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# Asthma Update

- Asthma Coalition of Los Angeles County
- April 28, 2014
- Los Angeles, CA


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- *www.uclahealth.org/pedspulmonology*


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# Outline

1. Review of asthma statistics.

2. Discuss the National Institutes of Health criteria for diagnosing asthma.

3. Understand how to use an asthma questionnaire to measure asthma control.

3. Identify the causes of uncontrolled asthma in children.

# Far-Reaching Effects of Asthma in Children

- Most common chronic disease of childhood (9.6%)
- 7.1 million children
- Most frequent cause of school absenteeism
  - 14 million days
  - 60% missed ≥1 school day
- $3 billion dollars in costs

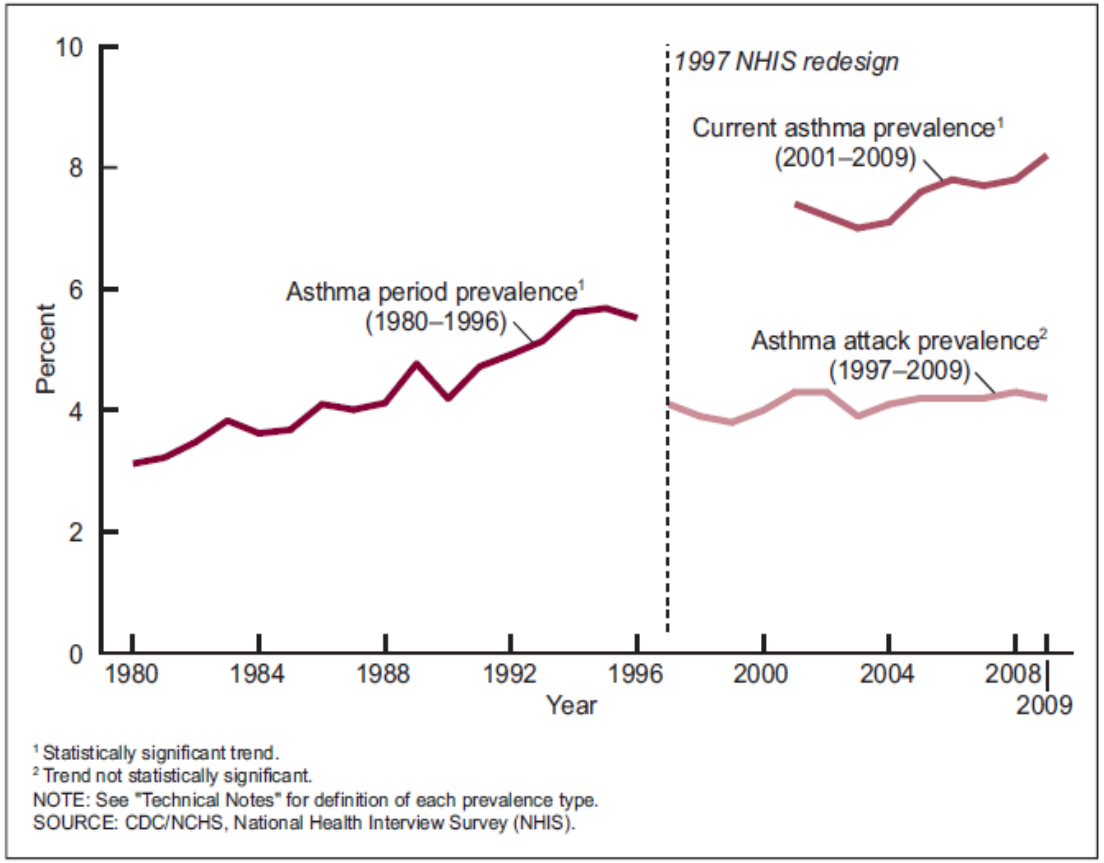


**Figure 1. Asthma period prevalence, asthma attack prevalence, and current asthma prevalence for all ages: United States, 1980–2009**

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Nat'l Health Statistics Report 2011:vol 32

L Werk Pediatrics 2000;105:585
R Adams Pediatrics 2001;107:706

# Asthma Statistics in Children

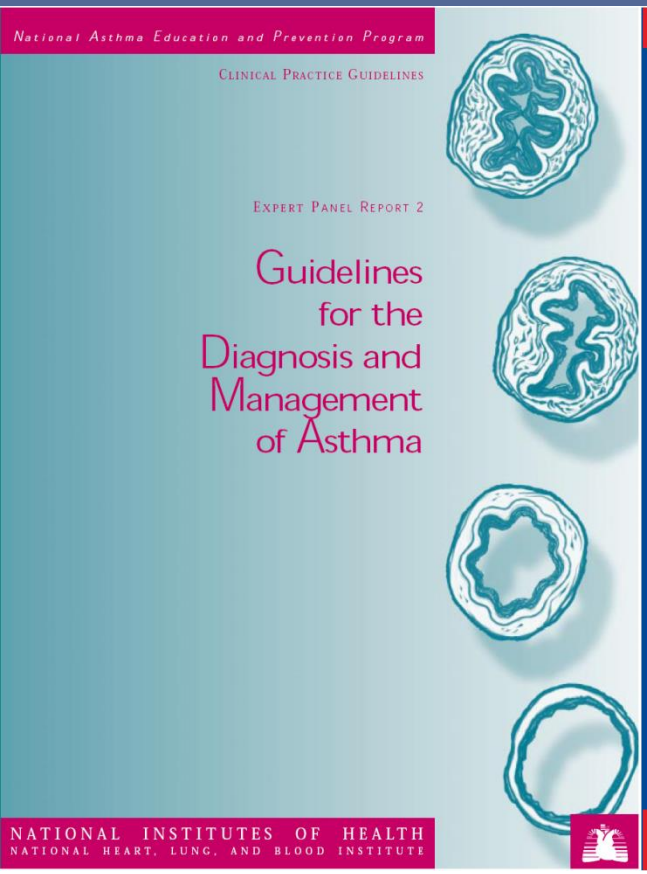
- 52% with an asthma attack in last 12 months
- 7,500,000 ambulatory visits for asthma per year
  - 60% of children with asthma
- 640, 000 ED visits for asthma per year
  - 7.5% of children with asthma
- 157,000 hospitalizations per year
  - 1.4% of children with asthma
- 186 deaths per year

