethasone dipropionate (10).

GINA 2020 and NHLBI 2007 categorise ICS for all age groups and suggest 'low' 'medium' and 'high' total daily dose values for ICS maintenance therapy.

An adaptation of the NHLBI 2007 Estimated Comparative Daily Dosages for Inhaled Corticosteroids is below:

**Table 3: Estimated Comparative Daily Dosages for Inhaled Corticosteroids (5)**

Drug	Low Daily Dose	Medium Daily Dose	High Daily Dose
<b>Preschool Children (≥1 to 5 years of age)</b>			
Fluticasone HFA/MDI 50, 125 or 250 mcg/puff	100 - 200 mcg	> 200 - 400 mcg	>400 mcg
Beclomethasone HFA 50 mcg/puff	100 - 200 mcg	> 200 - 400 mcg	>400 mcg
<b>School Aged Children (6 to 11 years of age)</b>			
Fluticasone HFA/MDI 50, 125 or 250 mcg/puff	100 - 200 mcg	> 200 - 400 mcg	>400 mcg
Budesonide DPI 80 or 160 mcg/inhalation	160 mcg	> 160 - 640 mcg	>640 mcg
Beclomethasone HFA 50 or 250 mcg per/puff	100 - 200 mcg	> 200 - 400 mcg	>400 mcg
<b>Adolescents and Adults (≥12 years of age)</b>			
Fluticasone HFA/MDI 50, 125 or 250 mcg/ inhalation	250 mcg	500 mcg	>500 mcg
Beclomethasone HFA 50 or 250 mcg per puff	250 mcg	500 mcg	>500 mcg
Budesonide DPI 80 or 160 mcg/puff	320 mcg	640 mcg	>640 mcg

**Abbreviations:** DPI, dry powder inhaler; HFA, hydrofluoroalkane; MDI, metered dose inhaler  
 The dosages listed here are the highest possible dose for the respective age groups.  
 The medications and dosages used in this table are based on the commonly available drugs in Jamaica.

## ***Inhaled Beta-2 agonist***

Inhaled beta-2 agonists are bronchodilators that can be classified as short-acting, long-acting, and fast-acting.

- Short acting beta-2 agonists (SABA): provide rapid, as-needed symptom relief and short-term prophylactic protection against bronchoconstriction induced by exercise or other stimuli (e.g., salbutamol).
- Long-acting beta-2 agonists (LABA): provide long-term bronchodilation and improve lung function. (e.g., salmeterol, formoterol)
- Fast acting beta-2 agonist (FABA): Can either be a short-acting beta-2 agonist or a long-acting beta-2 agonist with rapid onset of action. (e.g., formoterol) (11).

## ***Maintenance and Reliever Therapy (MART)***

MART refers to the use of a combination of low dose inhaled corticosteroids and fast acting beta-2 agonists (e.g., formoterol) as both the maintenance and reliever medications. This is a novel asthma treatment strategy where one combination drug is used as both the maintenance component and reliever component of therapy. MART therapy has been recommended by GINA 2022 and NHLBI 2020 although the US FDA does not approve any form of ICS/formoterol medicine as a reliever therapy component for any age group. The European Medicines Agency has approved generic forms of budesonide/formoterol (160/4.5) in ages 12 years and older as reliever therapy components for ages 12 years and older (12).

## ***Selection of Inhalers and Accessory Devices***

The efficacy of SABA delivery via pMDI (pressurised metered dose inhaler) and DPI (dry powder inhaler) is comparable, as is the efficacy of ICS delivered by DPI or pMDI with a spacer or valved holding chamber (VHC). However, the appropriate use of these devices can be influenced by factors such as the patient's age, physical and cognitive abilities, as well as the cost and availability of the drug and device (13).

Regular counselling and education of patients of all ages, and parents/caregivers of paediatric patients on the proper use of their inhaler with accessory devices decreases errors in technique and improves medication delivery (14). Clinicians should monitor for changes in patients' asthma control if their VHC device is switched (15, 16). Note that breath-actuated pMDIs (e.g., Easi-Breathe) and DPIs (e.g., Turbhaler, Diskhaler) do not use spacer/VHC devices.

In young children, an additional mask is appropriate to use. A tight seal with the face is critical for efficient drug delivery. This must be emphasised to parents/caregivers (17, 18).

There are a variety of inhaler designs. Instruction of optimal technique of each inhaler with or without an accessory device is key to proper inhaler use. Direct observation of use of inhalers is recommended at clinic visits where possible.

## ***Points to Note***

- In children <4 years-old, beta-2 agonists and inhaled corticosteroids should be used via pMDI with a spacer or valved holding chamber and mask.
- In all capable children >4 years-old, adolescents and adults, beta-2 agonists and inhaled

corticosteroids should be used via pMDI with a spacer or valved holding chamber.

- In all capable individuals 12 years and older, DPIs may be used.

### ***Inappropriate or excessive PRN SABA use***

Patients should be instructed that the appropriate use of SABA is 2 puffs every 4-6 hours as needed but regular use for symptom control should not exceed 2 days /week.

Inappropriate or excessive use of SABA is defined as use of more than 1 SABA canister/vial (e.g., albuterol, 200 puffs per canister/vial) in 4 months or 3 SABA canisters/vials in one year in paediatric or adult patients. The patient should promptly be evaluated for symptom control and adjustment or initiation of controller medications. In general practice, medication prescriptions with “as-needed” status are valid for 1 year and may be refilled by patients for up to 1 year without a clinician’s intervention. To reduce inappropriate or excessive SABA use, the SABA prescription should include “1 canister/vial for 120 days”. This repeat prescribing system allows the clinician to be actively aware of SABA use, record SABA use, and allow earlier patient consultation in the event that their asthma is uncontrolled.

### **Points to Note**

Three or more canisters/year suggests uncontrolled asthma. All patients with asthma should be reviewed regularly to determine the adequacy of asthma control. All patient reviews should:

- Be done ideally every 3 – 6 months
- Include review of patient medication adherence
- Reassess efficacy of treatment

### ***Prescribing Advice for Asthma Inhalers***

Physicians should be guided by the fact that prescriptions written for asthma inhalers are valid for 12 months by law. The physicians should craft prescriptions in language that will reduce the possibility of overfilling or use beyond the date of an expected review. A prescription for as-needed SABA should include “1 canister/vial in 120 days”, a prescription for ICS maintenance should include “3/12 only”. Such steps will improve drug monitoring and may lead to better outcomes.

### ***Inappropriate use or Excessive use of PRN ICS***

Therapy regimens that include PRN ICS can also be subject to inappropriate use or excessive use. In school aged children, concomitant PRN ICS and PRN SABA reliever therapy is recommended as a Step 1 treatment option. If the daily average dose of PRN ICS used is the same or more than the dosage for low-dose ICS maintenance therapy, then the patient should be “stepped-up” to Step 2 Preferred treatment.

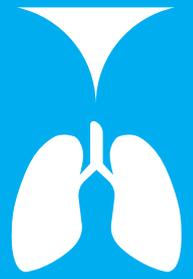
In adolescents and adults, concomitant PRN ICS and PRN SABA reliever therapy is recommended as an option in Step 1 treatment of Track 1. This therapy should be recommended in patients who have reliable perception of their symptoms. If the daily average dose of PRN ICS used is the same or more than the dosage for low-dose ICS maintenance therapy, then the patient should be “stepped-up” to

Step 2 treatment of Track 1.

In adolescents and adults, low dose ICS-formoterol combination reliever is recommended as Step 1 to Step 2 treatment of Track 2. If the daily average dose of ICS in the PRN budesonide-formoterol reliever used is the same or more than the dosage for low dose ICS-formoterol as maintenance and reliever therapy (MART), then the patient should be “stepped-up” to the Step 3 treatment.

