Be Smart and Breathe Easy

Asthma And Allergy Foundation of America
New England Chapter

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NEW ENGLAND CHAPTER

Be Smart and Breathe Easy Program, developed by the Asthma And Allergy Foundation of America New England Chapter, is an asthma education program for inner-city school nurses and custodial staff working in Boston Public Schools (BPS).

The goal of the program is to improve outcomes for students with asthma in BPS. The program aims to reduce school absenteeism due to asthma, reduce asthma triggers in schools, and increase understanding of disease management and treatment.

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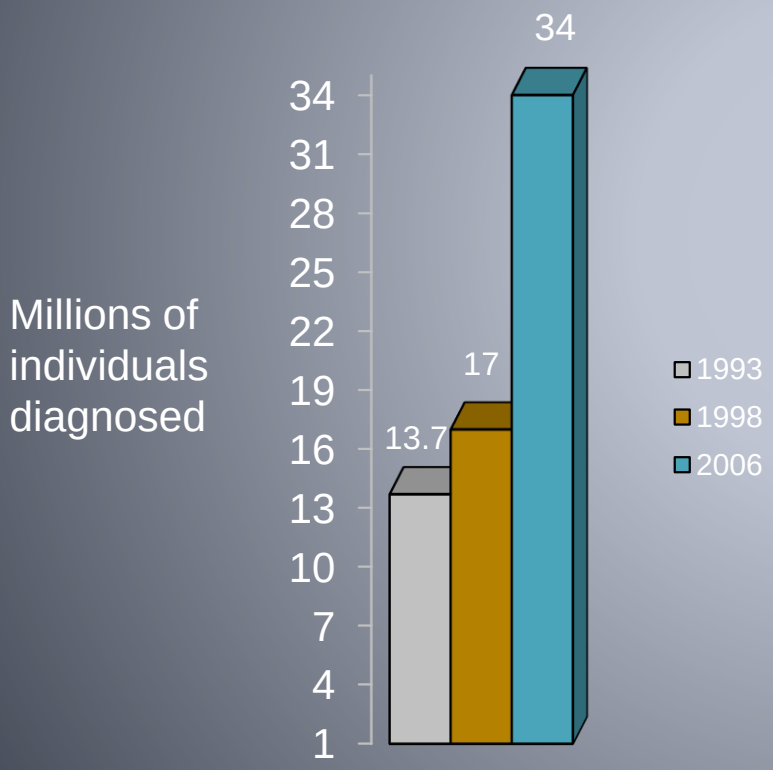
Rising Asthma Rates



- Americans diagnosed with asthma continue to rise
- 34 million Americans have been diagnosed with asthma in their lifetime in the US
- 7 million are children under 18 yrs

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Impact of Asthma

Every Year in the US, asthmatics have:

- 2 million emergency room visits
- 500,000 hospitalizations
- 4,000 deaths
- 12.8 million missed school days
- Nearly 10.1 missed workdays

Healthcare costs for asthma: estimated about 30 billion a year

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Cost Burden of Asthma

The economic burden of asthma in the United States continues to be significant. Deaths, healthcare costs and medical resources utilized due to asthma continues to rise each year.

- According to the World Health Organization, there were 380,000 death in 2015 due to asthma.
- Healthcare costs due to asthma (including lost days from work and school) was estimated at $81.9 billion in 2013.
- Disease inequity continues to contribute to the socio-economic burden of asthma in all age groups in the U.S. and worldwide.

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What is Asthma?

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Asthma is Not:

Acute bronchitis

Chronic bronchitis
Emphysema
Cystic fibrosis

} = **COPD**

Chronic Obstructive Pulmonary Disease

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Asthma is:

A ***chronic*** disease of the airways in the lungs.

Cannot be cured ***but can*** be treated and controlled.

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Asthma Has 2 Parts:

- A disorder of the bronchial tubes in which the ***airways narrow*** too much and too easily, resulting in wheezing, chest tightness, and shortness of breath.

- A chronic ***inflammatory*** disorder of the bronchial tubes.

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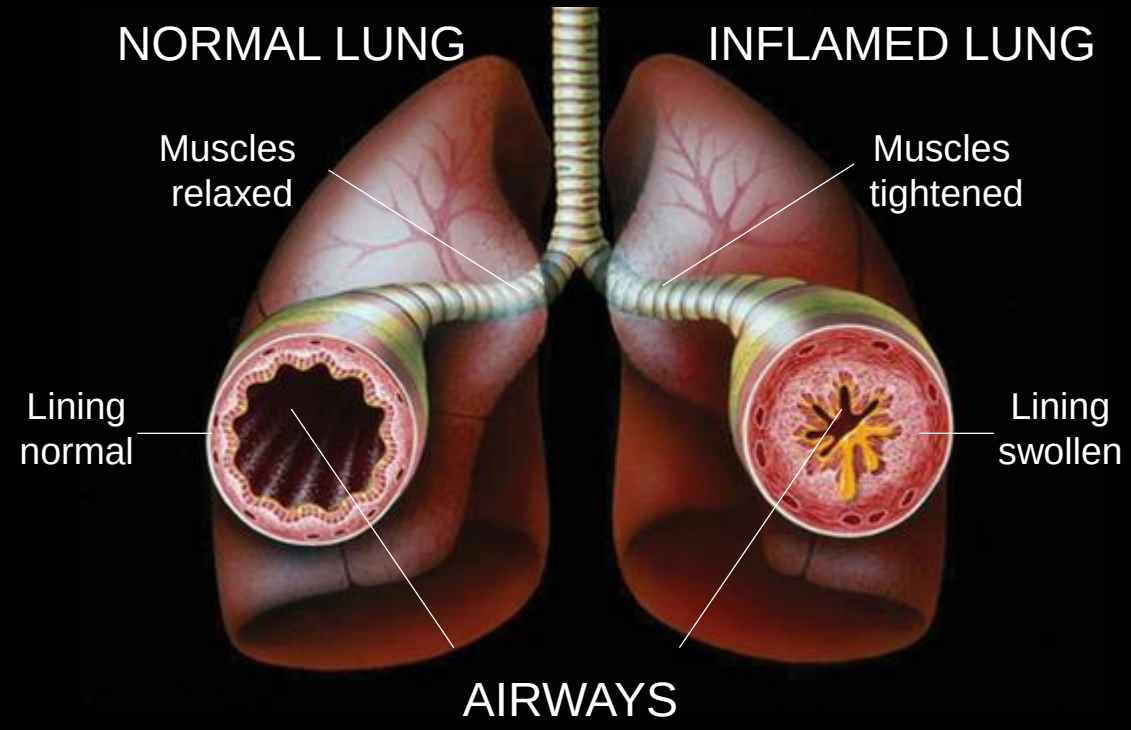
Causes of Asthma

