

# CLINICAL GUIDELINE:

## EVALUATION AND MANAGEMENT OF PERSISTENT ASTHMA In the Ambulatory Setting



Physician Clinical Integration  
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### Scope

Asthma is defined as a chronic inflammation of the lung airways that causes coughing, chest tightness, wheezing or shortness of breath [1]. According to the Global Burden of Disease study, asthma affects 26 million Americans and nearly 340 million people worldwide. Asthma is a major cause of absenteeism from school and work, affecting quality of life, financial stability, and emotional health [2].

Asthma attacks occur when the airways of the lungs become inflamed by triggers, such as indoor pollutants, allergens from dust mites and mold, and outdoor air pollution. Such attacks result in the narrowing and obstruction of airways causing wheezing, coughing, chest tightness, and difficulty breathing, leading to Emergency Department visits and hospitalizations [2].

The increase in asthma prevalence has prompted research and guidelines designed to reduce the disease burden and promote appropriate management, treatment, and prevention of this disease.

### Guidance

The PCIN Quality Committee and its designees reviewed the available information in the medical literature and societal guidelines on the evaluation and management of asthma, as well as information derived from their clinical practice to devise these guidelines.

The recommendations for this guideline are based on research conducted by the Global Initiative for Asthma (GINA) Report, *Global Strategy for Asthma Management and Prevention*, updated in 2019.

#### Population Included

- Patients  $\geq 5$  years of age with diagnosis of persistent asthma

#### Exclusions

None

## Recommendations

### Diagnosis

- ✓ The initial diagnosis of asthma should be based on:
  - Characteristic pattern of respiratory symptoms such as wheezing, shortness of breath (dyspnea), chest tightness or cough.
- ✓ Confirmed variable expiratory airflow limitation should be completed according to GINA guidelines with one or more of the following tests:
  - Positive bronchodilator (BD) reversibility test, more likely to be positive if BD medication is withheld before test (short acting beta-agonist [SABA]  $\geq 4$  hours, long acting beta agonist [LABA]  $\geq 15$  hours)
    - *Adults*: Increase in forced expiratory volume in the first second (FEV<sub>1</sub>) of  $>12\%$  and  $>200$  mL from baseline, 10-15 minutes after 200-400 mcg albuterol or equivalent (greater confidence if increase is  $>15\%$  and  $>400$  mL)
    - *Children*: Increase in FEV<sub>1</sub> of  $>12\%$  predicted
  - Excessive variability in twice-daily peak expiratory flow (PEF) over 2 weeks
    - *Adults*: Average daily diurnal PEF variability  $>10\%$
    - *Children*: Average daily diurnal PEF variability  $>13\%$
  - Significant increase in lung function after four weeks of anti-inflammatory treatment
    - *Adults*: Increase in FEV<sub>1</sub> by  $>12\%$  and  $>200$  mL (or PEF by  $>20\%$ ) from baseline after 4 weeks of treatment, outside respiratory infections
  - Positive exercise challenge test
    - *Adults*: Fall in FEV<sub>1</sub> of  $10\%$  and  $>200$  mL from baseline
    - *Children*: Fall in FEV<sub>1</sub> of  $>12\%$  predicted or PEF  $>15\%$
  - Positive bronchial challenge test (usually only performed in adults)
    - Fall in FEV<sub>1</sub> from baseline of  $\geq 20\%$  with standard doses of methacholine or histamine, or  $\geq 15\%$  with standardized hyperventilation, hypertonic saline or mannitol challenge
  - Excessive variation in lung function between visits (less reliable)
    - *Adults*: Variation in FEV<sub>1</sub> of  $>12\%$  and  $>200$  mL between visits, outside of respiratory infections
    - *Children*: Variation in FEV<sub>1</sub> of  $12\%$  in FEV<sub>1</sub> or  $>15\%$  in PEF between visits (may include respiratory infections)
- ✓ Documented expiratory airflow limitation
  - At a time when FEV<sub>1</sub> is reduced, confirm that FEV<sub>1</sub>/Forced expiratory volume (FVC) is reduced (it is usually  $>0.75-0.80$  in adults,  $>0.90$  in children).