LJ Akinbami Vital & Health Statistics Dec 12, 2006;381

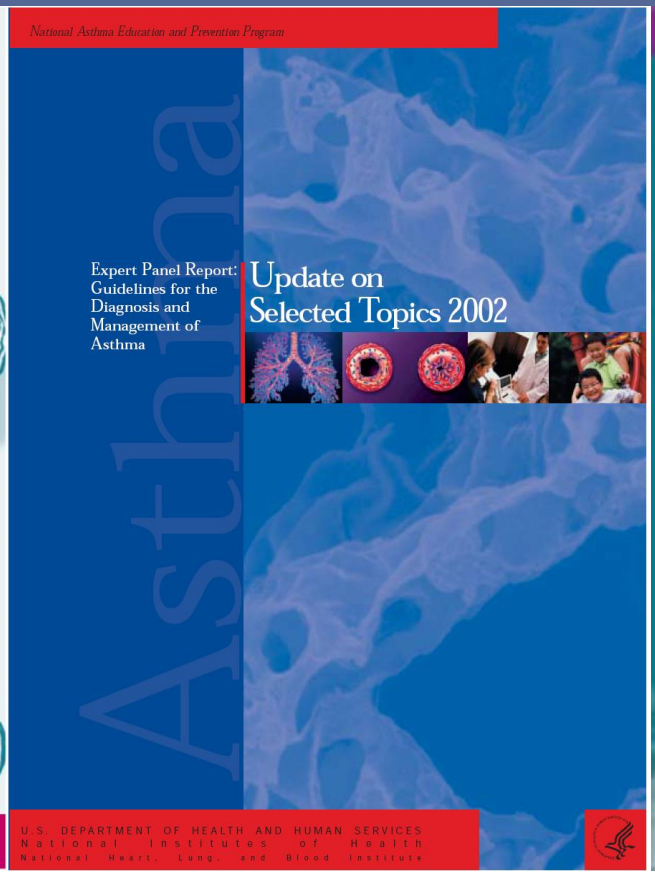
LJ Akinbami Nat'l Health Statistics Report 2011:vol 32

# Diagnosis

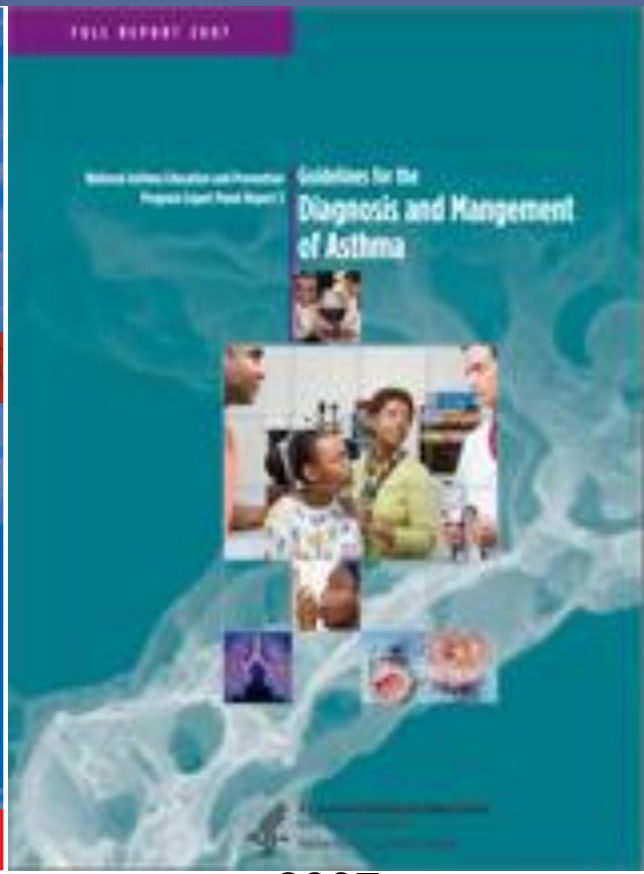
# NIH Asthma Guidelines: Expert Panel Reports: Systematic Review of Evidence + Expert Opinion




1991




2002




2007

http://www.nhlbi.nih.gov/guidelines/asthma/

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- What are the NIH diagnostic criteria for asthma?