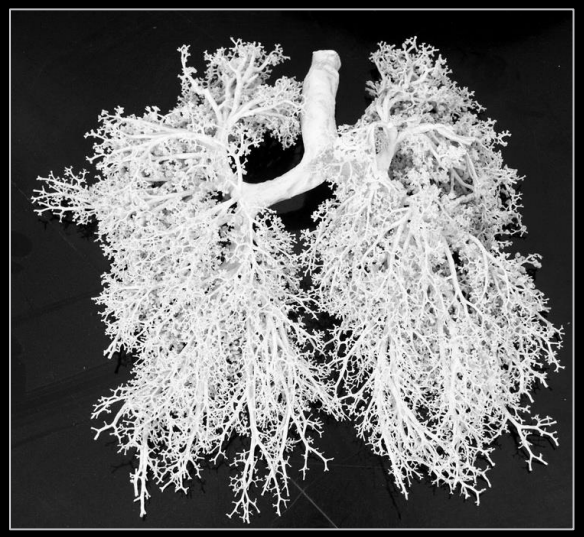
1. **Partly Hereditary**
   Tends to run in families

2. **Partly Environmental**
   Indoor air quality due to tobacco smoke, mold, dust mites, cockroaches, pet dander and others and *outdoor air quality* due to pollution, pollen, ragweed, and others can contribute to asthma



Normal and Asthmatic Airway

The Bronchial Tree



Airways and the Bronchial Tree

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Symptoms of Asthma

Symptoms of asthma may include:

- Shortness of breath
- Chest tightness
- Wheezing
- Coughing

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Asthma and Environmental Triggers

Many things, called **asthma triggers**, can make asthma worse

Knowing and avoiding your asthma triggers will help you better manage asthma

Asthma Triggers ?

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Indoor Environmental Triggers

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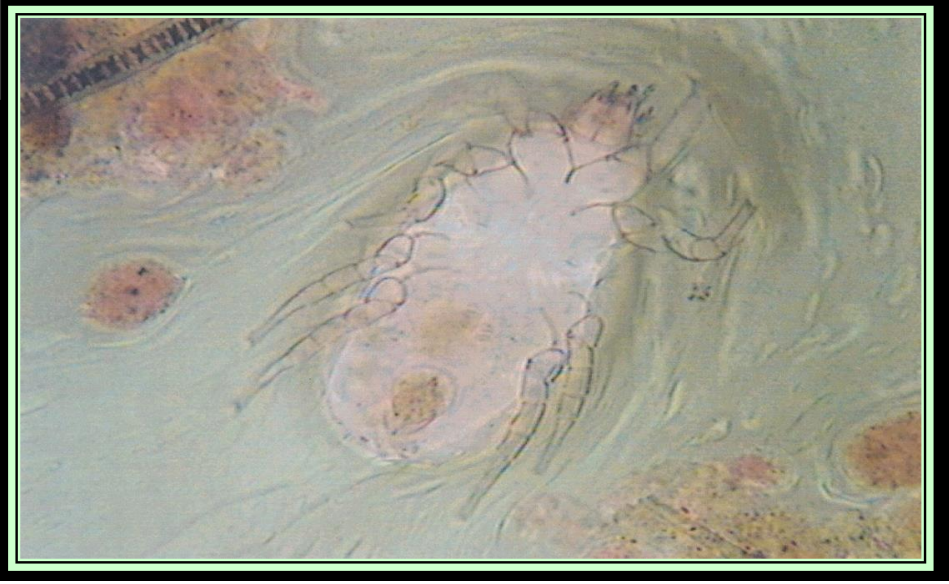
Under microscope in museum



Dust Mite

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Dust Mite Allergen

- Microscopic Arthropod
- Thrive in Hot, Humid Places
- Feed on Human Skin Flakes
- Waste Products & Decaying Mite Bodies are Airborne

Sources:

- Carpets, drapes, upholstered furniture, pillows

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Cat Allergen

- Main allergen is produced by the sweat glands (sebaceous glands)
- Also in the fur, saliva, and urine

- **Cat allergen is**:
  - Pervasive, can linger in homes for months
  - Sticky and adheres to drapes, furniture, rugs, floors, walls
  - Lightweight and can float in the air for hours

- The allergen can be carried around on clothing, thereby spreading it at school, work, church, etc.

Dog Allergen

- The allergen is present in dog dander ***not*** fur
- There is no difference whether the dog has long or short hair

  (i.e. can be as allergic to a Chihuahua as you can to a Cyberian Huskie).
- No breed is ***non-allergenic.***

  Even Poodles, Wheaten Terriers, and Shih Tzu (thought to be hypoallergenic), will likely induce allergy symptoms in sensitive individuals upon continuous exposure.

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Tobacco Smoke / SHS

Tobacco & Second Hand Smoke (SHS):

- Can trigger asthma
- Is a mixture of smoke from cigarettes, pipes, cigars and the smoke breathed out by a smoker
- Can travel through air ducts, cracks in floors and walls, stairwells, hallways, elevator shafts, plumbing, electrical lines, and open windows *(especially in multi-unit structures)*

**Research funded by the U.S. National Institute on Drug Abuse (NIDA), found that SHS has a direct and measurable impact on the brain similar to that of actually smoking. PET scans reveal just 1 hr of SES in an enclosed area allows nicotine to reach the brain and bind to receptors normally targeted by direct exposure to tobacco smoke. URL: nttp://consumer.healthday.com/Article.asp?AID-652532

