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# Updates in Pediatric Asthma


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## North Carolina Society for Respiratory Care
## September 27, 2012

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# Objectives

- Review current pediatric asthma epidemiology
- Revisit the definition of asthma: severity vs control
- Evaluate personalized asthma treatment
- Identify effective asthma management
- Underscore efforts to reduce health disparities

## National Institutes of Health
### National Asthma Education Prevention Program (NAEPP)

**2007**
**Guidelines for the Diagnosis and Management of Asthma (EPR-3)**

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

National Institutes of Health
The Nation's Medical Research Agency

National Asthma Education and Prevention Program

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http://www.health.state.mn.us/asthma/edtools.htm

## What Is Asthma?

"Asthma is a common chronic disorder of the airways that involves a complex interaction of airflow obstruction, bronchial hyperresponsiveness and an underlying inflammation. This interaction can be highly variable among patients and within patients over time".

2007 NAEPP Guidelines, EPR 3- Section 2, p 12.

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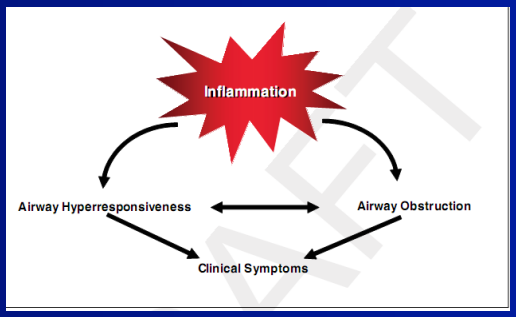
http://www.health.state.mn.us/asthma/edtools.htm

## Characteristics of Asthma

- Airway Inflammation
- Airway Obstruction (reversible)
- Hyperresponsiveness (irritability of airways)

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http://www.health.state.mn.us/asthma/edtools.htm

## Key Differences from 1997 & 2002 Reports

- The critical role of inflammation is validated - there is considerable variability in the pattern of inflammation indicating phenotypic differences that may influence treatment responses. *(in other words – genetics)*
- Gene-by-environmental interactions are affect the development of asthma. Of the environmental factors, allergic reactions are important. Viral respiratory infections are key and have an expanding role in these processes.
- The onset of asthma for most patients begins early in life with the pattern of disease persistence determined by early, recognizable risk factors including atopic disease, recurrent wheezing, and a parental history of asthma.
- Current asthma treatment with anti-inflammatory therapy does not appear to prevent progression of the underlying disease severity.

EPR 3 – section 2, p. 12 7

http://www.health.state.mn.us/asthma/edtools.htm

## Asthma

- In 2008, it is estimated that 23.3 million Americans currently have asthma
- Is one of the most common chronic disorders in childhood, affecting an approx. 7.1 million children under 18 years (9.6%) [1]
- In 2007, 3,447 deaths were attributed to asthma, 152 deaths were children under the age of 15 [2]
- Is the **third** leading cause of hospitalization among children under the age of 15 [6]
- Is one of the leading causes of school absenteeism [3] In 2008 asthma accounted for approx. 14.4 million lost school days [4]
- The annual health care costs of asthma is approx. $20.7 billion dollars [5]

From ALA website 11/2010 www.lungusa.org
1 CDC. National Center for Health Statistics, National Health Interview Survey Raw Data, 2009
2 CDC. National Center for Health Statistics. Final Vital Statistics Report. Deaths: Final Data for 2007. April 17, 2009. Vol 58 No 19.
3 CDC. National Center for Chronic Disease Prevention and Health Promotion. Healthy Youth! Health Topics: Asthma. August 14, 2009
4 CDC. National Center for Health Statistics, National Health Interview Survey Raw Data, 2008.
5 NHLBI Chartbook, U.S. Department of Health and Human Services, National Institute of Health, 2009
6 CDC: National Center for Health Statistics, National Hospital Discharge Survey, 2006.

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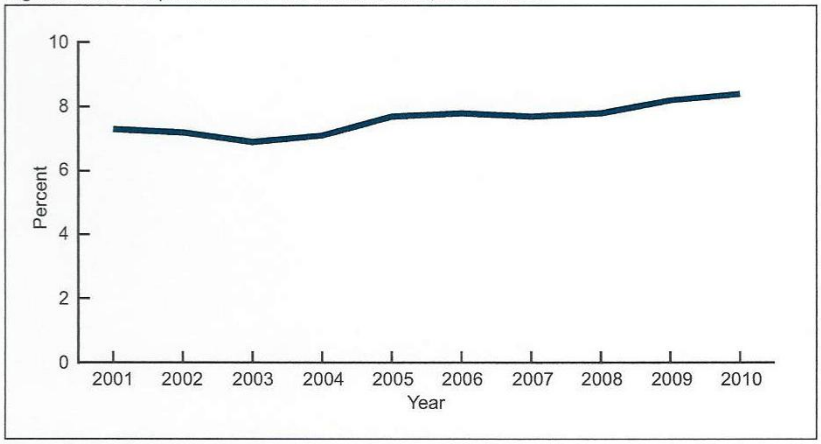
http://www.health.state.mn.us/asthma/edtools.htm

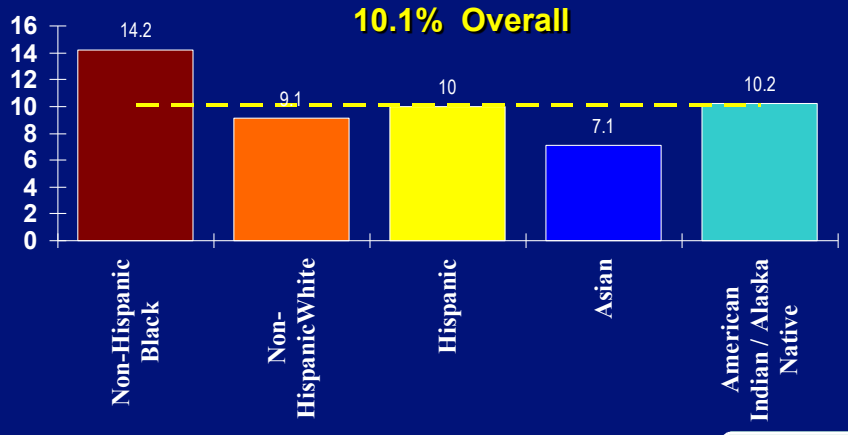
## Asthma prevalence increased from 2001 to 2010 and is now at its highest level.