## KEY POINTS: DIAGNOSIS OF ASTHMA

- To establish a diagnosis of asthma, the clinician should determine that (EPR—2 1997):
  - Episodic symptoms of airflow obstruction or airway hyperresponsiveness are present.
  - Airflow obstruction is at least partially reversible.
  - Alternative diagnoses are excluded.
- Recommended methods to establish the diagnosis are (EPR—2 1997):
  - Detailed medical history.
  - Physical exam focusing on the upper respiratory tract, chest, and skin.
  - Spirometry to demonstrate obstruction and assess reversibility, including in children 5 years of age or older. Reversibility is determined either by an increase in $FEV_1$ of ≥12 percent from baseline or by an increase ≥10 percent of predicted $FEV_1$ after inhalation of a short-acting bronchodilator.
  - Additional studies as necessary to exclude alternate diagnoses.

# Key Indicators to Diagnosis of Asthma

**BOX 3–1. KEY INDICATORS FOR CONSIDERING A DIAGNOSIS OF ASTHMA**

Consider a diagnosis of asthma and performing spirometry if any of these indicators is present.* These indicators are not diagnostic by themselves, but the presence of multiple key indicators increases the probability of a diagnosis of asthma. Spirometry is needed to establish a diagnosis of asthma.

- Wheezing—high-pitched whistling sounds when breathing out—especially in children. (Lack of wheezing and a normal chest examination do not exclude asthma.)
- History of any of the following:
  - Cough, worse particularly at night
  - Recurrent wheeze
  - Recurrent difficulty in breathing
  - Recurrent chest tightness
- Symptoms occur or worsen in the presence of:
  - Exercise
  - Viral infection
  - Animals with fur or hair
  - House-dust mites (in mattresses, pillows, upholstered furniture, carpets)
  - Mold
  - Smoke (tobacco, wood)
  - Pollen
  - Changes in weather
  - Strong emotional expression (laughing or crying hard)
  - Airborne chemicals or dusts
  - Menstrual cycles
- Symptoms occur or worsen at night, awakening the patient.

*Eczema, hay fever, or a family history of asthma or atopic diseases are often associated with asthma, but they are not key indicators.

# Breathmobile Screening Questionnaire

## Strongly consider asthma if any response is "yes"

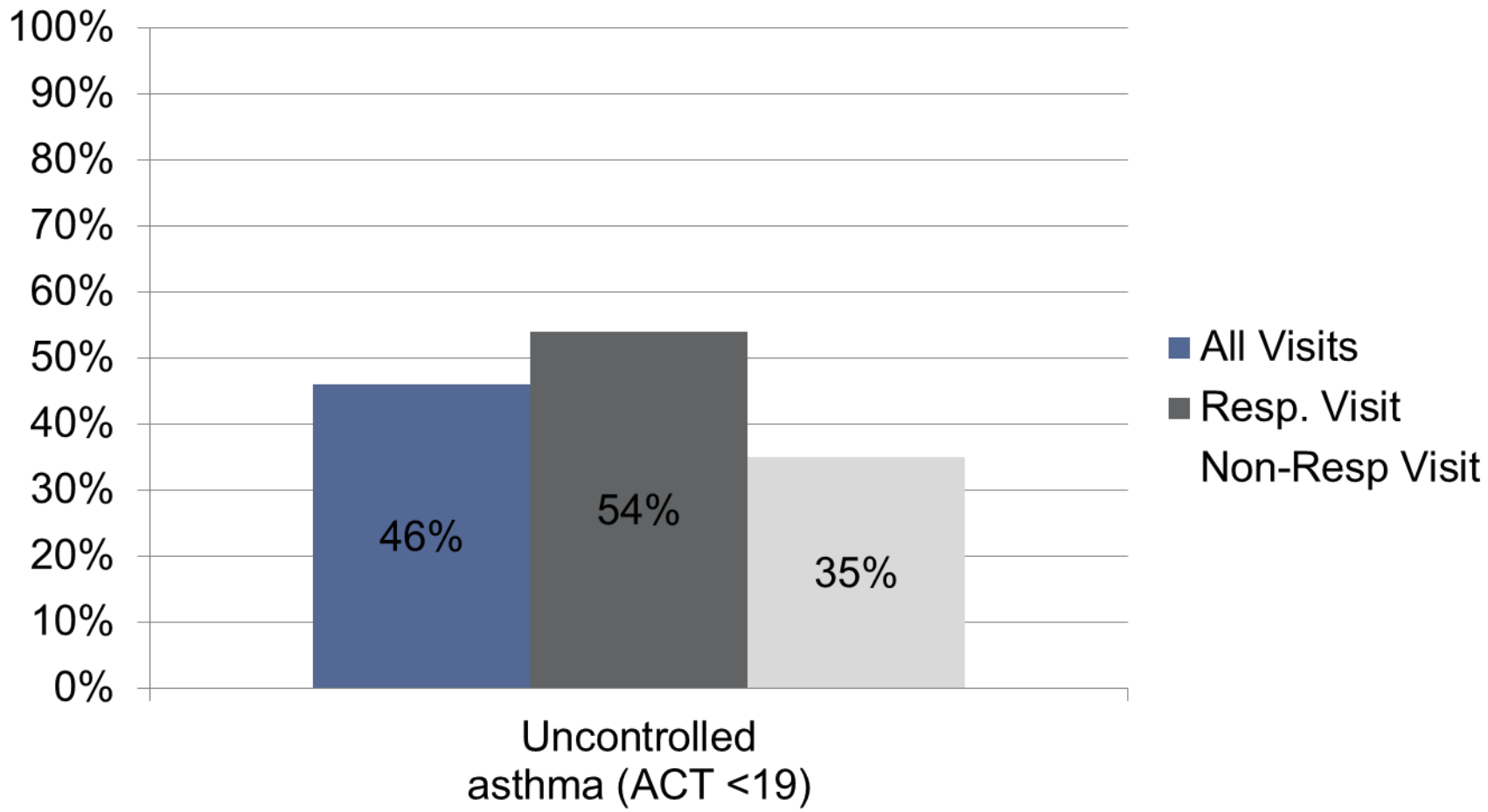
| | | | |
|---|---|---|---|
| During the past 1 – 2 years, has your child had ***repeated*** episodes of coughing, wheezing, chest tightness or trouble breathing? | **YES** | **NO** | **NOT SURE** |
| Does your child have coughing, wheezing, chest tightness, or trouble breathing when they **play or exercise**? | **YES** | **NO** | **NOT SURE** |
| In the last year has your child **missed school** because of coughing, wheezing, chest tightness, or trouble breathing? | **YES** | **NO** | **NOT SURE** |
| In the **past month** has your child had coughing, wheezing, chest tightness, or trouble breathing in the **daytime**? | **YES** | **NO** | **NOT SURE** |
| In the past month has your child had coughing, wheezing, chest tightness, or trouble breathing **at nighttime or with sleep**? | **YES** | **NO** | **NOT SURE** |
| Have you ever been **told by a doctor** that your child has **asthma**? | **YES** | **NO** | **NOT SURE** |
| Have you ever been **told by a doctor** that your child has **bronchitis**? | **YES** | **NO** | **NOT SURE** |