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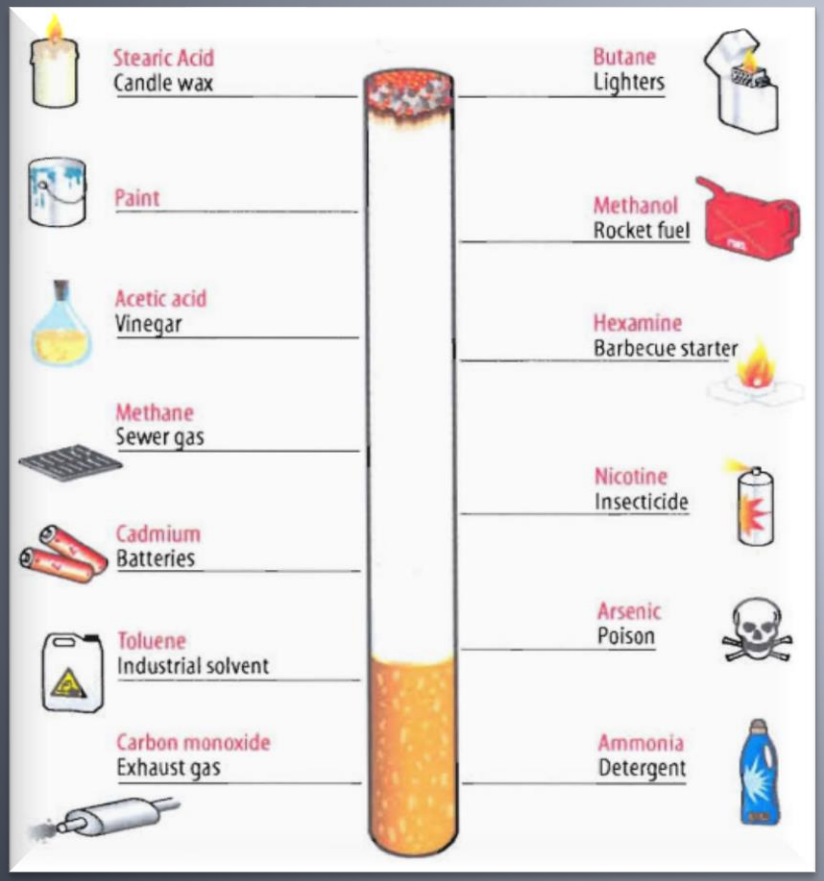
Third Hand Smoke



- Third-hand smoke is a term for the chemicals, gases, and other toxins left behind in hair, carpets, sofas, clothes and other materials long after a cigarette is put out.
- **Third-hand smoke can make asthma worse.**
- Young children are also at an increased risk of swallowing or breathing in these toxins because they spend more time closer to floors and other surfaces.

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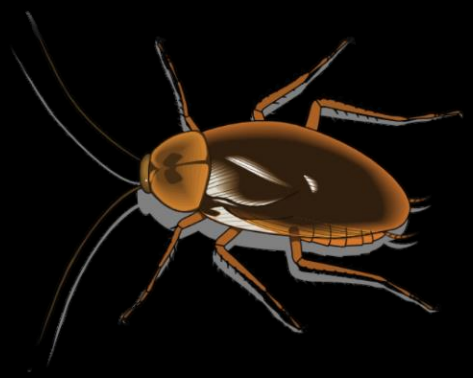
Pests



- The body parts and droppings of rodents and roaches contain allergens.
- Asthmatic children and adolescents allergic to **mice** experience more illness due to asthma than their counterparts.

Pests, like human beings, need food, water, and shelter to survive:

- ***Food sources:*** various foods and their crumbs, paints, wallpaper pastes, and book bindings.
- ***Water sources:*** sweating pipes, standing water, and any moist items or areas.
- ***Hiding places:*** cracks, cardboard boxes, newspaper, and grocery bags.

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Strong Odors

Strong odors can irritate the airways and trigger asthma

Pesticides

Cleaning Products

Perfumes

Hair Sprays

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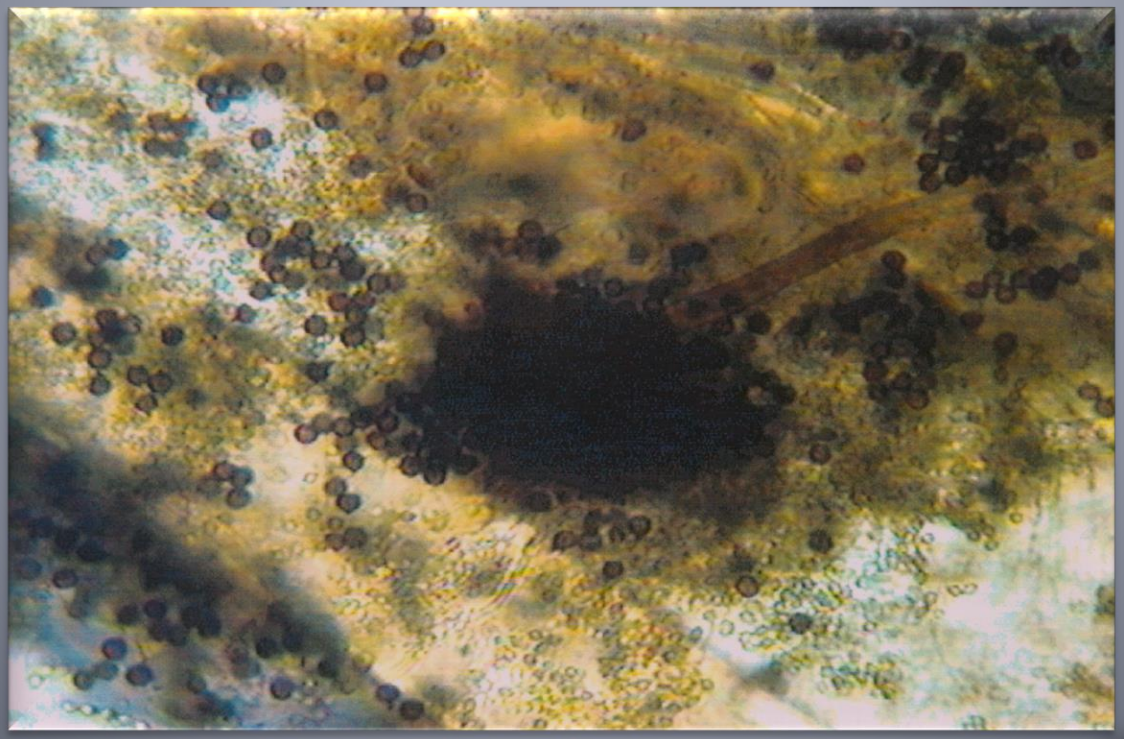
Indoor Mold
(Aspergillus – under carpets)

Mold spores are carried in the air and can trigger asthma



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Indoor Air Quality

Poor indoor air quality due to environmental hazards in schools has been linked to increase asthma and allergy, absenteeism due to illness, and poor academic performance in children.

Common contributors to poor indoor air quality in schools include:

- Inadequate Heat, Ventilation, and Air-Conditioning (HVAC) systems.
- Organic Vapors / Volatile Organic Compounds (VOCs)
- Rodents, pests, mold spores, and other pollutants.
- Moisture and other leakage issues.
- Toxic cleaning chemicals.