GINA. (2019). Diagnostic criteria for asthma in adults, adolescents, and children 6-11 years. Retrieved from <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf>, p. 19

Steps for confirming the diagnosis of asthma in a patient already taking controller treatment:

- ✓ For patients already taking controller treatment without previous documentation of lung function, diagnosis is confirmed based on the patient's symptoms and lung function during a step-down controller treatment.
  - Variable respiratory symptoms and variable airflow limitation
    - Diagnosis of asthma is confirmed; assess the level of asthma control and review controller treatment.
  - Variable respiratory symptoms but no variable airflow limitation
    - Repeat BD reversibility test again after withholding BD (SABA: 4 hours; LABA: 12 or 24 hours) or during symptoms. If normal, consider alternative diagnoses.
    - If FEV<sub>1</sub> is  $>70\%$  predicted: consider a bronchial provocation test. If negative, consider stepping down controller treatment and reassess in two to four weeks.
    - If FEV<sub>1</sub> is  $<70\%$  predicted: consider stepping up controller treatment for three months, then reassess symptoms and lung function. If no response, resume previous treatment and refer patient for diagnosis and investigation.
  - Few respiratory symptoms, normal lung function, and no variable airflow limitation
    - Repeat BD reversibility test again after withholding BD (SABA: 4 hours; LABA: 12 or 24 hours) or during symptoms. If normal, consider alternative diagnoses.
    - Consider stepping down controller treatment



- If symptoms emerge and lung function falls: asthma is confirmed. Step up controller treatment to previous lowest effective dose.
- If no change in symptoms or lung function at lowest controller step: consider ceasing controller and monitor patient closely for at least twelve months.
- ✓ Persistent shortness of breath and persistent airflow limitation
  - Consider stepping up controller treatment for three months, then reassess symptoms and lung function. If no response, resume previous treatment and refer patient for diagnosis and investigation [3].
  - Consider asthma/chronic obstructive pulmonary disease (COPD) overlap in cases where features of both diseases are present [6,7].

GINA. (2019). Steps for confirming the diagnosis of asthma in a patient already taking controller treatment. Retrieved from <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (Box 1-3, page 23)

### Assessment

GINA assessment of asthma control in adults, adolescents and children 6-11 years: <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (Box 2-2, page 31)

- ✓ FEV<sub>1</sub> should be measured at start of treatment; after three to six months on controller treatment to record the patient's personal best lung function; then periodically for ongoing risk assessment.
- ✓ The patient's personal best FEV<sub>1</sub> should be used rather than the predicted normal ranges.
- ✓ Before making any medication changes, the following factors should be assessed, and the patient educated regarding:
  - Poor inhaler technique
  - Poor medication adherence
  - Incorrect diagnosis of asthma
  - Comorbidities and complicating conditions such as rhinosinusitis, gastroesophageal reflux, obesity and obstructive sleep apnea
  - Ongoing exposure to sensitizing or irritant agents at home or work

### Treatment

- ✓ Inhaled corticosteroids (ICS)-containing controller treatment should be initiated as soon as possible, upon diagnosis.
- ✓ Asthma treatment should be based on a cycle of patient assessment, adjustment of treatment, and review of the response.
- ✓ GINA's step-down approach to personalized asthma management should be followed:
  - Step 1: A low-dose combination ICS-formoterol as needed for the relief of symptoms is the preferred controller. Evidence indicates a large reduction in severe exacerbations with ICS-formoterol; GINA no longer recommends the use of SABA-only treatment of asthma.
  - Step 2: The preferred controller option is daily low-dose ICS with as-needed SABA OR as-needed low-dose ICS-formoterol. Other options are leukotriene receptor antagonist (LTRA), or low-dose ICS taken whenever SABA is taken. Two randomized control trials (RCTs) showed reduced exacerbations compared with SABA-only treatment. Three RCTs showed similar or few exacerbations compared with maintenance ICS.
  - Step 3: The preferred controller options is daily low-dose ICS-LABA. Other options are medium-dose ICS, or low-dose ICS+LTRA.
  - Step 4: The preferred controller option is medium-dose ICS-LABA. Other options are high-dose ICS, add-on tiotropium, or add-on LTRA.
  - Step 5: The preferred controller option is high-dose ICS-LABA. At this step, asthma symptoms are persistent, and exacerbations continue despite appropriate treatment, medication adherence and proper inhaler technique. These patients should be referred for phenotypic assessment and consideration of add-on treatment. Other controller options may be to add low-dose oral corticosteroids (OCS), but side effects must be considered. GINA has developed guidelines for the diagnosis and treatment of difficult-to-treat and severe asthma; however, local eligibility and payer criteria must be verified due to cost and lack of insurance coverage.

