Current Guidelines in Asthma Management Across All Age Groups

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Disclosures

- **Presenter Disclosure:** Non-financial disclosures: Presenter has no relevant non-financial relationships to disclose. Financial disclosures: Presenter received an honorarium for presenting this course.
- **Content Disclosure:** This learning event does not focus exclusively on any specific product or service.

Learning Outcomes

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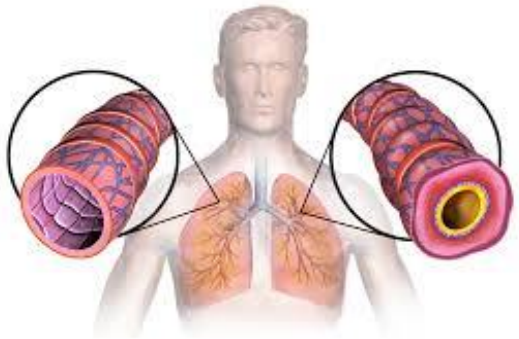
After this course, participants will be able to:

- Recognize the age group and severity classifications of asthma
- Identify the criteria for determining asthma severity
- List the most common types of patient non-compliance and strategies for prevention

Why I became a Respiratory Therapist…

Image of Presenter's Mother

What Is Asthma?



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- Chronic disease of the airways that may cause:
- Wheezing, breathlessness, chest tightness and nighttime or early morning coughing

Episodes are usually associated with widespread, but variable airflow obstruction within the lung that is often reversible either spontaneously or with treatment.

Asthma Pathophysiology

Bronchoconstriction

- Airway narrowing and subsequent interference with airflow

Airway hyper-responsiveness

- Exaggerated response to stimuli

Airway Edema

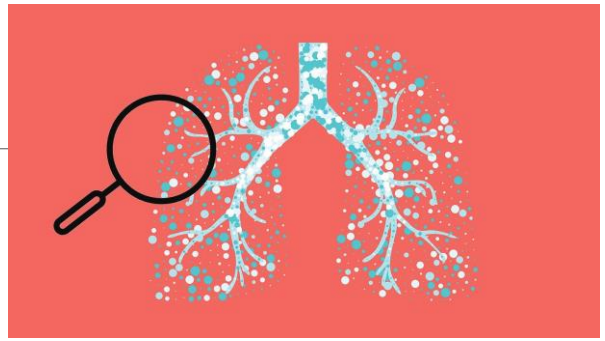
- As inflammation becomes progressive-edema, mucous hypersecretion and mucous plugs all further limit airflow

What Causes Asthma?

Picpedia.org

- Genetic and environmental factors
- Family Hx of allergies or asthma
- Mother's smoking, exposure to secondhand smoke or air pollution while pregnant
- Early childhood exposure to secondhand smoke, air pollution, indoor allergies
- Damage to lung development from premature birth or early childhood respiratory illnesses
- For adults, exposure to industrial dusts or chemicals in the workplace

Steps to an Accurate Diagnosis



- History, physical exam, eczema or dermatitis
- Spirometry-pre and post B/A
- Methacholine challenge
- Allergy testing
- Gerd-Obstructive Sleep Apnea (OSA)
- Sinus evaluation
- Fractional Exhaled Nitric Oxide (FENO) test to measure lung inflammation

Asthma Disparities/Rates

Factors that contribute to disparities:

- Access to care
- Income
- Environmental Allergens and Irritants
- Education Inequality
- Language and Cultural Differences

- More boys than girls have asthma
- More women than men have asthma
- Highest Asthma rates in U.S. are with persons:
  - on Medicaid
  - living below the poverty level

Asthma

25 MILLION
Americans diagnosed

1 in 10
CHILDREN

$80 BILLION
annual costs

3,168
DEATHS annually

75% higher for black persons than white persons

13.8 MILLION missed school days per year

#1 reason kids miss school

14.2 MILLION
missed work days per year

3 in 5
limit physical activity

71%
MISUSE
inhalers

1 in 5
CANNOT AFFORD
medications

AllergyAsthmaNetwork.org

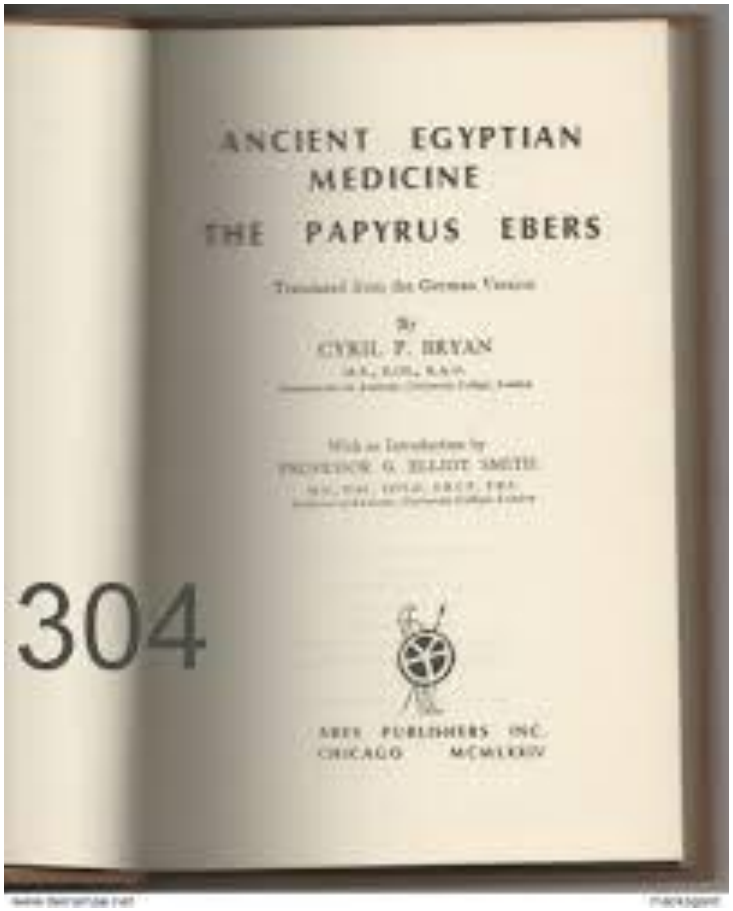
Allergy & Asthma NETWORK

Ebers Papyrus (c.1500BC)

First aerosol:

A mixture of herbs heated on a brick so that the sufferer could inhale their fumes

Inhalitorium.com



History of Aerosol Therapy

2000 BC- India & Egypt

400 BC- Hippocrates Pot with reed

1550- American Indian Pipes

1778- First use of inhaler

1850's- Atomizer and portable inhalation devices

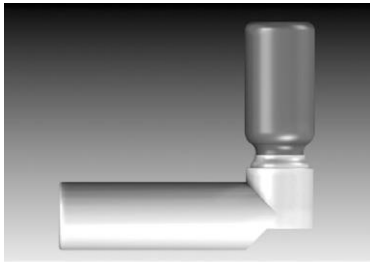
1858- First Nebulizer Sales-Giron

1900- Inhaled smoke with claims of benefits

1920- Term "Aerosol" coined

1930- 1940 Bulb and Compressor Nebulizers

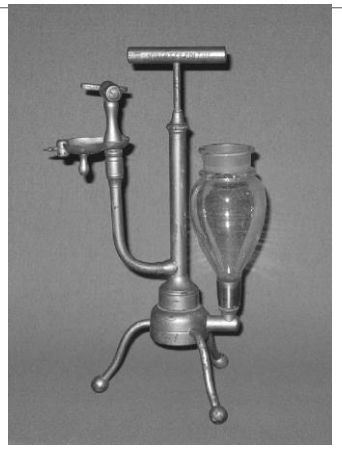
1956- MDI



Nebulizers Then and Now

1858 First Portable nebulizer

Sales-Girons. Atomize medication in liquid form pump handle draws liquid and forces through the nozzle



Pulverisateur

InnoSpire Go

https://www.youtube.com/watch?v=y8zpeyoQojw

InnoSpire Go

History of Aerosol Therapy 2005-Present

2005

Nebulizer

- Jet
- Ultrasonic
- Vibrating Mesh

MDI

- Breath-actuated
- Valved holding Chamber
- CFC/HFA

DPI-

- Passive/Active
- Single dose/multiple dose

The Current Landscape

Nebulizers

Small Volume
- Jet type
- Continuous
- Updraft
- Side stream

Vibrating Mesh

Ultrasonic
- Breath enhanced
- Breath actuated

Metered Dose Inhaler(MDI)
- Dry Powder Inhaler (DPI)
  - Diskus
  - Ellipta
  - Handihaler
  - Soft Mist inhalers (SMI)
    - Respimat

Respiratory Treatments

2023

Allergy & Asthma Network

AllergyAsthmaNetwork.org

800.878.4403

American College of Allergy, Asthma & Immunology

CHEST FOUNDATION

123 = DOSE INDICATOR G = GENERIC AVAILABLE DISEASE STATES: A = ASTHMA C = COPD

Allergy & Asthma Network is a national nonprofit organization dedicated to ending needless death and suffering due to asthma, allergies and related conditions through outreach, education, advocacy and research.

SHORT-ACTING BETA$_2$-AGONIST BRONCHODILATORS

relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

- **ProAir® Digihaler™** — 90 mcg, albuterol sulfate inhalation powder — 123 A
- **ProAir RespiClick®** — 90 mcg, albuterol sulfate inhalation powder — 123 A
- **Proventil® HFA** — 90 mcg, albuterol sulfate — 123 A G
- **Ventolin® HFA** — 90 mcg, albuterol sulfate — 123 A G
- **Xopenex HFA®** — 45 mcg, levalbuterol tartrate — A G

LONG-ACTING BETA$_2$-AGONIST BRONCHODILATORS

muscles in airways and offer lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours

relax tight

- **Serevent® Diskus®** — 50 mcg, salmeterol xinafoate inhalation powder — 123 A C
- **Striverdi® Respimat®** — 2.5 mcg, olodaterol hydrochloride — 123 C

INHALED CORTICOSTEROIDS

reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath

- **Alvesco® HFA** — 80, 160 mcg, ciclesonide — 123 A
- **ArmonAir® Digihaler™** — 55, 113, 232 mcg, fluticasone propionate inhalation powder — 123 A
- **Arnuity® Ellipta®** — 50, 100, 200 mcg, fluticasone furoate inhalation powder — 123 A
- **Asmanex® HFA** — 50, 100, 200 mcg, mometasone furoate — 123 A
- **Asmanex® Twisthaler®** — 110, 220 mcg, mometasone furoate inhalation powder — 123 A
- **Flovent® Diskus®** — 50, 100, 250 mcg, fluticasone propionate inhalation powder — 123 A
- **Flovent® HFA** — 44, 110, 220 mcg, fluticasone propionate — 123 A
- **Pulmicort Flexhaler®** — 90, 180 mcg, budesonide inhalation powder — 123 A
- **QVAR® Redihaler™** — 40, 80 mcg, beclomethasone dipropionate — 123 A

MUSCARINIC ANTAGONISTS (ANTICHOLINERGIC)

relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

Short-acting

- **Atrovent® HFA** — 17 mcg, ipratropium bromide — 123 C

Long-acting

- **Incruse® Ellipta®** — 62.5 mcg, umeclidinium inhalation powder — 123 C
- **Spiriva® HandiHaler®** — 18 mcg, tiotropium bromide inhalation powder — C
- **Spiriva® Respimat®** — 1.25, 2.5 mcg, tiotropium bromide — 123 A C
- **Tudorza™ Pressair™** — 400 mcg, aclidinium bromide inhalation powder — 123 C

COMBINATION MEDICATIONS

contain both short-acting beta$_2$-agonist and short-acting muscarinic antagonist

- **Combivent® Respimat®** — 20/100 mcg, ipratropium bromide and albuterol — 123 C

COMBINATION MEDICATIONS

contain both inhaled corticosteroid and long-acting beta$_2$-agonist (LABA)