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Outdoor Environmental Triggers

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Tree Pollen

Tree pollen (March – June)

Oak tree pollen grains

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Grass Pollen

Grass pollen (June – July)

Grass pollen grains

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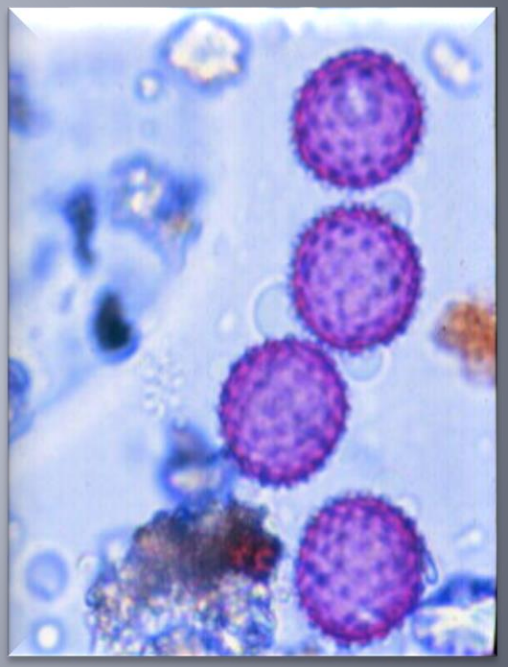
Ragweed Pollen

Weed pollen (Aug – Oct)



Ragweed pollen grains

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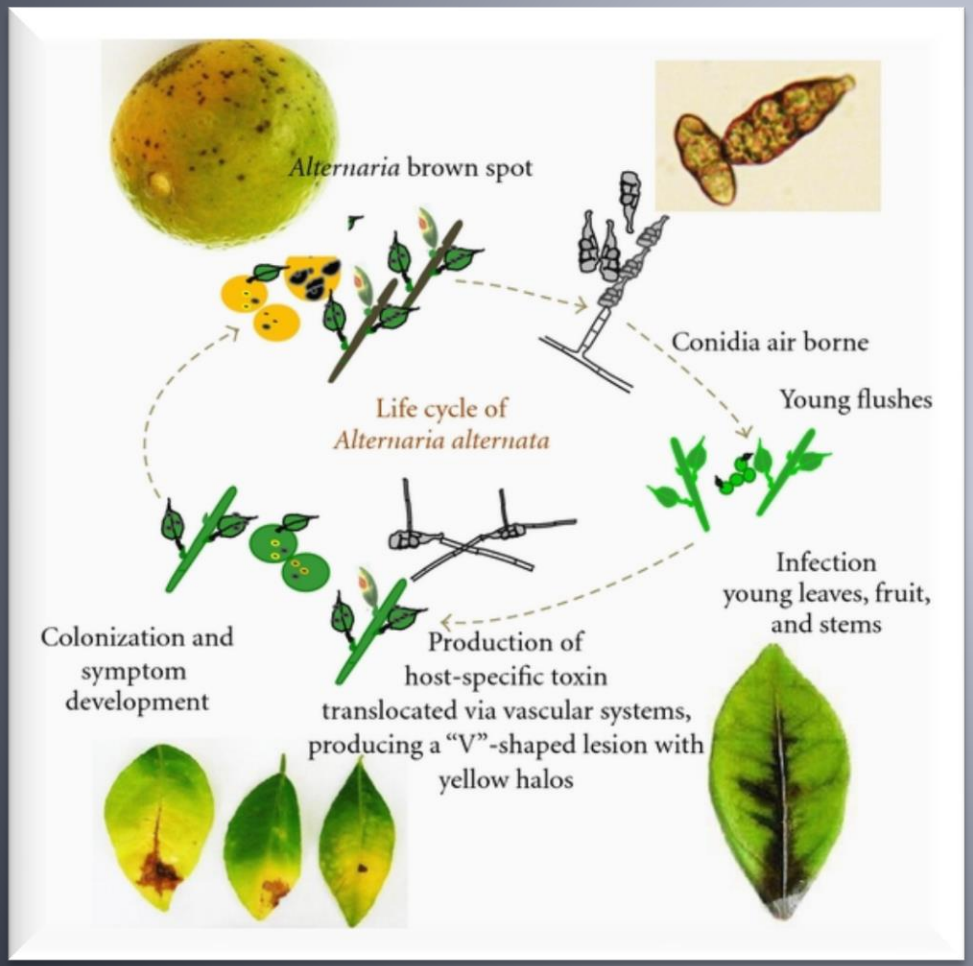
Outdoor Mold
(Alternaria)



Mold spores (Mar – Nov)

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Environmental Pollution

Harmful substances and emissions from industry, factories, buses, etc. can pollute the air, contributing to global warming and its associated health consequences.

Pollution is common in Inner-Cities, especially in densely populated areas and can trigger asthma.

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Other Common Triggers

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Other Common Triggers

- Medications like aspirin and NSAIDS
- Sulfites in food products (wine, dried fruits, packaged products)
- Clutter

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Managing Asthma?

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Managing Asthma

While a complex relationship exits between asthma severity and control of asthma, recent research clearly demonstrates:

- Optimal asthma management requires a multi-pronged approach.
- Improved disease management utilizing medication and environmental control results in improved asthma outcomes for all age groups.

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Managing Asthma
Multi-Pronged Approach

Involves:

- Asthma Severity / Control
- Asthma Medications
- Lung Function & Peak Flow Monitoring
- Asthma Action Plan
- Environmental Control

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Diagnosing Asthma

Sometimes diagnosing asthma can be straightforward, other times it involves investigation:

- Medical history
- Physical exam
- Spirometry
- Other test (chest X-ray, methacholine challenge, and others)

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Staging Asthma Severity

Expert Panel Report I (1991)

- Mild Asthma
- Moderate Asthma
- Severe Asthma

Expert Panel Report II (1991)

- Mild Intermittent Asthma
- Mild Persistent Asthma
- Moderate Persistent Asthma
- Severe Persistent Asthma

National Asthma Education and Prevention Program

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Classification of Asthma Symptoms

Mild Persistent	Asthma symptoms occur infrequently, ≤ twice a week. Nighttime awakenings occur ≤ twice a month. Peak flow is within the normal range (more than 80% of the average normal value for persons of the same age, height, and gender). Asthma flare-ups are relatively brief (lasting less than an hour) and infrequent.
Mild Intermittent	Asthma symptoms occur > twice a week but < than every day. Nighttime awakenings occur > twice a month, but < every week. Peak flow is usually within the normal range. Asthma attacks may interfere with normal activities.
Moderate Persistent	Daily asthma symptoms, daily use of the quick-acting bronchodilator for relief of asthma symptoms. Nighttime awakenings occur > once a week. Peak flow is reduced, as low as 60% of normal. Exacerbations may occur two or more times/week and may last for days.
Severe Persistent	Continual asthma symptoms with frequent nighttime awakenings due to asthma. Breathing tests (peak flow) are < 60% of normal and vary by > 30% over the course of the day. Asthma flare-ups are very common, perhaps several times a day.