In adolescents and adults, low-dose ICS-formoterol as maintenance and reliever therapy (MART) is recommended as a Step 3 treatment option. This therapy should be recommended in patients who have reliable perception of their symptoms. If the daily average dose of ICS of the PRN ICS-formoterol reliever is the same or more than the dosage for medium-dose ICS maintenance therapy, then the patient should be switched to Medium-dose ICS maintenance and PRN SABA reliever therapy or low-dose ICS-LABA maintenance and PRN SABA reliever therapy.

# ASSESSING FUTURE RISK OF ADVERSE EFFECTS DUE TO MEDICATION



## **The Impact of ICS on Linear Growth in Children**

It is important to monitor growth in children. Height percentiles should be closely followed once a child has started on any type of ICS therapy.

## **The Impact of ICS on Adrenal function in Children**

Children may experience adrenal suppression with ICS use, particularly after using higher doses of fluticasone (200 and 400 mcg/day). While unclear whether 100-200 mcg/day of fluticasone could affect cortisol levels, the risk of adrenal suppression remains a concern (19).

## **The Impact of ICS on Bone Mineral Density**

There is a potential reduction in bone mineral density, as such, routine, age-appropriate bone density screening is a crucial preventative measure to help reduce fracture-related morbidity and mortality.

## **Adverse drug reactions and Safety of Leukotriene Receptor Antagonists (LTRAs)**

The United States FDA has required a boxed warning (20) about the potential adverse effects of the LTRA, montelukast (Singulair, Breathezy, Glenmount, Leomont) such as psychiatric disorders (21). The FDA warns that clinicians need to be vigilant for additional mental health side effects such as completed suicides, suicidal thinking, agitation including aggressive behaviour or hostility, attention problems, anxiousness, dream abnormalities, hallucinations, insomnia, depression, irritability, restlessness, memory problems, obsessive-compulsive symptoms, sleepwalking, stuttering and tremor. These adverse drug reactions (ADR) can occur during or after completion of montelukast treatment and may or may not resolve after discontinuing the medicine (20). Montelukast withdrawal can be associated with mild asthma attacks, decrease in asthma control, decreased FEV<sub>1</sub>, decreased FEV<sub>1</sub>/FVC and increased bronchial hyperresponsiveness (22). Careful monitoring is required both to assess and manage ADRs even after appropriate step-down treatment to ensure that patients are clinically stable.

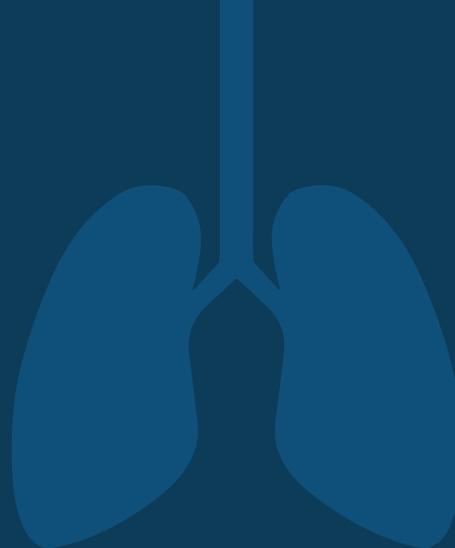
# REFERRAL TO AN ASTHMA SPECIALIST



Indications for referral to a specialist include:

- Asthma remains poorly controlled despite appropriate treatment
- The diagnosis of asthma is uncertain
- History of a severe asthma exacerbation (especially requiring intensive care)
- Frequent/regular use of oral corticosteroids required to maintain control

Follow up after specialist referral: Review asthma control every 3-6 months and more frequently when treatment has been changed or asthma is not well controlled.



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# **ASTHMA TREATMENT RECOMMENDATIONS FOR PRESCHOOL CHILDREN**

## Stepwise Approach for Management of Asthma in Preschool Children

These recommendations are for preschool children at the ages of  $\geq 1$  year to 5 years.

	Step 1 Treatment	Step 2 Treatment	Step 3 Treatment	Step 4 Treatment <sup>4</sup>
Preferred	PRN SABA reliever	Low-dose ICS maintenance and PRN SABA reliever	Medium dose ICS maintenance and PRN SABA reliever	Refer to a specialist
Alternative	Add short course of daily ICS to PRN SABA reliever at onset of RTI	LTRA <sup>1,2</sup> maintenance and PRN SABA reliever	Low-dose ICS and LTRA <sup>1,3</sup> maintenance and PRN SABA reliever or Fluticasone-salmeterol maintenance and PRN SABA reliever in 4-5-year-olds ONLY	

**Abbreviations:** ICS: inhaled corticosteroid; LTRA: leukotriene receptor antagonist; PRN: as-needed; RTI: respiratory tract infection; SABA: short acting beta-2 agonist.

<sup>1</sup>Parents/caregivers should be warned of mental health side effects of LTRAs.

<sup>2</sup>Only consider use in absolute parent/caregiver refusal of ICS or poor MDI technique despite repeated education.

<sup>3</sup>Can be considered if upper airway allergy symptoms are prominent.

<sup>4</sup>All patients with moderate asthma who are not controlled on Preferred or Alternative Step 3 treatments should be referred for expert advice and investigation.

### STEP 1 Treatment Options for Preschool Children



#### Preferred Treatment

Preschool aged children with very mild asthma at a low risk of exacerbations should use PRN SABA reliever for relief of symptoms as Step 1 preferred treatment.



#### Alternative Treatment

Preschool children with very mild asthma who have recurrent wheezing only triggered by a respiratory tract infection and do not wheeze in between infections, may use a short course of daily high dose inhaled corticosteroids added to PRN SABA reliever as Step 1 alternative treatment at the onset of a respiratory tract infection.



#### Not Recommended

Preschool children with very mild asthma who have recurrent wheezing only triggered by respiratory tract infections and do not wheeze between infections, **SHOULD NOT** use a short course of daily leukotriene receptor antagonist added to PRN SABA reliever at the onset of a respiratory tract infection.



## Points to Note

- Step 1 preferred treatment recommendation applies to all children 1- to 5- years-old with very mild asthma, at low risk of exacerbation, who meet every index of being well controlled. PRN SABA should be provided for relief of wheezing episodes on an as-needed basis. Children 1- to 5- years old with very mild asthma at a high risk of exacerbations or uncontrolled asthma symptoms should be “stepped-up” to Step 2 Preferred therapy.
- Inhaled salbutamol is recommended, liquid salbutamol should **not** be used.
- The most appropriately sized mask should be used for efficiency.
- See implementation guidance for PRN SABA reliever in section on [General Guidance for All Persons with Asthma](#) on page 42.
- To reduce inappropriate or excessive SABA use, the SABA prescription should include “1 canister/vial for 120 days”.
- Clinicians should consider Step 1 alternative treatment intervention appropriate in preschool children with very mild asthma who have recurrent wheezing that is triggered by respiratory tract infections and no wheezing episodes between infections.
- Available daily high dose ICS regimens include:
  - Fluticasone >400 mcg twice a day for 3 to 7 days
  - Beclomethasone >400 mcg twice a day for 3 to 7 days
- Total daily dosage of fluticasone or beclomethasone should not exceed 1000 mcg per day.
- In cases of emergency, children should be immediately taken to an appropriate health facility.
- Please see the section on [Adverse Drug Reactions and Safety of Leukotriene Receptor Antagonists \(LTRA\)](#) on page 21.

## STEP 2 Treatment Options for Preschool Children



### Preferred Treatment

Preschool children with mild asthma who are at a high risk of exacerbation or not controlled on PRN SABA reliever should use low dose ICS maintenance and PRN SABA reliever as Step 2 preferred treatment.



### Alternative Treatment

Preschool children may use leukotriene receptor antagonists (LTRA) maintenance with PRN SABA reliever as Step 2 alternative treatment in exceptional circumstances such as absolute parental/caregiver refusal to use the preferred option of inhaled corticosteroids or persistently poor technique using an MDI with spacer and facemask despite repeated education.