Figure 1. Asthma prevalence in the United States, 2001–2010




NOTES: Asthma prevalence refers to percentage of people who have ever been diagnosed with asthma and still have asthma. Data are age adjusted to the 2000 U.S. standard population. Access data table for Figure 1 at: http://www.cdc.gov/nchs/data/databriefs/db94_tables.pdf#1.
SOURCE: CDC/NCHS, National Health Interview Survey.

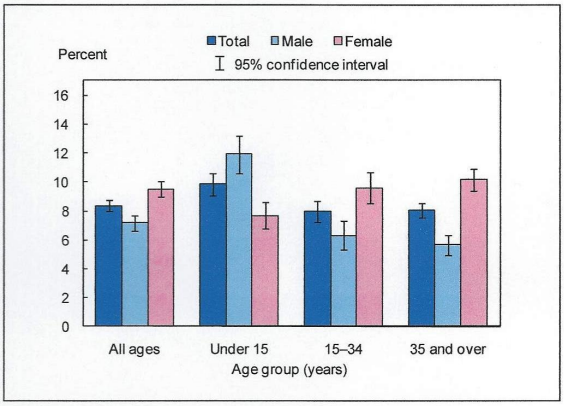
## Current Asthma Prevalence for Youth by Race/Ethnicity, Ages 5-17, 2005-2007




Centers for Disease Control and Prevention. National Center for Health Statistics. Health Data Interactive. www.cdc.gov/nchs/hdi.htm. [July 15, 2009].

Asthma episodes and current asthma (Released 6/2010)

**Figure 15.5. Prevalence of current asthma among persons of all ages, by age group and sex: United States, 2009**



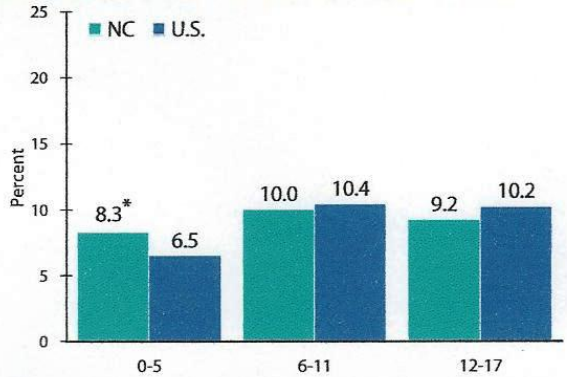

NOTES: Information on current asthma is self-reported by adults aged 18 years and over. For children under age 18, the information is collected from an adult family member, usually a parent, who is knowledgeable about the child's health. The analyses excluded 66 persons (0.2%) with unknown current asthma status.

DATA SOURCE: CDC/NCHS, National Health Interview Survey, 2009, combined Sample Adult and Sample Child Core components. Data are based on household interviews of a sample of the civilian noninstitutionalized population.

http://www.cdc.gov/asthma

In 2007, an estimated 322,007 children in North Carolina had asthma. Child current asthma prevalence was 9.2% compared with the U.S. rate of 9.0%[2].

Child Current Asthma Prevalence by Age, NSCH, 2007



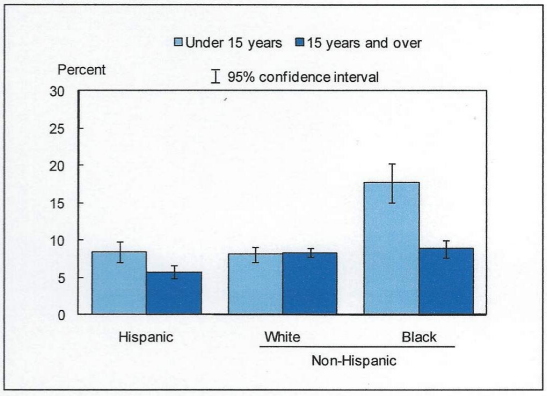

Child current asthma prevalence was similar among all age groups when compared with children aged 12-17 years in North Carolina; however, the rate was lower among children aged 0-5 years throughout the U.S.

**The estimate is unstable.*

http://www.cdc.gov/asthma

Asthma episodes and current asthma (Released 6/2010)

**Figure 15.6. Sex-adjusted prevalence of current asthma among persons of all ages, by age group and race/ethnicity: United States, 2009**

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DATA SOURCE: CDC/NCHS, National Health Interview Survey, 2009, combined Sample Adult and Sample Child Core components. Data are based on household interviews of a sample of the civilian noninstitutionalized population.