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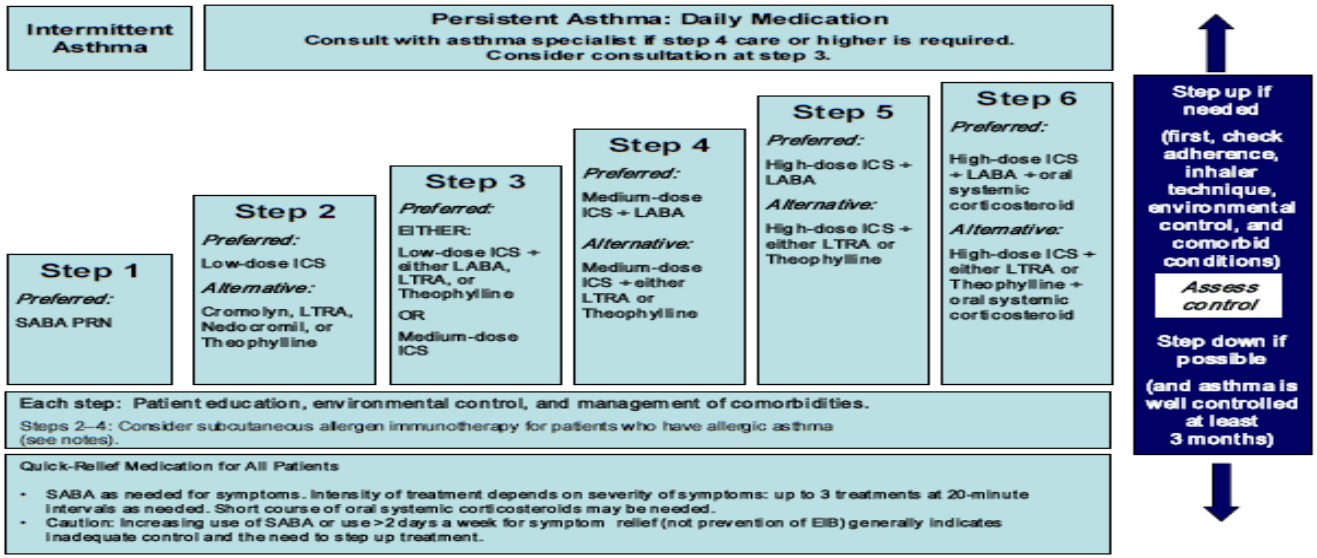
Adapted from, *Guide to Asthma*, Fata, C.H. 2003.

2008
Stepwise Approach for Managing Asthma in Children 5-11 Years of Age

FIGURE 4–1b. STEPWISE APPROACH FOR MANAGING ASTHMA IN CHILDREN 5–11 YEARS OF AGE

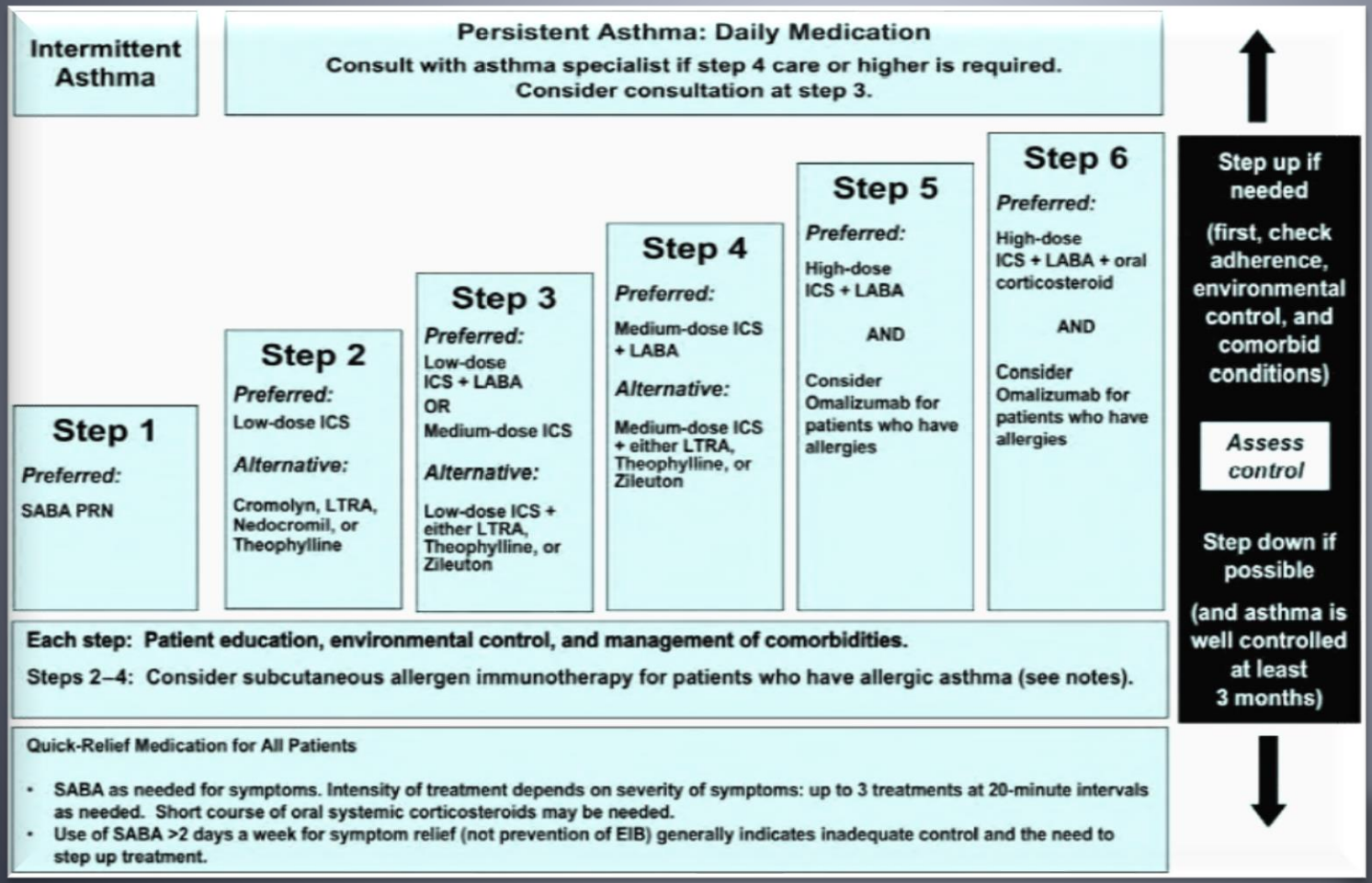


Key: **Alphabetical order is used when more than one treatment option is listed within either preferred or alternative therapy.** ICS, inhaled corticosteroid; LABA, inhaled long-acting beta$_2$-agonist, LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta$_2$-agonist

