

**Joint Report to the
General Welfare, Health and Human Resources Committee
of the Senate,
Health and Human Resources Committee
of the House of Representatives, and the**

**Report On the Design of a Comprehensive
State Plan to Reduce the Burden of Asthma
on the Tennessee School Children**

A Report to the 106th Tennessee General Assembly

**Tennessee Department of Health
September 2010**

Report on the Design of a Comprehensive State Plan to Reduce the Burden of Asthma on Tennessee School Children

This report is provided in response to Sections 1 and 2 of Public Chapter 1154 of the Public Acts of the 2008 Tennessee General Assembly which requires the Department of Health to report by September 1, 2010 to the appropriate standing committees of the House and Senate on the design of a comprehensive state plan to reduce the burden of asthma on Tennessee school children; to study the prevalence and severity of asthma in Tennessee and determine whether a pilot project should be developed in a municipality with high incidence of asthma.

The Department of Health convened STAT (State of Tennessee Asthma Task Force), a multidisciplinary group of professionals, including the Department of Education and Bureau of TennCare, to assist in developing a state plan to reduce the burden of asthma in Tennessee. The plan to reduce the asthma burden among Tennessee school children is included in the comprehensive plan produced by this group. The design of the plan includes goals and objectives in the areas of clinical care, education, environmental quality and surveillance. The STAT plan (with a list of taskforce members) is found on the Department of Health website:

<http://health.state.tn.us/Downloads/asthmaplan09.pdf>

Status of activities to date as they relate to Section 1 of Public Chapter 1154 follow. Data are from the Coordinated School Health Data and Compliance Report, 2008-2009.

1. School Action Plans

333 Tennessee schools have used the Environmental Protection Agency (EPA) *Indoor Air Quality Tools for Schools Kit* to formulate school-wide asthma plans and policies. The Department of Health recommends that Tennessee schools use this kit as a guide to formulate school-wide asthma plans and policies.

2. Individual Asthma Action Plans

- 124 (89%) of all school systems developed an Individual Health Plan (IHP) for all students with chronic or long-term illnesses (i.e. Asthma, Diabetes, Seizures, Sickle Cell Anemia, Cardiac Conditions, and Severe Allergic Reactions). The Department of Health recommends that school systems report the number of children with asthma who have individualized asthma action plans starting with the 2010-2011 school year.

3. In-Service Training

- The American Lung Association's (ALA) "Open Airways" training, a special asthma education program, was completed by 223 school nurses.

Other school staff training on appropriate medication accessibility, administration, storage, and documentation in 2008-2009:

- 10,709 school personnel were trained to handle medications and record keeping.
- All school systems have access to specific state and national guidelines and procedures for medications and health care procedures through the *Guidelines for Use of Health Care Professionals and Health Care Procedures in a School Setting*, (TCA 49-5-415) and the text, *Quality Nursing Interventions in the School Setting* (TCA 49-5-415).

4. Encourage the education of local boards of education and the public about self administration of asthma medications

Boards of education were informed of the data contained in the Coordinated School Health Annual Data and Compliance Report, 2008-2009 which includes details about school age children with asthma.

- 56,213 students had an asthma diagnosis in the 2009 school year
- 16,769 students self-administered inhaled asthma medications.

5. Procedures to reduce smoke, allergens and other respiratory irritants in school environments

- 110 (81%) of all school systems report that they offered a tobacco prevention program to students.
- Both federal and state laws prohibit smoking at school and the sale of tobacco products to minors. It is a crime for minors to be in possession of tobacco products. This is the same law that requires principals to write juvenile court citations for minors found in possession of tobacco products. In fact, principals are required to issue a citation to students who smoke or are found with tobacco at school.
- The EPA *Indoor Air Quality Tools for Schools Kit* is recommended, and available at no cost for schools and LEAs to initiate proactive indoor air quality practices.