- **Advair Diskus®** — 100/50, 250/50, 500/50 mcg, fluticasone propionate and salmeterol inhalation powder — 123 A C G
- **Advair® HFA** — 45/21, 115/21, 230/21 mcg, fluticasone propionate and salmeterol xinafoate — 123 A G
- **AirDuo® Digihaler™** — 55/14, 113/14, 232/14 mcg, fluticasone propionate and salmeterol inhalation powder — 123 A
- **AirDuo® RespiClick®** — 55/14, 113/14, 232/14 mcg, fluticasone propionate and salmeterol inhalation powder — 123 A G
- **Breo® Ellipta®** — 100/25, 200/25 mcg, fluticasone furoate and vilanterol inhalation powder — 123 A C
- **Dulera®** — 50/5, 100/5, 200/5 mcg, mometasone furoate and formoterol fumarate dihydrate — 123 A
- **Symbicort®** — 80/4.5, 160/4.5 mcg, budesonide and formoterol fumarate dihydrate — 123 A C G
- **Wixela™ Inhub™** — 100/50, 250/50, 500/50 mcg, fluticasone propionate and salmeterol xinafoate (approved generic of Advair Diskus) — 123 A C

COMBINATION MEDICATIONS

contain both long-acting beta$_2$-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

- **Anoro® Ellipta®** — 62.5/25 mcg, umeclidinium and vilanterol inhalation powder — 123 C
- **Bevespi Aerosphere®** — 9/4.8 mcg, glycopyrrolate and formoterol fumarate — 123 C
- **Duaklir® Pressair®** — 400, 12 mcg, aclidinium bromide and formoterol fumarate — 123 C
- **Stiolto™ Respimat®** — 2.5/2.5 mcg, tiotropium bromide and olodaterol — 123 C

COMBINATION MEDICATIONS

contain inhaled corticosteroid, long-acting beta$_2$-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

- **Trelegy® Ellipta®** — 200/62.5/25 mcg, 100/62.5/25 mcg, fluticasone furoate, umeclidinium and vilanterol inhalation powder — 123 A C
- **Breztri Aerosphere™** — 160/9/4.8 mcg, budesonide, glycopyrrolate and formoterol fumarate — 123 C

BIOLOGICS

target cells and pathways that cause airway inflammation; delivered by injection or IV

- **Cinqair®** — reslizumab — A
- **Dupixent®** — dupilumab — A
- **Fasenra™** — benralizumab — A
- **Nucala®** — mepolizumab — A
- **Tezspire™** — tezepelumab-ekko — A
- **Xolair®** — omalizumab — A

BRONCHIAL THERMOPLASTY

A minimally invasive procedure that uses mild heat to reduce airway smooth muscle, leading to fewer severe asthma flares, ER visits, and days lost from activities.

www.btforasthma.com

A

PDE4 INHIBITORS

ease lung inflammation and reduce exacerbations

- **Daliresp®** — 250, 500 mcg, roflumilast — C

Reviewed by Dennis Williams, PharmD

Generic versions of brand name inhalers are not included on this poster. Generic inhalers may be a different color.

Short Acting Beta$_2$ Agonist (SABA)

SABA's- Relax smooth muscles around the bronchial tubes

Albuterol Sulfate:

- ProAir Digihaler, ProAir HFA, Pro Air Respiclick, Ventolin HFA, Proventil HFA

Albuterol Tartrate:

- Xopenex HFA

***Best as rescue drugs PRN

***Few side effects

Long Acting $Beta_2$ Agonists (LABA's)

Relax airway smooth muscle by stimulating $Beta_2$ receptors which **antagonizes** bronchoconstriction

- Adjunct to ICS for long term control and prevention *12 yrs. and older w/moderate or severe persistent asthma*
- **Serevent, Striverdi Respimat**
- **COPD & Asthma**

**** Black Box warning as a monotherapy for asthma related death****

Inhaled Corticosteroids (ICS)

Inhaled Corticosteroids (ICS)

Treat inflammation

Flovent Diskus, Flovent HFA

Pulmicort Flexhaler, QVAR Redihaler, ArmonAir Digihaler, Asmanex HFA, Asmanex Twisthaler, Alvesco, Aerospan, Arnuity Ellipta

Most effective for persistent asthma

Reduce both impairment and exacerbation risk

Adverse effects are rare **Rinse mouth after using**

Long-Acting Muscarinic Antagonists (LAMA)

Opens asthma constricted airways for 24 hrs

- For 6 years of age and older
- Reduces the risk of asthma flares
- **Add on** for symptoms that persist despite LABA or ICS

Atrovent HFA- ipraproprium bromide*

Spiriva Respimat/Handihaler- tiotropium**

Incruse Ellipta-umeclidnnium*

Turdoza Pressair-acidinium bromide *

Respimat-SMI

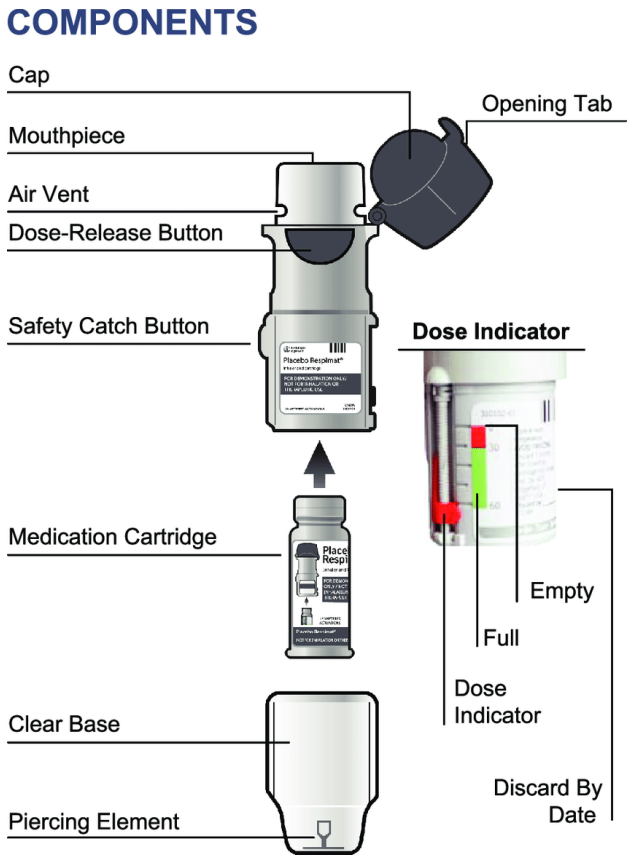
Advantages

- No Spacer needed
- 24 hour effect
- No propellant
- Longer spray duration

Disadvantages

- Needs assembly and specific priming before the first use
- Cost

***May take up to 4 to 8 weeks of treatment with SPIRIVA RESPIMAT for your breathing to improve



Inhaled Combination Medications

Contain both ICS and LABA

- **Advair Diskus/HFA** -fluticasone, salmeterol xinafoate
- **Airduo Respiclick/Digihaler** -fluticasone, salmeterol
- **Wixela Inhub** -fluticasone, salmeterol xinafoate
- **Breo Ellipta** -fluticasone furoate and vilanterol
- **Combivent Respimat**-ipraproium bromide, albuterol
- **Dulera**-mometasone and formoterol
- **Symbicort**-Budesonide and Formoterol

Rinse mouth after using

Wixela ™

(Fluticasone, Salmeterol)

Drug Class:

Corticosteroid + LABA

Primary delivery device type=Inhub ™

First generic version of Advair

1 dose twice per day

Asthma and COPD

Inhaled Combination Medications

Contain both LABA and (LAMA)

Anoro Ellipta-umeclidinion, vilanterol

Bevespi Aerosphere-glycopyrrolate formoterol fumarate
Dukalir Pressair-acidinium bromide, formoterol

Stiloto Respimat-tiotroprium bromide olodaterol

Utibron Neohaler-indacaterol, glycopyrrolate

Trelegy Ellipta- fluticasone furoate, umeclidinium, vilanterol

Breztri Aerosphere -budesonide, glycopyrrolate, formoterol

Trelegy® Ellipta®

(Fluticasone, Umeclindinium, Vilantrol)

Drug Class: Corticosteroid + Antimuscarinic+ LABA

Primary Delivery Device: Ellipta

18 yrs and older

Once per day use

2017 COPD 2020 Asthma

Oral Corticosteroids (Controller)

Inhibit inflammation

EPR-3 recommends **ONLY** for the most severe hard to control asthma due to the risk of **side effects**

- **Often >10 x's the dose of ICS's**
  - Short Burst to gain quick control
  - Alternate day dosing is effective and can cause fewer side effects
- **Prednisolone**
- **Prednisone**
- **Dexamethazone**

Leukotriene Modifiers (LTRA's)

Block the action of Leukotrienes that cause inflammation, swelling and tightening of the airways

- **Singulair**- montelukast
- **Accolate**- zafirlukast
- **Zyflo**- zileuton

Adjunct to ICS therapy

NOT to treat sudden onset symptoms

LABA's NOT LTRA's preferred in 12 yrs and older

Biologics (Immunomodulators)

Target specific cells and pathways that cause allergic inflammation

Given via injection or IV for specific phenotypes of severe **uncontrolled** asthma

High cost

- **Xolair**- omalizumab
- **Cinqair**- reslizumab
- **Fasenra**-benralizumab

Nucala- mepolizumab
Dupixent- dupilumab
Tezspire-tezepelumab-ekko

Bronchial Thermoplasty/ PDE4 Inhibitors

Bronchial Thermoplasty

- 18 yrs and older with uncontrolled severe asthma
- Minimally invasive procedure that uses mild heat to reduce airway smooth muscle potentially leading to fewer severe asthma flares, ER visits and days lost from activities. **www.btforasthma.com**

PDE4 Inhibitors

- **Daliresp**-roflumilast

Asthma Severity Categories

- Intermittent
- Mild Persistent
- Moderate Persistent
- Severe Persistent

Asthma Severity

For Most Age Groups

Intermittent

- Requires no daily medications.
- Short Acting Beta 2 Agonist (SABA)

Mild Persistent

- SABA & Low Dose Inhaled Corticosteroids (ICS)
- Evidence of variable expiratory flow limitations: by reduced FEV_1/FVC

Asthma Severity

Moderate Persistent-

- Low–Med dose ICS with a Long-Acting Beta 2 Agonist (LABA)

Severe Persistent-

- High dose ICS, a LABA and Oral Corticosteroids

Clinical Practice Guidelines

August 2007 National Asthma Education and Prevention Program (NAEPP)

- **Expert Panel Report 3 (EPR-3)**
  - New age group to childhood management
  - New approaches for monitoring
  - New Rx recommendations, patient teaching in a myriad of settings and control of environmental factors
  - Stresses the need to control asthma

https://www.nhlbi.nih.gov/sites/default/files/media/docs/EPR-3_Asthma_Full_Report_2007.pdf

Age Group Classifications

- Children up to age 4
- Children age 5-11
- Children age 12 or older and adults

www.nhlbi.nih.gov/guidelines/asthma

Pulmonary Function Testing (PFT's)

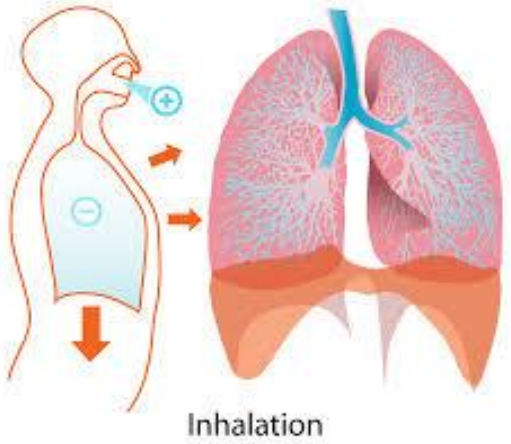
Normal value ranges

- Age
- Height
- Gender
- Sometimes weight and race

Cosmed, CC BY-SA 3.0 via Wikimedia Commons

- Results expressed in a % of expected value

PFT's



LadyofHats, Public domain, via Wikimedia Commons

- Two main types of lung disease that can be identified
  - **Obstructive**-airways are narrowed decreased ability to exhale fully

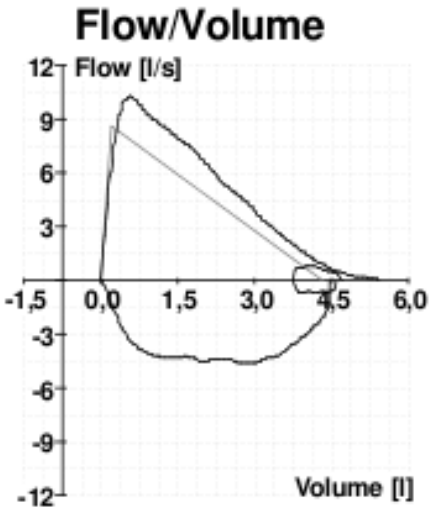
    ie; asthma, emphysema, bronchitis
  - **Restrictive**-decrease in lung tissue, in the ability to expand or in gas exchange capability

    ie; pneumonia, scleroderma, pulmonary fibrosis, sarcoidosis, multiple sclerosis)

Spirometry

Measures Peak Expiratory Flow- Velocity of air forcefully exhaled after a maximal exhalation in the first second

- Use of the ***ratio*** of Forced Expiratory Volume in 1 second **(FEV_1)** to Forced Vital Capacity **(FVC)** to class severity in children
- This ratio may be more sensitive than measuring FEV1 alone.