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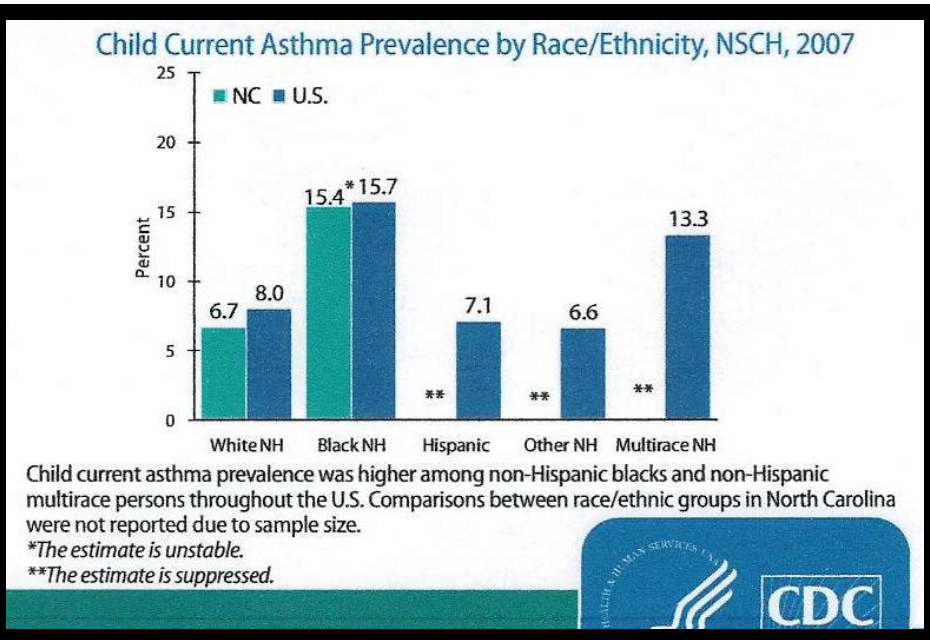
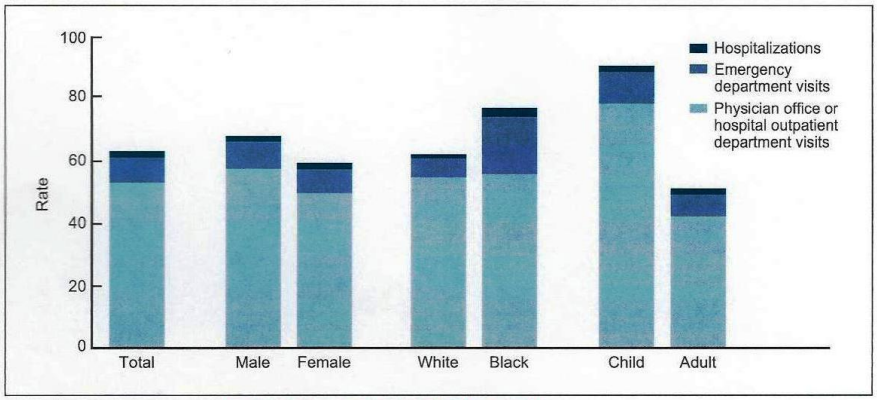



http://www.cdc.gov/asthma

NCHS Data Brief ■ No. 94 ■ May 2012

Figure 4. Asthma health care encounters per 100 persons with asthma: United States, 2001–2009




NOTE: Access data table for Figure 4 at: http://www.cdc.gov/nchs/data/databriefs/db94_tables.pdf#4.
SOURCES: CDC/NCHS, National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, National Hospital Discharge Survey, and National Health Interview Survey.

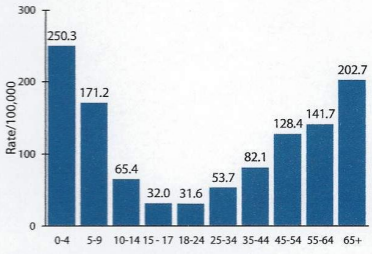
Children aged 0–17 years with asthma had a higher asthma visit rate for primary care settings and a higher ED visit rate than adults aged 18 and over. Asthma hospitalization rates per 100 persons with asthma were similar between adults and children.

http://www.cdc.gov/asthma

*Asthma in North Carolina*

**Asthma Hospitalizations**

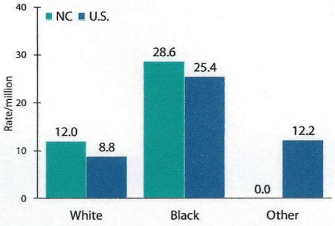
North Carolina Hospital Discharge Data, 2007




The age-adjusted asthma hospitalization rate in North Carolina was 115.0/100,000 persons[2] compared with the U.S. rate of 144/100,000 persons[4]. In North Carolina, the hospitalization rate for children was 142.1/100,000 persons[3] and for adults was 107.9/100,000 persons[3].

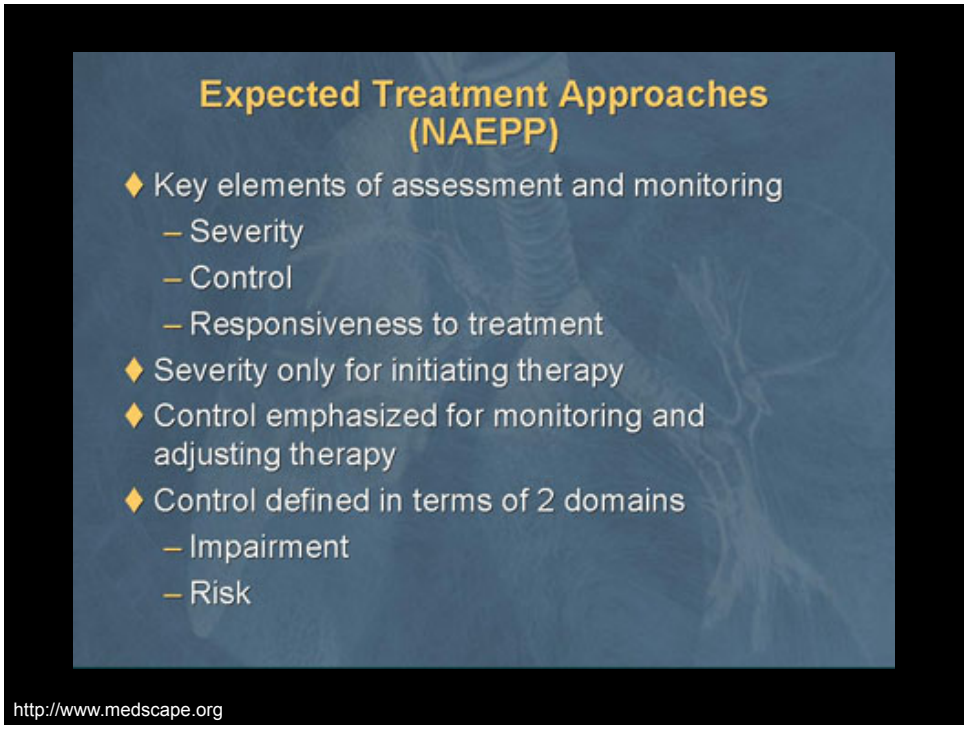
**Asthma Deaths**

Age-Adjusted Asthma Mortality Rate by Race, NVSS, 2007




Asthma was the underlying cause of death for 132 adults and less than 10** children in North Carolina[5]. The age-adjusted asthma mortality rate in North Carolina was 15.1/million and the U.S. rate was 11.0/million[5].
***The estimate is suppressed.*

http://www.cdc.gov/asthma




## The 4 Components of Asthma Management

- Component 1: Measures of Asthma Assessment and Monitoring
- Component 2: Education for a Partnership in Asthma Care
- Component 3: Control of Environmental Factors and Comorbid Conditions That Affect Asthma
- Component 4: Medications

