



Nursing Management for Asthma Education in School Aged Children

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Objectives

At the conclusion of this program the participants will be able to:

1. Develop an Asthma Action Plan for school aged children to parents and providers.
2. Recognize triggers for allergy and asthma
3. Teach effective Peak Flow Meter instruction to parents and children

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Asthma is a Major Public Health Problem

- Nearly 5 million children have asthma
- It is one of the most common chronic childhood illnesses
- It is a leading cause of school absences

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Morbidity & Mortality

- CDC estimates for children < 15 years of age:
 - 1.8 million asthma-related outpatient visits to emergency rooms in 2000 (more than 728,000 of these involve children under 18)
 - Accounts for 14 million lost school days annually
 - It is the leading cause of school absenteeism attributed to chronic conditions (3 times the rate of children without asthma)
 - 10.4 million asthma related outpatient visits to private MD offices and hospital clinics in 2000
 - 164,000 hospitalizations
 - 8.7 million prescriptions (under age 17)

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Trends in Asthma

- Third leading cause of hospitalization among children under the age of 15 and it is the first-ranking chronic condition
- Leading discharge diagnosis in children's hospitals
 - 15-30 percent of all patients discharged
- Financial Impact
 - Approaching \$2 billion a year in direct costs
 - Approximately \$1 billion a year in indirect costs

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What is Asthma?

A disease that:

- Is chronic
- Produces recurring episodes of breathing problems
 - Coughing
 - Wheezing
 - Chest tightness
 - Shortness of breath
- Cannot be cured, but can be controlled

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What are the Symptoms of Asthma?

- Shortness of breath
- Wheezing
- Tightness in the chest
- Coughing at night or after physical activity; cough that lasts more than a week
- Waking at night with asthma symptoms (a key marker of uncontrolled asthma)

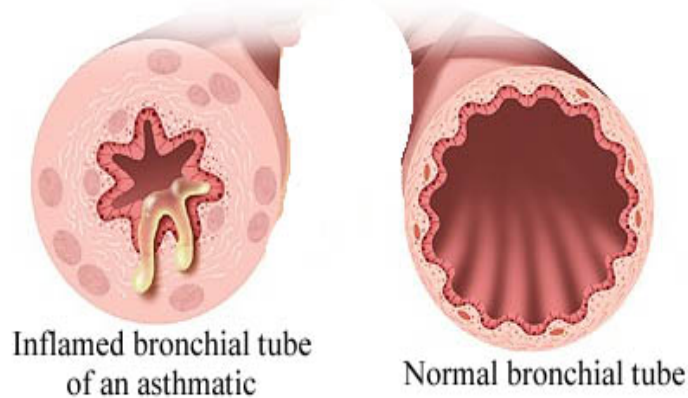
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What's Happening in the Lungs with Asthma?

- The lining of the airways becomes swollen (inflamed)
- The airways produce a thick mucus
- The muscles around the airways tighten and make airways narrower

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Clinical Review



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Exercise-induced Asthma

- Symptoms include coughing, wheezing, chest tightness, or shortness of breath
- Usually begins during exercise and peaks 5-10 minutes after stopping exercise
- May occur more easily on cold, dry days than on hot, humid days
- Children may need treatment before exercise, even when asthma is well-controlled.

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Exercise-induced Asthma

Asthma should not be an excuse to not participate in physical education, sports, or exercise

- Develop an asthma management plan that will allow the child to participate in any activity they wish
- Appropriate long-term control therapy can reduce the frequency and severity of exercise-induced symptoms
- Make it easy to take medications before exercise
- If full activity is not possible, modify
- A warm up period before exercise may help

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What Should People with Asthma Be Able To Do?

- 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 lung function (e.g., good peak flow number)
- Avoid side effects from asthma medicines

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Classification of Asthma Severity: Clinical Features Before Treatment

	Days with symptoms	Nights with symptoms	PEF % of personal best peak flow
Step 4 Severe persistent	Continual	Frequent	$\leq 60\%$
Step 3 Moderate persistent	Daily	≥ 5 times per month	$>60\% - < 80\%$
Step 2 Mild persistent	3-6 times per week	3-4 times per month	$\geq 80\%$
Step 1 Mild intermittent	≤ 2 times per week	≤ 2 times per month	$\geq 80\%$