# Assessment

# The goal of every clinical encounter with an asthma patient is to answer the question:

- Is Asthma Controlled?

# Uncontrolled asthma common despite type of visit (n = 2, 429 children at 29 practices)

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AH Liu J Peds 2010;157:276 - 281

# How can we reliably completely assess asthma control?

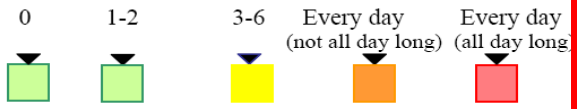
- Use  validated asthma questionnaires
- When?
- At every clinical encounter (e.g., well child care, sick visit)
- Why?
  - Better information
  - Consistent approach
  - Efficient retrieval of information
  - Reimbursement (HPI elements; time counseling)
  - Focus on other important tasks

# Pediatric Asthma Control & Communication Instrument

## Asthma Symptoms

7. Over the **past week**, how many days has your child had asthma symptoms? For example:

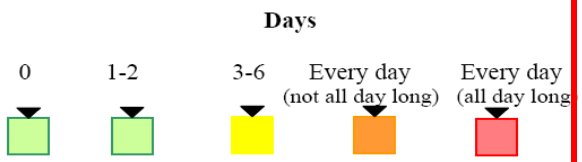
▪ Cough ▪ Chest tightness ▪ Shortness of breath ▪ Sputum (spit, mucous, phlegm when coughing) ▪ Difficulty taking a deep breath ▪ Wheezy or whistling sound in the chest




## Reliever use

8. Over the **past week**, how many days have you had to give your child medicine to quickly relieve asthma symptoms? For example:

▪ Albuterol ▪ Inhaler ▪ Spray ▪ Pump ▪ Machine ▪ Nebulizer



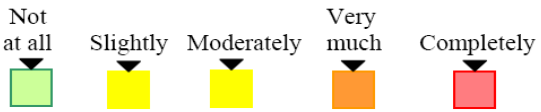

## Attacks

9. Over the **past week**, how many days did your child have an asthma attack? For example:

▪ When it is harder for your child to breathe
▪ When you give your child more asthma medicine
▪ When the asthma medicine does not work


## Activity Limitation

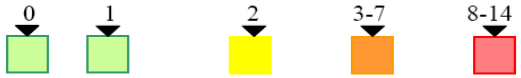
10. Over the **past week**, how much has asthma limited your child's activities?




## Nighttime Symptoms

11. Now for this question, please answer about the past 2 weeks.

How many nights did **your child's asthma** keep your child from sleeping or wake him/her up in the past 2 weeks?




**For clinician use only – Asthma Control Assignment**
Assign patient's current level of asthma control by looking at box checked farthest to the right on questions 7-11 and match color of this box to level of asthma control in this section and circle and/or document in patient's chart

## Pediatric Asthma Control & Communication Instrument

### Asthma Symptoms

7. Over the **past week**, how many days has your child had asthma symptoms? For example:

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Days

| 0 | 1-2 | 3-6 | Every day (not all day long) | Every day (all day long) |
|---|---|---|---|---|
| | | | | X |

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### Attacks

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▪ When it is harder for your child to breathe
▪ When you give your child more asthma medicine
▪ When the asthma medicine does not work

Days

| 0 | 1 | 2-3 | 4-7 |
|---|---|---|---|
| | | X | |

### Activity Limitation

10. Over the **past week**, how much has asthma limited your child's activities?

| Not at all | Slightly | Moderately | Very much | Completely |
|---|---|---|---|---|
| X | | | | |

### Nighttime Symptoms

11. Now for this question, please answer about the past 2 weeks.

How many nights did **your child's asthma** keep your child from sleeping or wake him/her up in the past 2 weeks?