Asthma Control

Decrease Impairment

- Preventing symptoms such as coughing, breathlessness day or night or after exercise
- Decrease the need for quick relief Rx to
- < 2 days/week
- Maintain near normal PFT's
- Maintain normal activity levels
- Meet patients and family's expectations of and satisfaction with asthma care

Asthma Control

paulbr75 CC0 Public Domain, via pixabay

Decrease Risk

- Prevent asthma exacerbations and minimize ED visits or hospitalizations
- Prevent loss of lung function or in children lung growth
- Provide optimal drug therapy with few or no adverse side effects

Determining Asthma Severity/Contol

S.A.L.S.A.

Symptoms

Activities

Lung function

SABA use

Awakenings

S.A.L.S.A.

Impairment:

Intermittent classification for most Age Groups

Symptoms – 2 days /week or <

Activities – no limitation

Lung function –**N/A in 0-4 yrs**

FEV**1** => 80% FEV**1**/FVC > 85% **5-11yrs**

FEV**1** => 80% FEV**1**/FVC normal **12yrs >**

SABA – 2 days/wk or <

Awakenings- None **0-4 yrs**

2 nights/mo. or < **5yrs-adult**

Risk: Exacerbations 1/ year or <

S.A.L.S.A.

Impairment:

Mild-Persistent classification for Age 5-11yrs

Symptoms - 3 x's/wk but not daily
Activities - minor limitation
Lung function - FEV_1 ≥= 80%
FEV_1/FVC > 80%
SABA – 3 days/wk or >
Awakenings- 3 nights/ month or >

Risk: Exacerbations 2/year or >

S.A.L.S.A.

Impairment:

Moderate Persistent classification for Age 12-Adult

Symptoms – every day

Activities - moderate limitation

Lung function - FEV_1 = 60-80% with normal FEV_1/FVC reduced 5%

SABA – every day

Awakenings- 2 nights /wk or >

Risk: Exacerbations 3/year or >

S.A.L.S.A.

Impairment:

Severe Persistent classification for Age 5-11 yrs

Symptoms – all day long

Activities – severe limitation

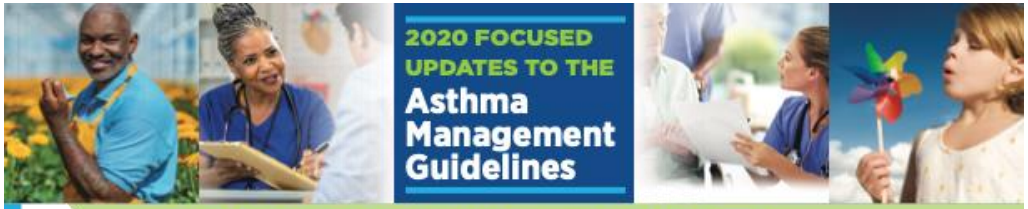
Lung function - $FEV_1 = 60\%$

$FEV_1/FVC < 75\ \%$

SABA – all day long

Awakenings- all week long

Risk: Exacerbations 3 / year or >



2020 FOCUSED UPDATES TO THE
Asthma Management Guidelines

CLINICIAN'S GUIDE

PURPOSE

This Clinician's Guide summarizes the *2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group* to help clinicians integrate the new recommendations into clinical care. The full 2020 Report, which is focused on selected topics rather than a complete revision of the 2007 *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* (EPR-3), can be found at **nhlbi.nih.gov/asthmaguidelines.** This summary guide should be used in conjunction with the full report. The Guide is organized by the following topics:

- **Intermittent Inhaled Corticosteroids**
- **Long-Acting Muscarinic Antagonists**
- **Indoor Allergen Mitigation**
- **Immunotherapy in the Treatment of Allergic Asthma**
- **Fractional Exhaled Nitric Oxide Testing**
- **Bronchial Thermoplasty**

Multiple stakeholders contributed to the selection of topics for the update. The Agency for Healthcare Research and Quality's (AHRQ) Evidence-Based Practice Centers conducted systematic reviews on these topics, which were subsequently published and used by the Expert Panel Working Group (the Expert Panel) of the National Asthma Education and Prevention Program Coordinating Committee (NAEPPCC), coordinated by the National Heart, Lung, and Blood Institute, as a basis for the updates. The Expert Panel used GRADE (Grading of Recommendations Assessment, Development, and Evaluation), an internationally accepted framework, for determining the certainty of evidence and the direction and strength of recommendations based on the evidence. Each recommendation is described as either strong or conditional. For all recommendations, shared decision making should be used to help individuals with asthma make choices that are consistent with their risks, values, and preferences; this is especially important for conditional recommendations.

Diagrams showing the recommended approaches to care, including the new recommendations, for individuals with asthma based on age have been updated from EPR-3. Within a given step, the preferred options are the best management choices supported by the evidence reviewed by the Expert Panel. When the available evidence was insufficient or did not change a previous recommendation, the diagrams list the preferred options from EPR-3. The diagrams are meant to assist, and not replace, clinical judgment or decision making required for individual patient management with input from individuals with asthma about their preferences.

U.S. Department of Health and Human Services
National Institutes of Health
National Heart, Lung, and Blood Institute

NIH Publication No. 20-HL-8141
December 2020

www.nhlbi.nih.gov

Stepwise Approach 0-4 yrs

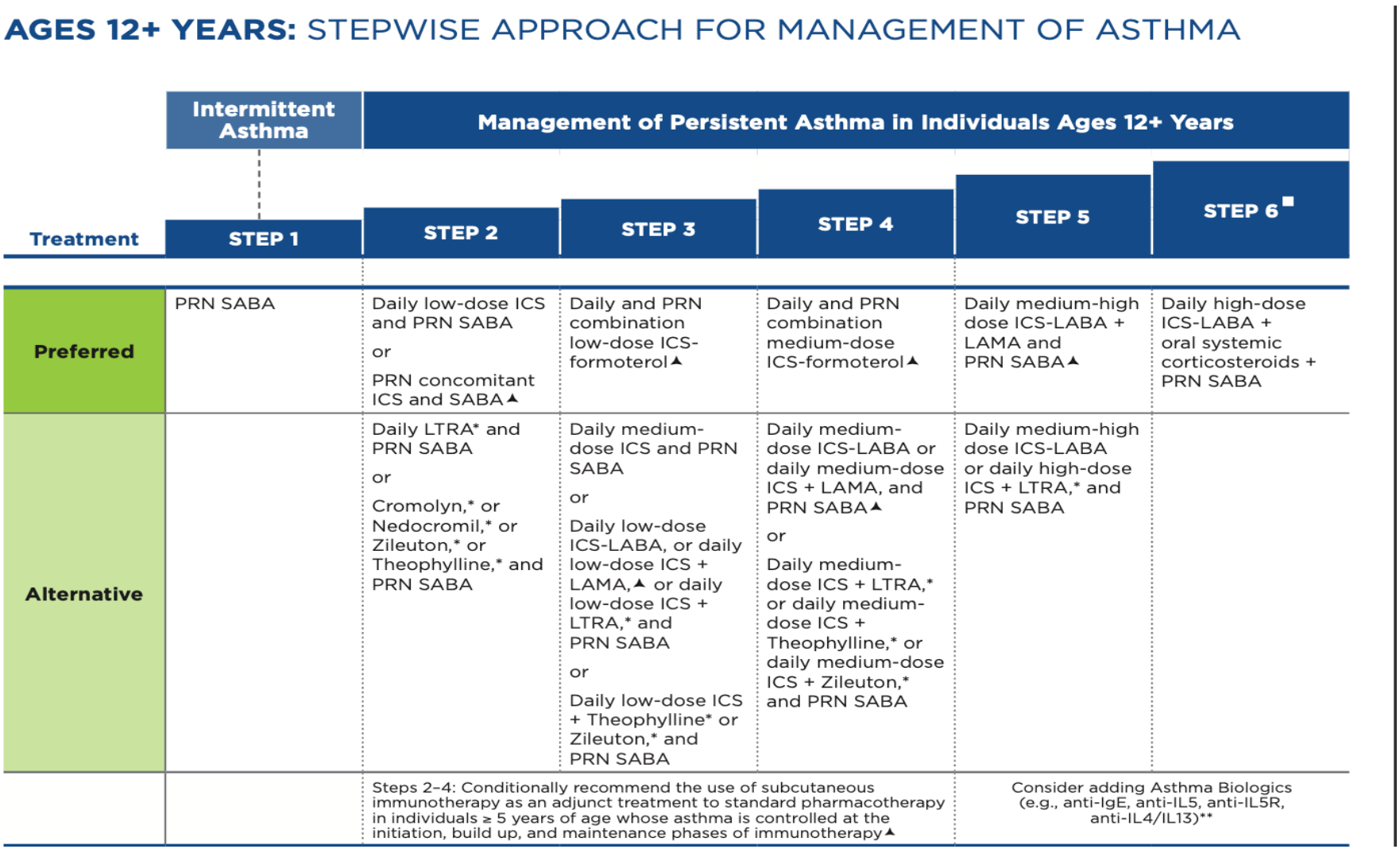
Figure I.b: Stepwise Approach for Management of Asthma in Individuals Ages 0–4 Years

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 0–4 Years				
Treatment	**STEP 1**	**STEP 2**	**STEP 3**	**STEP 4**	**STEP 5**	**STEP 6**
Preferred	PRN SABA and At the start of RTI: Add short course daily ICS▲	Daily low-dose ICS and PRN SABA	Daily medium-dose ICS and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast*+ oral systemic corticosteroid and PRN SABA
			For children age 4 years only, see Step 3 and Step 4 on Management of Persistent Asthma in Individuals Ages 5–11 Years diagram.			

Stepwise Approach 5-11yrs

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 5–11 Years				
Treatment	**STEP 1**	**STEP 2**	**STEP 3**	**STEP 4**	**STEP 5**	**STEP 6**
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LTRA,* or daily low-dose ICS +Theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* + oral systemic corticosteroid or daily high-dose ICS + Theophylline* + oral systemic corticosteroid, and PRN SABA
		Steps 2–4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider Omalizumab**▲	

Stepwise Approach 12+yrs



AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 12+ Years				
Treatment	**STEP 1**	**STEP 2**	**STEP 3**	**STEP 4**	**STEP 5**	**STEP 6** ■
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA▲	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily medium-high dose ICS-LABA + LAMA and PRN SABA▲	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA,▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2–4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

Stepwise Approach for Long Term Asthma Control

Six Steps

Rx tailored to level of asthma severity or control

NOT to replace clinical decision making

Step **UP**: After checks on Rx adherence, inhaler technique, environmental factors and co-morbidities- Reassess 4-6 weeks

Step **DOWN**: When asthma controlled for 3 months

Consult an Asthma Specialist:

Step 3 or > in 0-4yrs

Step 4 or > in 5-11yrs and 12-adult

2020 Focused Asthma Updates

Intermittent Inhaled Corticosteroids (ICS)

Daily ICS preferred for **persistent** asthma in individuals of all ages.

- For brief periods in response to symptoms as add on with or without Long Acting Beta Agonists (LABA)

Children ages 0-4 with recurrent wheezing:

Short (7-10 day) course of daily ICS with prn SABA for rescue at the onset of a respiratory infection.