GINA. (2019). Personalized management for adults and adolescents to control symptoms and minimize future risk: Retrieved from <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (Box 3-5A, page 46)



GINA. (2019). Personalized management for children 6-11 years to control symptoms and minimize future risk: <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (Box 3-5B, page 47)

## Asthma Control

- ✓ Patients should be seen one to three months after initiation of treatment and every three to twelve months thereafter. If the patient experiences an exacerbation, follow-up within one week is recommended.
- ✓ An asthma action plan should be initiated to include:
  - Symptom management
  - Peak flow monitoring
  - Importance of medication adherence
  - Proper inhaler technique
- ✓ Consider stepping down asthma treatment when asthma symptoms have been well-controlled and lung function has been stable for three or more months. Approach each step as a therapeutic trial:

### Step 5:

- If current medication is high-dose ICS-LABA plus OCS:
  - Continue high-dose ICS-LABA and reduce OCS dose
  - Use sputum-guided approach to reduce OCS
  - Alternate-day OCS treatment
  - Replace OCS with high-dose ICS
- If current medication is high-dose ICS-LABA plus other add-on agents:
  - Refer for expert advice

### Step 4:

- If current medication is moderate-to-high-dose ICS-LABA maintenance treatment:
  - Continue combination ICS-LABA with 50% reduction in ICS component, by using available formulations
  - Discontinuing LABA may lead to deterioration
- If current medication is medium-dose ICS-formoterol as maintenance and reliever:
  - Reduce maintenance ICS-formoterol to low-dose, and continue as-needed, low-dose ICS-formoterol reliever
- If current medication is high-dose ICS plus second controller:
  - Reduce ICS dose by 50% and continue second controller

### Step 3:

- If current medication is low-dose ICS-LABA maintenance:
  - Reduce ICS-LABA to once daily
  - Discontinuing LABA may lead to deterioration
- If current medication is low-dose ICS-formoterol as maintenance and reliever:
  - Reduce maintenance ICS-formoterol dose to once daily and continue as-needed, low-dose ICS-formoterol reliever
- If current medication is moderate or high-dose ICS:
  - Reduce ICS dose by 50%

### Step 2:

- If current medication is low-dose ICS:
  - Once-daily dosing (budesonide, ciclesonide, mometasone)
  - Switch to as-needed, low-dose ICS-formoterol
  - Adding LTRA may allow ICS dose to be stepped down
  - Insufficient evidence to support step-down to as-needed ICS with SABA
- If current medication is low-dose ICS or LTRA:
  - Switch to as-needed, low-dose ICS formoterol
  - Complete cessation of ICS in adults and adolescents is not advised as the risk of exacerbations is increased with SABA-only treatment

GINA. (2019). Options for stepping down treatment once asthma is well controlled: <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (Box 3-7, page 56)



- ✓ Referral to a pulmonologist or allergist is recommended if:
  - Atypical asthma symptoms are present;
  - Asthma control is not achieved or the patient experiences severe exacerbations;
  - Oral corticosteroid bursts are required for three days or more;
  - An assessment of potential environmental triggers is necessitated;
  - Knowing the phenotype and/or specific characteristics of the patient's condition could improve therapy; or
  - The patient has been admitted to the intensive care unit related to asthma [5,6,7].

### Reducing Exacerbations

- ✓ Non-pharmacologic strategies should be implemented to reduce the risk of exacerbations:
  - Smoking cessation
  - Physical activity
  - Avoidance of occupational exposures or allergens/pollutants
  - Avoidance of specific medications (i.e., NSAIDs, betablockers)
  - Maintaining a healthy diet high in fruits and vegetables
  - Vaccination against influenza
  - Weight reduction
  - Breathing exercises
  - Emotional wellbeing
- ✓ Exacerbations should be diagnosed based on the severity of symptoms and a decrease in lung function quantified by PEF or FEV<sub>1</sub>.
- ✓ Patients should be educated on self-management of worsening symptoms.
- ✓ Self-management of worsening asthma in adults and adolescents with a written asthma action plan: <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> Box 4-2, page 107
- ✓ Patient's action plan must include specific instructions on changes in reliever and controller medications in response to exacerbations and when/how to seek medical attention.

### Treatment of Patients Experiencing Acute Exacerbations in the Primary Care Setting

- ✓ A brief history/physical should be conducted along with prompt initiation of therapy.
- ✓ A more severe exacerbation may require SABA, controlled oxygen and systemic corticosteroids, along with patient transfer to an acute care facility, aimed at rapidly relieving airflow obstruction and hypoxemia.

## Rationale

### Diagnosis

Upon clinical assessment, the patient will exhibit a characteristic pattern of respiratory symptoms such as wheezing, shortness of breath (dyspnea), chest tightness or cough [3]. Wheezing on auscultation is the most common abnormal finding; however, examination should include the upper respiratory tract and skin for atopic conditions such as allergic rhinitis, nasal polyps, and dermatitis. A prolonged expiratory phase and wheezing on auscultation confirms the presence of airflow limitation. Auscultation is beneficial before and after administration of a fast-acting bronchodilator to diagnose asthma [7].

Typical features of asthma include:

- Generally, more than one type of respiratory symptom (in adults, isolated cough is seldom due to asthma)
- Symptoms occur variably over time and vary in intensity
- Symptoms are often worse at night or on waking
- Symptoms are often triggered by exercise, laughter, allergens, cold air
- Symptoms often appear or worsen with viral infections

Lung function testing to document variable expiratory airflow limitation is essential in the diagnosis of asthma. A decrease in lung function during a respiratory infection is not indicative of asthma. If FEV<sub>1</sub> is within the predicted normal range when a patient is experiencing symptoms, it is unlikely the symptoms are related to asthma. Best practice is to use the patient's personal best reading rather than the predicted normal ranges [3].



For patients already taking controller treatment without previous documentation of lung function, diagnosis is confirmed based on the patient's symptoms and lung function during a step-down controller treatment.

The diagnosis of asthma can be confirmed once the patient begins treatment. Marked improvement in clinical symptoms in response to a rescue BD, decreased acute care visits (i.e., office and emergency room visits, hospitalizations), and decreased need for rescue oral corticosteroids verifies an asthma diagnosis. Because asthma symptoms are variable, patients will not experience reversible airway obstruction at every visit. A negative spirometry result cannot be used to rule out asthma. Spirometry should typically be repeated, especially when patients are symptomatic [7].

While useful in the diagnosis of occupational asthma and/or monitoring asthma treatment, PEF is only acceptable for diagnosing asthma when spirometry is not available. PEF requires more effort by the patient and is much less reliable than spirometry [7].

Tests for bronchial hyperreactivity should only be used in a controlled environment, such as a pulmonary function laboratory; however, it can be beneficial when spirometry is normal, but symptoms are suggestive of severe asthma [5]. Environmental allergic triggers of asthma can be identified by allergy skin prick (epicutaneous) testing, also helpful in identification of the asthma phenotype of the patient [7].

### Assessment of Asthma

The first component of assessing asthma should be based on the frequency/intensity of symptoms and patient's level of activity. GINA's symptom control tool classifies symptoms using numerical asthma control scores and is used to guide treatment decisions when combined with a risk assessment [3,6]. Variable symptoms occur when the patient is exposed to allergens or irritants and often become worse at night. Symptoms such as these respond to fast acting bronchodilators, suggestive of asthma. Assessment of family history for asthma or atopic diseases are beneficial in the identification of patients with asthma [7].

The second component is identification of the patient's risk of adverse asthma outcomes such as exacerbations, persistent airflow limitation, and medication side effects. Risk factors for exacerbations include poor asthma control, a history of  $\geq 1$  exacerbations in the previous year, poor adherence, incorrect inhaler technique, chronic sinusitis and smoking. Risk factors for the development of persistent airflow limitation include cigarette smoke or noxious agent exposure, chronic mucus hypersecretion, and asthma exacerbations in patients not taking ICS. The risk for medication side effects increases with higher doses or more potent formulations.

GINA. (2019). Assessment of asthma control in adults, adolescents and children 6-11 years: <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (Box 2.2, page 31)

GINA recommends lung function should be assessed at the start of treatment; after three to six months of controller treatment to assess the patient's personal best FEV<sub>1</sub>; and periodically thereafter.

Appropriate interpretation of lung function test results assists the provider in identifying patients at risk of asthma exacerbations, alternative causes for the symptoms, and persistent bronchodilator reversibility:

- A low FEV<sub>1</sub> percent predicted:
  - Identifies patients at risk of asthma exacerbations, independent of symptom levels, especially if FEV<sub>1</sub> is <60% predicted
  - Is a risk factor for lung function decline, independent of symptom levels?
  - If symptoms are few, suggests limitation of lifestyle or poor perception of airflow limitation, which may be due to untreated airway inflammation
- A 'normal' or high FEV<sub>1</sub> in a patient with frequent respiratory symptoms (especially when symptomatic):
  - Prompts consideration of alternative causes for the symptoms; e.g. cardiac disease or cough due to post-nasal drip or gastroesophageal reflux disease
- Persistent bronchodilator reversibility:
  - Finding significant bronchodilator reversibility (increase in FEV<sub>1</sub> >12% and >200 mL from baseline) in a patient taking controller treatment, or who has taken a short-acting beta2-agonist within 4 hours or a LABA within 12 hours, suggests uncontrolled asthma

GINA. (2019). How to interpret lung function test results in asthma: <https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (page 34)



PEF can be used to monitor patients with asthma once the initial diagnosis is made to identify triggers for worsening symptoms or to establish a baseline for action plans. Personal best PEF is usually reached within two weeks of starting ICS. Sub-optimal asthma control can be identified in patients with excessive PEF variation, which could lead to exacerbations. Long-term PEF monitoring is only recommended for patients with severe asthma [3].

Uncontrolled asthma is often the reason for persistent symptoms and exacerbations and is more easily improved than severe asthma. Uncontrolled asthma can be caused by poor inhaler technique; poor medication adherence; incorrect diagnosis of asthma; comorbidities and complicating conditions such as rhinosinusitis, gastroesophageal reflux, obesity and obstructive sleep apnea; and ongoing exposure to sensitizing or irritant agents at home or work [3]. Studies indicate exacerbations are seasonal, emphasizing the need for environmental assessments [8].

## Treatment

The primary goal of asthma management is to prevent exacerbations and reduce the risk of morbidity and mortality by achieving and maintaining control of the disease. Appropriate treatment is designed to treat patients with the least amount of medication required to control symptoms and maintain normal activity [6,7].

Asthma medications are classified into three main categories:

- Controller medications
- Reliever (rescue) medications
- Add-on therapies for patients with severe asthma

Best practice indicates ICS-containing controller treatment should be initiated upon diagnosis and is proven to improve lung function when initiated as soon as possible [3,6]. A pressurized metered dose inhaler (pMDI) plus spacer (puffer) with a mouthpiece or dry-powder inhaler (DPI) is recommended for children  $\geq 6$  years of age. Patients should be educated on the importance of rinsing and spitting post treatment to reduce the risk of oropharyngeal candidiasis and dysphonia. Variable airflow obstruction within the lungs can be reversed spontaneously with a fast-acting bronchodilator [7].

Studies indicate patients who are not started on ICS and have a severe exacerbation may have an increased long-term decline in lung function. Initial asthma treatment is based on a cycle of patient assessment, adjustment of treatment, and review of the response. If asthma is controlled for two to three months, the lowest effective dose can be determined by a step-down approach [3,6].

ICS's do not "cure" asthma and are only shown to reduce symptoms and exacerbations. Symptoms are more likely to reoccur if ICS is discontinued. If ICS therapy is unsuccessful, factors such as misdiagnosis, poor adherence, improper inhaler technique, and continued trigger exposure must be addressed. Once these factors are ruled out, treatment should be modified [7].

Other treatments include theophylline, which has only modest anti-inflammatory effects and is associated with multiple side effects (i.e., gastrointestinal symptoms, loose stools, seizures, cardiac arrhythmias, nausea and vomiting); the anti-immunoglobulin E (IgE) monoclonal antibody (omalizumab) which may reduce the frequency of asthma exacerbations by approximately 50% and should be reserved for patients whose symptoms remain uncontrolled with combination therapy with an ICS or experience an allergic reaction with ICS; systemic corticosteroids useful in the treatment of acute exacerbation; and allergen-specific immunotherapy which has the potential for severe anaphylactic reactions and is not recommended by GINA [6,7].