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Assessment & Monitor

- Children with asthma need to be monitored regularly
 - Schedule at least 2 visits/year for a child whose asthma is under control
 - Child using daily therapy may require at least 3-4 visits/year
 - The child with unstable asthma may require visits at least every 2 weeks until asthma is stable
- Ask about symptom patterns
 - Nighttime or early morning
 - Daytime symptoms
 - Coughing
 - Wheezing
 - SOB
 - Rapid Breathing
 - Chest tightness

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Controlling Asthma & Allergy Triggers

- Indoor Irritants
 - Children absorb more of the harmful substance in the air, this is generally related to the rate and depth of breathing and they also have an immature immune system
 - Tobacco smoke (smoke outdoors, smoking cessation for parents)
 - Permit NO smoking around the child or in the child's home
 - Smoke – fireplaces or wood burners
 - Try to eliminate from house
 - Check for efficient ventilation
 - Pesticides
 - Try not to use a spray
 - If spraying, utilize a mask
 - Keep children out of area
 - Check with daycares or schools to see when & if they are spraying with pesticides

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Controlling Asthma & Allergy Triggers

- Indoor Allergens
 - Dust Mites
 - Dependent on moisture
 - Wash stuffed toys weekly in hot water
 - Encase pillows, mattress and box springs
 - Wash bedding weekly in hot water/fragrance-free detergent
 - Air purifiers
 - Remove carpeting
 - Vacuum 1-2 times/week, more often may stir up more dust mites
 - Begin dusting in bedroom
 - Cockroaches
 - Proteins found in droppings or body parts

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Controlling Asthma & Allergy Triggers

- Cockroaches (cont.)
 - Mainly seen in inner city populations
 - Do not leave food/garbage exposed
 - Reduce indoor humidity
 - Fix leaky faucets
 - Use traps or poison baits (boric acid traps)
- Mold & Mildew
 - Fix leaky faucets
 - Avoid vaporizers
 - Exhaust fan/dehumidifier
- Dander
 - Old skin cells which are shed, all warm blooded animals
 - Cats, problem with their saliva. Saliva is deposited on their skin every time they lick themselves. It then dries, flakes and becomes airborne

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Controlling Asthma & Allergy Triggers

- Dander (cont.)
 - Remove pet from home or at least patient's bedroom
 - Keep off furniture/upholstery
 - Wash pet weekly & brush often (wear a mask & do outside)
 - Wash hands after touching
- Outdoor Irritants
 - Repeat exposure to irritants plays a role in airway sensitivity
 - Car exhaust & diesel fumes
 - Soot particles inhaled from diesel exhaust may trigger asthma
 - Problem with children sitting in school buses or school buses that idle too long
 - Diesel fumes contain 40 chemicals listed as hazardous air pollutants under the clean air act

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Controlling Asthma & Allergy Triggers

- Outdoor Irritants (cont.)
 - Smog & Pollution (ozone)
 - Known to increase ER visits & hospital admissions for asthma
 - Stay inside, lower levels in the AM
 - Avoid exertion or outdoor exercise (modify routine)
 - Ozone is worse near freeways (cars pull in outside air)
 - Pollens (highest in AM after sunrise)
 - Keep windows & doors closed during peak seasons
 - Pollens more problematic on sunny, windy and low humidity days
 - Do not hang wash outside, pollens may cling to wash
 - If windows/doors are open, vacuum. Pollens can accumulate indoors.

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Controlling Asthma & Allergy Triggers

- Viral Infections
 - Most common precipitant of asthma exacerbations among children < 5 years of age
 - Viral infections can exacerbate asthma
 - Flu shot
 - Know signs & symptoms of infections and when to call physician
- Exercise (EIA or EIB)
 - May be the only precipitating factor to one's asthma
 - Generally begins during exercise and reaches a peak 5-10 min. after stopping. May resolve on its own.
 - Recommendations: warm up & cool down periods. Discuss medication options with MD

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Controlling Asthma & Allergy Triggers

- Stress/Emotions
 - Laughing and crying may both precipitate flare-ups
 - Stress
 - Proactive vs. Reactive
 - Tension may constrict airflow causing muscles to tighten
 - Stress, may make asthma more difficult to manage, patients forget to take their meds
- Sinusitis/Rhinitis
 - If one parent has allergic disease, the estimated risk of the child to develop allergies is 48 percent; the child's risk grows to 70 percent if both parents have allergies
 - Asthma is often associated with either, due to inflammation of the upper airway, contributes to lower airway sensitivity or asthma symptoms