2020 Focused Asthma Updates

Long Acting Muscarinic Antagonists (LAMA)

Children ages **12yrs and older** **uncontrolled** asthma with ICS alone adding a LABA rather than LAMA

Alternative If LABA is not available, not tolerated, contraindicated or inability to use the device adding a LAMA is acceptable

If **not** controlled with ICS-LABA add a LAMA which offers small benefit

2020 Focused Asthma Updates

Allergen Mitigation

- For individuals with specific allergies use **multiple** strategies vs only one
- Integrated pest management for those who are **allergic and exposed** to cockroaches and rodents
- Those with **no known allergies** to indoor substances environmental interventions in the home are **not** recommended

2020 Focused Asthma Updates

Immunotherapy

Immunotherapy administration of an aeroallergen Sub Q (SCIT), or Sublingual (SLIT)

- SCIT recommended as **adjunct** treatment for those with demonstrated allergic sensitization and evidence of worsening asthma after exposure
- **Do not initiate**, increase or administer maintenance SCIT if patient symptomatic or those with severe asthma
- SLIT use is **NOT** supported for treatment of allergic asthma

2020 Focused Asthma Updates

Fractional Exhaled Nitric Oxide Testing (FeNO)

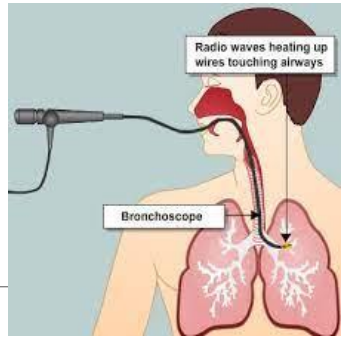
Nitric Oxide measured in exhaled breath as a measure of airway inflammation

May be useful to identify Type 2 (T2) inflammation

FeNO may support Dx if uncertain even after HX, Physical exam, Spirometry with BA.

In children 4 years and younger with recurrent wheezing, FeNO does not reliably predict future asthma

2020 Focused Asthma Updates



Bronchial Thermoplasty
Uses heat to remove muscle tissue from the airways of adults with moderate to severe asthma

Most individuals18 years and older with uncontrolled, moderate to severe, persistent asthma **should not** undergo BT

Some individuals with troublesome symptoms may be accept the risks of BT and, therefore, might choose this intervention after shared decision making with their health care provider.

Emergency Management

Assessment, Treatment, Lab, Adjunct Therapy

- Hx, Exam, Lung function
- Vitals, SpO_2, Pain, WOB, Breathlessness, Speech
- O_2, SABA's, Oral Corticosteroids
- LAB's: ABG's, CBC, Electrolytes
- IV Magnesium Sulfate
- Heliox
- Non-Invasive Ventilation (NIV)
- Mechanical Ventilation

Goals of Asthma Management

Healthcare Provider

- Provide accurate Dx
- Minimal or no symptoms or exacerbations
- Maintain normal lung function
- Minimal side effects
- No ER Visits to office or hospital
- Minimal need for Quick Relief therapy
- No limitations on physical activity

A Partnership in Asthma Care

Build active participation and negotiation with the family as a whole

- Cultural sensitivity
- Mutual respect
- Patient/family/caregiver goals
- Active open communication

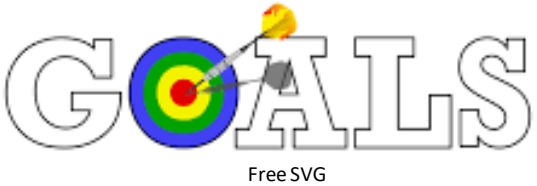
A Partnership in Asthma Care

Patient family centered goals

- Discuss family expectations and understanding disease process

Understand family dimensions

- Foster families
- Divorced families
- Multiple children in the household with asthma
- Grandparents raising grandchildren
- Poor socioeconomic situation
- Lack of insurance



A Partnership in Asthma Care

Goal of Patient Education

- Increase patient's *understanding* of asthma
- Improve self-treatment *skills*
- Enhance patient *satisfaction*
- Boost patient *confidence*
- Increase patients and families *adherence* with the treatment program

Most Common Types of Noncompliance

- Not having the prescription filled
- Taking an incorrect dose
- Taking the medication at the wrong time
- Forgetting to take one or more doses
- Stopping the medication too soon

Factors that Contribute to Non-compliance

- Prescriber related
- Patient related
- Medication related

Martin Vorel, public domain (CC0), via libreshot

Factors That Contribute to Noncompliance

Pxhere.com

Prescriber related factors

- Poor prescriber-patient relationship
- Poor prescriber communication skills
- Disparity between the health beliefs of the health care provider & those of the patient
- No positive reinforcement from health care provider

Factors that Contribute to Noncompliance

Patient related factors

- Limited access to health care
- Lack of financial resources
- Lack of social support
- Very busy schedule
- Literacy/language
- Low perception of illness & need to treat
- Negative expectations

Factors that Contribute to Noncompliance

Medication related factors

- Number of daily doses (esp. >2/day)
- Number of concurrent medications
- Adverse effects
- Long-term therapy – especially preventive for asymptomatic conditions

Adherence with Medications

Keep therapy simple & limit:

- Number of medications
- Doses/day

Meet patient's schedule

Establish patient (family) priorities & goals

- Enlist family & peer support
- Recognize medication costs & insurance coverage policies

Medication Assistance

- Shop around
- Compare prices at other pharmacies
- Check prices at:
  - **GoodRx**- www.goodrx.com
    - Phone App available
  - **Medicine Assistance Tool** - www.medicineassistancetool.org
  - **Needymeds**- www.needymeds.org

Who else is responsible in asthma management?

- RT/Nurse/PA
- Individual
- Parent/Caregiver
  - Additional support systems
- Schools
- Community Centers
- Childcare Providers

RT's Responsibility

Educate our Patients AND Caregivers

Disease Process and Role of inflammation

What? Why? How? When?

What- Medication and what is its action

Why- for rescue/quick relief or control/maintenance

When- to take the medication

How- to use and maintain the delivery device/s

THAT'S NOT ALL!!

Respiratory Treatments

2023

Allergy & Asthma Network

AllergyAsthmaNetwork.org

800.878.4403

American College of Allergy, Asthma & Immunology

CHEST FOUNDATION

123 = DOSE INDICATOR G = GENERIC AVAILABLE DISEASE STATES: A = ASTHMA C = COPD

Allergy & Asthma Network is a national nonprofit organization dedicated to ending needless death and suffering due to asthma, allergies and related conditions through outreach, education, advocacy and research.

SHORT-ACTING BETA$_2$-AGONIST BRONCHODILATORS

relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

- **ProAir® Digihaler™** — 90 mcg, albuterol sulfate inhalation powder — 123 A
- **ProAir RespiClick®** — 90 mcg, albuterol sulfate inhalation powder — 123 A
- **Proventil® HFA** — 90 mcg, albuterol sulfate — 123 A G
- **Ventolin® HFA** — 90 mcg, albuterol sulfate — 123 A G
- **Xopenex HFA®** — 45 mcg, levalbuterol tartrate — A G

LONG-ACTING BETA$_2$-AGONIST BRONCHODILATORS

muscles in airways and offer lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours

relax tight

- **Serevent® Diskus®** — 50 mcg, salmeterol xinafoate inhalation powder — 123 A C
- **Striverdi® Respimat®** — 2.5 mcg, olodaterol hydrochloride — 123 C

INHALED CORTICOSTEROIDS

reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath

- **Alvesco® HFA** — 80, 160 mcg, ciclesonide — 123 A
- **ArmonAir® Digihaler™** — 55, 113, 232 mcg, fluticasone propionate inhalation powder — 123 A
- **Arnuity® Ellipta®** — 50, 100, 200 mcg, fluticasone furoate inhalation powder — 123 A
- **Asmanex® HFA** — 50, 100, 200 mcg, mometasone furoate — 123 A
- **Asmanex® Twisthaler®** — 110, 220 mcg, mometasone furoate inhalation powder — 123 A
- **Flovent® Diskus®** — 50, 100, 250 mcg, fluticasone propionate inhalation powder — 123 A
- **Flovent® HFA** — 44, 110, 220 mcg, fluticasone propionate — 123 A
- **Pulmicort Flexhaler®** — 90, 180 mcg, budesonide inhalation powder — 123 A
- **QVAR® Redihaler™** — 40, 80 mcg, beclomethasone dipropionate — 123 A

MUSCARINIC ANTAGONISTS (ANTICHOLINERGIC)

relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

Short-acting

- **Atrovent® HFA** — 17 mcg, ipratropium bromide — 123 C

Long-acting

- **Incruse® Ellipta®** — 62.5 mcg, umeclidinium inhalation powder — 123 C
- **Spiriva® HandiHaler®** — 18 mcg, tiotropium bromide inhalation powder — C
- **Spiriva® Respimat®** — 1.25, 2.5 mcg, tiotropium bromide — 123 A C
- **Tudorza™ Pressair™** — 400 mcg, aclidinium bromide inhalation powder — 123 C

COMBINATION MEDICATIONS

contain both short-acting beta$_2$-agonist and short-acting muscarinic antagonist

- **Combivent® Respimat®** — 20/100 mcg, ipratropium bromide and albuterol — 123 C

COMBINATION MEDICATIONS

contain both inhaled corticosteroid and long-acting beta$_2$-agonist (LABA)

- **Advair Diskus®** — 100/50, 250/50, 500/50 mcg, fluticasone propionate and salmeterol inhalation powder — 123 A C G
- **Advair® HFA** — 45/21, 115/21, 230/21 mcg, fluticasone propionate and salmeterol xinafoate — 123 A G
- **AirDuo® Digihaler™** — 55/14, 113/14, 232/14 mcg, fluticasone propionate and salmeterol inhalation powder — 123 A
- **AirDuo® RespiClick®** — 55/14, 113/14, 232/14 mcg, fluticasone propionate and salmeterol inhalation powder — 123 A G
- **Breo® Ellipta®** — 100/25, 200/25 mcg, fluticasone furoate and vilanterol inhalation powder — 123 A C
- **Dulera®** — 50/5, 100/5, 200/5 mcg, mometasone furoate and formoterol fumarate dihydrate — 123 A
- **Symbicort®** — 80/4.5, 160/4.5 mcg, budesonide and formoterol fumarate dihydrate — 123 A C G
- **Wixela™ Inhub™** — 100/50, 250/50, 500/50 mcg, fluticasone propionate and salmeterol xinafoate (approved generic of Advair Diskus) — 123 A C

COMBINATION MEDICATIONS

contain both long-acting beta$_2$-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

- **Anoro® Ellipta®** — 62.5/25 mcg, umeclidinium and vilanterol inhalation powder — 123 C
- **Bevespi Aerosphere®** — 9/4.8 mcg, glycopyrrolate and formoterol fumarate — 123 C
- **Duaklir® Pressair®** — 400, 12 mcg, aclidinium bromide and formoterol fumarate — 123 C
- **Stiolto™ Respimat®** — 2.5/2.5 mcg, tiotropium bromide and olodaterol — 123 C

COMBINATION MEDICATIONS

contain inhaled corticosteroid, long-acting beta$_2$-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

- **Trelegy® Ellipta®** — 200/62.5/25 mcg, 100/62.5/25 mcg, fluticasone furoate, umeclidinium and vilanterol inhalation powder — 123 A C
- **Breztri Aerosphere™** — 160/9/4.8 mcg, budesonide, glycopyrrolate and formoterol fumarate — 123 C

BIOLOGICS

target cells and pathways that cause airway inflammation; delivered by injection or IV

- **Cinqair®** — reslizumab — A
- **Dupixent®** — dupilumab — A
- **Fasenra™** — benralizumab — A
- **Nucala®** — mepolizumab — A
- **Tezspire™** — tezepelumab-ekko — A
- **Xolair®** — omalizumab — A

BRONCHIAL THERMOPLASTY

A minimally invasive procedure that uses mild heat to reduce airway smooth muscle, leading to fewer severe asthma flares, ER visits, and days lost from activities.