Mamta Reddy, MD

## Key Points - Overview: Measures of Asthma Assessment & Monitoring

*Assessment and monitoring are closely linked to the concepts of **severity, control**, and **responsiveness** to treatment:*

- *Severity* - intensity of the disease process. Severity is measured most easily and directly in a patient not receiving long-term-control therapy.
- *Control* - degree to which asthma (symptoms, functional impairments, and risks of untoward events) are minimized and the goals of therapy are met.
- *Responsiveness* - the ease with which asthma control is achieved by therapy.

http://www.health.state.mn.us/asthma/edtools.htm

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EPR-3 , Pg. 36,

## Summary of the New Strategies of the EPR-3

EPR-3, Page 36-38

| | Assessment | Management |
|---|---|---|
| Severity | the intrinsic intensity of the disease | a clinical guide most useful for initiating controller therapy |
| Control | the degree to which symptoms are minimized | (after therapy is initiated) a clinical guide used to maintain or adjust therapy |
| Responsiveness | the ease of which prescribed therapy achieves asthma control | (variable) frequent follow-up to step-up and step-down therapy to achieve the goal of control |

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## CLASSIFYING ASTHMA SEVERITY AND INITIATING TREATMENT IN CHILDREN 0-4 YEARS OF AGE

EPR-3, p72, 307

| Components of Severity | | Classification of Asthma Severity | | | |
|---|---|---|---|---|---|
| | | Intermittent | Persistent | | |
| | | | Mild | Moderate | Severe |
| Impairment | Symptoms | ≤2 days/week | >2 days/week not daily | Daily | Continuous |
| | Nighttime Awakenings | 0 | 1-2x/month | 3-4x/month | >1x/week |
| | SABA use for sx control | ≤2 days/week | >2 days/week not daily | Daily | Several times daily |
| | Interference with normal activity | none | Minor limitation | Some limitation | Extremely limited |
| Risk | Exacerbations (consider frequency and severity) | 0-1/year | **≥2 exacerbations in 6 months requiring oral steroids, or ≥4 wheezing episodes/ year lasting >1 day AND risk factors for persistent asthma** | | |
| | | **Frequency and severity of may fluctuate over time** | | | |
| | | **Exacerbations of any severity may occur in patients in any category** | | | |
| **Recommended Step for Initiating Treatment** | | **Step 1** | **Step 2** | **Step 3** | Consider short course of oral steroids |
| | | In 2 -6 weeks, evaluate asthma control that is achieved and adjust therapy accordingly | | | |

## ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN CHILDREN 0 - 4 YEARS OF AGE

EPR-3, p75, 309

| Components of Control | | Classification of Asthma Control | | |
|---|---|---|---|---|
| | | Well Controlled | Not Well Controlled | Very Poorly Controlled |
| IMPAIRMENT | Symptoms | ≤ 2 days/week | > 2 days/week | Throughout the day |
| | Nighttime awakenings | ≤ 1/month | ≥ 2 x/month | ≥2x/week |
| | Interference with normal activity | none | Some limitation | Extremely limited |
| | SABA use | ≤ 2 days/week | > 2 days/week | Several times/day |
| RISK | Exacerbations | 0- 1 per year | 2 - 3 per year | > 3 per year |
| | Progressive loss of lung function | Evaluation requires long-term follow up care | | |
| | Rx-related adverse effects | Consider in overall assessment of risk | | |
| **Recommended Action For Treatment** | | **•Maintain current step<br>•REGULAR FOLLOW UP EVERY 3 - 6 MONTHS<br>•Consider step down if well controlled at least 3 months** | **•Step up 1 step<br>•Reevaluate in 2 - 6 weeks<br>•If no clear benefit in 4-6 weeks , consider alternative dx or adjust therapy** | **•Consider oral steroids<br>•Step up (1-2 steps) and reevaluate in 2 weeks<br>•If no clear benefit in 4-6 weeks , consider alternative dx or adjust therapy** |

