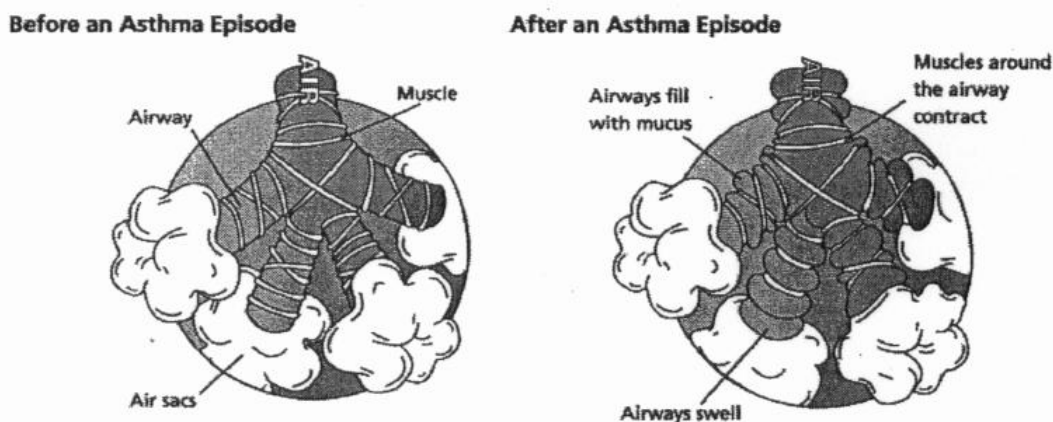


Asthma Diagnosis and Management

Asthma is a condition characterized by narrowing and inflammation of the airways. This inflammation causes the airways to be very sensitive and react to a variety of stimuli or triggers including physical changes (cold air, exercise), allergens (cat dander, dust mites, mold, pollens) and irritants (smoke, strong odors, sprays). This results in coughing, wheezing, or difficulty breathing. Asthma cannot be cured, only controlled. However, some people can outgrow their asthma.

During normal breathing, air is taken in through the nose and mouth, down your windpipe, through your airways and into your air sacs. When you breathe out, stale air leaves your lungs in the reverse order.

During an asthma attack the airways become narrow and it becomes difficult to breathe, the lining of the airways becomes swollen (inflamed), the airways produce thick mucus and the muscles around the airways tighten and make the airway narrower. These changes block the flow of air, making it hard to breathe.



The main symptoms of asthma are:

- a. Shortness of breath
- b. Wheezing
- c. Tightness of the chest
- d. Cough

Not all people with asthma wheeze. For some, coughing may be the only symptom. This occurs most often during the night and after exercise. It is important to know that treatment can reverse asthma symptoms. It is also important to treat even mild symptoms to keep them from getting worse.

Assess the Severity with Objective Lung Functions

Asthma severity can be judged by symptoms and objective measures of pulmonary function. Subjective assessment of symptoms by patients is often inaccurate. Poor perception of the severity of asthma is a major factor in causing delay in treatment and thus contributes to increased asthma exacerbations and hospitalizations. The tools for the objective measurement of lung function are spirometry and peak flow rate monitoring.

Francisco J. Cano, M.D.

Diplomat of the American Board of Allergy, and Immunology
Pediatric and Adult Asthma, Allergy and Immunology

Spirometry (Lung Function Test)

Spirometry is the evaluation of lung volumes and lung capacity using a machine called a spirometer done at the doctor's office. It is recommended in the initial assessment of most patients with suspected asthma. It is also used periodically symptoms. Individual cases with more complex disease require pulmonary functions at specialized pulmonary testing facilities.

Peak Flow Monitoring

A Peak Flow (PF) meter is a portable device that measures lung capacity. It is important to make frequent objective assessments of PF. Variations in the PF reflect the severity of the asthma. PF is an invaluable tool in the office, at home and in the emergency room. It is essential in the assessment of severity and degree of variation of lung function.

Other important uses include monitoring response to therapy during acute exacerbations, detecting deterioration even when symptoms have not yet started, monitoring response to daily therapy, providing justification for therapy and identification of triggers. Patients that have peak flow meters may use their medications less frequently and more effectively.

The effort required to produce the measurement is a short maximal blast of air. Because PF measurement is effort dependent, patients initially need to be coached to give their best effort. Ideally, PF should be measured twice daily: immediately if a bronchodilator is needed.

Variability is the difference in peak flow measurements between the morning and the evening reading. This is a very important parameter and should be less than 15%. Small variability reflects good asthma control. When your asthma becomes very stable, we will allow you to do PF intermittently (three times a week). Although this method loses the benefit of detecting early worsening in lung function, it still provides important information about variability. If PF is only measured two or three times a week, it is best to do both morning and evening readings on the same day.

It is important to establish personal best values and minimum variability when you are under good control. During a monitoring period of 2 to 3 weeks, you should record PF measurements at least twice a day. The personal best is the highest PF measurement achieved when your asthma is in good control. Note that the emphasis is not on an isolated reading, but rather on the variability from your personal best or from one reading to the next.

Avoid or Control Asthma Triggers

The identification and avoidance of triggers are very important. Avoidance or control of triggers can reduce symptoms and may, over the long term, decrease the airway inflammation that characterizes asthma. Triggers include allergens, drugs, chemicals, viral infections, exercise, cold air and extreme emotional depression. Since the majority of time is spent indoors, the indoor environment is an important area to control. When measures are taken to control the environment, the need for medications is reduced.

Removal of animal allergens from your environment is also important, although it may take several weeks or months after the animal has been removed for the full benefits to be perceived. All warm-blooded pets, including small rodents and birds, produce dander, urine

Francisco J. Cano, M.D.

Diplomat of the American Board of Allergy, and Immunology
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and saliva that can cause allergic reactions. Outdoor pollens and molds are impossible to avoid completely, but your exposure will be reduced if you use air conditioners and close windows and doors during peak pollen and mold seasons.

Food allergy is a rare trigger of asthma and occurs primarily in young children. Food avoidance is not a recommended course of action until a positive food challenge has been made.

Avoiding indoor irritants such as tobacco smoke, wood smoke, household sprays, hair sprays, organic compounds (cooking oils and polishes) and air pollutants is important because these irritants tend to worsen asthma.

Some medications can worsen asthma. Aspirin, ibuprofen and other anti-inflammatory drugs can cause severe exacerbations and should be avoided in sensitive patients. Beta-blockers (drug used to treat high blood pressure and migraine headaches) administered orally or by eye drops may exacerbate asthma and should be avoided. Antihistamines are safely taken by patients with asthma.

Allergy Injections

Allergy injections are appropriate when asthma is due to environmental allergens. To minimize the risk and improve success, the following suggestions are made:

- a. Allergy injections need to be prescribed by a trained allergy specialist and must be administered by a medical personnel trained to manage severe allergic reactions.
- b. Severe reactions to injections occur more often when asthma is not in optimal control. Therefore, it is essential that you are not experiencing any symptoms at the time of the injection.
- c. Before starting injections, pulmonary functions should be normal.

Medication Plan for Daily Asthma Management

Asthma medications are used in the prevention and reversal of asthma symptoms. The medications used to prevent asthma symptoms or controllers are the anti-inflammatory agents or (Anti-leukotrienes and Corticosteroids). The medications used to reverse asthma symptoms or relievers are called bronchodilators (beta-adrenergics). Although bronchodilators reverse symptoms, they do not treat the cause for asthma, which is inflammation.

Anti-inflammatory Agents: Corticosteroids (Controllers)

Corticosteroids are currently the most effective anti-inflammatory drugs for the treatment of asthma. Corticosteroids may be administered by mouth or by inhalation.

Inhaled steroids are safe and effective for the chronic treatment of asthma. Chronic oral steroid therapy should not be used unless other forms of therapy have failed. The use of long-term chronic oral therapy is limited because of the systemic side of effects.

Leukotriene Modifiers

Francisco J. Cano, M.D.

Diplomat of the American Board of Allergy, and Immunology
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Leukotrienes are substances released from cells that cause tightness in the smooth muscle of the airways, increases mucus secretions, and attracts and activates inflammatory cells in the airways of an asthmatic. Therefore, these medications are used to help block this process from occurring. These medications may be considered as an add-on therapy to inhaled corticosteroid or for younger patients with milder disease.

Bronchodilators: Beta-Adrenergics (Relievers)

Beta-adrenergics relax the airways. Short-acting beta-adrenergics are the treatment of choice for acute asthma exacerbations and for the pretreatment of exercise-induced asthma. Long-acting beta-adrenergics are not to be used for an acute asthma attack because they do not back immediately.

Although commonly used, frequent usage of beta-adrenergics is associated with worsening of asthma. It is now recommended that they be used on demand rather than on a regular basis.

Regular use of beta-adrenergic drugs should be kept to a minimum. Because well-controlled asthma requires only minimal use of beta-adrenergic, increased usage indicates deteriorating control. Frequent use of beta-adrenergics does not control asthma symptoms. Failure to respond to short-acting beta-adrenergic during an acute exacerbation of asthma mandates medical attention and usually indicates the need for short-term oral corticosteroids.

Medication Plan According to Asthma Severity

Mild Intermittent Asthma: Symptoms occur less than 2 times a week and nighttime symptoms are less than 2 times a month. Activity is not affected; requires only episodic use of beta-adrenergics to relieve asthma symptoms. If beta adrenergics are required more than 2 times a week, move to the next step of therapy.

Mild Persistent Asthma: Symptoms are more than 2 times a week but less than once a day, nighttime symptoms are more than twice a month. Activity may be affected. The primary therapy is inhaled anti-inflammatory medications taken on a daily basis. Inhaled beta-adrenergics should be available to take as needed to relieve symptoms.

Moderate Persistent Asthma: Symptoms are daily with nighttime symptoms occurring more than once a week. Activity is affected. The medication plan is the same as step 2 as well as a long acting beta-adrenergic for the nighttime symptoms a leukotrine inhibitor may be added.

Severe Persistent Asthma: Symptoms are continual with frequent nighttime exacerbations. Activity is limited due to continual symptoms. Therapy will require multiple medications, including high dose inhaled steroids. Oral steroids may be used.

Special Considerations for Children

Metered-dose inhalers (MDIs) are often difficult for children to use correctly. Therefore, they are recommended only when the prescription is accompanied by thorough and repeated instruction. After careful training, the use of a spacer device allows children as

Francisco J. Cano, M.D.

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young as 2 to 3 years of age to use MDIs. A device that combines a face mask with a spacer may also decrease the age to use MDIs. During acute exacerbations young children may have particular difficulties using MDIs without spacers. At this time, nebulizers are appropriate. Those prone to severe exacerbations may also find the nebulizers helpful during these attacks.

For Children under the age of 5, Peak Flow Meters are not available. For that reason, a medical history, quality of life and physical examination are very important in deciding therapy. Symptom reports kept by the parents on a patient diary card are essential for follow-up treatment.

Failure to make asthma diagnosis is a frequent problem. It occurs most often in young children whose main symptom is coughing and in those who wheeze only when they have colds. Often times they are dismissed as having bronchitis or pneumonia even though the signs and symptoms are more compatible with the diagnosis of asthma.

Viral respiratory infections are a common asthma trigger among children. Although there is not specific therapy, patients and parents need to be committed to regular asthma treatment plans. They need to be aware of early warning signs. If these patients tend to deteriorate rapidly ever time they have a viral respiratory infection, it may be appropriate to increase therapy during vial respiratory infections.

An Asthma Management Zone System

An asthma management zone system has been developed to help you understand the chronic and variable nature of asthma. By using this system, you will be able to identify the earliest possible signs that day-to-day control is deteriorating so you can act quickly to regain control, you should initiate actions appropriate to each zone according to you prearranged plan. The zones have been adapted to a traffic light system to make it easier to use and to remember. The zones suggested in the following discussion are guidelines only. They can vary from one patient to the next and should be tailored to you individual needs.

Green Zone: Green indicates that all is clear. Asthma is under good control. Peak Flow is usually 80 to 100 percent of predicted or personal best and usually < 15 percent variability. In this zone, there is no interruption of activity or sleep and there are minimal or no symptoms.

Yellow Zone: Yellow signals caution. A PF of 50 to 80 percent of predicted or personal best and 20 to 30 percent variability, and/ or occurrence of asthma symptoms (nocturnal, decreased activity, coughing, wheezing & chest tightness with activity or at rest).

When in the yellow zone, there is indication of one of one of the following:

1. An acute exacerbation for which a temporary increase in medication is indicated (see managing acute asthma exacerbations).
2. A deterioration of asthma which may be characterized by:
 - a. Gradual reduction in peak expiratory flow that fails to have a sustained response to beta-adrenergic
 - b. Greater intolerance of daily activities or exercise
 - c. The development of nocturnal symptoms

Francisco J. Cano, M.D.

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This indicates the need for further treatment. Initially, the dose of inhaled corticosteroids may be increased. If this is not successful, a course of oral corticosteroids may be indicated.

3. The yellow zone was improperly calculated.

Frequent changes into the yellow zone may indicate that the asthma is not sufficiently under control and the Green Zone therapy needs to be increased.

Red Zone: red signals a medical alert. PF is below 50 percent of prediction or personal best. Asthma symptoms are present at rest or interfere with activity. An inhaled beta-adrenergic should be taken immediately. If PF remains below 50 percent despite the bronchodilator, medical attention is immediately required. If the PF improves after the initial bronchodilator therapy, the Yellow Zone actions should be followed. Entry into the Red Zone generally represents a failure of the Green Zone therapy. We should always be contacted after your PF goes into the Red Zone.

Establish a Plan to Manage Exacerbations

Asthma attacks are episodes of progressively worsening symptoms (shortness of breath, coughing, wheezing or chest tightness). Exacerbations are characterized by decreases in PF. They usually reflect either a failure of long-term management or exposure to trigger. The severity of asthma exacerbations may vary from mild to severe.

Deterioration usually progresses over hours or days, but may occasionally occur rapidly over a few minutes. Emergency room visits and hospital admissions are usually because of inadequate action taken at the onset of the exacerbation.

The primary therapy for exacerbations is the repeated administration of inhaled beta adrenergics and the early introduction of corticosteroids. Crucial to successful treatment is close monitoring of the condition and response to treatment with serial measurements of peak flow rates. Assessment of the respiratory rate, particularly in children, also guides treatment decisions.

Full recovery from asthma exacerbations is usually gradual; it may take many days or weeks before lung function returns to normal.

Management of Exacerbations

Initiation of asthma therapy at the earliest possible sign is important to successful management of acute exacerbations. PF's are an integral part of home management. Everyone must have a written plan that outlines how to:

1. Recognize signs of deterioration
2. Start treatment
3. Get medical care

Treatment

For mild to moderate exacerbations, repeated administration of inhaled beta-adrenergics (2-4 puffs every twenty minutes for the first hour) is usually the best method to achieve reversal of airway obstruction. Increased beta-adrenergics alone may be continued if

Francisco J. Cano, M.D.

Diplomat of the American Board of Allergy, and Immunology
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there is a complete response (PF return to green zone) and the response last at least 3-4 hours.

In case of symptoms such as cough and mild wheezing, the beta-adrenergics should be started 2-4 puffs every 3-4 hours. If there is no improvement within 12-24 hours, our office should be contacted. If the response to inhaled beta-adrenergics is not prompt and sustained after 1 hour, an increase of inhaled steroids or institution of oral corticosteroids should be started to speed the resolution of the exacerbation.

Regular Follow-up care

Asthma patients need regular supervision and support. Continuous monitoring is essential to assure that the goals are met.

1. Review of PF's, symptom records, medication usage, techniques and environmental triggers.
2. It is important to monitor treatment plans, medications and management techniques and more importantly to review the level of asthma control.

The information contained within is adapted from the International Consensus Report on Diagnosis and Management of Asthma, National Heart, Lung and Blood Institute. U.S. Department of Health and Human Services.

A working group of 18 physicians and scientists representing 11 nationalities was established to develop an international consensus for the Treatment of Asthma. Members of the International Asthma Project met three times over a 6 month period and prepared a report that was reviewed by 12 consultants from eight countries.

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