www.btforasthma.com

A

PDE4 INHIBITORS

ease lung inflammation and reduce exacerbations

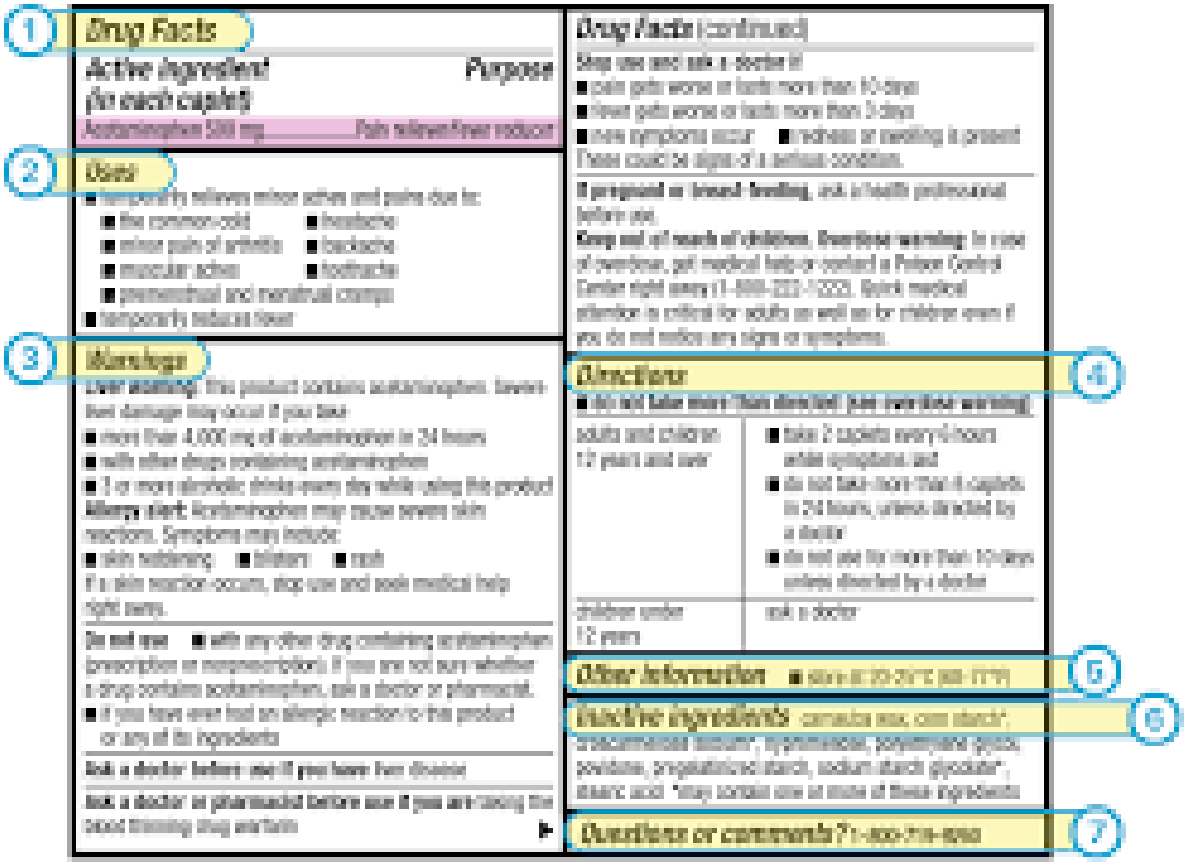
- **Daliresp®** — 250, 500 mcg, roflumilast — C

Reviewed by Dennis Williams, PharmD

Generic versions of brand name inhalers are not included on this poster. Generic inhalers may be a different color.

Manufacturer's Insert

Always the very best resource for accurate dosing technique, care maintenance, side effects



Essential Patient Teachings

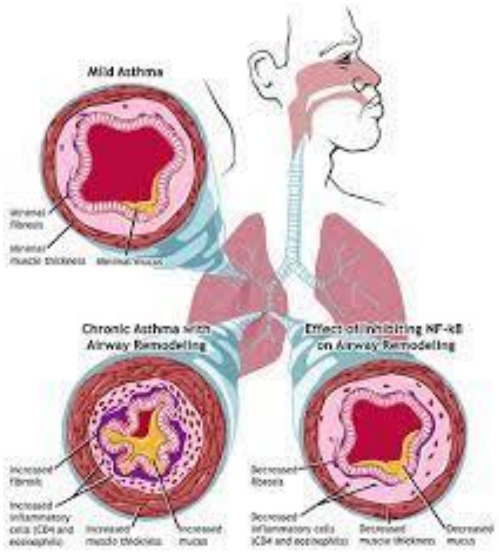
Teach and reinforce with patients at every opportunity

Basic Asthma Facts

- Normal vs Abnormal
- Role of inflammation
- What happens to the airways during an asthma attack

Role of Medications

- Quick Relief
- Controller



Flikr.com

Essential Patient Teaching

Asthma
Cannot be cured
but it **CAN** be
controlled

Nick Youngson CC BY-SA 3.0 via Picpedia.org

Essential Patient Teaching

QUIET ASTHMA

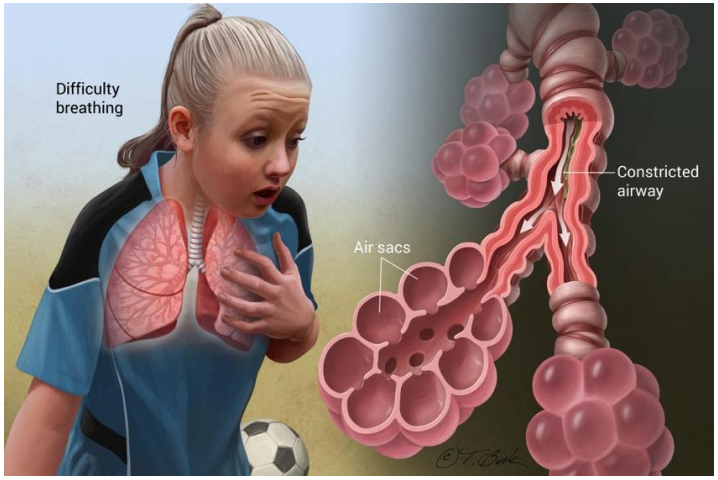
Inflammation & swelling

You are unable to hear or see what's happening

NOISY ASTHMA

Irritation triggers breathing problems

Coughing, wheezing, shortness of breath



Essential Patient Teachings

What is happening during an asthma attack?

Airway inflammation – the airway lining becomes red, swollen and narrow

Bronchoconstriction – the muscles around the airway tighten/spasm

Secretions- in the airway increase

As the airway tightens and narrows, it can be very difficult to get air in and out of the lungs

Exercise Induced Asthma

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Paul Jerry, CC BY 2.0 via Wikimedia Commons

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Exercise-Induced Bronchospasm

Triggered by vigorous or prolonged exercise or physical exertion

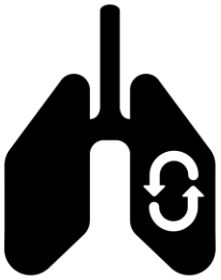
- **Symptoms**
  - Coughing, chest tightening, wheezing, **unusual fatigue**, shortness of breath
  - May begin during exercise and can worsen 5 to 10 minutes after exercise
- **Prevention**
  - Warm up and cool down
  - Take **SABA's** 15-20 minutes and **LABA's** 30 minutes prior to exercise

The Role of Medications

RESCUE

- Used to reverse asthma symptoms IMMEDIATELY
- Gives QUICK RELIEF

Created by Gan Khoon Lay from Noun Project



Created by Becca from Noun Project

CONTROLLER

- Used for LONG TERM DAILY CONTROL of persistent asthma
- Steroid (anti-inflammatory) inhalers or pills may be prescribed

Rules of 2

When is more than a **RESCUE** inhaler needed?

Are you taking your RESCUE inhaler

more than **2** times per week?

Are you awakening at night with asthma symptoms

more than **2** times per month (coughing)?

Have you refilled the RESCUE inhaler

more than **2** times per year?

If any of these are true, a CONTROLLER anti-inflammatory medication may be needed

Talk to your healthcare provider

Skills for Patient's to Know

- Taking or delivering medications correctly including inhalers, spacers, nebulizers
- Monitoring symptoms and assessing control
- Use of a written **Asthma Action Plan**
- Recognizing the WARNING SIGNS of an asthma attack
- Identifying and avoiding asthma triggers

****The greatest benefit is when a written Asthma Action Plan is used****

Delivery Device Considerations

Primary

- Efficacy and Safety of Rx

Secondary

- Delivery Devices
  - No regulatory preferences
  - Current clinical strategies provide little guidance

Types of Devices

- Particular inhalation technique required
  - Patients inspiratory profile
- Age, cognitive capacity and functional ability
- Patient acceptance or previous experience
  - Less favored yields poor adherence
- Cost

Meter Dose Inhalers(MDI's) Soft Mist Inhalers (SMI's)

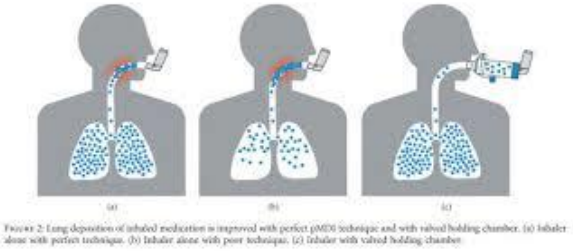
Advantages

- Portable
- Multiple doses
- Short treatment time
- Reproducible doses
- No drug prep
- Difficult to contaminate

Disadvantages

- Hand breath coordination
- Patient activation, breath and breath hold required
- Slow inhalation 30 lpm
- High oropharyngeal deposition
- Dose determination without counter

Reservoir Devices



Advantages

⬇ Oropharyngeal drug impaction/loss

⬆ Deposition by 2-4x's

Allows use w/ acute airflow obstruction with dyspnea

Simplifies coordination, actuation, inhalation

⬇ Local and systemic side effects

Disadvantages

Large, cumbersome

Expensive

Require some assembly

Common errors firing multiple doses

Possible contamination

How to take a Metered Dose Inhaler (MDI)

Use a “spacer” or valved holding chamber

Sit up or stand

Shake well

Exhale completely

Place mouth around the mouthpiece

Activate the dose

Inhale SLOWLY and Deeply

Hold breath up to 10 secs.

Wait 1 minute between inhalations

How to use your MDI with and without a spacer/chamber

Using Your Metered Dose Inhaler WITH a mouthpiece spacer

1.	Make sure that the metal canister of your MDI is inserted correctly into the plastic "boot" or holder (see drawing).
2.	Remove the cap from the mouthpiece of both the MDI and the spacer.
3.	Insert the MDI mouthpiece in the soft opening of the spacer. The MDI canister needs to be in an upright position.
4.	Shake the MDI with attached spacer several times.
5.	Breathe out, away from the spacer, to the end of your normal breath.
6.	Place the mouthpiece of the spacer into your mouth, past your teeth and above your tongue. Close your lips around the mouthpiece. If you are using a spacer with a mask, place the mask over your nose and mouth. Be sure the mask has a good seal against your cheeks and chin. There should be no space between the mask and your skin.
7.	Press down on the top of the metal canister once, to release the medicine into the spacer.
8.	Breathe in deeply and slowly through your mouth. If the spacer makes a "whistling" sound, you are breathing in too fast. You should NOT hear a whistle.
9.	Hold your breath for 5 to 10 seconds.
10.	Breathe out slowly.
11.	If you are instructed to take more than one puff (spray), wait about 15 to 30 seconds (or as directed by the package insert) before taking the next puff. Then repeat steps 4-10.
12.	Replace the cap on the mouthpiece of the MDI inhaler and spacer after you have finished.
13.	If you are inhaling a steroid, rinse your mouth out with water, swish, gargle and spit.

Using Your Metered Dose Inhaler WITHOUT a Spacer/Chamber

1.	Put the metal canister into the "boot" making certain it is seated correctly.
2.	Shake the inhaler several times. This mixes the propellant and medicine.
3.	Remove the cap off from the mouthpiece.
4.	Breathe out to the end of a normal breath.
5.	Hold the inhaler in its upright position (with the mouthpiece at the bottom).
6.	Put the mouthpiece in your mouth, past your teeth and above your tongue. Close your lips around the mouthpiece so that the medication does not go in your eyes (see second Figure).
7.	While breathing in slowly and deeply through your mouth, fully press down once on the top of the metal canister of your inhaler.
8.	Hold your breath for 5 to 10 seconds.
9.	Breathe out slowly.
10.	If you take more than one spray, wait 15 to 30 seconds (or as directed in the package insert) before taking the next puff. Then repeat steps 3-9.
11.	Replace the cap on the mouthpiece after you are finished.
12.	If you are inhaling a steroid, rinse your mouth out with water, swish, gargle and spit.

	Ask your healthcare provider for help if you need to use a facemask spacer

MDI-Common Errors

- Waiting too long to inhale
- Inhaling too fast >30 lpm
- Firing multiple doses before inhaling
- Reduces the dose delivered
- Failing to remove the mouthpiece cap
- PRIMING

MDI Cleaning and Dose Calculation

Clean Actuator weekly

Rinse with warm water through the top/mouthpiece 30 seconds

Shake off excess Air dry

If not washed fine particle mass can be reduced by 30%

Advair HFA- clean dispensing site w/ cotton swab

Dose Calculating/Counting

Flovent 120 puffs

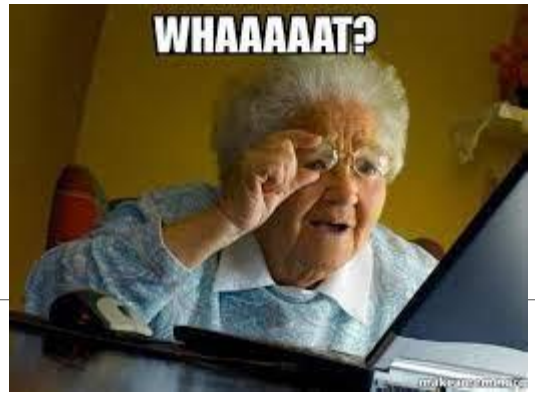
4 puffs daily - 30 days

PRN= Keep a log, tally puffs daily

Never Weigh!!

Observe Internal/External Dose Counter prior to use

MDI Priming!!!



Respimat-

- Prior to 1st Use- 3 complete sprays with visible mist

Ventolin, Proventil

- New-4 sprays
- Non use for 14 days- 4 sprays

Combivent Respimat

- New- 4 sprays
- Non use for 3 days- 1 sprays
- Non use for 21 days- 4 sprays

Flovent HFA

- New- 4 sprays
- Non use > 7 days or if dropped- 1 sprays

Symbicort

- New, non use > 7 days or if dropped -2 sprays

How to take an Nebulizer Treatment

- Sit upright
- Take **SLOW**, **DEEP** breaths
- Mouthpiece is best
- Watch the medicine disappear when breathing in
- If using a mask encourage slow deep breaths

Properly clean and store equipment

- Take apart and rinse after each use
- Soak in 1 part distilled vinegar and 3 parts hot water for 1 hour, once per week/air dry
- Many portable options for nebulizer machines

Mask Set up

Mouthpiece set up

Images from unsplash.com

How to take a Dry Powder Inhaler (DPI)

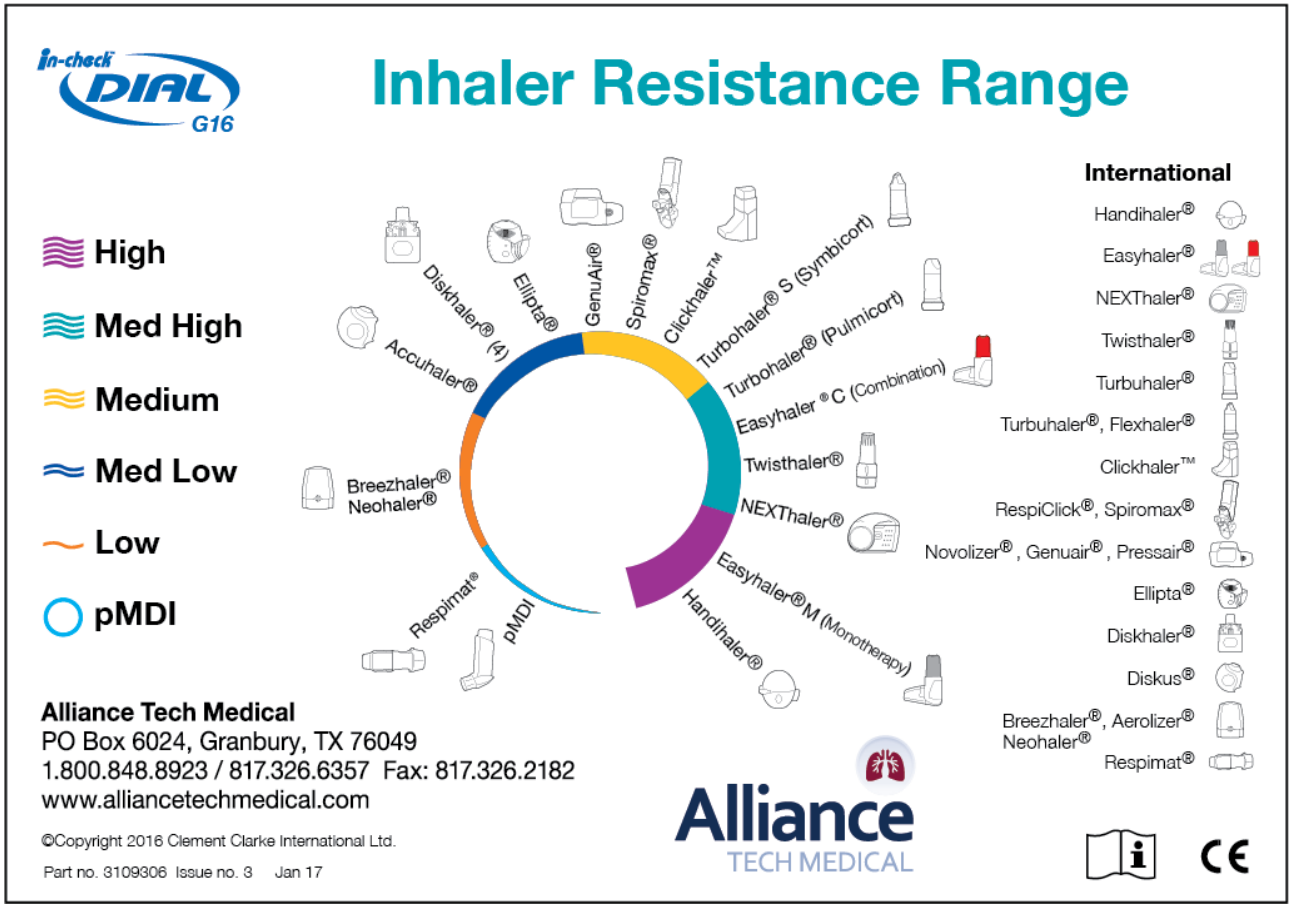
- **Sit** up or stand
- **Load** dose of medication
- **Hold** the device level
- **Exhale** completely
- Put mouth tightly around mouthpiece
- **Inhale** **QUICKLY** and **DEEPLY**
- **Hold** breath for 5-10 seconds
- Do not exhale in the device, shake it or wash it

If steroid component **rinse mouth**

Examples of DPI

Patient Inspiratory Assessment

Incheck Dial

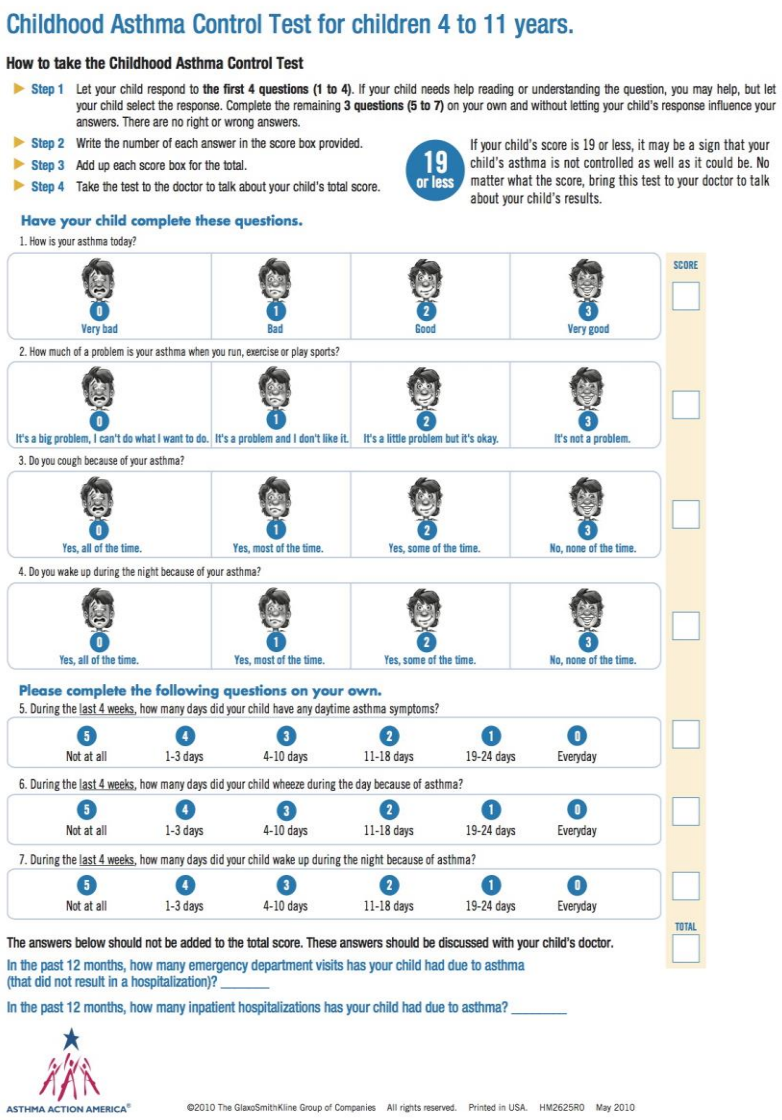


Assessing Asthma Control at Home

Asthma Control Test 4-11 yrs.

- An easy tool to help a parent know if their child's asthma may not be well controlled
- The child answers the first 4 questions
- Parent answers the rest

[No matter what the score share this information with your healthcare provider]



Childhood Asthma Control Test for children 4 to 11 years.

How to take the Childhood Asthma Control Test

- **Step 1** Let your child respond to **the first 4 questions (1 to 4)**. If your child needs help reading or understanding the question, you may help, but let your child select the response. Complete the remaining **3 questions (5 to 7)** on your own and without letting your child's response influence your answers. There are no right or wrong answers.
- **Step 2** Write the number of each answer in the score box provided.
- **Step 3** Add up each score box for the total.
- **Step 4** Take the test to the doctor to talk about your child's total score.

19 or less If your child's score is 19 or less, it may be a sign that your child's asthma is not controlled as well as it could be. No matter what the score, bring this test to your doctor to talk about your child's results.

Have your child complete these questions.

1. How is your asthma today?

0	1	2	3	SCORE
Very bad	Bad	Good	Very good	

2. How much of a problem is your asthma when you run, exercise or play sports?

0	1	2	3	
It's a big problem, I can't do what I want to do.	It's a problem and I don't like it.	It's a little problem but it's okay.	It's not a problem.	

3. Do you cough because of your asthma?

0	1	2	3	
Yes, all of the time.	Yes, most of the time.	Yes, some of the time.	No, none of the time.	

4. Do you wake up during the night because of your asthma?

0	1	2	3	
Yes, all of the time.	Yes, most of the time.	Yes, some of the time.	No, none of the time.	

Please complete the following questions on your own.

5. During the last 4 weeks, how many days did your child have any daytime asthma symptoms?

5	4	3	2	1	0	
Not at all	1-3 days	4-10 days	11-18 days	19-24 days	Everyday	

6. During the last 4 weeks, how many days did your child wheeze during the day because of asthma?

5	4	3	2	1	0	
Not at all	1-3 days	4-10 days	11-18 days	19-24 days	Everyday	

7. During the last 4 weeks, how many days did your child wake up during the night because of asthma?

5	4	3	2	1	0	
Not at all	1-3 days	4-10 days	11-18 days	19-24 days	Everyday	

TOTAL

The answers below should not be added to the total score. These answers should be discussed with your child's doctor.