Notes:

- The stepwise approach is meant to assist, not replace, the clinical decisionmaking required to meet individual patient needs.
- If alternative treatment is used and response is inadequate, discontinue it and use the preferred treatment before stepping up.
- Theophylline is a less desirable alternative due to the need to monitor serum concentration levels.
- Step 1 and step 2 medications are based on Evidence A. Step 3 ICS + adjunctive therapy and ICS are based on Evidence B for efficacy of each treatment and extrapolation from comparator trials in older children and adults—comparator trials are not available for this age group; steps 4–6 are based on expert opinion and extrapolation from studies in older children and adults.
- Immunotherapy for steps 2–4 is based on Evidence B for house-dust mites, animal danders, and pollens; evidence is weak or lacking for molds and cockroaches. Evidence is strongest for immunotherapy with single allergens. The role of allergy in asthma is greater in children than in adults. Clinicians who administer immunotherapy should be prepared and equipped to identify and treat anaphylaxis that may occur.

2008
Stepwise Approach for Managing Asthma in Youths ages 12+ and Adults



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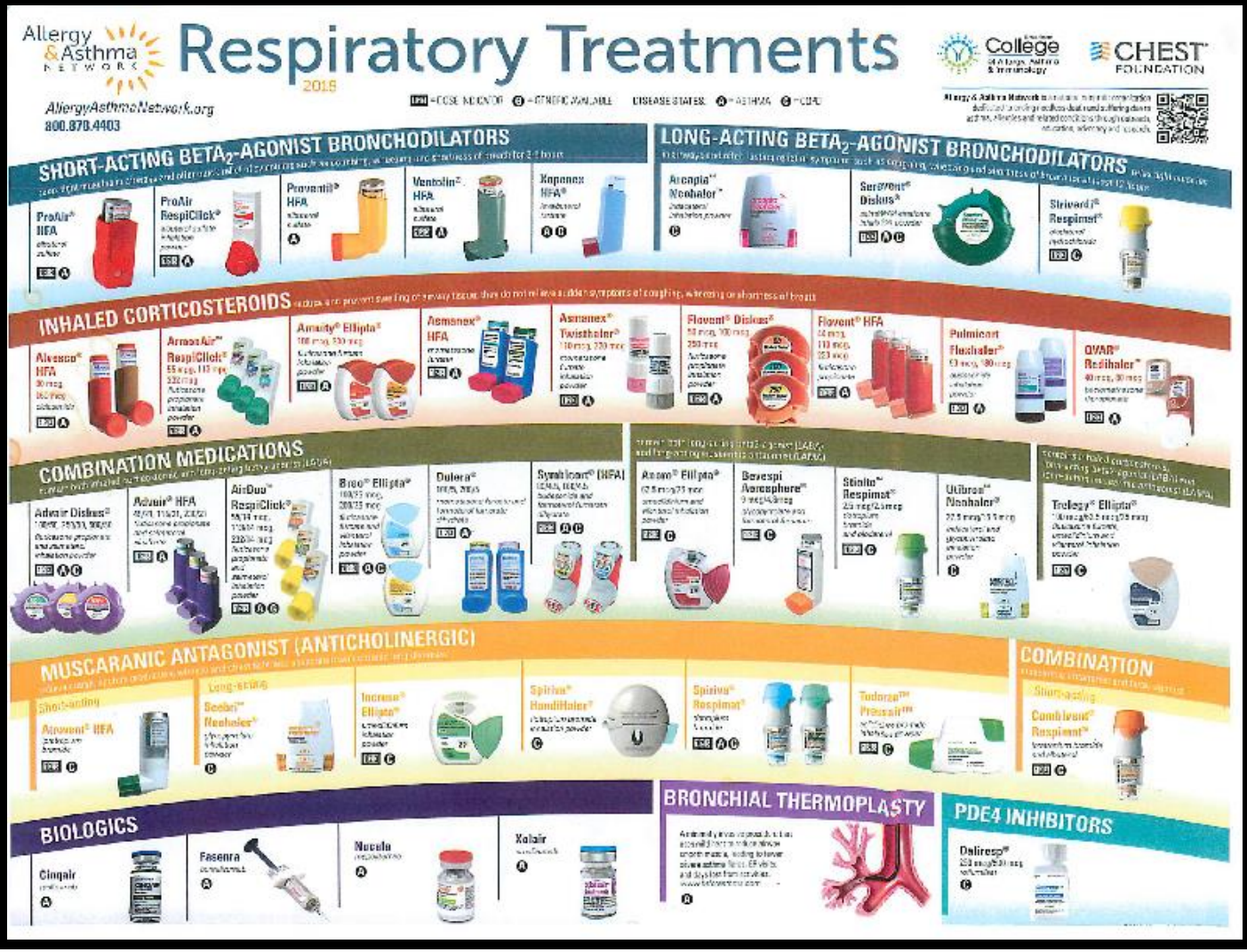
Asthma Management (Medication)

Bronchodilators (relievers/rescue)

- Short-acting bronchodilator

Antiinflammatories (controllers)

- Inhaled corticosteroids
- Long-acting bronchodilators
- Leukotriene modifiers
- Theophyllines
- Biologics (anti-IgE therapy)



Respiratory Inhalers

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New Devices

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Biologics

Biologics are reserved for difficult to treat asthma and do not always work for everyone. Current biologics approved for use in the treatment of difficult to control asthma include:

- Omalizumab **(Xolair)**
  Binds with free IGG
  Approved for ≥ 6 yrs
- Benralizumab **(Fasenra)**
  For severe eosinophilic asthma, ≥ 12 yrs
  Given every 4 weeks x 3, then every 8 weeks
- Mepolizumab **(Nucala)**
  For severe eosinophilic asthma
  Approved for ≥ 12 yrs
- Reslizumab **(Cinqair)**
  Approved for ≥ 18 years old with severe asthma
  20 minute IV infusion

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Nebulizers

Nebulizers area used to deliver asthma medication in a mist form

Pulmicort Respules

Mask

Tubing

Compressor

Nebulizer

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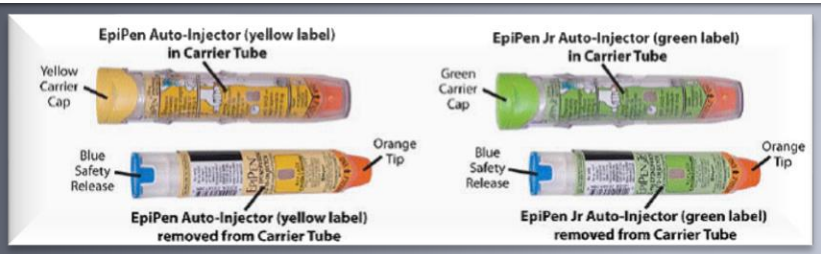
Asthma Management (Epi-Pen and Epi-Pen Jr.)