Nights

| 0 | 1 | 2 | 3-7 | 8-14 |
|---|---|---|---|---|
| | | X | | |

**For clinician use only – Asthma Control Assignment**
Assign patient's current level of asthma control by looking at box checked farthest to the right on questions 7-11 and match color of this box to level of asthma control in this section and circle and/or document in patient's chart

| Mild intermittent | Mild persistent | Moderate persistent | Severe persistent |
|---|---|---|---|
| | | | X |
| Controlled | Not Controlled | | |

1. Sum Score: 4 + 2 + 2 + 0 + 2 = 10

higher score = worse control

2. Problem Index: 1 + 1 + 1 + 0 + 1 = 4

higher count = worse control

3. **NHLBI categories**

**severe persistent asthma**

4. Controlled or

Not Controlled

# Is Asthma Controlled?

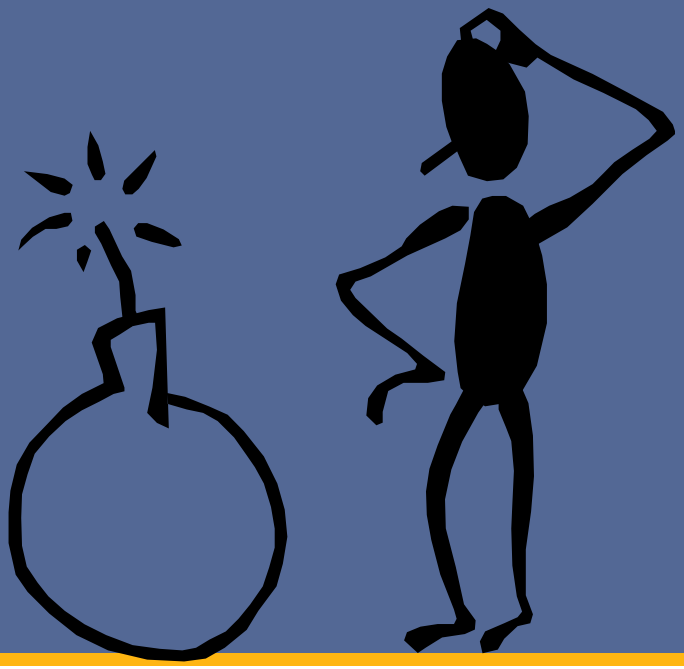
- Yes—do nothing or step-down treatment
  - Follow-up in 1 – 6 months
- No—work through causes of uncontrolled asthma
  - Follow-up in 2 – 6 weeks

# What are the causes of uncontrolled asthma?

# What are the causes of uncontrolled asthma?

- Non-adherence
- Poor inhaler technique
- Environmental exposures
  - Tobacco smoke
- Co-morbidities
  - Allergic rhinitis
  - Obesity
  - Sinusitis
- Under-treatment (need to step-up treatment)