In the past 12 months, how many emergency department visits has your child had due to asthma (that did not result in a hospitalization)? _____

In the past 12 months, how many inpatient hospitalizations has your child had due to asthma? _____

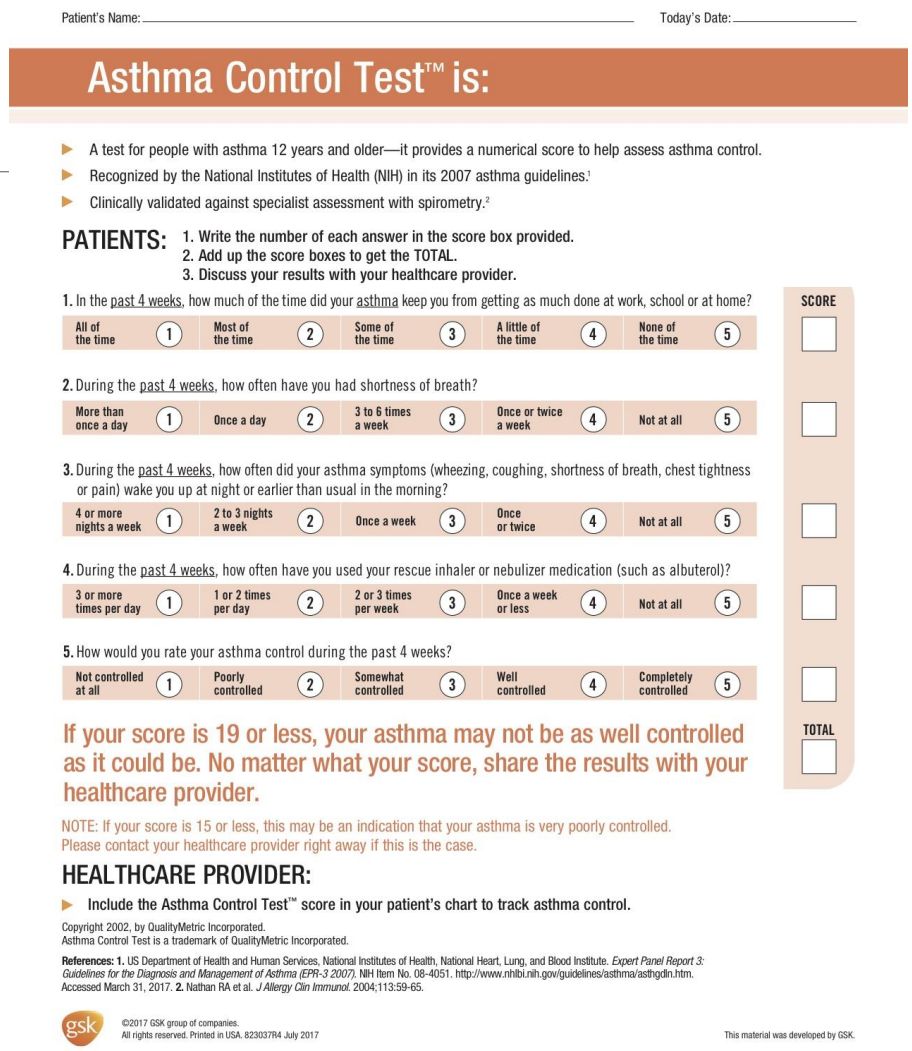
ASTHMA ACTION AMERICA®

Assessing Asthma Control at Home

Asthma Control Test 12 yrs. & older

- Easy tool to help a person know if their asthma may not be well controlled
- All of the questions are answered by the person with asthma

No matter what the score, share this information with your healthcare provider



Patient's Name: _____ Today's Date: _____

Asthma Control Test™ is:

- A test for people with asthma 12 years and older—it provides a numerical score to help assess asthma control.
- Recognized by the National Institutes of Health (NIH) in its 2007 asthma guidelines.[1]
- Clinically validated against specialist assessment with spirometry.[2]

PATIENTS:
1. Write the number of each answer in the score box provided.
2. Add up the score boxes to get the TOTAL.
3. Discuss your results with your healthcare provider.

									SCORE
1. In the past 4 weeks, how much of the time did your asthma keep you from getting as much done at work, school or at home?	All of the time	1	Most of the time	2	Some of the time	3	A little of the time	4	None of the time	5	
2. During the past 4 weeks, how often have you had shortness of breath?	More than once a day	1	Once a day	2	3 to 6 times a week	3	Once or twice a week	4	Not at all	5	
3. During the past 4 weeks, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?	4 or more nights a week	1	2 to 3 nights a week	2	Once a week	3	Once or twice	4	Not at all	5	
4. During the past 4 weeks, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?	3 or more times per day	1	1 or 2 times per day	2	2 or 3 times per week	3	Once a week or less	4	Not at all	5	
5. How would you rate your asthma control during the past 4 weeks?	Not controlled at all	1	Poorly controlled	2	Somewhat controlled	3	Well controlled	4	Completely controlled	5	
											TOTAL

If your score is 19 or less, your asthma may not be as well controlled as it could be. No matter what your score, share the results with your healthcare provider.

NOTE: If your score is 15 or less, this may be an indication that your asthma is very poorly controlled. Please contact your healthcare provider right away if this is the case.

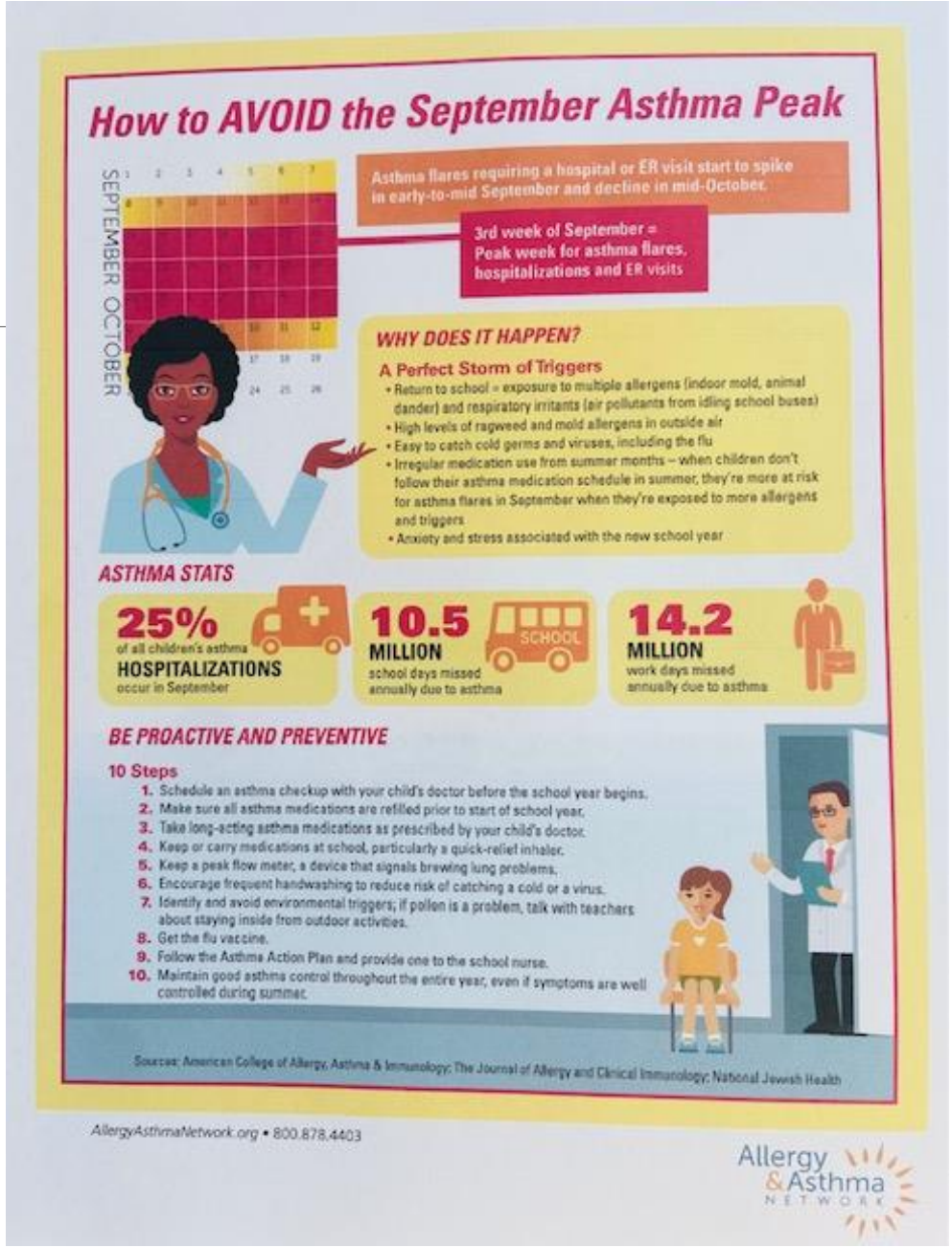
HEALTHCARE PROVIDER:

- **Include the Asthma Control Test™ score in your patient's chart to track asthma control.**

References: 1. US Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute. *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma (EPR-3 2007).* NIH Item No. 08-4051. http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm. Accessed March 31, 2017. **2.** Nathan RA et al. *J Allergy Clin Immunol.* 2004;113:59-65.

How to Avoid the September Asthma Peak

www.allergyasthma_network.org



Asthma Action Plan (AAP)

Tells you…

- **What** medicines to take
- **When** to take them
- **How** much to take
- **When** to get help

Picpedia.org

Remember to share yours/your child's plan

Meet with your child's teacher(s), day care providers and/or coaches about your child's asthma and have an Asthma Action Plan in place. Don't forget about family members!

AAP's should be updated every 3-6 months by your healthcare provider

ASTHMA ACTION PLAN

For: _____ Doctor: _____ Date: _____

Doctor's Phone Number: _____ Hospital/Emergency Department Phone Number: _____

GREEN ZONE

DOING WELL

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

And, if a peak flow meter is used,

Peak flow: more than _____
(80 percent or more of my best peak flow)

My best peak flow is: _____

Daily Medications

Medicine	How much to take	When to take it

Before exercise	☐ _____	☐2 or ☐4 puffs	5 minutes before exercise

YELLOW ZONE

ASTHMA IS GETTING WORSE

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

–Or–

Peak flow: _____ to _____
(50 to 79 percent of my best peak flow)

1st **Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.**

_____ (quick-relief medicine) _____ Number of puffs **or** ☐Nebulizer, once — Can repeat every _____ minutes up to maximum of _____ doses

2nd **If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:**

☐Continue monitoring to be sure you stay in the green zone.

–Or–

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:

☐Take: _____ (quick-relief medicine) _____ Number of puffs **or** ☐Nebulizer

☐Add: _____ (oral steroid) mg per day For _____ (3–10) days

☐Call the doctor ☐before/ ☐within _____ hours after taking the oral steroid.

RED ZONE

MEDICAL ALERT!

- Very short of breath, or
- Quick-relief medicines have not helped,
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

–Or–

Peak flow: less than _____
(50 percent of my best peak flow)

Take this medicine:

☐_____ (quick-relief medicine) _____ Number of puffs **or** ☐Nebulizer

☐_____ (oral steroid) mg

Then call your doctor NOW. Go to the hospital or call an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

DANGER SIGNS

- **Trouble walking and talking due to shortness of breath**
- **Lips or fingernails are blue**

→

- **Take _____ puffs of _____ (quick relief medicine) AND**
- **Go to the hospital or call for an ambulance _____ (phone) NOW!**

See the reverse side for things you can do to avoid your asthma triggers.

www.nhlbi.nih.gov

The Asthma Action Plan; Controlling Asthma Triggers

How To Control Things That Make Your Asthma Worse

This guide suggests things you can do to avoid your asthma triggers. Put a check next to the triggers that you know make your asthma worse and ask your doctor to help you find out if you have other triggers as well. Then decide with your doctor what steps you will take.

Allergens

❒ **Animal Dander**

Some people are allergic to the flakes of skin or dried saliva from animals with fur or feathers.