Section 2 of Public Chapter 1154 requires the Department of Health to study the prevalence and severity of asthma in the state including hospital discharge data. In 2008, the Tennessee Department of Health issued *The Burden of Asthma in Tennessee*. This report contains an analysis of morbidity, mortality and health care utilization and costs for this chronic disease as a

beginning step to address asthma control and was used to guide the development of the state plan for reducing the burden of asthma in Tennessee in 2009. Also in 2009, the Department of Health issued *Childhood Asthma in Tennessee 1997-2007*, which provided more detailed analyses of asthma prevalence, health care utilization, and disparities among Tennessee children. In preparation for 2010 World Asthma Day events, the Department of Health Office of Policy, Planning, and Assessment produced summary "Fact Sheets" from the 2009 report in order to disseminate the information to health professionals and policy-makers. The full asthma reports and fact sheets are available on the Department of Health's website:

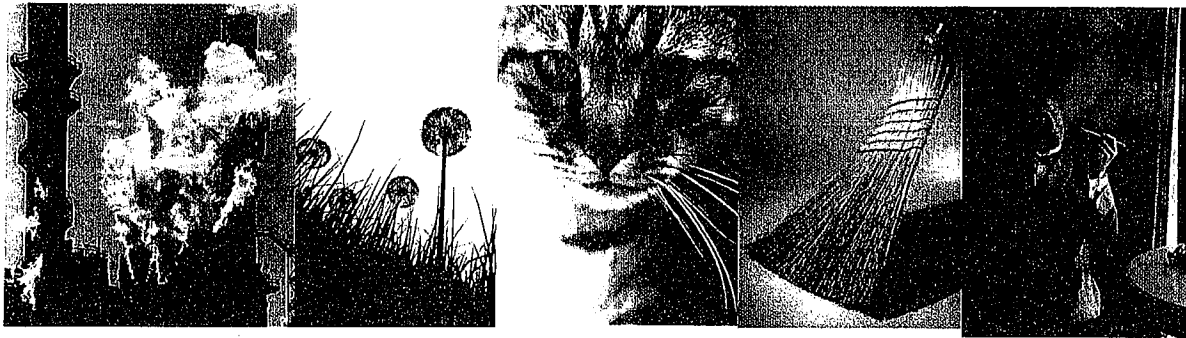
<http://hit.state.tn.us/Reports/HealthResearch/ChildhoodAsthma1997-2007.pdf>

<http://hit.state.tn.us/Reports/HeartBurden/BurdenHealthTNReport.pdf>

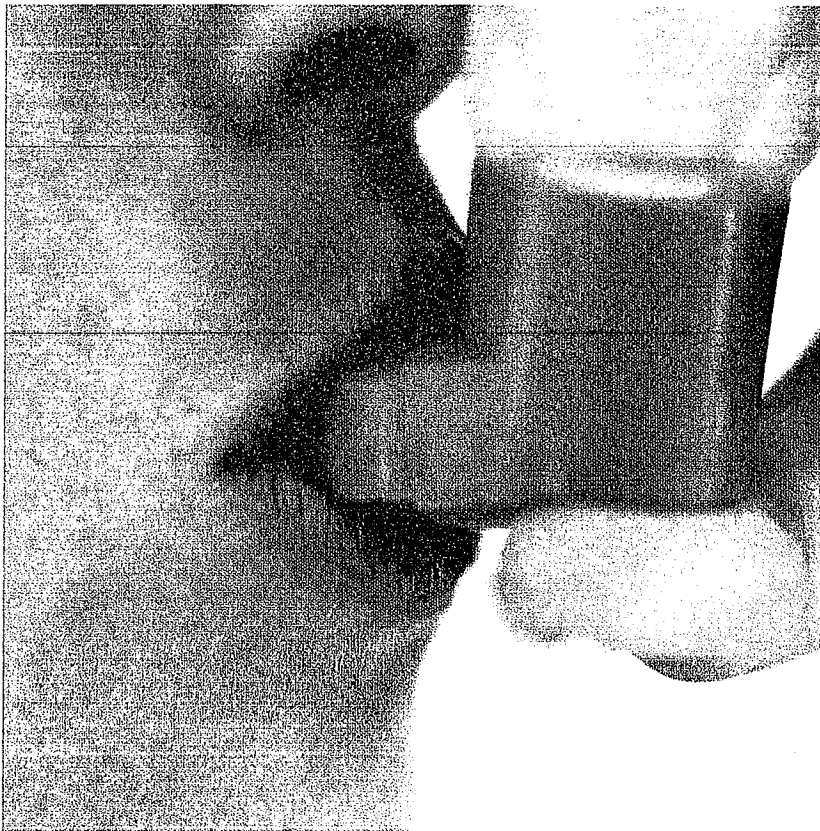
<http://health.state.tn.us/MCH/PDFs/Childhood%20Asthma%20Tennessee%20Fact%20Sheet.pdf>

<http://health.state.tn.us/MCH/PDFs/Childhood%20Asthma%20Tennessee%20FastStats.pdf>

Section 2 also requires the Department of Health to determine whether a pilot project should be developed. A pilot project would likely yield vital information to guide future asthma prevention activities and should be considered, yet it should be noted that the most useful information will only be obtained from a fully funded, science-based program that is rigorously planned, implemented, and evaluated.



**STAT Plan to Reduce
Asthma in Tennessee
2009**





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PHIL BREDESEN
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SUSAN R. COOPER, MSN, RN
COMMISSIONER

April 2009

Dear Tennesseans:

More than 750,000 Tennesseans are diagnosed with asthma. It is one of the most common chronic childhood illnesses and a leading cause for missed school days. Asthma impacts adults as well with lost work days, high health care costs and a lower quality of life for persons with the disease and their families. Despite significant improvements in the medical management to treat asthma, the disease is still a serious public health problem with significant financial consequences.

The State of Tennessee Asthma Task Force (STAT) was convened to develop *The STAT Plan to Reduce Asthma in Tennessee, 2009*. To produce this Plan, members of STAT examined the state's current asthma burden document and developed specific goals, objectives and evidence-based intervention strategies with measurable outcomes to address needs and inequities. The current *Burden of Asthma in Tennessee* document produced by the Office of Policy, Planning and Assessment - Surveillance, Epidemiology and Evaluation revealed that in 2006, hospital charges for a primary asthma diagnosis totaled \$125.6 million in Tennessee. There were 192 deaths from asthma in this same year.

Please join with the Tennessee Department of Health to implement this Plan for change throughout the state. Major progress to reduce the burden of asthma in Tennessee cannot be made without us purposely working together to manage this chronic disease. We trust the information in the Plan will guide asthma initiatives throughout Tennessee and encourage our partners to strive to improve the quality of life for those with asthma.

Sincerely,

Susan R. Cooper, MSN, RN
Commissioner
Tennessee Department of Health

Veronica Gunn, MD, MPH
Chief Medical Officer
Tennessee Department of Health

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INTRODUCTION

Asthma: A Major Public Health Problem

Asthma in Tennessee is a chronic health problem for the 757,276 diagnosed Tennesseans* -and for an unknown number of people with breathing problems who are not diagnosed or are misdiagnosed each year. Until recently, asthma has not been addressed as a public health problem. The increase in cases in the 1990s and the ever increasing cost of emergency room visits and hospitalizations has brought this disease to the attention of policy makers, clinical practitioners and consumers alike in spite of the leveling off of persons diagnosed with asthma between 2000 and 2006.

Asthma is a chronic inflammatory disease of the airways characterized by intermittent recurrent episodes of wheezing, breathlessness, chest tightness, and coughing. It affects people of all ages and sometimes goes undiagnosed for extended periods of time. Emergency room visits and hospitalizations as a result of an asthma episode are common. Unfortunately, some Tennesseans die of this chronic disease if it is not monitored and managed by both the patient and his or her health care provider.

The economic cost of asthma is high. In 2004, the United States spent \$16.1 billion on asthma, a figure which includes \$4.6 billion in lost productivity. In Tennessee, hospitalization charges for persons treated for an asthma diagnosis totaled \$125 million in 2006 – 69 percent of these charges were for inpatient services and the remainder for outpatient hospitalizations. Emergency room visits, especially, are perceived to be preventable with appropriate education, monitoring and management. Neither the national figure nor the state's include the emotional cost of this chronic disease and the impact it has on the person, family and community. Our current understanding of asthma is that it is a multi-factorial disease which can sometimes severely limit a person's activity and quality of life. We do not know the exact causes of nor do we have simple methods to diagnose asthma. What we do know is that asthma morbidity and mortality are largely preventable with improved patient education, appropriate medical management and adoption of public policies that support people with asthma.

The document titled *The Burden of Asthma in Tennessee* (2008) set the stage for the Department of Health to begin formulating a public health approach to asthma as a major public health problem. This document summarized the state's data regarding vulnerable populations—including racial and gender differences. The Department used hospital charge data to generate the economic cost of asthma to the state. TennCare, the state Medicaid program, also provided data for analysis of medical costs for TennCare enrollees with asthma diagnoses. The Summary of Key Findings from the *Burden* document is contained in Appendix 5. Since TennCare provides health care coverage for people who meet financial guidelines, they are an important subset for understanding the true cost of asthma in Tennessee.

*Estimated number of Tennesseans with asthma based on lifetime prevalence; 12.3% of adults and children who have ever been told they have asthma. Population of Tennessee, US Census, 2007 was 6,156,719.

The Burden document provided the impetus to convene a diverse group of stakeholders to begin to address asthma from the policy level and through data analysis and system intervention across service agencies. Further impetus was added when the state legislature passed Public Chapter 1154, (Appendix 5), which requires the Department of Health in conjunction with the Department of Education and the TennCare Bureau, to develop a detailed plan addressing the burden of asthma in school age children. A written report about the school age plan is due to the legislature by September 1, 2010.

The following strategic plan is based on addressing asthma management in the most vulnerable populations as identified in *The Burden of Asthma in Tennessee*, (2008). The stakeholder group, (Appendix 2), called the State of Tennessee Asthma Task Force (STAT) team established three target populations for intervention based on data from the Burden document identifying specific risk populations. Phase one will target asthma in children aged 0-5 years, their families and caregivers. Phase two will expand this child and family environment to include children up to age 10, the second group with the highest number of hospitalizations and emergency room visits. Finally, the third phase will address improving asthma management in Tennesseans older than 30, since data indicates an increase in health care costs after age 30.

Planning is only the first step in any public health approach to reduce the burden of disease in a state. The STAT team is committed to monitoring the specific activities associated with the objectives set out in this plan and to improving asthma education, care and management through evidence based approaches. The team will meet at least twice a year to review progress and revise targets. Updates to the Burden document and the plan will be considered at least every three years. Asthma is no longer regarded as just a clinical issue. We believe that by working together, in a systems approach, we can decrease the personal, economic and community burden of asthma in our state.

WHAT IS ASTHMA?

Asthma is a chronic inflammation of the airways with reversible episodes of obstruction, caused by an increased reaction of the airways to various stimuli (Centers for Disease Control, August, 2007). Asthma breathing problems are described as “episodes” or attacks but the underlying inflammation associated with asthma can remain constant. Symptoms may vary but can include shortness of breath, coughing, wheezing, and chest pain or tightness. Asthma attacks may be triggered by things such as allergens (e.g., pollen), infections, exercise, changes in the weather, and exposure to airway irritants (e.g., tobacco smoke). While asthma is a chronic disease and cannot be cured, persons with asthma can live productively by controlling asthma episodes. Additionally, we can control health care system costs by adopting a public health approach to asthma management and treatment, effectively reducing emergency room use and hospitalizations.

Individuals with asthma and their families must have access to primary and specialty asthma care, education services, and the necessary medications and devices for effective asthma self-management. More often than not, many confront barriers to quality care and educational services due to any number of social and economic issues. Other individuals may have access

to care, but lack the coordination of care that is necessary for effective management of asthma. Improved partnerships and new strategic approaches between government agencies and health services are vital to improve both access to and coordination of asthma care that will continue to reduce asthma morbidity and mortality.

Anyone can develop asthma, although most studies have focused on people under age 50. There is a higher chance of developing asthma if you have family members with asthma, but environmental factors certainly aggravate, or, in selected situations, potentially cause asthma. The symptoms are variable and, depending on environmental triggers and baseline health risks, may be severe or fatal. Diagnosing asthma also remains a challenge, especially in young children (0-5 years) and the elderly. Symptom control does not always correlate with disease control, so objective monitoring of airway obstruction with or without inflammation is important. Likewise, reduced peak flow readings or abnormal spirometry results—tests used to monitor the disease—may be due to conditions other than asthma.

Once diagnosed, a person with asthma must:

1. Understand the basics about asthma pathophysiology
2. Develop awareness of specific triggers (internal and environmental) and what preventive steps can be taken to minimize exposure
3. Use the most cost-effective medications to keep asthma under control
4. Have a written action plan that allows the individual, family, and/or caregivers (e.g., daycare providers) to learn and develop the skills to best manage asthma symptoms

CAUSES OF ASTHMA

The primary causes of asthma, and particularly the reasons for recent increases in asthma diagnoses, remain largely unknown. We do know that certain factors or exposure to triggers aggravate asthma symptoms.

The Surgeon General report, *The Health Consequences of Involuntary Exposure to Tobacco Smoke* concludes that there is a causal relationship between parental smoking and asthma among school age children. The 2000 Institute of Medicine (IOM) panel also provided the following comments regarding the development of asthma:

“Saying that a particular agent may be associated with the development of asthma does not mean it is the sole factor determining whether an individual will manifest the illness. Most scientists believe that some individuals have a prior, underlying predisposition that permits the evolution of clinical asthma. The development of this predisposition to asthma is dependent upon a complex – and at presently poorly understood – combination of factors, which are partially inherited and partially acquired later in life.”

Reports from the IOM in 2000 and 2004 reviewed available evidence regarding the relationship between environmental exposures and asthma in *Clearing the Air: Asthma and Indoor Air Exposures* and in *Damp Indoor Spaces and Health*. These reports indicate that there is sufficient evidence of an association between asthma symptoms in sensitized asthmatic persons and exposure to damp indoor environments. A similar association was found between the

presence of mold or other agents in damp indoor environments and asthma symptoms in sensitized people with asthma. The following is a generally accepted list of common asthma triggers.

Table 1. Asthma Triggers
Animal dander
Dust mites
Cockroaches
Pollen
Mold
Tobacco smoke
Air pollutants (e.g. ozone)
Strong odors or scented products/chemicals
Cold air or changes in weather
Physical exertion (including exercise)
Strong emotions or stress
Certain medications (e.g. aspirin, beta-blockers)
Sulfites (preservatives in foods such as dried fruit and wine)
Gastroesophageal reflux disease (GERD)
Respiratory infections

Although these comprehensive reports are very useful in summarizing what we know about environmental exposures and asthma, they do not shed new light on causes for the apparent increase in asthma that was noted previously. There is no evidence that any of these factors have increased substantially in the last 20 years, and in some cases there is evidence that exposures have been reduced; while triggers are important in understanding the stimuli for asthma episodes, they do not explain the increase of persons with asthma in Tennessee.

THE BURDEN OF ASTHMA IN TENNESSEE

Although the incidence of asthma has been a developing public health problem nationally and in the state, little has been done to analyze and address asthma management in Tennessee. In 2008, the Tennessee Department of Health Office of Policy, Planning and Assessment prepared a report titled *The Burden of Asthma in Tennessee*, (2008). This report looked at the prevalence of asthma among adults and children as well as health care utilization and cost. Based on state data, hospital charge data and national surveys, this document brought to attention the need for developing a comprehensive asthma management plan for the state.

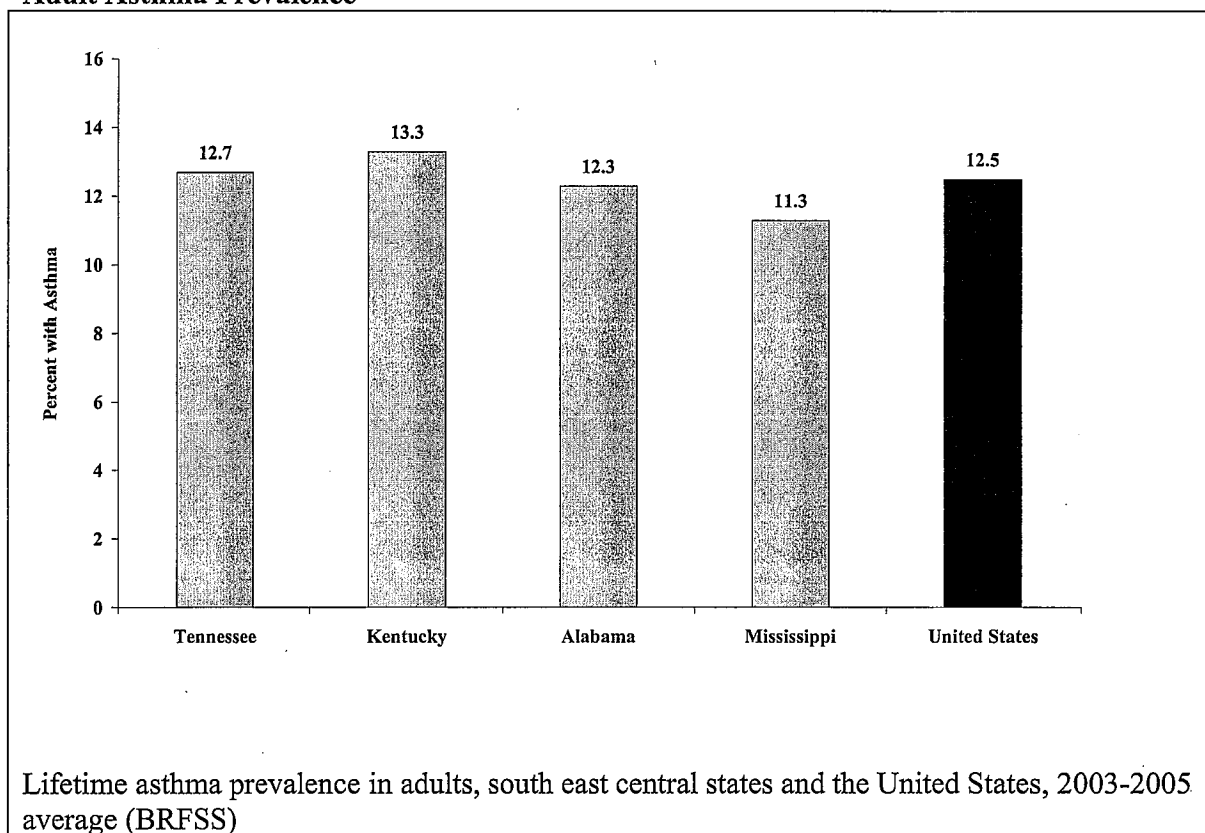
ASTHMA PREVALENCE

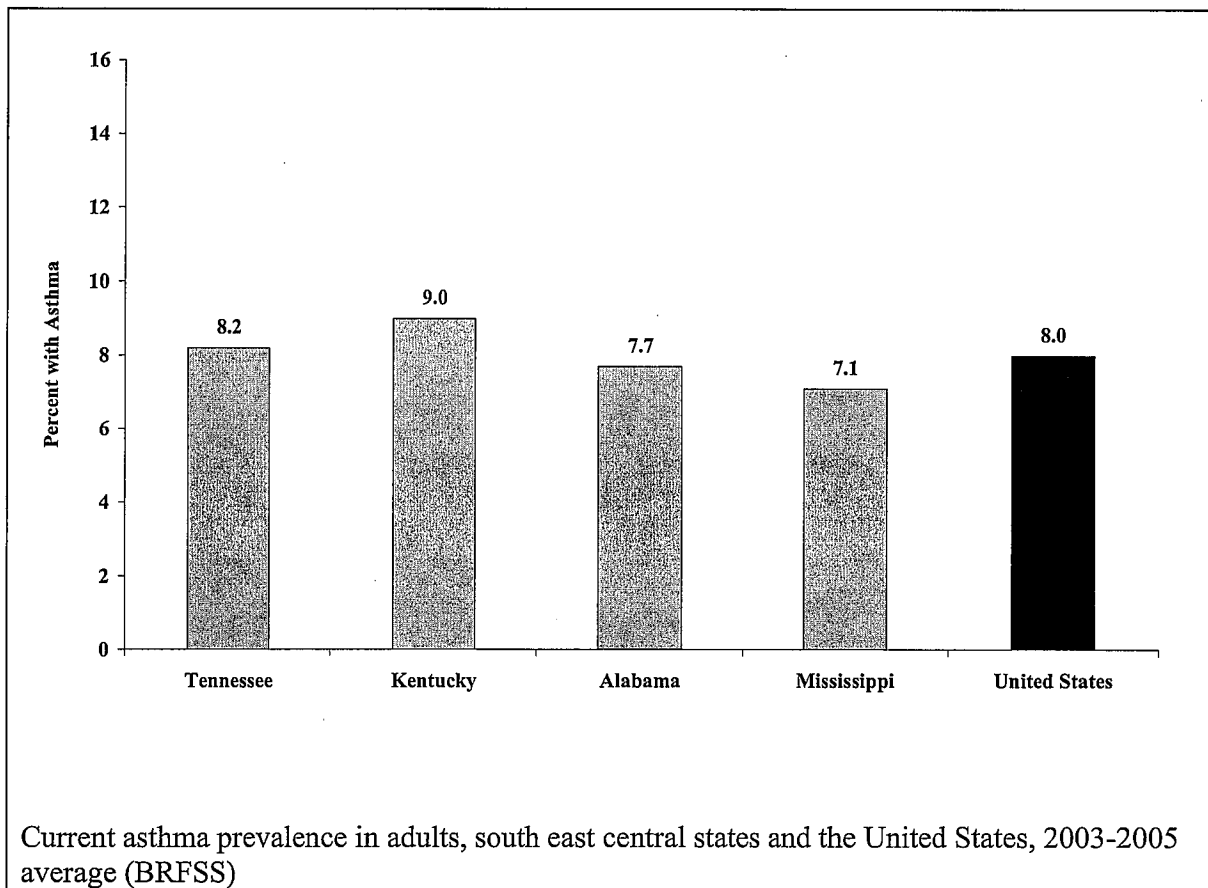
The prevalence rate of a disease is the proportion of persons in a population who have the disease at a specific point in time or over a specified period of time. Current prevalence rates are based on those who have been told they have asthma at one point in time, whereas lifetime prevalence rates indicate the proportion of the population that has ever been told that they have

asthma. Current and lifetime prevalence are often determined through the use of surveys. There are several available sources of survey data regarding asthma, including the Behavioral Risk Factor Surveillance System (BRFSS), the National Health Interview Survey (NHIS) and the National Survey of Children's Health (NSCH) that were used to determine asthma prevalence in Tennessee.

The following section discusses the prevalence of asthma in adults and children as two different segments of the population. Health care utilization is also broken out by these two groups and further segmented into emergency room visits and hospital admissions.

Adult Asthma Prevalence





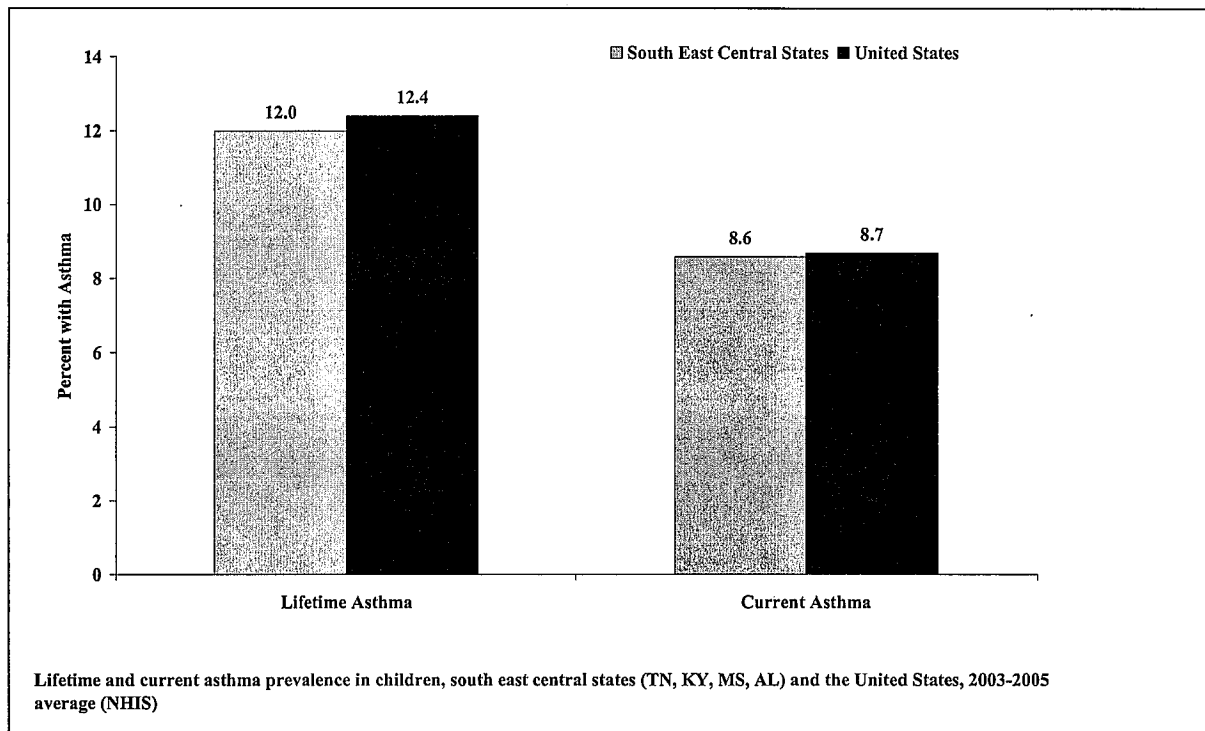
The following points are extracted from *The Burden of Asthma in Tennessee, 2008* regarding asthma prevalence in the adult population:

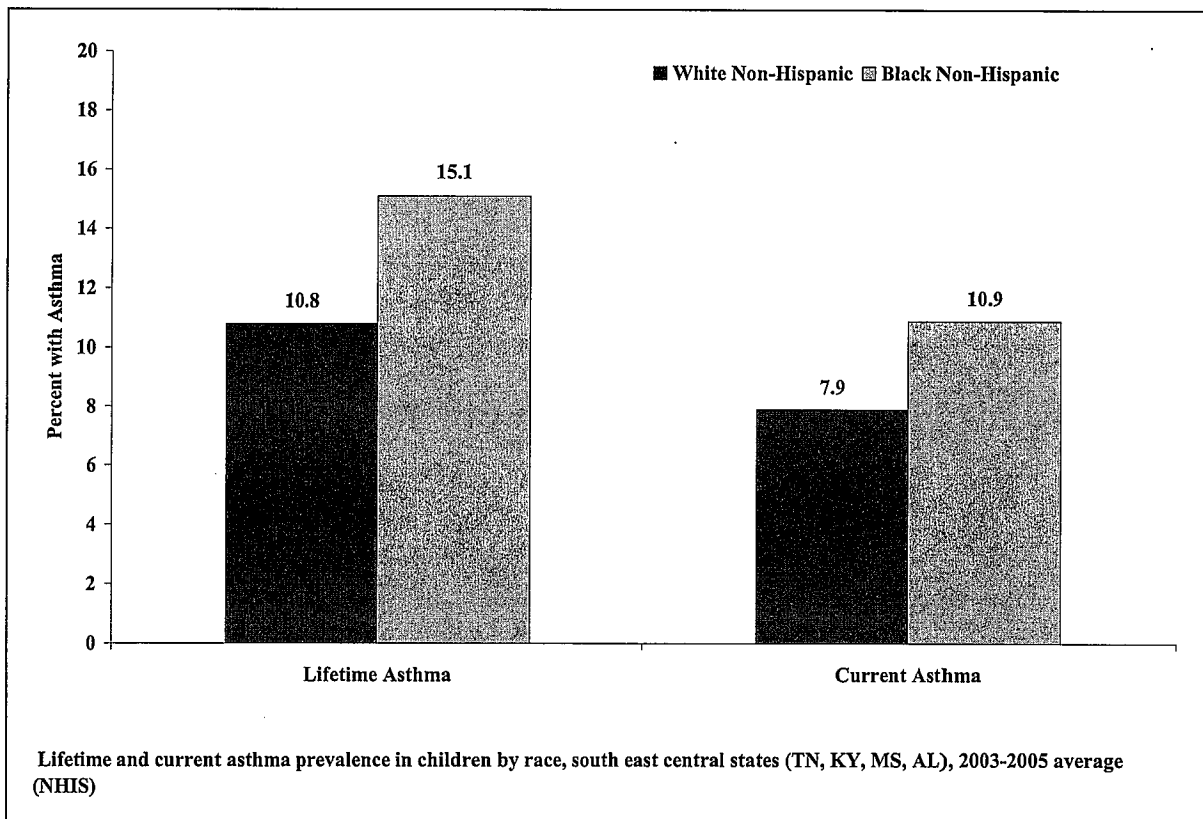
- Based on BRFSS data, the lifetime prevalence of asthma among adult Tennesseans (≥ 18 years) averaged 12.7% between 2004 and 2006. This represents approximately 570,000 adults in the state who ever had a diagnosis of asthma.
- During this same time period, the current prevalence of asthma averaged 8.4%.
- