ASTHMA FACTS

• Asthma is one of the most common chronic diseases worldwide. It is the most common chronic illness in childhood. Unlike most other chronic diseases, asthma often appears early in life and can adversely affect patients throughout their lives.

• Prevalence is increasing in many countries, especially in children.

• In the U.S., the prevalence of asthma in children under 18 years ranges from 4.3% to 6.7% (an estimated 4.1 million). The prevalence of asthma in children 2-5 years is 5.2%.

• Prevalence in children under 4 years old rose 160% from 1980-1994 (74% in 5-14 year olds).

• 80% of childhood asthma onset is by 5 years of age.

• Prevalence is higher in minorities.

• Prevalence is higher in inner cities.

• In Miami-Dade County: in 1999 – 7.1% of middle and high school age children reported prevalent, diagnosed asthma. In 200 – 5.1% of adults reported prevalent, diagnosed asthma.

• Asthma is the highest-ranking chronic condition causing hospitalization in children.

• In Miami-Dade County: in 1999 – hospitalization rates were double the Healthy People 2010 objectives in every age group. Total cost was $38 million.

• 87% of asthmatic children had unscheduled physician visits in the prior year.

• Asthma is the number one chronic illness resulting in school absences.

• 35% of parents of asthmatics missed work in the prior year.

• 78% of parents of asthmatics report that asthma has a negative impact on the family.

• An overall increase in severity of asthma increases the pool of patients at risk for death.

• 40% of asthmatics have sleep disturbances.
RISK FACTORS THAT PREDISPOSE TO ASTHMA

HOST FACTORS: predispose individuals to or protect them from developing asthma.

- Genetic predisposition.
- Atopy.
- Airway hyperresponsiveness.
- Gender.
- Race/ethnicity.

ENVIRONMENTAL FACTORS: influence susceptibility to development of asthma in predisposed individuals, precipitate asthma exacerbations, and/or cause symptoms to persist.

- Indoor allergens.
- Outdoor allergens.
- Tobacco smoke.
- Air pollution.
- Respiratory infections.
- Socioeconomic factors.
- Family size.
- Diet.
- Occupational sensitizers.
- Obesity.

FACTORS PREDICTING PERSISTENT ASTHMA

- Family history of asthma (maternal > paternal).
- Atopy (IgE/positive skin tests, eczema, rhinitis).
- Allergen exposure (dust mites/animals).
- Certain viral infections.
- Gender.
- Smoking (maternal, passive, active).
- Severity in childhood.
ASTHMA PERSISTENCE: ASSOCIATIVE RISK FACTORS

**DEFINITE:**

- Severity.
- Personal history of atopy (allergic rhinitis, atopic dermatitis).
- Family history of atopy (first-degree relatives).
- Continued environmental exposure.

**POSSIBLE:**

- Female gender.
- Parental treatment.
- Food allergy.
- Chronic respiratory infections.
- Chronic aspiration and gastroesophageal reflux.

**POSITIVE ASSOCIATION:**

- Young maternal age.
- Geographic area.
- Migraine.
- History of: enuresis, febrile seizures, recurrent vomiting.
- Allergic bronchopulmonary aspergillosis.

**NO ASSOCIATION (WITH PERSISTENCE):**

- Birth weight.
- Social class.
- Birth order.
- Parental occupation.

**NOTE:** Appropriate immunotherapy in select patients may help control symptoms of allergic rhinitis and asthma.
FACTORS THAT EXACERBATE ASTHMA

- Air pollutants (including smoke, dust, ozone).
- Allergens.
- Industrial irritants (eg. Sulfur dioxide).
- Certain inhalants.
- Respiratory viral infections.
- Exercise and hyperventilation.
- Weather changes, cold temperatures.
- Food additives.
- Certain medicines (such as aspirin, anti-inflammatory drugs, beta blockers, birth control pills).
- Gastroesophageal reflux.
- Upper respiratory tract inflammation (allergic rhinitis, sinusitis).
- Psychological.

SPECIAL CONSIDERATIONS

Special considerations are required to manage asthma in relation to:

- Pregnancy.
- Surgery.
- Physical activity.
- Rhinitis, sinusitis, nasal polyps.
- Respiratory infections.
- Gastroesophageal reflux.
- Aspirin-induced asthma.
- Occupational asthma.