## Asthma Control

Asthma control is variable, therefore ongoing monitoring of treatment, symptom control, risk factors and frequency of exacerbations is crucial to ensure control [3]. Periodic lung functioning assessment is crucial for patients who may not recognize symptoms until their airway is obstructed [5]. Adherence and inhaler technique are crucial to effective treatment and should be assessed at each visit. The frequency of visits is determined by the patient's level of control. Generally, patients should be seen one to three months after initiation of treatment and every three to twelve months thereafter. If the patient experiences an exacerbation, follow up within one week is recommended [3].

Once asthma is well-controlled and maintained for three months, step-down in treatment is often successful without loss of control. GINA recommends the development of an action plan to ensure patients understand how and when to resume their previous treatment if symptoms worsen [3,8]. Ongoing monitoring and follow up are important to ensure control is achieved/maintained and to assess for side effects, lung function, and new triggers [7]. In a study of the effects of self-management on clinical outcomes, it



was determined self-management education reduced hospitalizations, emergency room visits, unscheduled visits to the physician, and days off from work or school. Patients who self-managed the adjustment of their medications based on an individualized action plan had improved lung function compared to those who simply returned to the physician for medication adjustments [4]. Education on symptom management, peak flow monitoring, the importance of medication adherence, and proper inhaler technique must be incorporated into the action plan [3].

Research indicates step-down treatment must be individualized, and the patient must understand the importance of adherence to the trial. Reducing the ICS dose and removing the LABA for a patient who is well-controlled on a medium-dose ICS-LABA has resulted in lower lung function and increased hospitalizations. Stepping down too quickly and completely discontinuing ICS has been shown to increase risk of exacerbations [3].

The concept of asthma control has changed since 2006. Severity classification (mild, moderate, severe) is established after a treatment period of several months and can change over time [6]:

- Step 1 or 2: Mild asthma
- Step 3: Moderate asthma
- Step 4 or 5: Severe asthma

Severe asthma should be considered in patients requiring step 4 or 5 treatment or when asthma is uncontrolled. Poorly controlled asthma can lead to functional damage of the airways due to asthma remodeling and possible development of COPD [5].

### **Reducing Exacerbations**

Research indicates asthma exacerbations are avoidable if patients receive the appropriate therapy and patient education [9].

Studies also indicate non-pharmacological strategies such as smoking cessation, physical activity, avoidance of occupational exposures or allergens/pollutants, avoidance of specific medications (i.e., NSAIDs, beta blockers), maintaining a healthy diet high in fruits and vegetables, vaccination against influenza, weight reduction, breathing exercises, and emotional well-being reduces morbidity and mortality related to co-morbidities and decreases exacerbations [3]. Compliance with these recommendations is usually poor as it is labor-intensive and requires much effort from the patient [7].

Exacerbations are diagnosed based on the severity of symptoms and a decrease in lung function quantified by PEF or FEV<sub>1</sub>. The patient's action plan must include specific instructions on changes in reliever and controller medications in response to exacerbations and when/how to seek medical attention. For patients on a maintenance low-dose ICS/formoterol, when asthma symptoms interfere with normal activities or the PEF has decreased by >20% for greater than two days the patient should understand the importance of increasing ICS. The risk of exacerbations can also be reduced by increasing the as-needed doses of ICS-formoterol when symptoms increase; however, the patients must understand if more than twelve inhalations are needed in a day, they should seek medical attention. For patients on an inhaled SABA as a reliever, repeating SABA only provides temporary relief and is less effective in preventing exacerbations. Research indicates the combination of rapid onset LABA (formoterol) and low-dose ICS (budesonide or beclomethasone) in a single inhaler is effective in improving asthma symptom control as both the controller and the reliever medication. It may also reduce exacerbations requiring OCS and hospitalizations compared to the same or higher dose of controller with as-needed SABA reliever.

Patients should not experience more than one exacerbation every three years if treatment is optimized. Those requiring emergency room visits or hospitalization are at increased risk of future exacerbations, particularly if they are classified as severe [8].

### **Treatment of Patients Experiencing Acute Exacerbations in the Primary Care Setting**

GINA. (2019). Management of asthma exacerbations in primary care (adults, adolescents, children 6-11 years)  
<https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf> (Box 4-3, page 109)





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