## Assessing Asthma Control in Children 5 - 11 Years of Age

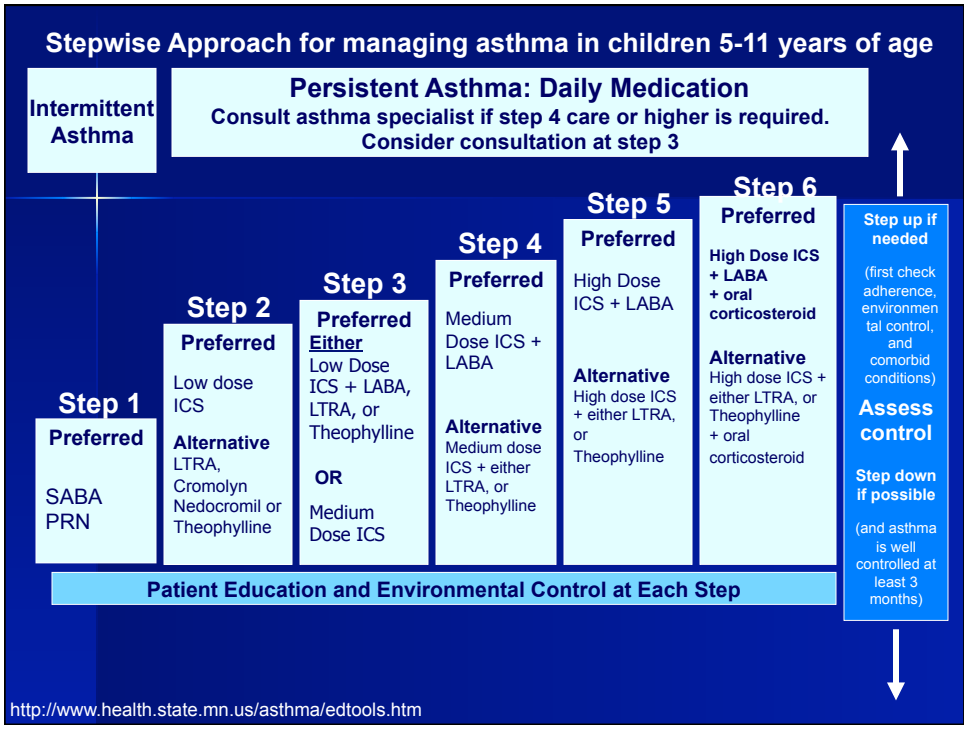
| Components of Control | | Classification of Asthma Control (Children 5–11 years of age) | | |
|---|---|---|---|---|
| | | Well Controlled | Not Well Controlled | Very Poorly Controlled |
| Impairment | Symptoms | ≤2 days/week but not more than once on each day | >2 days/week or multiple times on ≤2 days/week | Throughout the day |
| | Nighttime awakenings | ≤1x/month | ≥2x/month | ≥2x/week |
| | Interference with normal activity | None | Some limitation | Extremely limited |
| | Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB) | ≤2 days/week | >2 days/week | Several times per day |
| | Lung function<br>▪ $FEV_1$ or peak flow<br>▪ $FEV_1/FVC$ | >80% predicted/ personal best<br>>80% | 60–80% predicted/ personal best<br>75–80% | <60% predicted/ personal best<br><75% |
| Risk | Exacerbations requiring oral systemic corticosteroids | 0–1/year | ≥2/year (see note) | |
| | | Consider severity and interval since last exacerbation | | |
| | Reduction in lung growth | Evaluation requires long-term followup. | | |
| | Treatment-related adverse effects | Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk. | | |

http://www.health.state.mn.us/asthma/edtools.htm

## ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN YOUTHS ≥ 12 YEARS OF AGE AND ADULTS

EPR-3, p77, 345

| Components of Control | | Classification of Asthma Control | | |
|---|---|---|---|---|
| | | Well Controlled | Not Well Controlled | Very Poorly Controlled |
| IMPAIRMENT | Symptoms | ≤ 2 days/week | > 2 days/week | Throughout the day |
| | Nighttime awakenings | ≤ 2/month | 1-3/week | ≥ 4/week |
| | Interference with normal activity | none | Some limitation | Extremely limited |
| | SABA use | ≤ 2 days/week | > 2 days/week | Several times/day |
| | $FEV_1$ or peak flow | > 80% predicted/ personal best | 60-80% predicted/ personal best | <60% predicted/ personal best |
| | Validated questionnaires<br>ATAQ/ACT | 0/≥ 20 | 1-2/16-19 | 3-4/≤ 15 |
| RISK | Exacerbations | 0- 1 per year | 2 - 3 per year | > 3 per year |
| | Progressive loss of lung function | Evaluation requires long-term follow up care | | |
| | Rx-related adverse effects | Consider in overall assessment of risk | | |
| Recommended Action For Treatment | | •Maintain current step<br>•Consider step down if well controlled at least 3 months | •Step up 1 step<br>•Reevaluate in 2 - 6 weeks | •Consider oral steroids<br>•Step up 1-2 weeks and reevaluate in 2 weeks |




## Safety of Long-Acting Beta$_2$-Agonists (LABA's)

- Adding a LABA to the tx of patients whose asthma is not well controlled on low- or medium-dose ICS improves lung function, decreases symptoms, and reduces exacerbations and use of SABA for quick relief in most patients
- The FDA determined that a Black Box warning was warranted on all preparations containing a LABA
- For patients who have asthma not sufficiently controlled with ICS alone, the option to increase the ICS dose should be given equal weight to the option of the addition of a LABA to ICS
- It is not currently recommended that LABA be used for treatment of acute symptoms or exacerbations
- LABAs are not to be used as monotherapy for long-term control

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http://www.health.state.mn.us/asthma/edtools.htm

## The Goals of Asthma Therapy: (Asthma Control)

EPR-3, p284

- Reducing impairment
  - prevent chronic and troublesome symptoms
  - require infrequent use (≤ 2 days a week) of inhaled SABA for symptoms
  - maintain (near) "normal" pulmonary function
  - maintain normal activity levels
  - meet patients' and families' satisfaction with care
- Reducing risk
  - prevent recurrent exacerbations of asthma (ED/inpatient)
  - prevent progressive loss of lung function
  - provide optimal pharmacotherapy

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## Monitoring Asthma Control

EPR-3, Page 78

**Ask the patient**

- Has your asthma awakened you at night or early morning?
- Have you needed more rescue inhaler than usual?
- Have you needed urgent care for asthma? (office, ED, etc)
- Are you participating in your usual or desired activities?
- What are your triggers? (and how can we manage them?)

**Actions to consider**

- Assess whether medications are being taken as prescribed
- Assess whether inhalation technique is correct
- Assess spirometry and compare to previous measurements
- Adjust medications, as needed to achieve best control with the lowest dose needed to maintain control
- Environmental mitigation strategy

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## Treatment Strategies

- **Gain Control!!!**
  - **Aggressive, intensive initial therapy to suppress airway inflammation and gain prompt control**
- **Maintain Control**
  - **Frequent follow-up, clinically and physiologically**
  - **Therapeutic modifications depending on severity and clinical course**
  - **"Step down" long-term control medications to maintain control with minimal side effects**

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EPR-3, p121-139

# Key Educational Messages

- Significance of the diagnosis
- Inflammation as the underlying cause of symptoms
- Controllers versus quick-relievers
- How to use medication delivery devices
- Triggers, including second-hand tobacco smoke
- Home monitoring/ self-management
- How/ when to reach the provider
- The need for continuous on-going interaction with the clinician to step-up and step-down therapy
- Annual Influenza vaccine (yearround reminder)