Treatment of upper respiratory problems and gastroesophageal reflux is essential to adequate asthma control.
Respiratory infections may exacerbate asthma symptoms.
GOALS FOR ASTHMA THERAPY

• Minimal or no chronic asthma symptoms, day or night. Prevent chronic and troublesome symptoms (e.g., coughing or breathlessness with exercise, during the night or early morning).
• No limitations on activities (e.g., no school/work missed because of asthma).
• Minimal or no recurrent exacerbations of asthma; minimal or no emergency department visits or hospitalizations.
• Avoid adverse effects from asthma medications.
• Minimal use of inhaled short-acting β2-agonist (<1 time per day; <1 canister per month).
• Normal or near-normal lung function.
• Minimal or no adverse side effects from medications.
• Satisfaction with asthma care.

PATIENT SELF-MANAGEMENT SKILLS

• Recognize signs and symptoms of worsening asthma.
• Take medicines appropriately.
• Use peak flow meters appropriately.
• Monitor response to medications.
• Follow a written action plan.
• Seek medical treatment as needed.

HOW TO GET PATIENT ADHERENCE TO TREATMENT PLAN

• Clarify the patient’s expectations for treatment and answer questions.
• Involve the patient and family in the development of a treatment plan.
• Simplify the treatment plan when possible.
• Provide patients with daily diaries.
• Explain how each medication works to control or prevent symptoms.
• Have the patient describe the plan to evaluate his or her understanding.
• Evaluate the treatment plan with the patient and provide positive reinforcement for goals achieved.
• Identify problems with adherence (compliance) by asking questions.
• Provide with instructions, including the correct use of inhaler devices.
REAL OUTCOME MEASURES FOR ASTHMA

These are measures that we should look at in order to measure success of asthma education, treatment, and prevention programs.

- **SYMPTOMS**: should be minimal and patients should be able to participate in all activities.

- **EXACERBATIONS**: should be recognized early so that treatment can be stepped up before severe symptoms occur.

- **NEED FOR EMERGENCY TREATMENT**: should be rare.

- **EMERGENCY ROOM VISITS**: for asthma should be preventable.

- **HOSPITAL ADMISSIONS**: for asthma should be preventable.

- **TIME OFF WORK/SCHOOL**: unscheduled time off should be preventable.

- **LONG-TERM DETERIORATION**: can be prevented by avoiding triggers, recognizing early warning signs and instituting early treatment, using preventive medications and keeping regular follow-up appointments and establishing adequate communications with treating health-care systems.

- **DEATH**: is preventable by educating the patient and providing access to adequate asthma management programs.

- **SIDE EFFECTS OF MEDICATIONS**: can be prevented by adequate patient education and maintaining open communications with treating providers.
WHEN TO REFER TO SPECIALTY CARE

Referral to an asthma specialist for consultation or co-management is recommended in the following circumstances:

- A single life-threatening asthma exacerbation occurs.

- Treatment goals for the patient’s asthma are not being met after 3 weeks to 6 months of treatment or if the physician concludes that the asthma is not responding to current therapy.

- Atypical signs and symptoms make asthma diagnosis unclear, or other conditions are complicating diagnosis.

- The patient has a history suggesting that occupational factors, or an inhaled substance is provoking asthma.

- The initial diagnosis is severe, persistent asthma.

- Additional diagnostic testing is indicated.

- The patient is a child aged <3 years with moderate or severe persistent asthma.

- The patient is a candidate for immunotherapy.

- The patient or family requires additional education or guidance in managing asthma complications following the treatment plan, or avoiding asthma triggers.

- The patient requires continuous oral corticosteroids therapy or high-dose inhaled steroids, or has had more than two courses of oral corticosteroids in one year.
PATHOLOGY:

1. Extensive mucosal edema and hyperemia.
2. Widespread mucus plugging.
3. Hyperplasia and hypertrophy of bronchial and bronchiolar smooth muscle.
4. Infiltration of mucosa by inflammatory cells such as eosinophils, lymphocytes, mast cells, histiocytes.
5. Sloughing of mucosal cells; opening of intercellular and intracellular spaces.

