Treatment of Asthma

Long-term management includes avoiding triggers, using controller medications on an ongoing daily basis, even when there are no symptoms, and using relief medications as needed. Peak flow monitoring, increasing inhaled steroids, and a short course of oral steroids may be recommended during an acute exacerbation. Treatment is based on severity, and is directed toward suppression of increasing airway inflammation. Most patients should be able to achieve the goals of therapy listed below. Controlling asthma well will lead to less need for more medications in the long run, and will reduce the risk of long term damage to your lungs.

Asthma needs to be watched and cared for every day. It does not go away just because your symptoms do. You need to care for it every day to keep it controlled.

Goals of Therapy

- Symptoms occur ≤ 2 times per week
- No awakening at night due to asthma
- Full participation in desired physical activities/exercise/sports without asthma symptoms
- Prevent asthma episodes (attacks)
- Prevent the need for urgent medical visits or hospitalizations due to asthma
- No need for absences from school or work
- Maintain normal or near normal lung function
- Provide optimal treatment with minimal or no adverse effects

Remember: if you are unable to achieve the goals listed above, your asthma is NOT well controlled, and treatment must be "stepped up" to achieve control. Treatment should always involve the minimum amount of medication/s required to fully achieve the goals of therapy.

There are two groups of medications used to treat asthma – long-term-control medications and quick-relief rescue medications.

LONG-TERM-CONTROL MEDICATIONS

Control medications treat the underlying disease process, and must be taken ***every day***, even when symptoms are not present, to maintain control of asthma. This will reduce the overall severity of asthma and reduce the need for rescue medications. The types and dosages of control medications will be selected by your doctor based on the severity of your asthma, and will be tailored specifically to your needs.

- **Corticosteroids:** Most potent and effective anti-inflammatory medication currently available. ***Inhaled corticosteroids*** are considered ***first-line*** medications for long-term treatment of asthma which is mild persistent, moderate persistent or severe. Early intervention with inhaled corticosteroids can improve asthma control and normalize lung function and may prevent irreversible airway injury. They act locally to reduce inflammation, and thereby reduce the associated hypersensitivity. Higher doses of inhaled corticosteroids may be associated with a reduction in the rate of growth in some children during the first two years, but long-term studies have shown that with continued use over many years, there is catch-up growth and no effect on overall height achieved. In contrast, uncontrolled asthma can permanently stunt growth. (Examples of inhaled steroids include Vanceril, Qvar, Flovent, Pulmocort, Asmacort, and Aerobid). **Systemic corticosteroids** (oral or IV) are often used to gain prompt control of the disease when initiating long-term therapy, or during treatment of an acute exacerbation of asthma. Systemic corticosteroids can take 2 to 4 hours to have an effect, so symptoms need to be addressed with appropriate measures until the systemic corticosteroids take effect.
- **Long-acting beta2-agonist:** Long-acting bronchodilators are used concomitantly with anti-inflammatory medications for long-term control of symptoms, including nighttime symptoms. Adding inhaled long-acting bronchodilators to inhaled corticosteroids is even more effective than doubling the dose of inhaled corticosteroids. They are available alone or as a combination inhaler with an inhaled corticosteroid as in (Advair). They also prevent exercise-induced bronchospasm/asthma. They should never be used more than 2 times a day, and the dose should never be doubled. The diskhaler dose is 1 puff, the aerosol inhaler dose is 2 puffs. Examples are Serevent and Foradil.
- **Leukotriene modifiers:** Oral medications available to add on to first or second line control medications (inhaled corticosteroids). Especially effective for aspirin sensitive asthma. Examples are Singulair and Accolate.
- **Mast cell stabilizers:** (Cromolyn/Intal and Nedocromil/Tilade) Mild anti-inflammatory medications which can be used for children with very mild persistent asthma. Can also be used to prevent exercise-induced bronchospasm/asthma. When both Intal and a short acting bronchodilator are used before exercise, the period of effective prevention of symptoms is doubled.
- **Methylxanthines:** Sustained-release theophylline is another add on therapy to inhaled steroids. Can be helpful in control of nighttime symptoms. However, many other medications and even common colds can alter blood levels of theophylline, resulting in either ineffective or toxic levels.

Control/preventive/maintenance medications MUST be taken on a long-term DAILY basis to achieve and maintain control of persistent asthma.

QUICK RELIEF RESCUE MEDICATIONS

These medications are used for quick relief of symptoms. Short acting beta agonists and anticholinergics comprise this group. They are bronchodilators, and relieve the spasm of the smooth muscle in the wall of the airway. However, they do not address the underlying pathology/disease process. Every person with asthma should always have a short acting bronchodilator available to them for relief of symptoms. If they are needed >2 times per week, one's asthma is ***not*** controlled and treatment with long-term maintenance medications needs to be increased.

- **Beta Agonists:** Open the airways, relieve bronchospasm. They begin working in 5 minutes and last 4 to 6 hours. They should not be used more than every four hours. If they are not lasting four hours, contact your doctor. They are also effective in preventing exercise- induced asthma and should be taken 0 to 20 minutes before exercise. This protective effect should last 2 hours. If symptoms are experienced within 2 hours, the beta agonist should be taken again, but let your doctor know that this was necessary. Examples include Provental HFA, Ventolin, generic Albuterol, Maxair, and Xopenex.
- **Anticholinergics:** Open the airways. Begins working in 30 minutes, lasts 4 to 6 hours. Example: Atrovent. Also available as a combination inhaler with the beta agonist albuterol: Combivent.

Monitoring

Spirometry is recommended for diagnosis and periodic monitoring. This will be done in the asthma specialist's office typically every 6 to 12 months. It provides an objective measurement of airflow and the state of the airway. This allows your doctor to make informed decisions when developing and adjusting your treatment plan and medications.

Peak flow (PEF) monitoring at home may be recommended. Peak flow meters are portable devices that measure one aspect of airway function. This is entirely effort dependant. If done well, this provides an objective measure of how well controlled one's asthma is, and may signal a decline in airway function even before it becomes symptomatic. It is particularly helpful if you have trouble identifying when your asthma is worsening. Children age 5 and older are usually able to use a peak flow meter effectively. ***However, if your child's peak flow is normal but your child is in distress, treat your child's symptoms, not the peak flow reading!***

The same peak flow meter should be utilized over time. There is significant variability between different types of peak flow meters, and a PEF reading from one type of peak flow meter usually does not correlate with the same value on a different type of peak flow meter. Peak flow monitoring may be recommended daily initially to determine one's baseline best PEF while asthma is well controlled. It then may be helpful to monitor PEF during exacerbations, until one has fully recovered. PEF should be measured on waking in the morning, before taking a bronchodilator, if one is used. Always record the best of three readings. ***Do not average them.***

A color zone is used to guide treatment based on peak flow readings:

- GREEN ZONE: 80% to 100% of best. Asthma is well controlled when your PEF is in this range. Continue your maintenance/control medications.
- YELLOW ZONE: 50% to 80% of best. Caution - asthma is worsening/flaring. Use your short acting bronchodilator, and check your PEF 20 minutes later. Your PEF should now be back in the GREEN zone. If your PEF stays in the YELLOW zone, you may need to temporarily increase or add on to your maintenance medications. Alternatively, the overall asthma may not be under sufficient control, and maintenance therapy may need to be increased
- RED ZONE: 0 to 50% of best. Signals medical alert. Use your short acting bronchodilator immediately. If the PEF measure does not return immediately and stays in the yellow or red zones, contact your doctor or get to an emergency room right away.

According to the most recent NHLBI Asthma Guidelines, one's ***"personal best"*** PEF should be used as the basis for an action/ treatment plan (rather than one's "predicted" best). Refer to the figure below for information on how to establish one's "personal best".