# What can be done?

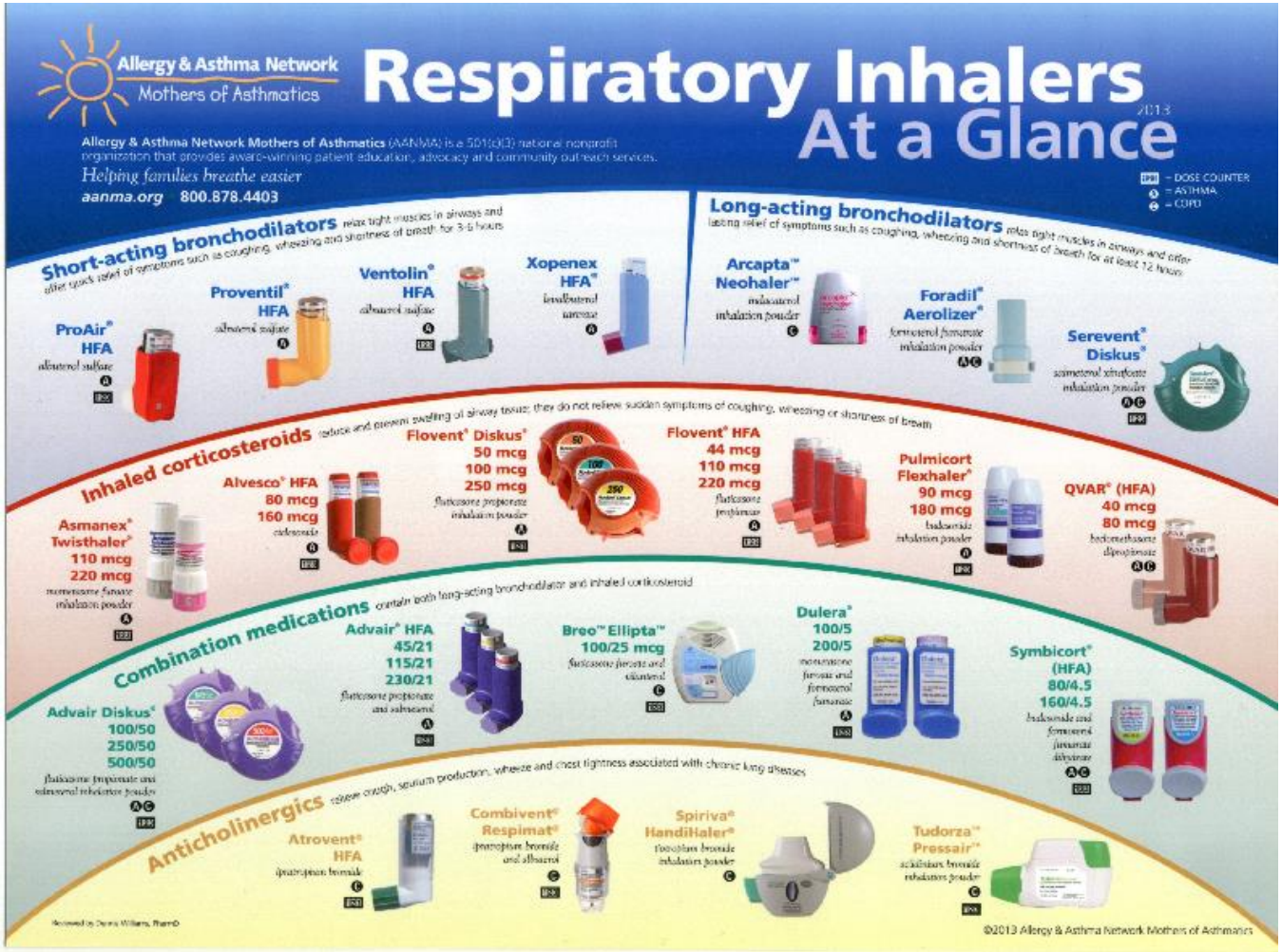


# Adherence Solutions

**Mistaken**

**Non-adherence**

- Provide & review written treatment plan at each visit
- Ask patient to repeat dosing instructions
- Review device technique
- Provide asthma education
- Encourage accessing social support


Allergy & Asthma Network
Mothers of Asthmatics
Respiratory Inhalers At a Glance
2013
Allergy & Asthma Network Mothers of Asthmatics (AANMA) is a 501(c)(3) national nonprofit organization that provides award-winning patient education, advocacy and community outreach services.
Helping families breathe easier
aanma.org 800.878.4403
DPI = DOSE COUNTER
A = ASTHMA
C = COPD
Short-acting 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® HFA albuterol sulfate A DPI
Proventil® HFA albuterol sulfate A
Ventolin® HFA albuterol sulfate A DPI
Xopenex HFA® levalbuterol tartrate A
Long-acting bronchodilators relax tight muscles in airways and offer lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours
Arcapta™ Neohaler™ indacaterol inhalation powder C
Foradil® Aerolizer® formoterol fumarate inhalation powder A C
Serevent® Diskus® salmeterol xinafoate inhalation powder A C DPI
Inhaled corticosteroids reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath
Asmanex® Twisthaler® 110 mcg 220 mcg mometasone furoate inhalation powder A DPI
Alvesco® HFA 80 mcg 160 mcg ciclesonide A DPI
Flovent® Diskus® 50 mcg 100 mcg 250 mcg fluticasone propionate inhalation powder A DPI
Flovent® HFA 44 mcg 110 mcg 220 mcg fluticasone propionate A DPI
Pulmicort Flexhaler® 90 mcg 180 mcg budesonide inhalation powder A DPI
QVAR® (HFA) 40 mcg 80 mcg beclomethasone dipropionate A C DPI
Combination medications contain both long-acting bronchodilator and inhaled corticosteroid
Advair Diskus® 100/50 250/50 500/50 fluticasone propionate and salmeterol inhalation powder A C DPI
Advair® HFA 45/21 115/21 230/21 fluticasone propionate and salmeterol A DPI
Breo™ Ellipta™ 100/25 mcg fluticasone furoate and vilanterol C DPI
Dulera® 100/5 200/5 mometasone furoate and formoterol fumarate A DPI
Symbicort® (HFA) 80/4.5 160/4.5 budesonide and formoterol fumarate dihydrate A C DPI
Anticholinergics relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases
Atrovent® HFA ipratropium bromide C DPI
Combivent® Respimat® ipratropium bromide and albuterol C DPI
Spiriva® HandiHaler® tiotropium bromide inhalation powder C
Tudorza™ Pressair™ aclidinium bromide inhalation powder C DPI
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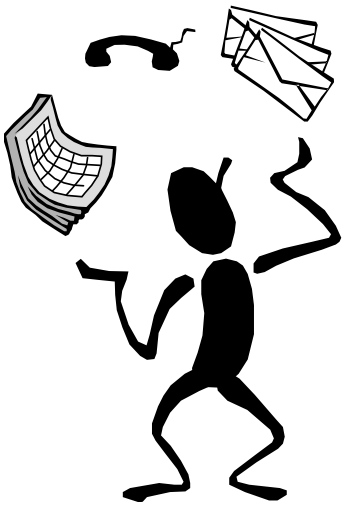
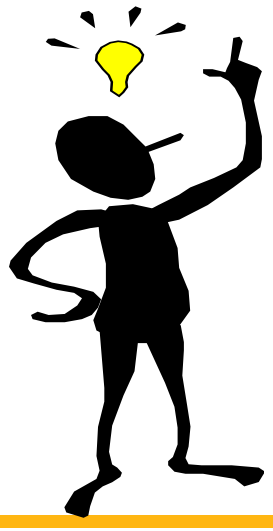
# Erratic Non-adherence