### Not Recommended

Preschool children with mild asthma **SHOULD NOT** use concomitant PRN low dose ICS with SABA reliever as a Step 2 treatment option.



### Points to Note

- Clinicians should consider Step 2 alternative treatment appropriate in preschool children with mild asthma, who are not controlled on PRN SABA or are at a higher risk of exacerbation.
- Available low dose ICS maintenance regimens include:
  - Fluticasone twice a day with a maximum daily dosage of 100 - 200 mcg
  - Beclomethasone twice a day with a maximum daily dosage of 100 – 200 mcg
- See implementation guidance for PRN SABA reliever in section on [General Guidance for All Persons with Asthma](#) on page 42.
- Inhaled salbutamol is recommended, liquid salbutamol should not be used.
- The most appropriately sized masks should be used for efficiency.
- Parents/ caregivers should be told that the low dose ICS is a SUPERIOR therapy and the better option, but if refused or cannot be used, LTRA maintenance is another possible therapy. LTRA maintenance and PRN SABA should be considered for use in patients with mild asthma with exceptional circumstances such as absolute parental/ caregiver refusal to use inhaled corticosteroids or poor MDI with spacer and facemask technique despite repeated education. Please see [Adverse Drug Reactions and Safety of Leukotriene Receptor Antagonists \(LTRA\)](#) on page 21.
- Inhaled salbutamol is recommended, liquid salbutamol should not be used.
- The most appropriate size mask should be used for efficiency.
- 4 mg of montelukast per day would be appropriate.
- See implementation guidance for PRN SABA reliever in the section on [General Guidance for All Persons with Asthma](#) on page 42.

## STEP 3 Treatments Option in Preschool children



### Preferred Treatment

Preschool children with moderate asthma at high risk of exacerbations should use medium dose ICS maintenance with PRN SABA reliever as Step 3 preferred treatment.



### Alternative Treatment

Preschool children with moderate asthma may use daily LTRA maintenance with low dose ICS maintenance and PRN SABA reliever as a Step 3 alternative treatment in exceptional circumstances such as the prominence of upper airway symptoms of allergies. Parents/caregivers must be made aware of US FDA boxed warnings.

### Alternative Treatment for 4- to 5-year-year-old Children

Four-to-five-year-old children with moderate asthma who are at high risk of exacerbation, may use low dose fluticasone-salmeterol maintenance with PRN SABA reliever therapy as Step 3 alternative treatment.



### Points to Note

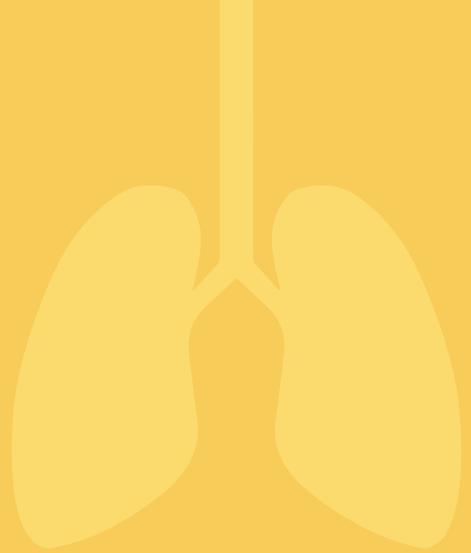
- Step 3 preferred treatment therapy should be used in preschool children who are not controlled on Low Dose ICS maintenance and PRN SABA reliever or at high risk of exacerbations.
- Available medium dose ICS regimens include:
  - Fluticasone twice a day with a maximum daily dosage of >200 - 400 mcg
  - Beclomethasone twice a day with a maximum daily dosage of >200 - 400 mcg
- See implementation guidance for PRN SABA reliever in the see section on [General Guidance for All Persons with Asthma](#) on page 42.
- Inhaled salbutamol is recommended, liquid salbutamol should not be used.
- The most appropriately sized masks should be used for efficiency.
- Step 3 alternative treatment option should be considered for use in exceptional circumstances in which upper airway allergy symptoms are prominent in preschool children with moderate asthma.
- Parents/caregivers must be made aware of US FDA boxed warnings. (Please see [Adverse Drug Reactions and Safety of Leukotriene Receptor Antagonists \(LTRA\)](#) on page 21. For asthma, it is recommended that the benefits and mental health risks should be weighed before prescribing montelukast (20). Patients should be evaluated regularly, every three months, for monitoring of medication efficacy, changes in behaviour or mood. In this age group, parents/caregivers should be aware that changes in behaviour or mood mentioned above may be subtle and can present as

fussiness, crying more than usual or changes in sleep.

- Available low dose ICS maintenance regimens include:
  - Fluticasone twice a day with a maximum daily dosage of 100 – 200 mcg
  - Beclomethasone twice a day with a maximum daily dosage of 100 – 200 mcg
- 4 mg of Montelukast per day would be appropriate.

### ***Step 3 Alternative option for 4-5-year-old children***

- This therapy is appropriate for 4-5-year-old children, with moderate asthma, at high risk of exacerbation.
- Salmeterol is a long-acting beta-2 agonist and should not be used as reliever therapy.
- Children must be provided with PRN SABA for quick relief of symptoms.
- Salmeterol is the only long-acting beta-2 agonist (LABA) approved for children 4-to-5-years old.
- Salmeterol 50 mcg twice a day would be appropriate.
- Fluticasone twice a day with a maximum daily dosage of 200 mcg would be appropriate.
- Low dose fluticasone-salmeterol can be combined in one inhaler device or in separate inhaler devices.
- There is an additional cost for this ICS-LABA medication. This should be discussed with parents/ caregiver to determine if this medication would still be appropriate (24).



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# ASTHMA TREATMENT RECOMMENDATIONS FOR SCHOOL AGED CHILDREN

## Stepwise Approach for Management of Asthma in School Aged Children

The recommendations are for school-aged children at the ages of  $\geq 6$  years to 11 years.

	Step 1 Treatment	Step 2 Treatment	Step 3 Treatment	Step 4 Treatment <sup>3</sup>
Preferred	PRN SABA reliever for low risk of exacerbation  or Concomitant PRN low dose ICS with SABA reliever for high risk of exacerbation	Low dose ICS maintenance and PRN SABA reliever	Medium dose ICS maintenance and PRN SABA reliever  or ICS-LABA maintenance and PRN SABA reliever	Refer to a specialist
Alternative	-	LTRA <sup>1,2</sup> maintenance and PRN SABA reliever	-	

**Abbreviations:** ICS: inhaled corticosteroid; LABA: long-acting beta-2 agonist; LTRA: leukotriene receptor antagonist; PRN: as-needed; SABA: short acting beta-2 agonist.

<sup>1</sup>Parents/caregivers should be warned of mental health side effects of LTRAs.

<sup>2</sup>Can be considered use in absolute parent/caregiver refusal of ICS or poor MDI technique despite repeated education.

<sup>3</sup>All patients with moderate asthma who are not controlled on Preferred or Alternative Step 3 treatments should be referred for expert advice and investigation.

### STEP 1 Treatment Options for School Aged Children



#### Preferred Treatment

School aged children with very mild asthma who are at **low risk of exacerbation** and have controlled asthma symptoms may use PRN SABA as a Step 1 preferred treatment option.

School aged children with very mild asthma who are at **high risk of exacerbation** may use concomitant PRN low dose ICS with SABA reliever therapy as a Step 1 preferred treatment option.



#### Not Recommended

School aged children with very mild asthma **SHOULD NOT** use low dose ICS maintenance and PRN SABA reliever as a Step 1 treatment option.



### Points to Note

- Clinicians should consider Step 2 alternative treatment appropriate in preschool children with mild asthma, who are not controlled on PRN SABA or are at a higher risk of exacerbation.
- Available low dose ICS maintenance regimens include:
  - Fluticasone twice a day with a maximum daily dosage of 100 - 200 mcg
  - Beclomethasone twice a day with a maximum daily dosage of 100 – 200 mcg
- See implementation guidance for PRN SABA reliever in section on [General Guidance for All Persons with Asthma](#) on page 42.
- Inhaled salbutamol is recommended, liquid salbutamol should not be used.
- The most appropriately sized masks should be used for efficiency.
- Parents/ caregivers should be told that the low dose ICS is a SUPERIOR therapy and the better option, but if refused or cannot be used, LTRA maintenance is another possible therapy. LTRA maintenance and PRN SABA should be considered for use in patients with mild asthma with exceptional circumstances such as absolute parental/ caregiver refusal to use inhaled corticosteroids or poor MDI with spacer and facemask technique despite repeated education. Please see [Adverse Drug Reactions and Safety of Leukotriene Receptor Antagonists \(LTRA\)](#) on page 21.
- Inhaled salbutamol is recommended, liquid salbutamol should not be used.
- The most appropriate size mask should be used for efficiency.
- 4 mg of montelukast per day would be appropriate.
- See implementation guidance for PRN SABA reliever in the section on [General Guidance for All Persons with Asthma](#) on page 42.

## STEP 2 Treatment Options for School Aged Children



### Preferred Treatment

School aged children with mild asthma should use low dose ICS maintenance and PRN SABA reliever as Step 2 preferred treatment.



### Alternative Treatment

School aged children with mild asthma may use LTRA maintenance and PRN SABA therapy as Step 2 alternative treatment in exceptional circumstances such as absolute parental/caregiver refusal to use the preferred option of ICS or persistently poor technique using an MDI with spacer and facemask despite repeated education.



### Not Recommended

School aged children with mild asthma **SHOULD NOT** use concomitant PRN low dose ICS with SABA as a Step 2 treatment option.



### Points to Note

- Clinicians should consider low-dose ICS maintenance and PRN SABA reliever therapy appropriate for school aged children with mild asthma who are not controlled on PRN SABA reliever.
- Available low- dose ICS maintenance regimens include:
  - Fluticasone twice a day with a maximum of 100 - 200 mcg
  - Beclomethasone twice a day with a maximum of 100 - 200 mcg
- See implementation guidance for PRN SABA reliever in section on [General Guidance for All Persons with Asthma](#) on page 42.
- Parents/caregivers must be made aware of US FDA boxed warnings. (Please see [Adverse Drug Reactions and Safety of Leukotriene Receptor Antagonists \(LTRA\)](#) on page 21. For asthma, it is recommended that the benefits and mental health risks should be weighed before prescribing montelukast (20). Patients should be evaluated regularly, every three months, for monitoring of medication efficacy, changes in behaviour or mood. In this age group, parents/caregivers should be aware that changes in behaviour or mood mentioned above may be subtle and can present as changes in sleep.
- Inhaled salbutamol is recommended, liquid salbutamol should not be used.
- 4 or 5 mg of montelukast per day would be appropriate.
- The most appropriate size masks should be used for efficiency.

## STEP 3 Treatment options for School Aged Children



### Preferred Treatment

School aged children with moderate asthma at high risk of exacerbation should use either of the following for Step 3 treatment:

- Medium dose ICS maintenance and PRN SABA reliever therapy, or
- ICS-LABA maintenance and PRN SABA reliever therapy



### Not Recommended

School aged children with moderate asthma **SHOULD NOT** use low dose ICS and LTRA maintenance and PRN SABA reliever therapy as a Step 3 treatment option.

School aged children ( $\geq 6$  years old) with moderate asthma **SHOULD NOT** use ICS-formoterol as maintenance and reliever therapy (MART) as Step 3 treatment.



### Points to Note

- Clinicians should consider medium dose ICS maintenance and PRN SABA reliever therapy or ICS-LABA maintenance and PRN SABA reliever therapy appropriate in school aged children with moderate asthma and at high risk of exacerbation.

#### Medium dose ICS maintenance

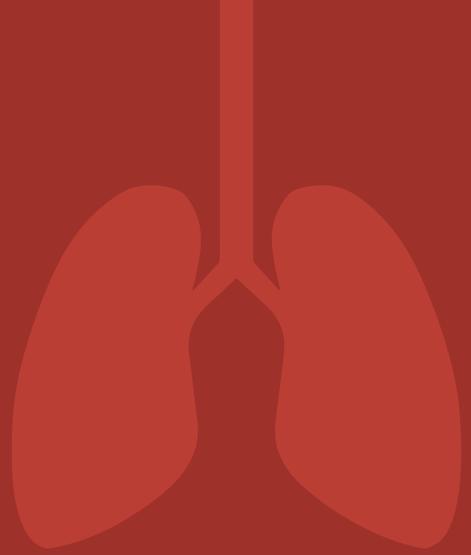
- Available medium dose ICS maintenance regimens include:
  - Fluticasone twice a day with a maximum daily dosage of >200-400 mcg
  - Beclomethasone twice a day with a maximum daily dosage of >200-400 mcg

#### ICS-LABA maintenance

- Available ICS-LABA maintenance regimens include:
  - 2 inhalations of Budesonide-formoterol 80/4.5 twice a day
  - 2 inhalations of Fluticasone-salmeterol 50/25 twice a day
- Low dose fluticasone-salmeterol can be combined in one inhaler device or in separate inhaler devices.

#### PRN SABA reliever

- See implementation guidance for PRN SABA reliever in section on [General Guidance for All Persons with Asthma](#) on page 42.



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# **ASTHMA TREATMENT RECOMMENDATIONS FOR ADOLESCENTS AND ADULTS**

## Stepwise Approach for Management of Asthma in Adolescents and Adults

These recommendations are for adolescents and adults at the age of 12 years and older. Older adults are defined as individuals 60 years and older.

	Step 1 Treatment	Step 2 Treatment	Step 3 Treatment	Step 4 Treatment <sup>1</sup>
<b>Track 1</b>	Concomitant PRN low dose ICS with SABA reliever	Low dose ICS maintenance and PRN SABA reliever	Low dose ICS-LABA maintenance and PRN SABA reliever Or Medium dose ICS maintenance and PRN SABA reliever	Refer to a specialist
<b>Track 2</b>	PRN low dose ICS-formoterol combination reliever		Or Low dose ICS-formoterol as MART <sup>2</sup>	

**Abbreviations:** ICS: inhaled corticosteroid; LABA: long-acting beta-2 agonist; MART: maintenance and reliever therapy; PRN: as-needed; SABA: short acting beta-2 agonist.

<sup>1</sup>All patients with moderate asthma who are not controlled on Track 1 or Track 2 treatments should be referred for expert advice and investigation.

<sup>2</sup>At the time of this publication, budesonide formoterol was the only approved ICS-formoterol combination to be used as MART.

### Please Note:

*For adult and adolescent therapy, a patient can EITHER be treated along the Step therapy of Track 1 OR Track 2. The Step therapy of the Options cannot be inter-mixed. The use of Track 1 vs Track 2 is based on availability, cost, and patient preference.*

*For patients in need of Step 3 treatment or those who have moderate asthma, the listed treatments can be used for both Track 1 and 2.*

## STEP 1 Treatment Options for Adolescents and Adults

### Track 1

Adults and adolescents with mild asthma may use concomitant PRN low dose ICS with SABA reliever for Track 1 of Step 1 treatment.

### Track 2

Adults and adolescents with mild asthma may use PRN low dose ICS-formoterol combination reliever for Track 2 of Step 1 treatment.



### Not Recommended

Adolescents and adults with mild asthma, **SHOULD NOT** use PRN SABA reliever for Step 1.



## Points to Note

### Concomitant PRN low dose ICS with SABA reliever

- If the daily average dose of ICS used is the same or more than the dosage for low-dose ICS maintenance therapy, then the patient should be “stepped-up” to the Step 2 treatment in Track 1.
- The following dosages are considered appropriate:
  - Fluticasone – 250 mcg per day
  - Beclomethasone – 200 mcg per day
  - Please see additional implementation guidance for PRN SABA reliever and PRN ICS on page 19.

### PRN low dose budesonide-formoterol combination reliever

- When a metered dose inhaler MDI is used, PRN low dose budesonide-formoterol reliever should be delivered with a spacer attachment in adults and adolescents.
- If the daily average dose of ICS in the PRN budesonide-formoterol reliever used is the same or more than the dosage for low-dose ICS maintenance therapy, then the patient should be “stepped-up” to the Step 2 treatment in Track 2.
- The following dosages are considered appropriate:
  - For patients 12 to 18 years old, 1 inhalation of budesonide-formoterol 80/4.5 as needed.
  - For patients older than 18 years old, 1 inhalation of budesonide-formoterol 160/4.5 as needed.

### Important Guide

- PRN concomitant ICS and SABA should only be used with patients that have good symptom perception and should not utilise ICS doses greater than those used for daily low dose ICS, to avoid overtreatment.
- PRN concomitant ICS and SABA can be initiated at home; however, regular follow-up is required to ensure the regimen is still appropriate.

## STEP 2 Treatment Options for Adolescents and Adults

### Track 1

Adolescents and adults with mild asthma may use low dose inhaled corticosteroids maintenance and PRN SABA reliever as a Step 2 treatment for Track 1.

### Track 2

Adolescents and adults with mild asthma may use PRN low dose ICS-formoterol combination reliever as a Step 2 treatment for Track 2.



#### Not Recommended

Adolescents and adults with mild asthma **SHOULD NOT** use leukotriene receptor antagonist maintenance and as-needed short-acting beta-2 agonist reliever as Step 2.



#### Points to Note

##### Low dose ICS maintenance and PRN SABA reliever

- The following ICS dosages are considered appropriate:
  - Fluticasone – 125 mcg twice per day
  - Beclomethasone – 100 mcg twice per day
- See implementation guidance for PRN SABA reliever in section on [General Guidance for All Persons with Asthma](#) on page 42.
- Low dose ICS maintenance and PRN SABA may be used for patients with low symptom perception to avoid under treatment.

##### Low dose budesonide-formoterol combination reliever therapy

- PRN low dose budesonide-formoterol reliever should be delivered through a metered dose inhaler (MDI) or dry powder inhaler (DPI).
- If the daily average dose of ICS in the PRN budesonide-formoterol reliever used is the same or more than the dosage for low-dose ICS maintenance therapy, then the patient should be “stepped-up” to the Step 3 treatment.
- Budesonide-formoterol should be administered as 2 inhalations twice daily (morning and evening, approximately 12 hours apart), every day by the orally inhaled route only. After inhalation, the patient should rinse the mouth with water without swallowing.
- The following dosages are considered appropriate:

- For ages 12 to 18 years old, 1 inhalation of budesonide-formoterol 80/4.5 twice daily.
- For patients older than 18 years old, 1 inhalation of budesonide-formoterol 160/4.5 twice daily.
- The maximum recommended dosage in adult and adolescent patients 12 years and older is budesonide-formoterol 160/4.5, two inhalations twice daily.

The United States FDA has required a boxed warning about the potential adverse effects of the LTRA, montelukast. Patients/parents/caregivers must be made aware of US FDA boxed warnings. (Please see section on [Adverse drug reactions and Safety of Leukotriene Receptor Antagonists \(LTRA\)](#) on page 21. The FDA recommends that, for asthma, the benefits and mental health risks should be weighed before prescribing montelukast<sup>1</sup>.

## STEP 3 Treatment Options for Adolescents and Adults

Adults and adolescents with moderate asthma should use one of the following three options as Step 3 treatment for Track 1 and Track 2. Either:

- Low dose ICS and long-acting beta-2 agonist (LABA) maintenance and PRN SABA reliever,  
or
- Medium dose ICS maintenance and PRN SABA reliever,  
or
- Low dose ICS-formoterol as maintenance and reliever therapy (MART).



### Not Recommended

Adolescents and adults with moderate and severe asthma **SHOULD NOT** use low-dose budesonide and long-acting muscarinic antagonist maintenance and PRN SABA reliever for Step 3.



### Points to Note

This recommendation applies to patients 12 years and older with moderate asthma, who are not controlled on PRN low dose budesonide-formoterol combination reliever therapy, low-dose ICS maintenance and as PRN SABA reliever or concomitant PRN low dose ICS with SABA.

#### Low dose ICS-LABA maintenance and PRN SABA reliever

- The following dosage is considered:
  - Fluticasone salmeterol – 50/250 mcg twice daily
- The following dosages are considered appropriate for budesonide-formoterol:
  - For ages up to 18 years old, 1 inhalation of budesonide-formoterol 80/4.5 twice daily.
  - For patients older than 18 years old, 1 inhalation of budesonide-formoterol 160/4.5 twice daily.

#### Medium dose ICS maintenance and PRN SABA reliever

- The following dosage are considered appropriate:
  - Fluticasone – 500 mcg per day
  - Beclomethasone – 400 mcg per day

### **Budesonide-formoterol maintenance and reliever therapy (MART)**

- Budesonide-formoterol should be administered as 2 inhalations twice daily (morning and evening, approximately 12 hours apart), every day by the orally inhaled route only. After inhalation, the patient should rinse the mouth with water without swallowing.
- The following dosage are considered appropriate for the maintenance:
  - For ages 12 to 18 years old
    - *Maintenance*: 1 or 2 inhalations of budesonide-formoterol 80/4.5 once or twice daily.
    - *Reliever*: 1 inhalation of budesonide-formoterol 80/4.5 as needed at least 12 hours apart.
    - The maximum amount of budesonide-formoterol is 4 puffs in 24 hours. This can be done up to 1 to 2 weeks, but the patient must be reevaluated after 1 to 2 weeks of this maximum budesonide-formoterol reliever therapy.
    - If a patient still has breakthrough wheezing while on this maximum budesonide formoterol therapy, PRN SABA can be added to the regimen but must be given 6 hours after budesonide-formoterol reliever. Please see implementation guidance for PRN SABA reliever here.
  - For patients older than 18 years old
    - *Maintenance dose*: 1 or 2 inhalations of budesonide-formoterol 160/4.5 once or twice daily.
    - *Reliever dose*: 1 inhalation of budesonide-formoterol 160/4.5 as needed at least 12 hours apart.
    - The maximum amount of budesonide-formoterol is 8 puffs in 24 hours. This can be done up to 1 to 2 weeks, but the patient must be re-evaluated after 1 to 2 weeks of this maximum budesonide-formoterol therapy.
    - If a patient still has breakthrough wheezing while on this maximum budesonide-formoterol therapy, PRN SABA can be added to the regimen but must be given 6 hours after budesonide-formoterol reliever.
- See implementation guidance for PRN SABA reliever in section on [General Guidance for All Persons with Asthma](#) on page 42.



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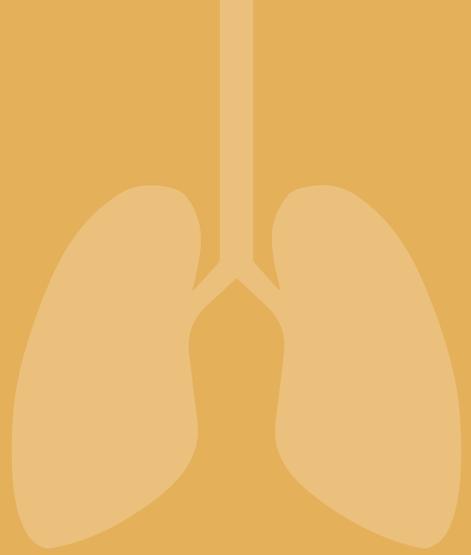
# **GENERAL GUIDANCE FOR ALL PERSONS WITH ASTHMA**

All patients with asthma or parents/guardians of children with asthma should keep the following under consideration.

- a. Each patient should have an asthma action plan to assist in personal management of asthma.
- b. Each patient should be aware of and avoid all possible triggers of asthma. A list of common non-allergic and allergic triggers is available on page 6 ([The Pathophysiology of Asthma](#)).
- c. Ensure regular follow-ups are held with a primary care doctor.
- d. Patients as well as parents/guardians of children with asthma should ensure that SABA is **NOT** overused. The appropriate use of SABA is 2 puffs every 4 – 6 hours as needed. Regular use for symptom control should not exceed 2 days per week, and a canister should last for at least 120 days.
- e. Patients as well as parents/guardians of children with asthma should ensure rinsing of the mouth after use of steroid MDI and dry powder inhaler (DPI) without swallowing.
- f. In cases of emergency, all patients should be immediately taken to an appropriate health facility.

Health care workers / clinicians should note the following:

- g. Clinicians should evaluate the risk of exacerbation and asthma control in patients. Also, where possible, clinicians should use direct observation to evaluate patients' technique in using devices, to assess adequate drug delivery. These devices include but are not limited to MDI with spacer, MDI with valved holding chamber or facemask, peak flow metre, DPI, or mister.
- h. Clinicians should advise patients that treatments that are required to be taken twice daily should be taken 12 hours apart.
- i. Inhaled salbutamol is the recommended PRN SABA; liquid salbutamol should not be used.
- j. Clinicians should ensure that patients know that PRN SABA reliever should be delivered through an MDI plus a spacer attachment. A facemask should be used along with the MDI with spacer for children less than 6 years of age and those who may not be able to properly use a MDI such as some elderly patients. The most appropriately sized mask should be used for efficiency.
- k. Clinicians should note that in general, a valved chamber is considered superior to other spacers.
- l. Clinicians and health care workers should inform all patients of the appropriate use of SABA to reduce inappropriate or excessive SABA use. Persons who use more than 1 vial/canister in 120 days are likely to have poorly controlled or uncontrolled asthma and should be considered for step-up in therapy by their physician. Patients should be counselled to seek medical re-evaluation if frequency of SABA use exceeds 1 vial/canister for 120 days. Increasing use of SABA or use more than 2 days a week for symptom relief (not prevention of exercise induced bronchoconstriction (EIB)) generally indicates inadequate control and may require a step up in treatment.
- m. It is important to monitor growth in children. Height percentiles should be closely followed once a child has started on any type of ICS therapy. Look for a reduction in height percentiles. If height growth percentiles are static or trending downwards, referral to a specialist is indicated. The prescription for all ICS maintenance regimens should include "3/12 only".
- n. Indications for step-up in treatment: If patients are uncontrolled at the previous step, for either preferred or alternative treatment, the patient should be recommended to the next step.

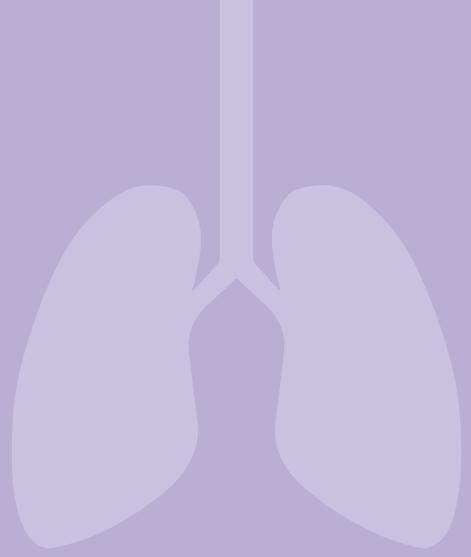


**REFERRAL FOR  
EXPERT ADVICE  
AND FURTHER  
INVESTIGATION**

All patients with moderate asthma who are not controlled on Preferred or Alternative Step 3 treatments may be referred for expert advice and investigation. Referral should also be considered at any treatment Step if the diagnosis of asthma is not clear. Refer to a specialist (paediatrician or internist) in a tertiary healthcare setting who has experience in asthma management or a Pulmonologist.

### **Point to Note**

NHLBI 2020 suggests that preschool patients should be referred for expert advice if Step 3 therapy or higher is required and consultation could even be considered at Step 2 treatment level. For patients 5 years and older, they should be referred for expert advice if Step 4 treatment or higher is required and consultation could even be considered at Step 3 treatment level.



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# REFERENCES

1. Zar HJ, Ferkol TW. The global burden of respiratory disease-impact on child health. *Pediatr Pulmonol*. 2014;49(5):430-4.
2. Martin J, Townshend J, Brodlie M. Diagnosis and management of asthma in children. *BMJ Paediatr Open*. 2022;6(1).
3. Hashmi M, Tariq M, Cataletto M. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023.
4. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention 2022 [Available from: [www.ginasthma.org](http://www.ginasthma.org)].
5. National Asthma Education and Prevention Program, Third Expert Panel on the Diagnosis and Management of Asthma. Expert Panel Report 3: 2007 Guidelines for the Diagnosis and Management of Asthma. Bethesda (MD) 2007 [Available from: <https://www.ncbi.nlm.nih.gov/books/NBK7232/>].
6. National Institute for Health and Care Excellence. Asthma: diagnosis, monitoring and chronic asthma management (NG80) 2017 [Available from: <https://www.nice.org.uk/guidance/ng80>].
7. British Thoracic Society and Scottish Intercollegiate Guidelines Network Guideline. British Guideline on the Management of Asthma: a National Clinical Guideline 2019 [Available from: <https://www.brit-thoracic.org.uk/quality-improvement/guidelines/asthma/>].
8. WHO package of essential noncommunicable (PEN) disease interventions for primary health care. Geneva: World Health Organization.2020 [Available from: [https://www.who.int/publications/i/item/who-package-of-essential-noncommunicable-\(pen\)-disease-interventions-for-primary-health-care](https://www.who.int/publications/i/item/who-package-of-essential-noncommunicable-(pen)-disease-interventions-for-primary-health-care)].
9. Chung KF, Wenzel SE, Brozek JL, Bush A, Castro M, Sterk PJ, et al. International ERS/ATS guidelines on definition, evaluation and treatment of severe asthma. *Eur Respir J*. 2014;43(2):343-73.
10. Barnes NC, Hallett C, Harris TA. Clinical experience with fluticasone propionate in asthma: a meta-analysis of efficacy and systemic activity compared with budesonide and beclomethasone dipropionate at half the microgram dose or less. *Respir Med*. 1998;92(1):95-104.
11. Yang CL, Hicks EA, Mitchell P, Reisman J, Podgers D, Hayward KM, et al. Canadian Thoracic Society 2021 Guideline update: Diagnosis and management of asthma in preschoolers, children and adults. *Canadian Journal of Respiratory, Critical Care, and Sleep Medicine*. 2021;5(6):348-61.
12. BiResp Spiromax European Medicines Agency2023 [cited 2023. Available from: <https://www.ema.europa.eu/en/medicines/human/EPAR/biresp-spiromax#ema-inpage-item-product-info>].
13. Ari A, Restrepo RD, Care AAfR. Aerosol delivery device selection for spontaneously breathing patients: 2012. *Respir Care*. 2012;57(4):613-26.
14. Gillette C, Rockich-Winston N, Kuhn JA, Flesher S, Shepherd M. Inhaler Technique in Children with Asthma: A Systematic Review. *Acad Pediatr*. 2016;16(7):605-15.
15. Dissanayake S, Nagel M, Falaschetti E, Suggett J. Are valved holding chambers (VHCs) interchangeable? An in vitro evaluation of VHC equivalence. *Pulm Pharmacol Ther*. 2018;48:179-84.
16. Hagedoorn P, Bawary W, Frijlink HW, Grasmeijer F. A comparative analysis of changes in pMDI drug dose delivery before and after detergent coating using five antistatic valved holding chambers. *The Journal of Allergy and Clinical Immunology: In Practice*. 2020;8(3):1124-5. e4.
17. Amirav I, Newhouse MT. Aerosol therapy with valved holding chambers in young children: importance of the facemask seal. *Pediatrics*. 2001;108(2):389-94.

18. Thorsson L, Geller D. Factors guiding the choice of delivery device for inhaled corticosteroids in the long-term management of stable asthma and COPD: Focus on budesonide. *Respiratory Medicine*. 2005;99(7):836-49.
19. Masoli M, Weatherall M, Holt S, Beasley R. Systematic review of the dose-response relation of inhaled fluticasone propionate. *Arch Dis Child*. 2004;89(10):902-7.
20. US Food and Drug Administration requires Boxed Warning about serious mental health side effects for asthma and allergy drug montelukast (Singulair); advises restricting use for allergic rhinitis; 3-4-2020 FDA Drug Safety communication [Available from: <https://www.fda.gov/drugs/drug-safety-and-availability/fda-requires-boxed-warning-about-serious-mental-health-side-effects-asthma-and-allergy-drug>].
21. Dixon EG, Rugg-Gunn CE, Sellick V, Sinha IP, Hawcutt DB. Adverse drug reactions of leukotriene receptor antagonists in children with asthma: a systematic review. *BMJ Paediatr Open*. 2021;5(1): e001206.
22. Dixon EG, King C, Lilley A, Sinha IP, Hawcutt DB. Deprescribing montelukast in children with asthma: a systematic review. *BMJ Open*. 2022;12(1): e053112.
23. Schuenemann H, Brozek J, Oxman A, editors. GRADE handbook for grading quality of evidence and strength of recommendations. Updated October 2013. The Grade Working Group 2013 [Available from: <https://gdt.gradepro.org/app/handbook/handbook.html>].
24. Castro-Rodriguez JA, Rodrigo GJ. A systematic review of long-acting  $\beta$ 2-agonists versus higher doses of inhaled corticosteroids in asthma. *Pediatrics*. 2012;130(3): e650-7.



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# APPENDICES

## APPENDIX 1: ASTHMA ACTION PLAN

# ASTHMA ACTION PLAN

Date: \_\_\_/\_\_\_/\_\_\_

Name: \_\_\_\_\_

Doctor: \_\_\_\_\_

Number of Doctor or Clinic: \_\_\_\_\_

Number of friend/ relative/ taxi: \_\_\_\_\_

Personal best peak flow reading: \_\_\_\_\_



Remember the traffic light!

**RED – DANGER**

**YELLOW – BE CAREFUL**

**GREEN – GO**

### GREEN (GO!) – USE YOUR PREVENTER MEDICATION

If all the following apply:

- Breathing well
- No cough, SOB, or wheeze
- Can sleep through the night.
- Can work and play.
- Peak flow  $\geq 80\%$



MEDICATION NAME (colour)	HOW MUCH	HOW OFTEN/ WHEN

If you have symptoms with exercise, use this medication 20 minutes before sports/ exercise: \_\_\_\_\_

### YELLOW (BE CAREFUL!) – CONTINUE GREEN ZONE MEDICATION AND ADD:

If you have **any** of these:

- Symptoms of a cold
- Cough
- Mild wheezing
- Tight chest
- Night-time cough
- Peak flow 51 to 79 %



MEDICATION NAME (colour)	HOW MUCH	HOW OFTEN/ WHEN

### RED (DANGER!) – CALL/ SEE YOUR DOCTOR NOW & USE THESE MEDICATIONS

If you have **any** of these, then you are getting worse and fast:

- Not feeling better
- Breathing hard and fast
- Ribs show
- Nose opens wide
- Can't talk well
- Peak flow  $\leq 50\%$



MEDICATION NAME (colour)	HOW MUCH	HOW OFTEN/ WHEN

**NB: This is not to be used for those using MART® therapy.**

## APPENDIX 2: ASTHMA ACTION PLAN: INSTRUCTIONS FOR PATIENTS

This plan is to help you with the management of your asthma.

Each of the coloured blocks represents the various stages of asthma symptoms and how to approach treatment.

Make sure to discuss this plan with your/your child's doctor/clinician before you leave the office.

### For the GREEN ZONE:

- This is for when asthma control is good.
- Daily use of the medications listed should be expected to keep asthma symptoms away.

### For the YELLOW ZONE:

- This is for when asthma control has suddenly fallen.
- A fall of 20% below personal best peak flow likely puts you/your child in the yellow zone.
- If the preventer medication was not being used regularly, then it is to be restarted.
- If the preventer medication was being used, then the dose is to be increased, as listed in the table, until symptoms go away, or peak flow has returned to an acceptable value.
- Start reliever medications as listed in table.
- If there is no improvement within 48 hours, then contact your regular or nearest doctor/ health facility.
- If the peak flow falls below 60% of the personal best, then you may need to use oral prednisone/ prednisolone (as listed in table).
- If oral prednisone/prednisolone has been taken (according to the table), then make sure to go to the nearest doctor/ health facility within 24 hours.

### For the RED ZONE:

- **This is the emergency zone and requires quick medical attention!**
- Sit up straight and try to remain calm.
- Take the reliever medications as listed in the table while you are preparing to go to the nearest doctor/ health facility.
- Start oral prednisone/ prednisolone if prescribed (according to the table).
- Plan to get to the nearest doctor/ health facility/ emergency room within 1 hour of these symptoms.

**If you can't see another doctor, then go to the emergency room as soon as possible. Make an appointment with your doctor/ clinic within 2 days after being seen at the emergency room.**

## APPENDIX 3: ASTHMA ACTION PLAN: INSTRUCTIONS FOR CLINICIANS

This plan is to help with patient self-management of their asthma.

Each of the coloured blocks represents the various stages of asthma symptoms and how to approach treatment.

All medications are to be given using a spacer (as well as a facemask, if applicable).

Can be used with/or without peak flow information in most cases.

This plan **must be discussed** between doctor/clinician and the patient/parent before the patient/parent leaves the office.

A copy of the Asthma Action Plan should be printed along with the patient's instructions. Please see in Appendix 2: Asthma Action Plan: Instructions for patients (page 50) and Appendix 5: Instructions for Use of MART Asthma Action Plan for Patients (page 53). These forms are available at Public Education Resources – Ministry of Health & Wellness, Jamaica or <https://ncdip.moh.gov.jm/resources/>

Device use education must be done and checked at every opportunity.

### For the GREEN ZONE:

- This is for when asthma control is good.
- Educate patient/parent that daily use of the medications listed should be expected to keep asthma symptoms away.

### For the YELLOW ZONE:

- This is for when asthma control has suddenly fallen.
- A fall of 20% below personal best peak flow likely puts the patient in the yellow zone.
- Instruct the patient that if preventer medication was not being used regularly, then it is to be restarted.
- Or, if the preventer medication was being used, then the dose is to be increased (quadrupled daily dosing in most instances<sup>¥</sup>). List the medication accordingly in the table and instruct the patient to use it until symptoms go away, or peak flow has returned to an acceptable value.
- List reliever medications as in table and instruct the patient how to use it.
- If the peak flow falls below 60% of the personal best, then prednisone/prednisolone use may be warranted. List it in the table and instruct the patient how to use it.

### For the RED ZONE:

- **This is the emergency zone and requires quick medical attention!**
- Advise the patient that if they are in the red zone to sit up straight, and remain calm, and go to the nearest doctor/health facility.
- List reliever medications in the table and instruct the patient that they are to take it while preparing to go to the nearest doctor/health facility.
- List oral prednisone/prednisolone and instruct the patient how/when to use it.
- Instruct the patient that they are to get to the nearest doctor/health facility/ emergency room within 1 hour of these symptoms.