- Disposable, pre-filled automatic injection devices with a single dose of epinephrine for **allergic emergencies**. (Requires a prescription)
- If an individual shows signs or symptoms of an allergic emergency, inject the prescribed EpiPen or EpiPen Jr. immediately, then call 911 and seek immediate medical attention.

Signs of an allergic emergency may include:

*closing of the airways

*Swelling of the lips and tongue

* Numbness/tingling of the lips and tongue

*Itching

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Asthma Management
Lung Function and Peak Flow Monitoring

- The ***Peak Flow Meter*** is a device used to measures how fast air comes out of the lungs
- **Used to**: diagnose asthma, assess asthma severity, and track changes in asthma symptoms and asthma medications
- The *Personal Best Number,* determined by age, height, and gender, is needed when monitoring lung function

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Asthma Management

Normal Peak Flow Values in Children

Height (cm)	Height (in)	Height (ft+in)	Predicted (L/min)	Green zone (80-100%)		Yellow zone (50-79%)		Red Zone (< 50%)
109	43	3'7"	147	118	147	74	117	<74
112	44	3'8"	160	128	160	80	127	<80
114	45	3'9"	173	138	173	87	137	<87
117	46	3'10"	187	150	187	94	149	<94
119	47	3'11"	200	160	200	100	159	<100
122	48	4'	214	171	214	107	170	<107
124	49	4'1"	227	182	227	114	181	<114
127	50	4'2"	240	192	240	120	191	<120
130	51	4'3"	254	203	254	127	202	<127
132	52	4'4"	267	214	267	134	213	<134
135	53	4'5"	280	224	280	140	223	<140
137	54	4'6"	293	234	293	147	233	<147
140	55	4'7"	307	246	307	154	245	<154
142	56	4'8"	320	256	320	160	255	<160
145	57	4'9"	334	267	334	167	266	<167
147	58	4'10"	347	278	347	174	277	<174
150	59	4'11"	360	288	360	180	287	<180
152	60	5'	373	298	373	187	297	<187
155	61	5'1"	387	310	387	194	309	<194
157	62	5'2"	400	320	400	200	319	<200
160	63	5'3"	413	330	413	207	329	<207
163	64	5'4"	427	342	427	214	341	<214
165	65	5'5"	440	352	440	220	351	<220
168	66	5'6"	454	363	454	227	362	<227
170	67	5'7"	467	374	467	234	373	<234

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Personal Best Number

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Asthma Management

Normal Peak Flow Values in Adults

WOMEN

Age	Height				
	55″	60″	65″	70″	75″
20	390	423	460	496	529
25	385	418	454	490	523
30	380	413	448	483	516
35	375	408	442	476	509
40	370	402	436	470	502
45	365	397	430	464	495
50	360	391	424	457	488
55	355	386	418	451	482
60	350	380	412	445	475
65	345	375	406	439	468
70	340	369	400	432	461

MEN

Age	Height				
	60″	65″	70″	75″	80″
20	554	602	649	693	740
25	543	590	636	679	725
30	532	577	622	664	710
35	521	565	609	651	695
40	509	552	596	636	680
45	498	540	583	622	665
50	486	527	569	607	649
55	475	515	556	593	634
60	463	502	542	578	618
65	452	490	529	564	603
70	440	477	515	550	587

PEAK FLOW VALUES IN LITERS/MINUTE

These values are the normal average values for individuals of a given age, and height.

Click here to calculate a "normal" value for a healthy person of a given age and height.

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Asthma Action Plan (AAP)

Massachusetts Asthma Action Plan

Name:		Date:
Birth Date:	Doctor/Nurse Name:	Doctor/Nurse Phone #:
Patient Goal:		Parent/Guardian Name & Phone:
Important! Avoid things that make your asthma worse:		

Personal Best Peak Flow: _____

The colors of a traffic light will help you use your asthma medicine.

Green means **Go Zone!** Use controller medicine.

Yellow means **Caution Zone!** Add quick-relief medicine.

Red means **Danger Zone!** Get help from a doctor.

GO – You're Doing Well! ➡ Use these daily controller medicines:

You have *all* of these:
- Breathing is good
- No cough or wheeze
- Sleep through the night
- Can go to school and play

Peak flow from _____ to _____

MEDICINE/ROUTE	HOW MUCH	HOW OFTEN/WHEN

CAUTION – Slow Down! ➡ Continue with green zone medicine and add:

You have *any* of these:
- First signs of a cold
- Cough
- Mild wheeze
- Tight Chest
- Coughing, wheezing, or trouble breathing at night

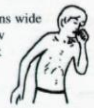
Peak flow from _____ to _____

MEDICINE/ROUTE	HOW MUCH	HOW OFTEN/WHEN

CALL YOUR DOCTOR/NURSE: _____

DANGER – Get Help! ➡ Take these medicines and call your doctor now.

Your asthma is getting worse fast:
- Medicine is not helping
- Breathing is hard and fast
- Nose opens wide
- Ribs show
- Can't talk well



Peak flow from _____ to _____

MEDICINE/ROUTE	HOW MUCH	HOW OFTEN/WHEN

GET HELP FROM A DOCTOR NOW! Do not be afraid of causing a fuss. Your doctor will want to see you right away. It's important! If you cannot contact your doctor, go directly to the emergency room and bring this form with you. DO NOT WAIT.

Make an appointment with your doctor/nurse within two days of an ER visit or hospitalization.

Doctor/NP/PA Signature: _____ Date: _____

I give permission to the school nurse, my child's doctor/NP/PA or _____ to share information about my child's asthma.

Parent/Guardian Signature: _____ Date: _____

****SEE BACK OF SCHOOL COPY FOR STUDENT MEDICATION ADMINISTRATION AUTHORIZATION****

ADAPTED FROM NIH PUBLICATION (7/20/01)

White Copy: Patient/Parent Green Copy: Provider Yellow Copy: School/Other

Asthma Management

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Asthma Management
Environmental Control

Consideration in the School Environment

- Allergen avoidance measures
- Integrated pest management (IPM)
- Environmental tobacco smoke (ETS)

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Reducing Dust Mite Exposure

- Wash or remove stuffed animals
- Remove upholstered furniture from the classroom
- Use scatter/area rugs in place of large carpeting
- Use a HEPA filter air cleaner if possible

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Reducing Animal Dander Exposure

- Airborne pet allergens increase fivefold when the pet is in a room
- Removal of the animal is the most effective measure
- Keep furry animal out of the classroom
- HEPA filter air cleaners can reduce the airborne concentrations pet allergens

Reducing ETS

- Important to adopt a smoke free environment in schools.

  Use strong, personalized message:

  "Quitting smoking is the best thing you can do for your health and the health of your family"

- Encourage staff and others who smoke to quit.
- Make available information on smoking cessation programs where appropriate.
- Increase ventilation in schools

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Reducing Pests Exposure

Integrated Pest Management (IPM)

Prevention-based approach to controlling cockroaches, rodents and/or other pests known to trigger asthma.

IPM measures include:

- Sealing all cracks in walls, floors and ceiling (sites of entry for pests)
- Using traps (roach motel, mice traps, bait, etc.)
- Eliminating food and water supply
- Keeping food or snacks in airtight containers
- Ensure trash cans are emptied daily

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Reducing Fumes and Strong Odors

- Avoid using cleaning products with strong odors.
- Avoid using perfumes, scented lotions, hairsprays around allergic individuals.
- Avoid air fresheners, plug-ins and other scented materials in the classroom.
- Avoid arts and crafts materials with fragrances and fumes.

Alternatively:

- Use green cleaners subscribed by BPS
- Use natural air fresheners (i.e. white vinegar and water, lemon juice and water)

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Reducing Mold Exposure

- Limit plants in the classroom.
- HEPA filters can be used to remove particles from the air.
- Increase ventilation in areas where mold is an issue.
- Use non-toxic cleaner and/or 5% bleach solution (non-chlorine bleach and water) for cleaning mild mold issues.

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Improving Indoor Air Quality

- Use HEPA air cleaners to remove particles from the air.
- Ensure HVAC systems are maintained regularly.
- Increase ventilation in areas where mold is an issue.
- Use non-toxic cleaners.
- Use non-toxic pest control measures as with IPM instead of chemical agents for issues of pest infestation.
- Use non-toxic school supplies.

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Reducing Pollen Exposure

- Keep windows closed on peak pollen days, use air conditioner as necessary. See www.pollen.com for daily pollen count.
- A HEPA air cleaner will remove pollen that has entered the school.
- Conduct lawn/garden maintenance when children are not in school.

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Use clear storage bins to store school supplies.

- Recycle, Recycle, Recycle!

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Source: www.unclutter.com

Recycling

Adopt a school-wide recycling program

- Ensure recycling receptacles are appropriately marked, i.e. paper, plastic, cardboard, etc.
- Place recycle bins in a visible and convenient area to encourage use.
- Encourage staff and students to play their part in recycling activities.

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Case Study
Nyssa

Nyssa is in the 5th grade now and very excited to be back in school this year. Last year, her 5th grade teacher told her she would have the opportunity to spend time with her helping out the 3rd and 4th graders with reading and during recess. Nyssa was looking forward to it all summer long.

As the school year got underway, Nyssa received her “duties” for the school year. She was to read exciting books, both old and new to the 3rd grade students as well as help out with play at recess with the 4 grade students. Nyssa continued with her “duties” but 1-2 times a week (usually on Tuesday and Friday) she ended up in the nurses office with shortness of breath and wheezing, needing to use her inhaler.

Case Study
What is going on?

Q1. What could be causing Nyssa's symptoms?

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Case Study
Let's Investigate?

Q1. What do we know?

Q2. What is happening on Tuesdays and Fridays?

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Case Study
Let's Investigate?

On Tuesday Nyssa participates in huddle reading with the 3rd grade students. She enjoys sitting in the reading area because it is cozy with the soft carpet and pillows. The children also enjoys watching the hamster run around on its wheel. However, after beginning to read one of her favorite books, her throat begins to itch. By the time she finishes the book, she has to go to nurse's office where she receives a nebulizer treatment.

On Thursday, Nyssa leads the 4th grade class in play activities outside. She enjoys running around playing tag and leap frog and other games with the children. However, with-in a 10 min she almost always begins to feel tired and has to stop. Even after resting for a few minutes it is hard for her to catch her breath and she ends up in the nurse's office with a nebulizer treatment.

Case Study Discovery?

Q2. What could be causing Nyssa's symptoms?

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Case Study Action!

- Review AAP and asthma medications
- Contact Parent, Physician
- Encourage Nyssa to use a PFM, review numbers
- Remove class pet from reading area
- Ensure area rugs are cleaned often
- Encase pillow in hypoallergenic covers
- Remove dust in reading area, especially the old books

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Summary

- Asthma is a chronic disease of the airways in the lung
- Asthma has two parts:
  - Inflammation
  - Bronchospasm
- Asthma cannot be cured but can be treated and controlled

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Summary

Asthma attacks are caused by triggers such as:

- Dust
- Mold
- Mice, cockroaches
- Dander
- Cleaning Products
- Cigarette Smoke

Optimal asthma management involve:

- Medication use
- Proper environmental changes
- Peak flow monitoring
- Use of an asthma action plan

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Can you "Outgrow" Asthma?

- No, asthma is a ***chronic disease***, which means it is always there.
- Asthma symptoms may come and go over time, but the condition of asthma is always there.
- Some young children may experience less asthma symptoms as they get older, but recurrence of asthma is typical, especially in children with severe asthma.
- Remission of adult asthma is rare (<10%).

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Helpful Links

1. Boston Public Health Commission(BPHC) www.bphc.org/bahvc
2. Breathe Easy Program – BPHC www.cityofboston.gov/isd
3. Partners Asthma Center (PAC) – Brigham and Women's Hospital www.asthma.partners.org

American Academy of Allergy, Asthma, & Immunology
American College of Allergy, Asthma
American Lung Association
Asthma and Allergy Foundation of America
National Institutes of Health
The National Heart, Lung and Blood Institute

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Asthma and Allergy Foundation of America New England Chapter

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