The best thing to do:

- Keep furred or feathered pets out of your home.

If you can't keep the pet outdoors, then:

- Keep the pet out of your bedroom and other sleeping areas at all times, and keep the door closed.
- Cover the air vents in your bedroom with heavy material to filter the air.
- Remove carpets and furniture covered with cloth from your home. If that is not possible, keep the pet away from fabric-covered furniture and carpets.

❒ **Dust Mites**

Many people with asthma are allergic to dust mites. Dust mites are tiny bugs that are found in every home—in mattresses, pillows, carpets, upholstered furniture, bedcovers, clothes, stuffed toys, and fabric or other fabric-covered items.

Things that can help:

- Encase your mattress in a special dust-proof cover.
- Encase your pillow in a special dust-proof cover or wash the pillow each week in hot water. Water must be hotter than 130° F to kill the mites.
- Wash the sheets and blankets on your bed each week in hot water.
- Reduce indoor humidity to below 60 percent (ideally between 30-50 percent). Dehumidifiers or central air conditioners can do this.
- Try not to sleep or lie on cloth-covered cushions.
- Remove carpets from your bedroom and those laid on concrete, if you can.
- Keep stuffed toys out of the bed and wash or freeze the toys weekly.

❒ **Cockroaches**

Many people with asthma are allergic to the dried droppings and remains of cockroaches.

The best thing to do:

- Keep food and garbage in closed containers. Never leave food out.
- Use poison baits, powders, gels, or paste (for example, boric acid). You can also use traps.
- If a spray is used to kill roaches, stay out of the room until the odor goes away.

❒ **Indoor Mold**

- Fix leaky faucets, pipes, or other sources of water that have mold around them.
- Clean moldy surfaces with a cleaner that has bleach in it.

❒ **Pollen and Outdoor Mold**

What to do during your allergy season (when pollen or mold spore counts are high):

- Try to keep your windows closed.
- Stay indoors with windows closed from late morning to afternoon, if you can. Pollen and some mold spore counts are highest at that time.
- Ask your doctor whether you need to take or increase anti-inflammatory medicine before your allergy season starts.

Irritants

❒ **Tobacco Smoke**

- If you smoke, ask your doctor for ways to help you quit. Ask family members to quit smoking, too.
- Do not allow smoking in your home or car.

❒ **Smoke, Strong Odors, and Sprays**

- If possible, do not use a wood-burning stove, kerosene heater, or fireplace.
- Try to stay away from strong odors and sprays, such as perfume, talcum powder, hair spray, and paints.

Other things that bring on asthma symptoms in some people include:

❒ **Vacuum Cleaning**

- Try to get someone else to vacuum for you once or twice a week, if you can. Stay out of rooms while they are being vacuumed and for a short while afterward.
- If you vacuum, use a dust mask (from a hardware store), a double-layered or microfilter vacuum cleaner bag, or a vacuum cleaner with a HEPA filter.

❒ **Other Things That Can Make Asthma Worse**

- Sulfites in foods and beverages: Do not drink beer or wine or eat dried fruit, processed potatoes, or shrimp if they cause asthma symptoms.
- Cold air: Cover your nose and mouth with a scarf on cold or windy days.
- Other medicines: Tell your doctor about all the medicines you take. Include cold medicines, aspirin, vitamins and other supplements, and nonselective beta-blockers (including those in eye drops).

859–283–1400
www.nlga.us

U.S. Department of Health and Human Services
National Institutes of Health

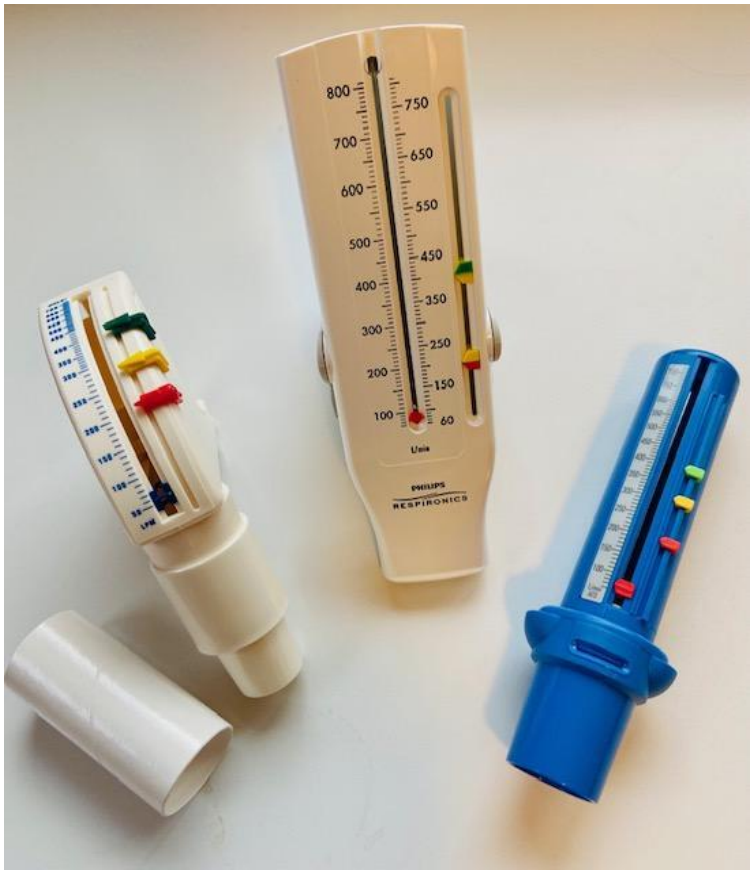
National Heart Lung and Blood Institute

For More Information, go to: www.nhlbi.nih.gov

NIH Publication No. 07-5251
January 2007

Peak Flow Monitoring

Measures the amount and velocity of air forcefully exhaled from the lungs in L/min after a maximum inhalation

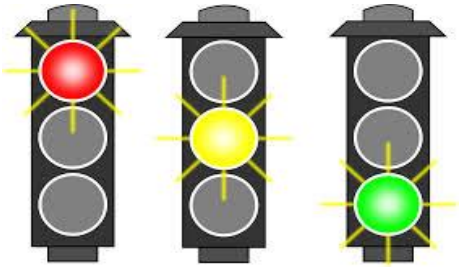


Examples of peak flow meters

Personal Best Peak Flow

- A key component to the Asthma Action Plan
- Your **Personal Best** is the highest measurement you can reach during a two-week period when you are **feeling your best** or **FREE** of asthma symptoms.
- Take your readings when you **wake** up and when you go to **sleep**
- Take additional readings **before** and **after** you take your inhaled medications

The 3 Zone System



Red Zone = < 50% of your ideal number

Signals Medical Alert- Take your Quick Relief medication and call your doctor

Yellow Zone = 50-79% of your ideal number

Signals Caution- Follow your plan or call your doctor.

Green Zone = 80-100% of your ideal number

Signals All Clear

Late Warning Signs of an Asthma Attack

Call **911** if any of the following occur:

- You are not sure what to do
- Blueness of lips or nails
- Individual unable to walk, talk or drink
- Individual struggling to breathe
- Chest and neck muscles working hard (sucking in)
- Breathing does not improve or is worse after the treatment

CONTINUE QUICK RELIEF INHALER

Self Management Training

Outcomes

- Reduced morbidity
- Decreased use of health-care providers

** The greatest benefit is when a written self-management Asthma Action Plan was used **

Asthma patients …

KNOW YOUR TRIGGERS

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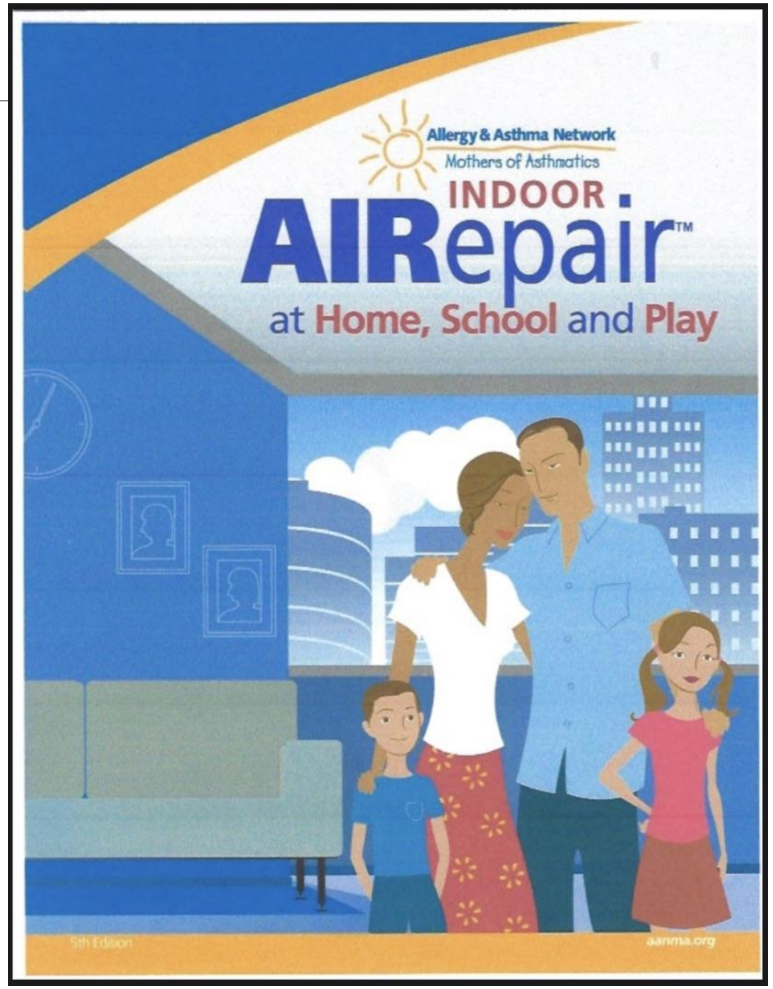
Asthma Triggers

Asthma Triggers

- Tobacco smoke, Wood burning
- Mold and mildew
- Pollutants resulting from poor ventilation
- Pets with fur or feathers
- Cockroach or mouse droppings
- Strong Odors (chemicals, cleaning agents, paint, air fresheners, perfumes, dry erase markers, magic markers, glue/paste, fumes from soldering or welding)
- Exercise
- Cold / damp weather
- Extreme emotional expression (stress, anxiety, anger or crying)
- Prolonged sneezing, yelling or laughing
- Hormonal
- Common cold, influenza, respiratory infections
- Certain foods –peanuts, milk, soy, shellfish, eggs

Keeping Your Environment Asthma Friendly

This booklet helps you be a detective in your home, at school and play **FINDING** and **FIXING** what can make asthma worse



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Resource Organizations

American Association for Respiratory Care www.aarc.org

Allergy & Asthma Network www.allergyasthmanetwork.org

National Heart, Lung & Blood Institute (National Asthma Education & Prevention Program) www.nhlbi.nih.org

Centers for Disease Control and Prevention, www.cdc.org

American Association for Respiratory Care, www.aarc.org

U.S. Department of Health and Human Services www.hhs.gov

American College of Allergy, Asthma, & Immunology, www.acaai.org

National Institute of Allergy & Infectious Diseases,www.niaid.nih.gov

Global Initiative for Asthma 2022 Report https://ginasthma.org/gina-reports/

Resources

2020 Focused Updates to Asthma Management Guidelines

https://www.nhlbi.nih.gov/sites/default/files/publications/AsthmaManagementGuidelinesReport-2-4-21.pdf

American Thoracic Society https://www.thoracic.org/patients

Centers for Disease Control and Prevention
https://www.cdc.gov/asthma/inhaler_video/default.htm

American Academy of Pediatrics—Healthy Children—videos on how to use inhalers

https://www.healthychildren.org/English/health-issues/conditions/allergies-asthma/Pages/default.aspx

Allergy and Network (also available in Spanish)

https://allergyasthmanetwork.org/what-is-asthma/how-is-asthmatreated/how-to-use-a-metered-dose-inhaler/

American College of Chest Physicians Chest Foundation

https://foundation.chestnet.org/lung-health-a-z/inhaler-devices/

The Goal of Asthma Management

Everyone *should live happy, healthy, physically active lives, without asthma symptoms slowing them down!*

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