Pathogenesis of Asthma in Children

Inflammation in Asthma

[Images showing pathological changes in asthma]
**IS IT ASTHMA?**

Making the diagnosis of asthma may be difficult.

Asthma may be considered if the following symptoms occur:

- Recurrent episodes of wheezing.
- Troublesome cough at night.
- Cough, wheeze or shortness of breath after exercise.
- Cough, wheeze or chest tightness after exposure to airborne allergens or pollutants.
- Colds “go to the chest” or take more than 10 days to clear.

Airway inflammation leads to bronchial hyperresponsiveness. Eventually, this leads to airflow obstruction and finally to symptoms of asthma (cough, shortness of breath, wheeze).

A patient with asthma may not realize that the airways inflammation is occurring until it is too late. It is important to monitor symptoms and peak flows regularly, so that the patient can start early treatment.

Early and aggressive treatment of airways inflammation with preventive (controller) medications is important. Treatment after symptoms occur may be dangerous, and will lead to severe consequences.

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**The “Tip” of the Iceberg**

- Symptoms
- Airflow obstruction
- Bronchial hyperresponsiveness
- Airway inflammation

**TITANIC**
Acute asthma response occurs when symptoms of asthma appear within 4 hours of exposure to an allergen. This is also known as early asthma reaction.

Inflammation and hyper-reactivity of the airway occurs when inflammatory cells (see below) come into the airway, release mediators and cause chronic changes. This is also known as late asthma reaction.

If this is not treated adequately, in a timely manner, airway remodeling follows. In adults, this may lead to scarring of the airways and permanent damage, and therefore chronic symptoms and restriction of the lungs.

### Inflammation in Asthma

- **Acute Response**
  - Bronchoconstriction
  - Edema
  - Secretions
  - Cough

- **Chronic Inflammation**
  - Cell recruitment
  - Epithelial damage
  - Early structural changes

- **Airway Remodeling**
  - Cellular proliferation
  - Extracellular matrix increase
  - Structural changes

### Mechanisms Underlying the Definition of Asthma

Risk Factors (for development of asthma) → **Inflammation** → Airway Hyperresponsiveness → Airflow Obstruction → Symptoms → Risk Factors (for exacerbations)

Several cells are involved in the development of asthma. These cells release chemicals, called mediators, that cause inflammation and symptoms of asthma.

### Cell-Derived Mediators

- **Mast cells**
  - Histamine
  - Leukotrienes
  - Prostaglandins
  - Platelet activating factor
  - Enzymes
  - Cytokines

- **Eosinophils**
  - Histamine
  - Leukotrienes
  - Prostaglandins
  - Platelet activating factor
  - Enzymes
  - Cytokines

- **T lymphocytes**
  - Histamine
  - Leukotrienes
  - Prostaglandins
  - Platelet activating factor
  - Enzymes
  - Cytokines
Other illnesses or medical conditions may cause symptoms similar to those of asthma.

Smoking eventually lead to increased mucus production. The mucus clogs the airway and causes cough, wheeze or shortness of breath.
OTHER CAUSES OF WHEEZING

Congenital airway abnormalities, such as tracheobronchomalacia (weak muscle in the larger airway) may also cause wheeze or shortness of breath. Chronic aspiration, or foreign body aspiration may also cause cough, wheeze or shortness of breath.

Scar tissue or granuloma in airway occludes the airway and may cause wheezing, which may be confused with asthma.
WHY CHILDREN WITH RESPIRATORY VIRAL ILLNESS MAY WHEEZE

A child with healthy lungs has airways that allow the air to go through with no resistance.