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Controlling Asthma & Allergy Triggers

- Sinusitis/Rhinitis (cont.)
 - Rhinitis
 - Inflammation of nasal walls, can be seasonal or perennial
 - » Seasonal - “hay fever” tends to affect sufferers in spring/summer and or early fall. Sneezing, itchy eyes & runny nose are general problems due to sensitivity to airborne pollens or mold spores
 - » Perennial – year round, triggered by sensitivity to allergens such as dust, dander or mold
 - Antihistamines/nasal sprays
 - Sinusitis
 - Infection of the sinuses treated with antibiotics. If untreated could lead to asthma flare-ups.
- GERD
 - Gastroesophageal reflux disease, cause of heartburn

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Controlling Asthma & Allergy Triggers

- GERD (cont.)
 - May be associated with half of the episodes of coughs & wheezes in asthmatics
 - Acid back-up in the airways may cause asthma symptoms
 - Suspect if asthma attacks follow episodes of heartburn or attacks are worse after eating or exercise
- NSAIDS and Acetaminophen
 - 10 percent of asthmatic adults and children have aspirin-induced asthma
 - Asthma gets worse when patients take aspirin
 - Aspirin usually reduces inflammation in other disorders, it may have the opposite effect in many asthmatics
 - Reason unknown, AIA often develops after viral infection

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Controlling Asthma & Allergy Triggers

- Immunotherapy
 - Allergy shots
 - Allergen immunotherapy is a form of treatment aimed at decreasing your sensitivity to substances called allergens
 - Involves injecting increasing amounts of an allergen to a patient over several months
 - Works like a vaccine. Your body responds to the injected amounts of a particular allergen, given in gradually increasing doses, by developing an immunity or tolerance to the allergen.
 - Immunotherapy can lead to decreased, minimal or no allergy symptoms when you are exposed to the allergen(s) included in the allergy vaccine
 - Build-up phase: involves receiving injections with increasing amounts of the allergen(s). The frequency of injections during this phase generally ranges from 1-2 times a week for 3-6 months

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Controlling Asthma & Allergy Triggers

- Immunotherapy (cont.)
 - Maintenance phase: this phase begins when the effective therapeutic dose is reached

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Rules of 2™

When do you need more than a rescue bronchodilator?

- Do you take your quick relief inhaler more than 2 times per week?
- Do you awaken at night with asthma more than 2 times per month?
- Do you refill your quick relief inhaler more than 2 times per year?

If the answer to these questions is yes, a long term controller anti-inflammatory medication may be needed.

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How Is Asthma Controlled?

- Follow an individualized asthma management plan
- Avoid or control exposure to things that make asthma worse
- Use medication appropriately
 - Long-term-control medicine
 - Quick-relief medicine

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How Is Asthma Controlled?

- Monitor response to treatment
 - Symptoms
 - Peak flow
- Get regular follow-up care

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Pharmacologic Therapy

- Long Term Control
 - Improves lung function and decreases the need for quick relief medications
 - Reduces inflammation & prevents permanent injury in the lungs
 - Generally, taken daily for long periods of time to maintain and prevent exacerbations
 - Meds need to build up in system to work effectively (7-10 days)
 - Rinse after use to prevent “thrush”

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Pharmacologic Therapy

- Long Term Control Medications
 - Cromolyn Sodium (Intal)/Nedocromil Sodium (Tilade)
 - Inhaled anti-inflammatory agents
 - Available as a MDI, Cromolyn is also available as nebulizer
 - Alternative therapy to low-doses of inhaled steroids in mild persistent asthma
 - Nedocromil may also be added to inhaled steroids in moderate asthma
 - Can be used to prevent symptoms to anticipated exposures (dust, exercise)
 - May have an unpleasant taste
 - Inhaled Corticosteroids
 - Most potent & effective long-term anti-inflammatory medication currently available
 - Available as MDI & dry powder inhaler (DPI)

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Pharmacologic Therapy

- Inhaled Corticosteroids (cont.)
 - Used for management of persistent asthma at all levels
 - Broad action on inflammatory processes
 - Possible growth delay
 - Spacer/holding chamber should be used, rinse after use
 - Examples of Inhaled Corticosteroids:
 - Flovent
 - Pulmicort (also comes in nebulized form)
 - Azmacort
 - AeroBid
 - Beclovent (qvar for kids >5 years old)

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Pharmacologic Therapy

- Oral corticosteroids
 - Broad anti-inflammatory effects
 - Short term “burst” (3-10 days)
 - Long term use is associated with systemic effects
 - Use lowest possible dose and/or alternate day dosing in severe persistent asthma
 - Do not necessarily have to be tapered
 - Examples of oral corticosteroids:
 - Orapred
 - Medrol
 - Prelone
 - Pediapred
 - Prenisone

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Pharmacologic Therapy

- Leukotriene modifiers
 - Stabilize airways, prevent symptoms, FDA approved for allergies
 - Available as tablets
 - May be considered as alternative therapy to low doses of inhaled steroids for children with mild persistent asthma, position of Leukotrienes has not been fully established
 - Examples of Leukotriene Modifiers:
 - Zyflo
 - » Elevations of liver enzymes have been seen
 - Accolate
 - Singulair
- Long acting Beta 2 agonist
 - Relax bronchial smooth muscle
 - Should not be used to treat acute symptoms or exacerbations

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Pharmacologic Therapy

- Long acting Beta 2 agonist (cont.)
 - Add-on therapy to inhaled steroids for long-term control of symptoms, especially nighttime symptoms
 - Available as MDI, DPI and tablets
 - Inhaled route is preferred
 - Slower onset and longer duration of action than short term Beta 2 agonist
 - Examples of long action Beta 2 agonist:
 - Serevent
 - Volmax
 - Proventil Repetabs
- Methylxanthines (Theophylline)
 - Produce mild to moderate bronchodilation

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Pharmacologic Therapy

- Methylxanthines (Theophylline) (cont.)
 - Add-on therapy to anti-inflammatory meds for long-term control of symptoms
 - Theophylline is an alternative, but not preferred therapy for persistent asthma
 - Available as tablets/capsules
 - Monitoring is required, serum levels 5-15 mcg/mL
 - Side effects increase with increasing serum levels
 - Nausea
 - Insomnia
 - Hyperactivity

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Pharmacologic Therapy

- Quick Relief Medications
 - Give prompt relief of bronchoconstriction and accompanying acute symptoms: coughing, wheezing, shortness of breath or rapid breathing, chest tightness
 - Short-acting Beta 2 agonists
 - Relax bronchial smooth muscle, resulting in bronchodilation usually within 5-10 minutes of administration (MDI or nebulized)
 - Therapy of choice for relieving acute symptoms and preventing exercise-induced bronchospasm
 - Overuse indicates a need to evaluate and possibly increase (or start) long term control therapy
 - **RULES OF TWO**

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Pharmacologic Therapy

- Short-acting Beta 2 agonists (cont.)
 - Examples of short-acting Beta 2 agonists
 - Albuterol
 - Proventil
 - Ventolin
 - Xopenex (nebulized only)
 - Maxair (inhaler only)
 - Combivent
- Oral Corticosteroids
 - Broad anti-inflammatory effects
 - Use a short (3-10) day course to gain initial control of asthma and to speed resolution of moderate persistent or severe persistent exacerbation
 - A course of 7 days or less is usually sufficient. In some cases, the exacerbation requires up to 10 days of treatment

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Pharmacologic Therapy

- Oral Corticosteroids (cont.)
 - Tapering dose is not always necessary
 - Examples of Oral Corticosteroids:
 - Medrol
 - Prelone
 - Pediapred
 - Prednisone
- Anticholinergics
 - Possible additive benefit to inhaled Beta 2 agonists for severe exacerbations
 - Possible alternative bronchodilator for children who do not tolerate inhaled Beta 2 agonists
 - Examples of Anticholinergics
 - Atrovent
 - Combivent

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Pharmacologic Therapy

- Steroids and Linear Growth Risks
 - The potential small risk of adverse effects on linear growth is well balanced by efficiency
 - The clinical significance of the findings is unclear
 - Monitoring growth is recommended
 - Poor asthma control itself can result in retarded linear growth
 - Adverse effects on linear growth appear to be dose dependent
 - High doses of inhaled steroids have greater potential for growth suppression, but less potential than the alternative of oral steroids
 - Some caution (e.g., monitoring growth, stepping down therapy when possible) is suggested while this issue is studied further

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Pharmacologic Therapy

- New Medications on the Horizon
 - Symbicort (over 12 years old), combination of Pulmicort and Foradil
 - Generic version of Flonase intranasal corticosteroid
 - Patanol, nasal spray for allergic rhinitis
 - Advair DPI down to age 4 years (presently 12 & over)
 - Xopenex MDI (currently only available for nebulizers)
 - Xolair (currently only for > 12 years old)
 - Alvesco (new steroid possibly for children 4 years & older)

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Types of Long Term Controller Medications

Brand names are listed as examples only, and are not inclusive.