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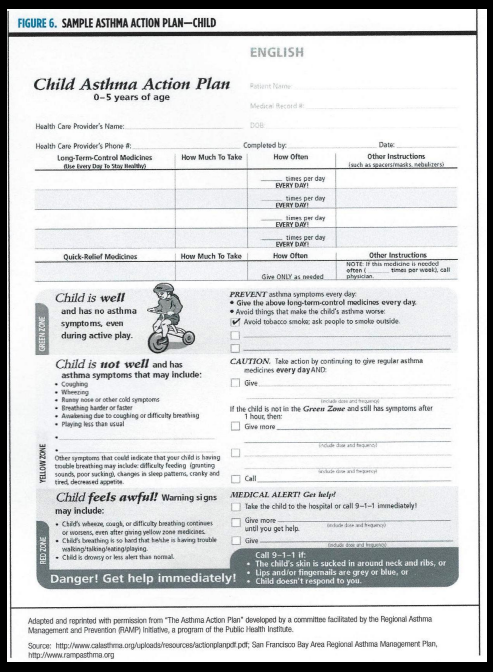

FIGURE 6. SAMPLE ASTHMA ACTION PLAN—CHILD

ENGLISH

**Child Asthma Action Plan**
0–5 years of age

Patient Name:
Medical Record #:
Health Care Provider's Name:
DOB:
Health Care Provider's Phone #:
Completed by:
Date:

| Long-Term-Control Medicines (Use Every Day To Stay Healthy) | How Much To Take | How Often | Other Instructions (such as spacers/masks, nebulizers) |
|---|---|---|---|
| | | ____ times per day EVERY DAY! | |
| | | ____ times per day EVERY DAY! | |
| | | ____ times per day EVERY DAY! | |
| | | ____ times per day EVERY DAY! | |

| Quick-Relief Medicines | How Much To Take | How Often | Other Instructions |
|---|---|---|---|
| | | Give ONLY as needed | NOTE: If this medicine is needed often (_____ times per week), call physician. |

GREEN ZONE

*Child is* ***well*** and has no asthma symptoms, even during active play.

*PREVENT* asthma symptoms every day:
- Give the above long-term-control medicines every day.
- Avoid things that make the child's asthma worse:
  - ☑ Avoid tobacco smoke; ask people to smoke outside.
  - ☐ _____
  - ☐ _____

YELLOW ZONE

*Child is* ***not well*** and has asthma symptoms that may include:
- Coughing
- Wheezing
- Runny nose or other cold symptoms
- Breathing harder or faster
- Awakening due to coughing or difficulty breathing
- Playing less than usual
- •
- •

Other symptoms that could indicate that your child is having trouble breathing may include: difficulty feeding (grunting sounds, poor sucking), changes in sleep patterns, cranky and tired, decreased appetite.

*CAUTION.* Take action by continuing to give regular asthma medicines **every day** AND:
- ☐ Give _____ (include dose and frequency)

If the child is not in the *Green Zone* and still has symptoms after 1 hour, then:
- ☐ Give more _____ (include dose and frequency)
- ☐ _____ (include dose and frequency)
- ☐ Call _____

RED ZONE

*Child* ***feels awful!*** Warning signs may include:
- Child's wheeze, cough, or difficulty breathing continues or worsens, even after giving yellow zone medicines.
- Child's breathing is so hard that he/she is having trouble walking/talking/eating/playing.
- Child is drowsy or less alert than normal.

*MEDICAL ALERT! Get help!*
- ☐ Take the child to the hospital or call 9–1–1 immediately!
- ☐ Give _____ (include dose and frequency) until you get help.
- ☐ Give _____ (include dose and frequency)

Call 9–1–1 if:
- The child's skin is sucked in around neck and ribs, or
- Lips and/or fingernails are grey or blue, or
- Child doesn't respond to you.

**Danger! Get help immediately!**

Adapted and reprinted with permission from "The Asthma Action Plan" developed by a committee facilitated by the Regional Asthma Management and Prevention (RAMP) Initiative, a program of the Public Health Institute.

Source: http://www.calasthma.org/uploads/resources/actionplanpdf.pdf; San Francisco Bay Area Regional Asthma Management Plan, http://www.rampasthma.org

## Preventing exercise induced asthma (EIA)

- Have an Asthma Action Plan (AAP) that provides details on pre-exercise medication regimen
- Athletes should use their reliever medication (Albuterol) 10-15 minutes before activity
- Do warm-up/ cool-down exercises before and after activities
- Check outdoor ozone/air quality levels
  http://aqi.pca.state.mn.us/
- Never encourage an athlete to "tough it out" when having asthma symptoms

http://www.health.state.mn.us/asthma/edtools.htm

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## The 4 Components of Asthma Management

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# Clearing the Air: Indoor Air Exposures & Asthma Exacerbation

## Biological Agents

- **Sufficient evidence of causal relationship**
  - Cat
  - Cockroach
  - House dust mite
- **Sufficient evidence of an association**
  - Dog
  - Fungus/Molds
  - Rhinovirus
- **Limited or suggestive evidence of association**
  - Domestic birds
  - Chlamydia and Mycoplasma pneumonia
  - RSV

## Chemical Agents

- **Sufficient evidence of causal relationship**
  - Environmental tobacco smoke (among pre-school aged children)
- **Sufficient evidence of association**
  - $NO_2$, $NO_X$ (high levels)
- **Limited or suggestive evidence of association**
  - Environmental Tobacco Smoke (among school-aged, older children, and adults)
  - Formaldehyde
  - Fragrances