Normal Bronchioles

THE RSV-ASTHMA LINK

RSV Bronchiolitis and Asthma

Infection of airway with certain viruses causes swelling and damage of airway mucosa. The airway then becomes engorged with debris. There is also swelling outside of the airway and of the muscles surrounding the airway. This makes it difficult for the air to pass through the airway. Symptoms of this process are cough, difficulty breathing and wheezing (which is similar to asthma). It may take up to 6 weeks for this process to heal. If a child gets frequent viral infections, these symptoms recur.
Peak expiratory flow rate (PEFR) is the greatest velocity that can be obtained during a forced expiration starting with fully inflated lungs (total lung capacity). PEFR measurement has many benefits. It provides a simple, quantitative, reproducible measure of airway obstruction that can be obtained using inexpensive, portable peak flow meters. *The primary limitation of PEFR measurement is that it is effort dependent.*

Regular, objective measurement of airflow obstruction such as PEFR in patients with asthma is recommended because subjective measurements, such as dyspnea (shortness of breath) and wheezing may be inaccurate. In fact, poor perception of the severity of asthma on the part of the patient and physician has been cited as a major factor causing delay in treatment and this contributes to increased severity and mortality from asthma exacerbations. Another advantage of PEFR measurement is that when patients have access to PEFR information, they may use their medications less frequently and more appropriately.

PEFR can be measured in the clinician’s office, emergency department, hospitals, and at home.

**ZONE SYSTEM FOR MONITORING CHANGES IN PEFR:**

To help patients manage their asthma at home, a system of PEFR zones has been suggested. The specific zones are established as a function of the individual’s personal best. The emphasis is not on an isolated reading, but rather on the variability patients experience from their personal best or from one reading to the next.

The zone system has been adapted to a traffic light system to make it easier to use and remember:

**GREEN:** 80-100% of personal best signals all clear: no asthma symptoms are present and the routine treatment plan for maintaining control can be followed. For patients taking chronic medications, consistent readings in the green zone may indicate an opportunity to consider a reduction in medications.

**YELLOW:** 50-80% of personal best signals caution: an acute exacerbation may be present and a temporary increase in medication may be indicated. Alternatively, the overall asthma may not be under sufficient control, and controller (maintenance) therapy may need to be increased.

**RED:** below 50% of personal best signals a medical alert: an immediate bronchodilator should be taken, and the clinician should be notified if PEFR measures do not return immediately and stay in yellow or green zones.
QUESTIONS ABOUT ASTHMA

Answer TRUE or FALSE to the following questions:

1. Only people with asthma wheeze.
2. School- age children with asthma “grow out” of asthma.
3. People with asthma should not exercise.
4. Asthma is more of a problem in developed countries.
5. People who grow up around animals will not develop asthma.
6. People with asthma who cough should take Robitussin.
7. VICKS vapor rub prevents asthma attacks.
8. Shortness of breath with exercise may be a sign of asthma.
9. Cigarette smoking causes asthma.
10. In children, asthma may start after a bad viral infection.
11. People with emphysema have symptoms of asthma.
12. People who have frequent bronchitis may have asthma.
13. Some living conditions may make asthma worse.
14. Asthma is a psychological disease.
15. People with asthma should not take the influenza (flu) vaccine.
16. People who have allergies are more likely to get asthma.
17. Steroids should not be used for asthma.
18. Taking asthma medicines daily is not recommended.
19. Taking medicine with a nebulizer (aerosols machine) is better than an inhaler.
20. Most asthma medicines have severe side effects.
21. Children who wheeze in the first year of life may not develop asthma.

22. Making environmental changes at home is very important in controlling asthma.

23. Hospitalizations for asthma are usually preventable.

Wheeze occurs because of:
a) swelling of the airway  b) mucus clogging  c) muscle contraction  d)  a + c  e)  a + b + c
TRACKING YOUR ASTHMA HISTORY

**WHAT KINDS OF SYMPTOMS:** (check all that apply)

- a) Coughing.
- b) Wheezing.
- c) Shortness of breath.
- d) Chest tightness.

**WHEN SYMPTOMS OCCUR:** (check all that apply)

- a) Year-round.
- b) Seasonal (note season).
- c) At night.
- d) During particular outdoor activities, such as mowing the lawn, raking leaves, gardening, or exercising.

**FACTORS LEADING TO SYMPTOMS:** (check all that apply)

- a) Irritants, especially tobacco smoke.
- b) Respiratory infection.
- c) Cold air.
- d) Environmental allergens such as pollen, mold, house dust, animal dander.
- e) Chemicals at the workplace.
- f) Exercise.

**WHEN ASTHMA SYMPTOMS BEGAN:** (fill in each blank)

- Age when symptoms began: _________________________________
- Progress of disease since: _________________________________
- Previous diagnoses or medications: ___________________________

**HOME ENVIRONMENT:** (check all that apply, and fill in the blanks)

- Smoker in home.
- Animals in home.
- Home age: _______________________________________________

- Type of heating, including periodic use of wood-burning stove: ______________________________________

- Description of patient’s bedroom, including type of pillow, bedding, and floor covering: ________________________________

**FAMILY HISTORY:** Other family members or relatives with asthma or allergies: ________________________________
WHAT IS ASTHMA?

Asthma is a chronic lung disease that lasts a long time. It cannot be cured-only controlled.
Airways are inflamed. That is, airway linings are swollen.
Airways narrow and breathing becomes hard to do. This narrowing gets better (but not all the way in some patients), sometimes by itself, sometimes with treatment.
Airways are super sensitive. They react to many things, such as cigarette smoke, pollen, or cold air. Coughing, wheezing, tight chest, difficult breathing, or an asthma episode may result. A more complete list of things that can cause some people’s airways to react is given later.

WHAT ARE THE SYMPTOMS OF ASTHMA?

The main symptoms of asthma are:

- Shortness of breath.
- Wheezing.
- Tightness in the chest.
- Cough lasting more than a week.

Not all people with asthma wheeze. For some, coughing may be the only symptom of asthma. Coughing often occurs during the night or after exercise.

It is important to know that treatment can reverse asthma symptoms. And it is important to treat even mild symptoms of asthma so that you can keep the symptoms of asthma from getting worse.

NORMAL BREATHING

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

WHAT HAPPENS DURING AN EPISODE OF ASTHMA?

Asthma affects the airway in your lungs. During an episode of asthma:

- The lining of the airways in your lungs becomes inflamed.
- The airways produce thick mucus.
- The muscles around the airways tighten and make the airways narrower.
These changes in the airways block the flow of air, making it hard to breathe.

You need to know the ways that asthma affects the airways so you can understand why it often takes more than one medicine to treat. Some medicines relax the airways and others reduce (and even prevent) the swelling of the airway and mucus production.

**WHAT CAUSES ASTHMA?**

The basic cause of asthma is not yet known. What we do know is that asthma is not caused by emotional factors such as a troubled parent-child relationship. Asthma is not “all in one’s head”. It is instead a chronic lung disease.

**WHAT CAUSES ASTHMA EPISODES?**

People with asthma have airways that are super sensitive to things that do not bother people who do not have asthma. These things are called triggers because when you are near or come in contact with them, they may start an asthma episode. Your airways may become swollen, produce too much mucus and tighten up.

**COMMON TRIGGERS FOR ASTHMA EPISODES MAY INCLUDE THE FOLLOWING:**

- Dander (or flakes) from the skin, hair, or feathers of all warm-blooded pets (including dogs, cats, small rodents, and birds).
- House dust mites.
- Cockroaches.
- Pollen from grass and tree mold.
- Molds (indoor and outdoor).
- Cigarette smoke, wood smoke, scented products (such as hairspray), cosmetics, and cleaning products, strong odors from paint or cooking, automobiles, and air pollution.
- Infections in the upper airway, such as colds (a common trigger for both children and adults).
- Exercise.
- Showing strong feelings (crying, laughing).
- Changes in weather and temperature.

**IS THERE A CURE FOR ASTHMA?**

Asthma cannot be cured, but it can be controlled. You should expect nothing less.
HOW CAN ASTHMA EPISODES BE PREVENTED?

To prevent asthma episodes, you will have to work closely with your doctor to:

- Develop a medicine plan that keeps you from getting symptoms.
- Plan ways to avoid or reduce contact with your triggers.

HOW ARE ASTHMA EPISODES CONTROLLED?

To control asthma episodes when they occur you will have to work out a medicine plan with your doctor that includes:

- Treating symptoms early.
- Doing the right things for any changes in symptoms.
- Knowing when a doctor’s help is needed, and seeking help right away.

WHAT CAN A PATIENT WITH ASTHMA EXPECT FROM TREATMENT?

With proper treatment most people with asthma will be able to:

- Be active without having asthma symptoms. This includes participating in exercise and sports.
- Sleep through the night without having asthma symptoms.
- Prevent asthma episodes (attacks).
- Have the best possible peak flow number- lungs that work well.
- Avoid side effects from asthma medicines.
The Long-Term Management of Asthma: Treatments in the Stepwise Approach for Infants and Young Children

The aim of treatment is the control of asthma.

OUTCOME: CONTROL OF ASTHMA

- Minimal (ideally no) chronic symptoms, including nocturnal symptoms.
- Minimal (infrequent) episodes.
- No emergency visits.
- Minimal need for prn β2—agonist.
- No limitations on activities, including exercise.
- PEF circadian variation <20%.
- (Near) normal PEF.
- Minimal (or no) adverse effects from medicine.

NOTE:

- It is important to remember that there are very few studies on asthma therapy for infants (see text).
- Patients should start treatment at the step most appropriate to initial severity of their condition. A rescue course of prednisolone may be needed at any time and at any step.

<table>
<thead>
<tr>
<th>Step 4: Severe Persistent Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
</tr>
<tr>
<td>*High-dose inhaled corticosteroid (MDI with spacer and face mask)</td>
</tr>
<tr>
<td>*Oral steroids-lowest possible dose on an alternate-day, early morning schedule</td>
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<tr>
<th>Step 3: Moderate Persistent Asthma</th>
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<tbody>
<tr>
<td>Controller</td>
</tr>
<tr>
<td>*Low-to-medium-dose inhaled corticosteroid (MDI with spacer and face mask)</td>
</tr>
<tr>
<td>*Leukotriene inhibitor may be added</td>
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<tr>
<th>Step 2: Mild Persistent Asthma</th>
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<tbody>
<tr>
<td>Controller</td>
</tr>
<tr>
<td>*Low-dose inhaled corticosteroid (preferred), or Cromoglycate (MDI with spacer and face mask) OR</td>
</tr>
<tr>
<td>*Leukotriene inhibitor</td>
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<tr>
<th>Step 1: Mild Intermittent Asthma</th>
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<tbody>
<tr>
<td>Controller</td>
</tr>
<tr>
<td>*No controller medication needed</td>
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</table>

Avoid or Control Triggers At All Times

Step down: Review treatment every 3 to 6 months. If control is sustained for at least 3 months, a gradual stepwise reduction in treatment may be possible.

Step up: If control is not achieved, consider step up. But first: review patient medication technique, compliance and environmental control (avoidance of allergies or other trigger factors).
The Long-Term Management of Asthma: Treatments in the Stepwise Approach

The aim of treatment is control of asthma.

**OUTCOME: CONTROL OF ASTHMA**

- Minimal (ideally no) chronic symptoms, including nocturnal symptoms.
- Minimal (infrequent) episodes.
- No emergency visits.
- Minimal need for prn β2-agonist.
- No limitations on activities, including exercise.
- PEF circadian variation <20%.
- (Near) normal PEF.
- Minimal (or no) adverse effects from medicine.

**NOTE:**

Patients should start treatment at the step most appropriate to the initial severity of their condition. A rescue course of prednisolone may be needed at any time and at any step.

<table>
<thead>
<tr>
<th>Step 4: Severe Persistent Asthma</th>
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<tbody>
<tr>
<td><strong>Controller</strong></td>
<td><strong>Reliever</strong></td>
</tr>
<tr>
<td><em>High dose inhaled corticosteroid and long-acting β2-agonist</em></td>
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<tr>
<td><em>Theophylline and oral corticosteroids may be needed</em></td>
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<table>
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<th>Step 3: Moderate Persistent Asthma</th>
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</thead>
<tbody>
<tr>
<td><strong>Controller</strong></td>
</tr>
<tr>
<td><em>Low-to-medium dose inhaled corticosteroid + long-acting β2-agonist (preferred) OR medium dose inhaled corticosteroid OR low-to-medium-dose inhaled corticosteroid + leukotriene inhibitor or theophylline</em></td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Step 2: Mild Persistent Asthma</th>
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</thead>
<tbody>
<tr>
<td><strong>Controller</strong></td>
</tr>
<tr>
<td><em>Low-dose inhaled corticosteroid (preferred) OR cromoglycate, nedocromil, leukotriene inhibitor or sustained release theophylline</em></td>
</tr>
<tr>
<td><em>If needed, add leukotriene inhibitor, long-acting β2-agonist or theophylline</em></td>
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<tr>
<th>Step 1: Mild Intermittent Asthma</th>
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<tbody>
<tr>
<td><strong>Controller</strong></td>
</tr>
<tr>
<td><em>No daily medicine needed</em></td>
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</table>