- Inhaled corticosteroids - Flovent[®], Pulmicort[®], QVAR[®], Azmacort[®], Aerobid[®], Pulmicort Respules[®] (only nebulized form), Vanceril[®], Beclovent[®]. Preferred therapy for persistent asthma.
- Long acting bronchodilators - Serevent[®], Foradil[®].

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Types of Long Term Controller Medications

Brand names listed as examples only, and are not inclusive.

- Combination inhaled corticosteroids/long-acting bronchodilator - Advair[®]
- Leukotriene modifiers - Singulair[®], Accolate[®].
A pill, not an inhaler, not a steroid
- Inhaled non steroidal anti-inflammatory medications - Intal[®], Tilade[®]
- Oral steroids

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Using a Metered Dose Inhaler (MDI)

MDI's deliver asthma medication directly to the lungs. To use:

- Remove the cap and hold inhaler upright
- Shake the inhaler
- Keep the head and neck in a neutral position and breathe out
- Position the inhaler in one of the following ways:
 - Open mouth and hold inhaler 1-2 inches away
 - Use holding chamber (recommended for young children)
 - Put in the mouth

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Using a MDI

- Press down on inhaler to release medication as you start to breathe in
- Breathe in *slowly* (3 to 5 seconds)
- Hold breath for 10 seconds to allow medicine to reach deeply into lungs
- Repeat puffs as directed

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How are Asthma Episodes Controlled?

- Know the signs that asthma is worsening
- Treat symptoms or drop in peak flow at first signs of worsening
- Monitor response to therapy
- Seek a doctor's help when it is needed

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Use of Asthma Action Plans

- Observe symptoms
- Obtain Peak Flow Meter reading
- Review zones and current Medication regime
- Use quick relief MDI's
- Monitor pulse and respiratory rate
- Provide a calming atmosphere
- If no improvement in 15 minutes, seek medical attention (Follow zone guidelines)

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Teaching Asthma Action Plans to Parents and Children

- After reviewing health history, request visit with parents to discuss current treatment plan and contributing factors
- Ask about Asthma Action Plan and request documentation for use of medications while in school
- If child does not have an Asthma Action Plan, encourage the use, give one to parent and encourage Plan with all asthmatics

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Using a Peak Flow Meter

- A peak flow meter is a useful tool for objectively measuring the severity of asthma
- The value obtained is called a peak expiratory flow rate (PEFR)
- The PEFR shows the degree of airway obstruction or narrowing

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Determining a “Personal Best” Value

- Each person has a normal PEFR based on height and gender. This is a predicted value.
- Many physicians prefer to use the person’s “personal best” value
- The “personal best” represents the highest rate obtained over a specific period of time.

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Teaching Correct Technique for Using a Peak Flow Meter

- Place indicator at the base of the numbered scale
- Stand up
- Take a deep breath
- Place the meter in the mouth and close lips around the mouthpiece
- Blow out as hard and fast as possible
- Write down the achieved value
- Repeat the process two more times
- Record the highest of the 3 numbers achieved

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Goals for School Health(Asthma)

From the National Asthma
Education Prevention Program

Asthma Goals for School Health

- Healthy school environment
- Health services in school
- Asthma education
- Supportive policies
- Sound communication

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Goal: Healthy School Environment

- Enforce no-smoking policies
- Reduce exposures to triggers: tobacco smoke, chemical vapors, furry or feathered animals, mites, cockroaches, chalk dust, mold
- Keep temperature and humidity at appropriate settings
- Maintain heating, ventilation, and air conditioning (HVAC) systems
- Dry up damp and wet areas within 1-2 days
- Educate support staff on triggers and emergency plans

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Goal: Health Services in School

- Provide full-time nursing services
- Include nursing assessments, care plans in student records
- Teach and monitor correct inhaler techniques, peak flow meter use
- Train, supervise and delegate to health assistants and education staff, as appropriate

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Goal: Asthma Education

- Provide asthma awareness for all students
- Teach asthma management to students with asthma
- Provide asthma education for faculty and staff
- Teach parents how to manage asthma

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Goal: Supportive Policies

- Identify students with asthma
- Provide quick, reliable access to medications
- Establish individualized student asthma management plan
- Establish individualized student emergency plan for asthma episodes
- Promote safe and full participation in all school activities
- Monitor students' asthma

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Supportive Policies

Identify students

- Review student health records
- Interview parents
- Interview school health staff

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Supportive Policies

Provide access to medication

- Ensure reliable access to medication for all school activities
- Allow self-administration as appropriate
- Provide for nebulizer treatment as needed

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Supportive Policies

Establish student asthma management plan

- Address triggers
- Record personal best peak flow
- Specify routine medications
- Outline signs and symptoms of worsening asthma
- Specify medications required for emergencies and how to monitor response to them.
- Indicate emergency contacts
- Place plan in student's health record
 - Make copies for off-campus activities

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Supportive Policies

Establish a plan for asthma episodes

- Develop school wide emergency plans/procedures
 - Include respiratory distress treatment protocols
 - Include plan for someone without an individualized plan
- Include an emergency plan for asthma episodes in the individualized student asthma management plan.

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Supportive Policies

Promote participation in all activities, including physical activities

- Encourage student participation
- Allow pretreatment and or warm-up before physical activity
- Allow access to quick relief medication
- Modify activity or substitute with less strenuous option

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Anaphylaxis Management

- Accidents are never planned
- Quick treatment can be life-saving
- Create a plan for managing a reaction **before** you need it
- Up to 20% of students who will have an anaphylactic reaction have their first one in school
- Educate others on what to do in case you need their help

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Supportive Policies

Monitor students' asthma

- Watch for symptoms of uncontrolled asthma
- Monitor absenteeism due to asthma
- Establish a link with the child's health care provider
- Refer for home teaching as needed

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Goal: Sound Communication

- Form linkages among school, home and health care providers
- Observe and report symptoms, medication use
- Review difficulties student may have with daily school management plan
- Resolve problems with school performance related to asthma
- Encourage active student participation in school activities

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Education

- Asthma and the School Child
 - One of the most important environments to be safeguarded
 - Physician should work closely with school personnel to help them understand asthma, its impact and how to meet the needs of children with asthma
 - Action plan (care plan) should always be available to school personnel
 - The action plan (care plan) for the child should include:
 - The early warning signs of an asthma episode
 - What medications the student uses and how they are taken
 - When to contact the physician or emergency room
 - Common asthma triggers in the school environment:
 - Dust mites
 - Chalk dust

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Education

- Common asthma triggers in the school environment (cont.):
 - Animals
 - Strong odors (perfumes, paints, chemicals)
 - Mold (older schools)
 - Exercise (gym class or playground)
 - Weather (gym class)
- What do school personnel need to know
 - Early warning signs of an asthma episode
 - How to treat an asthma episode
 - What medications the child uses
 - How to help the child with asthma follow his/her management plan at school
 - Laws surrounding inhalers
 - Phone numbers for MD, parents and ER

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Education

- School health personnel should also know
 - How to use devices to deliver asthma medications
 - MDI's, dry powder inhalers, nebulizers, spacers
 - How to use a peak flow meter
- Taking medications at school may be difficult
 - Many children with asthma want to hide their need for medications
 - Poorly informed school authorities sometimes make it impossible for children to take their medication
 - It may be disruptive for children to go to another part of the school building to take their medication
- Encourage parents to
 - Meet with the teachers, school nurse and perhaps the principal at the beginning of the school year to make them aware of the child's asthma

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Education

- Encourage parents to (cont.)
 - Explain the child's asthma, what medications he/she uses, and the possible side effects
 - Explain that the student should be treated “normally” like other children
 - Encourage school personnel to allow the student to take his/her medications as required, without making it a “big deal”

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Handouts

- Standards of Care
- Asthma Action Plan
- Asthma information sheet for support staff
- How to use your peak flow meter
- Steps for using your inhaler
- Asthma Trigger Sheet
- Asthma Action Plan for caregivers
- School Nurse Asthma Action Plan
- Asthma Exercise Plan

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Conclusion

- When using Asthma Action Plan for individual students, remember guidelines may change over time with new medications and age of child
- Encourage parent and teacher involvement with avoiding asthma triggers
- Encourage and teach effective peak flow monitoring to children and parents
- Information is POWER

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