- **Query barriers & problem-solve**
- **Simplify & tailor regimen**
- **Behavioral strategies**
  - Self-monitoring (e.g. diaries)
  - Cueing (e.g. toothbrush, pillbox)
  - Reminders (e.g., cell phone)
  - Linking to established habits or pleasurable activities
- **Reinforcement**

# Intentional Non-adherence



- Include patient in decision-making
- Provide personalized feedback on relationship between adherence and health outcomes
- Provide asthma education
- Link therapy with personal goals

# Systematically Screen for Non-adherence

| | Forget to take medicine | | | | |
|---|---|---|---|---|---|
| 6. How often do you forget to give your child's daily asthma medicine when he/she feels fine?<br>Daily asthma medicines include: Aerobid, Advair, Asmanex, Azmacort, Budesonide, Flovent, QVAR, Pulmicort, Singulair, Symbicort | My child is not supposed to take a daily asthma medicine | None of the time | Some of the time 1-2 days/week | Most of the time 3-4 days/week | All of the time 5-7 days/week |

# Pharmacy Data for Medication Refills

| Fill Date | Drug Label Nar | Pharmacy Name | Pharı | Quant | Days Sup |
|---|---|---|---|---|---|
| 4/5/2009 | AMOXICILLIN 5 | WALGREENS 030 | FL | 14 | 7 |
| 4/5/2009 | PREDNISONE 1 | WALGREENS 030 | FL | 20 | 5 |
| 4/28/2009 | Fluticasone HF | CVS PHARMACY 0 | MD | 12 | 24 |
| 4/28/2009 | PREDNISOLON | CVS PHARMACY 0 | MD | 150 | 10 |
| 6/2/2009 | Fluticasone HF | CVS PHARMACY 0 | MD | 12 | 30 |
| 6/2/2009 | FLUTICASONE | GIANT PHARMAC | MD | 16 | 30 |
| 6/4/2009 | Montelukast 5 | GIANT PHARMAC | MD | 30 | 30 |
| 8/19/2009 | Fluticasone HF | CVS PHARMACY 0 | MD | 12 | 30 |
| 9/8/2009 | AZITHROMYCI | GIANT PHARMAC | MD | 23 | 6 |
| 9/8/2009 | IPRATROPIUM | GIANT PHARMAC | MD | 150 | 21 |
| 9/25/2009 | FLUTICASONE | GIANT PHARMAC | MD | 16 | 30 |
| 9/26/2009 | Fluticasone HF | CVS PHARMACY 0 | MD | 12 | 24 |
| 10/15/2009 | PREDNISONE 1 | GIANT PHARMAC | MD | 30 | 5 |
| 10/15/2009 | Oseltamivir 75 | CVS PHARMACY 0 | MD | 58 | 5 |
| 11/12/2009 | Fluticasone HF | CVS PHARMACY 0 | MD | 12 | 24 |
| 12/29/2009 | Fluticasone HF | CVS PHARMACY 0 | MD | 12 | 30 |
| 2/9/2010 | Fluticasone HF | CVS PHARMACY 0 | MD | 12 | 24 |

Flovent adherence

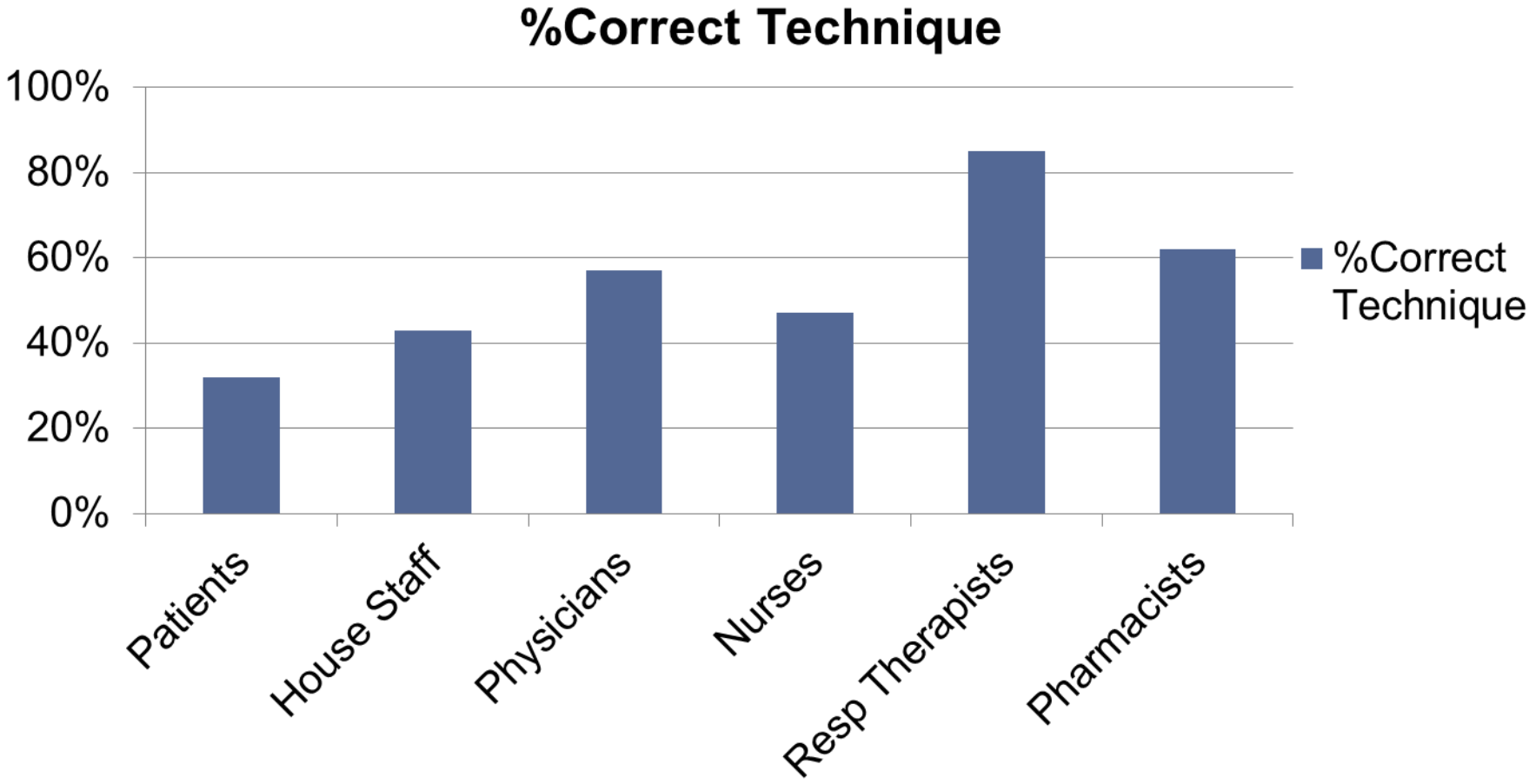
= Observed fills/Expected fills

= Total fills / [(# of months of refill data) x (number of puffs per day /4)]

= 7 observed fills / 12 expected fills

= 58%

# Inhaler Technique

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Fink & Rubin 2005
Guidry et al. 1992
Interiano & Guntupalli 1993
Kesten et al. 1993

# Standardized Inhaler Assessment

**BAILEY – MDI USE ABILITIES**

**[STATE TO CAREGIVER/PATIENT]**: Please show me how you use the inhaler.

| Desirable Behaviors | Yes | No |
|---|---|---|
| Caregiver/Patient shakes canister for 5 seconds | 1 | 0 |
| Caregiver/Patient attaches spacer correctly | 1 | 0 |
| Caregiver/Patient positions finger on the top of the medication canister and provides support | 1 | 0 |
| Patient exhales normally | 1 | 0 |
| Caregiver/Patient places the mouthpiece into the mouth between the teeth | 1 | 0 |
| Patient closes lips around the spacer tube or mouthpiece | 1 | 0 |
| Caregiver/Patient correctly presses down the top of the medication canister to release the medication | 1 | 0 |
| Patient inhales medication deeply and slowly | 1 | 0 |
| Patient holds the medication inside the lungs a minimum of 3 seconds before exhaling | 1 | 0 |

Total Possible Score: 9  Patient's Score: _____ out of 9

## Cómo usar su inhalador y espaciador

Neighborhood Health Plan

1. Saque el tapón del inhalador.

2. Agite el inhalador.

3. Conéctelo al espaciador.

4. Quitele la tapa al espaciador.

**5. EXHALE completamente.**

6. Cierre los labios alrededor de la boquilla.

7. Apriete aquí hacia abajo.

**8. INHALE LENTA y Profundamente**

9. Aguante la respiración por diez segundos, si puede. Después exhale lentamente.


Si necesita otra inhalación del medicamento, espere UN minuto. Después repita los pasos 5 a 9.

10. Enjuáguese la boca con agua y ESCUPA.

# Summary

1. Diagnosis of asthma: episodic symptoms of airflow obstruction or bronchospasm: **cough**, wheeze, dyspnea.
    1. Breathmobile Questionnaire to help with diagnosis
2. The goal of every encounter with an asthma patient is to determine if asthma is controlled
    a) yes: do nothing or step down
    b) no: identify causes
3. The common causes of uncontrolled asthma:
    non-adherence to controller medications—screen systematically
    poor inhaler technique—assess and review systematically
    environmental exposures (tobacco smoke);
    co-morbidities (allergic rhinitis; obesity);
    under-treatment

# Further Thoughts

- Asthma care is a “team sport”
- Plan improvements in asthma care based on the “health system” you work in (office, HMO, etc.)
- EHRs may be means of sustainably providing high quality asthma care
  - Automation
  - Decision support
  - Feedback on performance

# Discussion/Questions

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