CDC ATSDR

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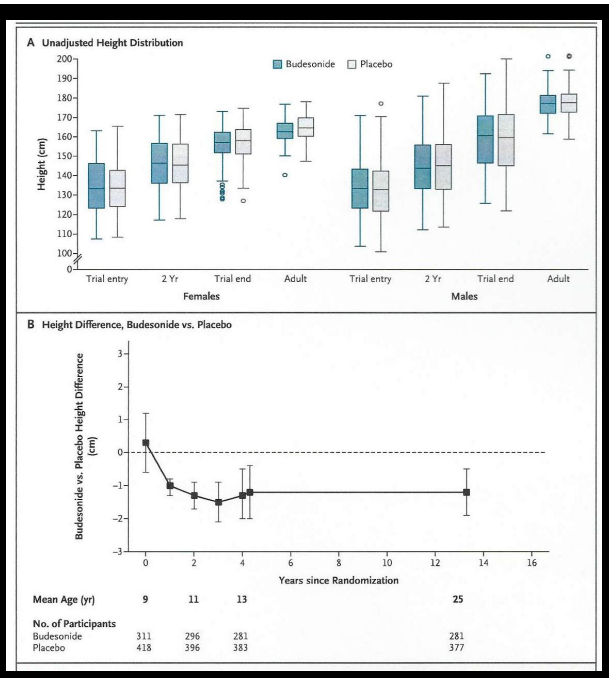


NEJM, 2012;367:904-12

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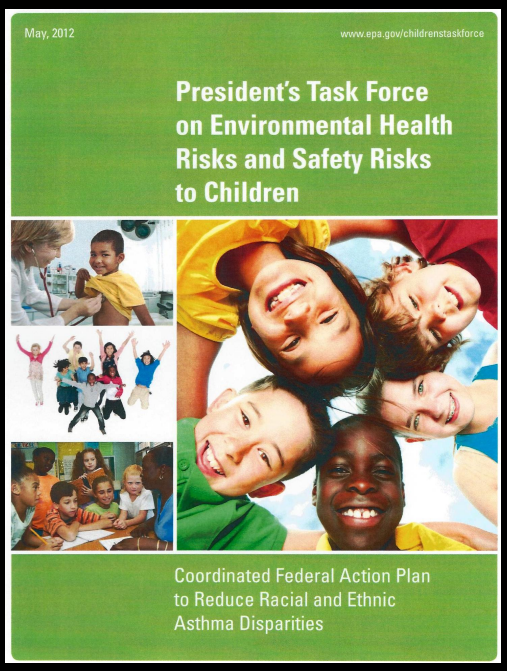
…Another observation of interest is the recognition that tiotropium, a long-acting anticholinergic agent, can improve lung function in patients with severe uncontrolled asthma treated with high-dose ICSs and LABAs.

The next logical step is to conduct studies for specifically labeling this medication for use in the treatment of asthma and extending those studies to children.

JACI, 2012;129:60-68




http://www.epa.gov/childrenstaskforce/federal_asthma_disparities_action_plan.pdf

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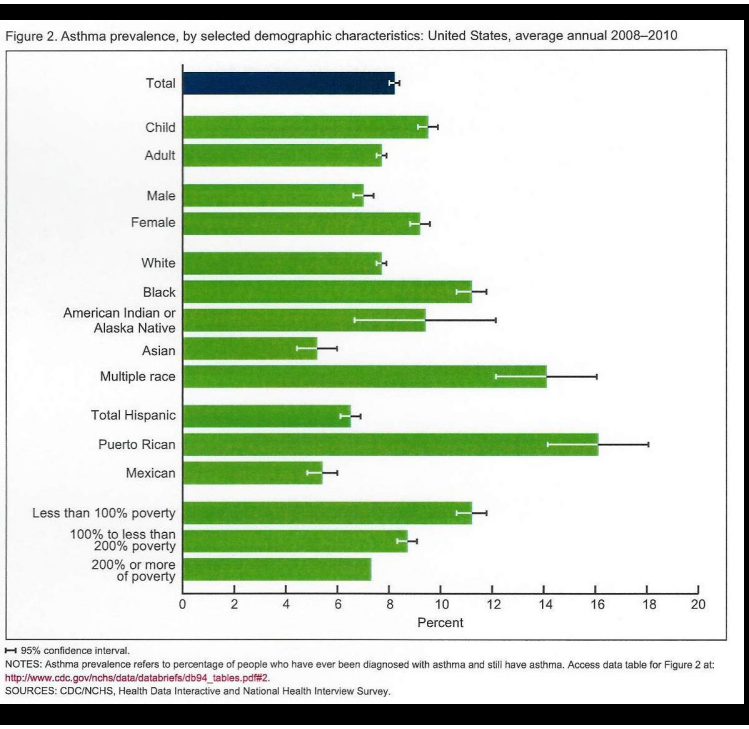
The prevalence of current asthma in the U.S. is 16 percent among non-Hispanic black children; 10.7 percent among American Indian and Alaska Native children; 6.8 percent among Asian; 8.2 percent among non-Hispanic white; and 7.9 percent among Hispanic children (16.5 percent among Puerto Rican children and 7 percent among Mexican children).

http://www.epa.gov/childrenstaskforce/




# Asthma Disparities Among U.S. Children

- Low-income populations, minorities, and children living in inner cities experience more ED visits, hospitalizations, and deaths due to asthma than the general population.[1]
- The burden of asthma falls disproportionately on non-Hispanic black, American Indian/Alaskan Native and some Hispanic (i.e., Puerto Rican) populations.[2, 3]

[1]Lieu TA et al. Racial/Ethnic Variation in Asthma Status and Management Practices Among Children in Managed Medicaid. Pediatrics 2002; 109:857–865.
[2]National Center for Health Statistics. Health data for all ages http://www.cdc.gov/nchs/health_data_for_all_ages.htm.
[3]Asthma and Allergy Foundation of America and National Pharmaceutical Council. Ethnic Disparities in the Burden and Treatment of Asthma. Reston, 2005.