ESTABLISHING PERSONAL BEST PEAK EXPIRATORY FLOW

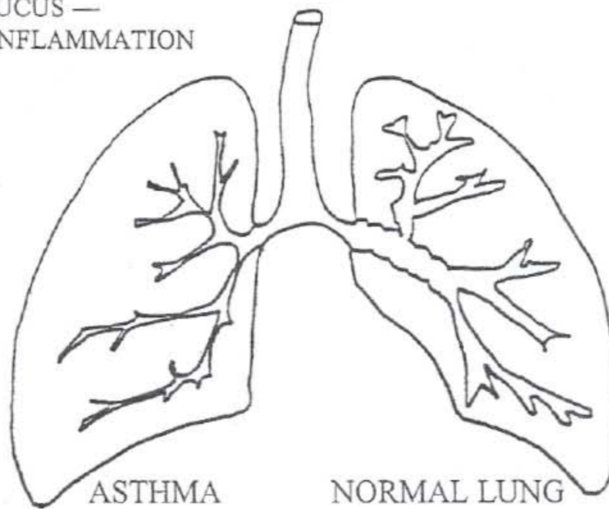
Personal best PEF can be determined after a 2 to 3 week period in which one records PEF at least once a day in the early afternoon. Additional measurements should be made after each use of a short-acting beta-agonist for symptom relief. The personal best value is usually achieved in the early afternoon measurement after maximal therapy has stabilized the patient. A course of oral corticosteroids may be needed to establish the personal best PEF. The patient's personal best value should be reassessed periodically to account for progression of disease in children and adults and for growth in children. Occasionally, a PEF value is recorded that is markedly higher than other values. This may be due to spitting (especially if the peak flow meter mouthpiece is small), coughing into the peak flow meter, or blockage of the air outflow. Therefore, caution should be used in establishing a personal best value when an outlying value is observed. The highest value achieved, with the exception of those rare outliers, is taken as one's "personal best." Children with moderate to severe persistent asthma should repeat the short-term monitoring period every 6 months to establish changes in personal best that occur with growth.

ASTHMA

INFLAMATION OF THE AIRWAYS. THIS CAUSES THEM TO BE SENSITIVE & HYPERREACTIVE.
SYMPTOMS: SPASM — COUGH AND WHEEZING, TIGHTNESS OF CHEST, SHORTNESS OF BREATH, MUCUS — CONGESTION/INFLAMMATION

TRIGGERS:

RESPIRATORY VIRAL INFECTIONS, ALLERGIES, IRRITANTS, COLD AIR, HUMIDITY, STRESS, G.E. REFLUX, ASPIRIN, BETA BLOCKERS, EXERCISE



Peak Flow ________

Best ____________

Mild intermittent:

1. Short-acting beta$_2$ agonist as needed.

Mild persistent:

1. Short-acting beta$_2$ agonist as needed.
2. Inhaled steroids.

Moderate asthma:

1. Inhaled steroids
2. Long acting inhaled beta$_2$ agonists, and/or Leukotriene inhibitor, or sustained-release Theophylline.
3. Short-acting inhaled beta$_2$ agonist up to 3–4 times daily as needed.

Severe asthma:

1. Inhaled corticosteroids daily.
2. Long acting inhaled beta$_2$ agonists, and/or Leukotrien inhibitor, and/or sustained-release Theophylline.
3. Oral corticosteroid (alternate day or single daily dose).
4. Short-acting inhaled beta$_2$-agonist as needed, up to 3–4 times daily.

				MEDICATIONS:				
				RELIEF	CONTROL			
				quick acting	long acting	mast cell stabilizer	inhaled steroid	leukotriene
				B2 Agonists/ anticholinergics	Servent/Foradil Theophylline	Tilade/Intal	Vanceril/Flovent, etc...	Accolate/ Singulair
	Peak Flow:	Spirometry / PEF variability	Symptoms: Day/Night					
Mild Intermittent	need baseline PF	FEV 1>80% baseline/ <20%	<or=2/week / <or=2/month	X as needed	—	—	—	—
Mild Persistent	during exacerbations	FEV 1>80% review annually / 20–30%	3–6/week / 3–4/month	X as needed	—	X	One of these three is needed X	X
Moderate	check regularly	FEV 1 60–80% review annually / >30%	daily / >or=5/month	X as needed	one or the other	X	One or two of these three needed X	X
Severe	check regularly	FEV 1 <60% review bi-annually / >30%	continual / frequent	X as needed	one or both	—	Both are needed X	X

Acute Exacerbation:

Peak flow monitoring and a short course of oral steroids is recommended.