**Instruct the patient/parent that if they can't see a doctor, then go to the emergency room as soon as possible. Make an appointment with their doctor/clinic within 2 days after being seen at the emergency room.**

¥ - in cases where a patient is already on highest dose steroids, then addition of oral steroids may be more useful.

## APPENDIX 4: MART ASTHMA ACTION PLAN

# MART ASTHMA ACTION PLAN

Date: \_\_\_/\_\_\_/\_\_\_

Name: \_\_\_\_\_

Doctor: \_\_\_\_\_

Number of Doctor or Clinic: \_\_\_\_\_

Number of friend/ relative/ taxi: \_\_\_\_\_

Personal best (PB) peak flow reading: \_\_\_\_\_



Remember the traffic light!

**RED – DANGER**

**YELLOW – BE CAREFUL**

**GREEN – GO**

### GREEN (GO!) – USE YOUR PREVENTER MEDICATIONS

If all the following apply:

- Breathing well
- No cough, SOB, or wheeze
- Can sleep through the night.
- Can work and play.
- Peak flow >80% of PB



MEDICATION NAME & DOSE	HOW MUCH	HOW OFTEN/ WHEN
Formoterol/budesonide____		Every 12 hours
If you have symptoms with exercise, use this medication 20 minutes before sports/exercise:		
*Salbutamol	2 puffs	20 mins before exercise

### YELLOW (BE CAREFUL!) USE MEDICATIONS AS FOLLOWS

- Cough
- Mild wheezing
- Tight chest
- Night-time cough
- Peak flow <80% of PB



MEDICATION NAME & DOSE	HOW MUCH	HOW OFTEN/ WHEN
Formoterol/budesonide____		Every 6 hours
<b>NB: Up to 12 puffs/inhalations daily (age ≥12 years)</b>		
If no improvement over 2 – 3 days please seek medical attention!		

### RED (DANGER!) – SEE YOUR DOCTOR NOW & USE THESE MEDICATIONS!

If there is no improvement over 2-3 days or you are getting worse:

- Not feeling better
- Breathing hard and fast
- Ribs show
- Nose opens wide
- Can't talk well
- Meds not working
- Peak flow <50% of PB



MEDICATION NAME & DOSE	HOW MUCH	HOW OFTEN/ WHEN
Formoterol/budesonide____	1 puff/ inhalation	Every 2 mins <sup>‡</sup>
<b><sup>‡</sup>Up to a maximum of 6 puffs (age ≥ 12 years) on a single occasion on the way to seek emergency medical attention. Daily maximum is 12 puffs/day (age ≥ 12 years).</b>		

**NB: This asthma plan is only to be used for those using MART therapy.**

\*MART therapy is not suggested for patients with exercise induced asthma.

## APPENDIX 5: INSTRUCTIONS FOR USE OF MART ASTHMA ACTION PLAN FOR PATIENTS

- This plan is to help you with self-management of your/your child's asthma with a maintenance and reliever single device.
- Each of the coloured blocks represents the various stages of asthma symptoms and how to approach treatment.
- All medications are to be given using a spacer, if needed, depending on device (as well as a facemask as recommended by the doctor).
- Can be used with or without peak flow information in most cases.
- This plan **must be discussed** with your/your child's doctor before parent leaves the office.
- You must carry the device at all times.
- A separate rescue inhaler such as salbutamol is not necessary in most cases (except perhaps if there are exercise-induced symptoms).

### For the GREEN ZONE:

- This is for when asthma control is good.
- Daily use of the medications listed should be expected to keep asthma symptoms under control.
- Please note that there is no reliever component in the Green zone. You/your child should be well controlled on budesonide/formoterol maintenance and **not use** formoterol/budesonide as a reliever.
- If you/your child experience breakthrough symptom such as cough, and mild wheeze, it puts you/ them into the Yellow zone and they will use the budesonide/formoterol maintenance and reliever according to the Yellow zone of the table.

### For the YELLOW ZONE:

- This is for when asthma control has suddenly fallen.
- A fall of 20% below personal best peak flow likely puts the patient in the yellow zone.
- If the preventer medication was not being used regularly, then it is to be restarted.
- If the preventer medication was being used, then the dose is to be increased as listed, until symptoms go away, or peak flow has returned to an acceptable value.
- If there is no improvement within 2 days, then contact your regular or nearest doctor/ health facility.
- If more than 8 inhalations (your child) or 12 inhalations (you) are needed in a day, then urgently seek medical care.

### For the RED ZONE:

- **This is the emergency zone and requires quick medical attention!**
- Sit up straight and try to remain calm.
- Take the medications listed in the table while you are preparing to go to the nearest doctor/ health facility.
- Plan to get to the nearest doctor/health facility/emergency room within 1 hour of these symptoms even if the symptoms seem to settle.

**If you can't see another doctor, then go to the emergency room as soon as possible. Make an appointment with your doctor/ clinic within 2 days after being seen at the emergency room (25, 26).**

## APPENDIX 6: INSTRUCTIONS FOR USE OF MART ASTHMA ACTION PLAN FOR CLINICIANS

- This plan is to help with patient self-management of their asthma with a maintenance and reliever single device.
- Each of the coloured blocks represents the various stages of asthma symptoms and how to approach treatment.
- All medications are to be given using a spacer, if needed, depending on device (as well as a facemask as recommended by the doctor).
- Can be used with or without peak flow information in most cases.
- This plan **must be discussed** between the doctor and the patient/parent before the patient/parent leaves the office.
- Device use education must be done and checked at every opportunity.
- Device must be carried with the patient at all times.
- A copy of the MART Asthma Action Plan should be printed along with these instructions. Please see Appendix 5: Instructions for Use of MART Asthma Action Plan for Patients (page 53). These forms are available at Public Education Resources – Ministry of Health & Wellness, Jamaica or <https://ncdip.moh.gov.jm/resources/>
- A separate rescue inhaler such as salbutamol is not necessary in most cases (except perhaps if there are exercise-induced symptoms).

### For the GREEN ZONE:

- This is for when asthma control is good.
- Daily use of the medications listed should be expected to keep asthma symptoms under control.
- Please note that there is no reliever component in the Green zone. Patients should be well controlled on budesonide/formoterol maintenance and **not use** formoterol/budesonide as a reliever. Whenever they experience breakthrough symptoms, it puts them into the Yellow zone and they will use the budesonide/formoterol maintenance and reliever according to the Yellow zone of the table.

### For the YELLOW ZONE:

- This is for when asthma control has suddenly fallen.
- A fall of 20% below personal best peak flow likely puts the patient in the yellow zone.
- If the preventer medication was not being used regularly, then it is to be restarted.
- If the preventer medication was being used, then the dose is to be increased as listed, until symptoms go away, or peak flow has returned to an acceptable value.
- If there is no improvement within 7 days, then contact your regular or nearest doctor/ health facility.
- If the peak flow falls below 60% of the personal best, then prednisone/prednisolone use may be warranted.
- If prednisone/prednisolone has been taken (according to the table), then make sure to go to the nearest doctor/ health facility within 24 hours.
- If more than 12 inhalations are needed in a day, then urgently seek medical care.

**For the RED ZONE:**

- **This is the emergency zone and requires quick medical attention! Give them the following directions:**
  - Sit up straight and try to remain calm.
  - Take the medications listed in the table while you are preparing to go to the nearest doctor/health facility.
  - Plan to get to the nearest doctor/health facility/emergency room within 1 hour of these symptoms even if the symptoms seem to settle.
  - **If they can't see another doctor, then go to the emergency room as soon as possible.**
  - **Make an appointment with your doctor/ clinic within 2 days after being seen at the emergency room (25, 26).**





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