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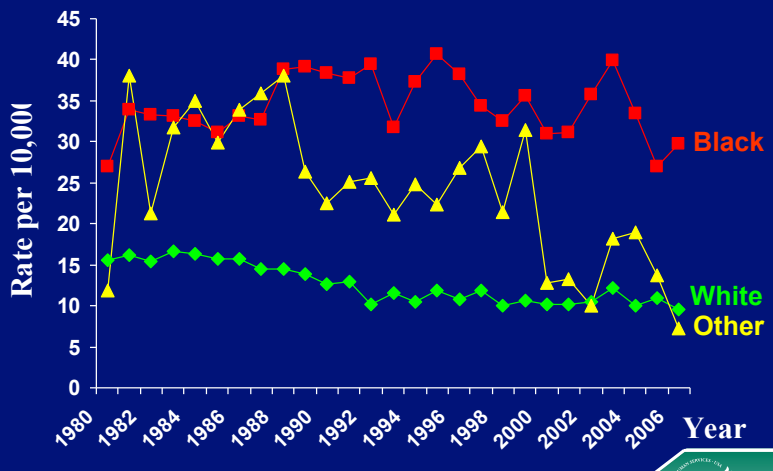
On top of disparities in the prevalence, there are significant racial and ethnic disparities in asthma outcomes
(e.g., measures of asthma control, exacerbation of symptoms, quality of life, health care utilization and death). Among children with asthma, black children are:

- Twice as likely to be hospitalized.
- More than twice as likely to have an ED visit.
- Four times more likely to die due to asthma than white children.

Minority children are less likely than white children to be prescribed or take recommended treatments to control their asthma, and are less likely to attend outpatient appointments.

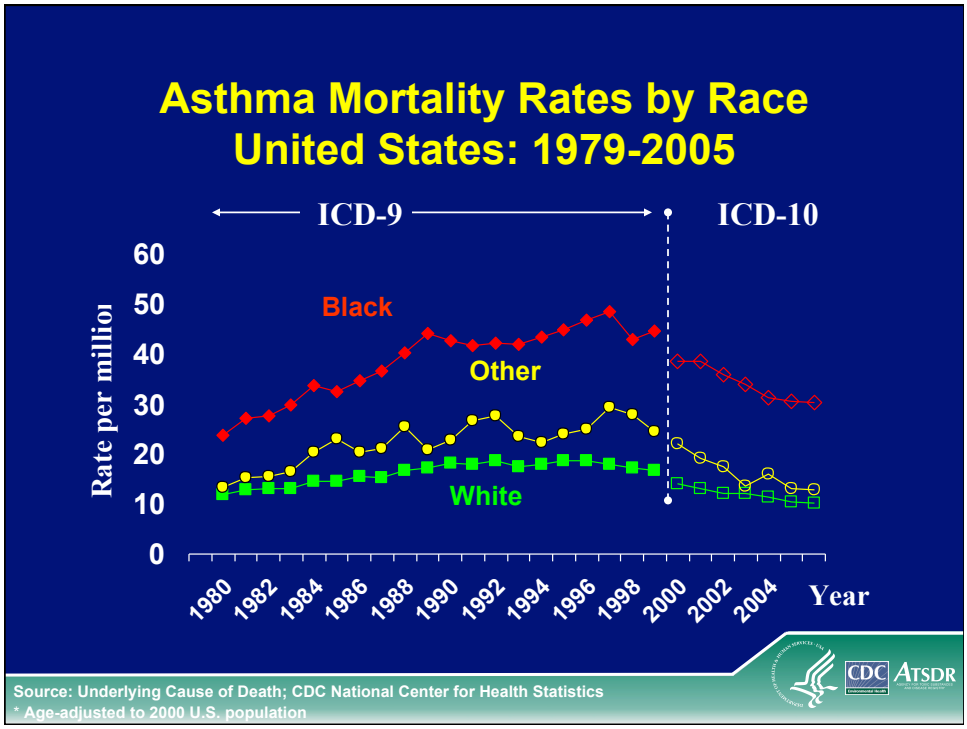
http://www.epa.gov/childrenstaskforce/

## Asthma Hospital Discharge Rates by Race United States, 1980-2006




Source: National Hospital Discharge Survey, CDC National Center for Health Statistics, * First-listed diagnosis, # Age-adjusted to 2000 U.S. population

CDC ATSDR

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**Reduce barriers to the implementation of guidelines-based asthma management.**

**Enhance capacity to deliver integrated, comprehensive asthma care to children in communities with racial and ethnic asthma disparities.**

**Improve capacity to identify the children most impacted by asthma disparities.**

**Accelerate efforts to identify and test interventions that may prevent the onset of asthma among ethnic and racial minority children.**

http://www.epa.gov/childrenstaskforce/

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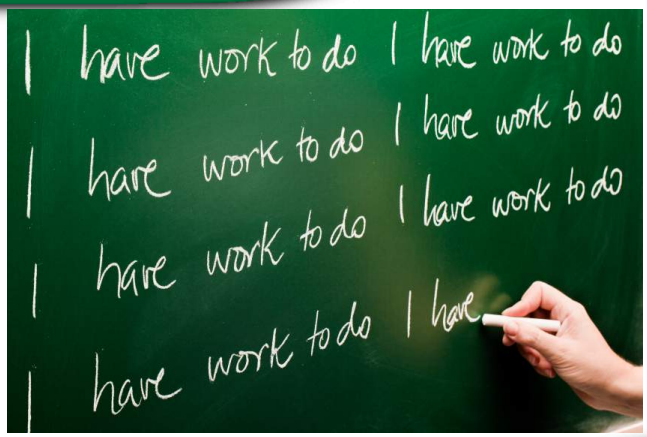


http://www.xlurbanmedia.com/wp-content/uploads/2012/08/I-Have-Work-To-Do.jpg

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## National Asthma Educator Certification
## http://naecb.com/

**NAECB Mission Statement**

**To promote optimal asthma management and quality of life among individuals with asthma, their families and communities, by advancing excellence in asthma education through the Certified Asthma Educator process.**

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## Why is Certification Important?

**Role of the Asthma Educator has increased as research has shown the importance of a well-educated, informed patient.**

**Need for standardized approach to evaluate effectiveness of disease management.**

**Certification assures education based on scientifically sound concepts of disease management.**

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## Mecklenburg County Asthma Coalition: Asthma Health Fair

**January 26, 2013 (9 a.m.–2 p.m.)**

**UNC Charlotte Center City**
**Sponsor: Department of Public Health Sciences**

MCAC
Mecklenburg County
Asthma Coalition