Avoid or Control Triggers At All Times

If control is not achieved, consider stepup. But first: review patient medication technique, compliance and environmental control (avoidance of allergies or other trigger factors).

Stepup

Stepdown

Review treatment every 3 to 6 months. If control is sustained for at least 3 months, a gradual stepwise reduction in treatment may be possible.
**Things To Be Aware Of:**
- Asthma symptoms will become worse for about one-third of pregnant women.
- Asthma symptoms may be most severe between 29 and 36 weeks of pregnancy.
- Asthma that is not under control may affect the health of your baby as well as your own health.

**What To Do:**
- Tell your doctor, nurse, or nurse midwife that you have asthma.
- Make regular visits to your doctor, nurse, or nurse midwife for asthma and care of your unborn baby.
- Follow your asthma medicine plan. Most medicines for asthma are safe to take when you are pregnant if you follow your doctor’s advice.

*Remember:* if your asthma is not under control, your lungs are not getting enough oxygen to your baby. Not giving the baby oxygen is a far greater risk than taking asthma medicines.

**Try Not To Take These Asthma-Allergy Medicines While You Are Pregnant:**
- Decongestants. These are medicines that break up or decrease excess mucus. Cold medicines often contain this type of medicine.
- Certain antibiotics such as tetracycline.
- Live virus vaccine. *Killed* virus vaccines are all right.
- Immunotherapy (“allergy shots”). Do not begin allergy shots (but they may be continued if you were getting them before this pregnancy).
- Iodides.
- Medicines such as brompheniramine, epinephrine, phenylephrine, and phenylpropanolamine. Ask your doctor about these.

**Review And Improve All Actions You Take To Avoid Or Reduce Contact With Triggers Of Asthma. These Triggers May Include:**
- Animal dander; Tobacco smoke.
- House dust mites; Mold spores
- Pollen.
- Strong odors (for example, paint, perfume, and cooking).
- Any other known allergen or irritant.

**Don’t Worry:**
- Wheezing during labor and delivery is rare.
- Most asthma medicines will not harm your baby.

*Remember:* the best way to help your baby is to take care of your asthma.
- Asthma medicines will not cause problems for your baby if you decide to breast-feed.
IF YOUR INFANT HAS ASTHMA YOU WILL HAVE TO TAKE EXTRA CARE

The lungs of an infant do not function as efficiently as the lungs of an older child. As a result, a severe episode of asthma can quickly result in lung failure.

What To Do:

Follow the appointment schedule for checking on your infant’s asthma. The doctor will want to see your child regularly, even if he or she is not having symptoms.

If your infant has asthma symptoms, act quickly. Follow the asthma control plan your doctor made for handling symptoms.

Watch your infant closely for signs to seek emergency care. These signs include:

- Breathing rate increases (to over forty breaths per minute while the infant is sleeping).
- Count the number of breaths in 15 seconds and multiply by four.
- Suckling or feeding stops.
- Skin between the infant’s ribs is pulled tight.
- Chest gets bigger.
- Coloring changes (pale or red face, fingernails turn blue).
- Cry changes in quality (become softer and shorter).
- Nostrils open wider (nasal flaring).
- Grunting.

Be Prepared. Do not wait until the last minute to learn how to handle an emergency.

Have an asthma control plan to get to the doctor or hospital that includes knowing how you’ll get there, how much it will cost, and who will watch your other children.

DURING AN ASTHMA EPISODE DO NOT DO THE FOLLOWING:

- DO NOT give your infant large volumes of liquids to drink; just give normal amounts.
- DO NOT have your infant breathe warm, moist air (e.g., the mist from a hot shower).
- DO NOT have your infant rebreathe into a bag held tightly over his or her nose and mouth.
- DO NOT give your infant over-the-counter antihistamines and cold remedies.
What To Do:

- Have a complete checkup to find out what other health problems you may have that could affect or be affected by your asthma. For example, asthma can affect heart disease. Theophylline can make high blood pressure worse.
- Discuss with your doctor any symptoms that you may have even if you don’t think they are related to asthma.
- Report any physical problems you may have that might make it hard for you to take your asthma medicine.
- If you have hearing problems and don’t hear or understand the doctor or nurse, be sure you ask them to speak up. Ask questions. Be sure you understand what they want you to do.
- If you have arthritis, a holding chamber or spacer device (a tube to attach to the inhaler) can make it easier to use a metered dose inhaler.
- If you have vision problems, remember to wear your glasses when measuring medicines or peak flow numbers. Ask for asthma handouts in larger type.
- If you have memory problems, ask the doctor to make your medicine plan as simple as possible to follow. Be sure the plan is written down.
- Get help from a support group, close friends or family members, or a counselor when you feel under great stress or are depressed. Changes in your life, like death of a loved one or loss of a job, may cause these feelings. Although it is very rare, these problems may increase your chances of having an asthma episode that could threaten you life. You must take care of yourself to keep your asthma under control.
- If you are taking long-term steroid medicines, have regular checkups.

As Your Doctor to Check:

- The number of your blood cells, your blood sugar, and your potassium.
- Your eyes each year to be sure you are not getting cataracts or glaucoma.
- The health of your bones.
WARNING SIGNS OF ASTHMA EPISODES

Asthma episodes rarely occur without warning. Most people with asthma have warning signs (physical changes) that occur hours before symptoms appear. Warning signs are not the same for everyone. You may have different signs at different times. By knowing your warning signs and acting on them, you may be able to avoid a serious episode of asthma.

- Think back on your last asthma attack/episode. Did you have any of the signs below?
- Check your warning sign(s). Discuss them with your doctor and family.
- Remember to follow your asthma control plan as soon as these signs appear.

CHECK HERE

- Chronic cough, especially at night.
- Difficulty breathing.
- Chest starts to get tight or hurts.
- Breathing faster than normal.
- Getting out of breath easily.
- Tired.
- Itchy, watery or glassy eyes.
- Itchy, scratchy or sore throat.
- Sneezing or runny nose.
- Change in face color.
- Dark circles under eyes.
- Restless.
- Decreased exercise tolerance.
- Drop in peak flow reading.

My most common warning signs of an asthma attack are:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
SUMMARY OF STEPS TO PREVENT/MANAGE ASTHMA ATTACKS

- Avoid triggers.
- **Know your warning signs** - so you can step-up treatment early.
- **Know your peak flow zones** - so you can step up treatment early.
- **Take the correct amount of medicine** – if the asthma control plan includes increased dosage or addition of another medicine to be used during episodes, take it as prescribed.
- **Keep calm and relaxed.**
- **Review the list below for signs to seek emergency medical care for asthma** - they include:
  - Your wheeze, cough, or shortness of breath gets worse, even after the medicine has been given and has had time to work. Most inhaled bronchodilator medicines produce an effect within 5 to 10 minutes. Discuss the time your medicines take to work with your doctor.
  - Your peak flow number goes down, or does not improve after treatment with bronchodilators, or drops to 50% or less of your personal best.
  - Your breathing gets difficult. Signs of this are:
    - Chest and neck are pulled or sucked in with each breath.
    - Hunching over.
    - Struggling to breathe.
  - You have trouble walking or talking.
  - You stop playing or working and cannot start again.
  - Your lips or fingernails are gray or blue. If this happens – go immediately to the Emergency Room.
- **Keep your important information for seeking emergency care handy.**
- **Call a family member, friend, or neighbor to help you.**

**DO NOT DO THE FOLLOWING:**

- **DO NOT** drink a lot of water. Just drink normal amounts.
- **DO NOT** breath warm, moist air from a shower.
- **DO NOT** re-breathe into a paper bag held over the nose.
- **DO NOT** use over-the-counter cold or cough remedies without first calling the doctor.
- **DO NOT** use holistic or other home remedies without discussing them first with your doctor.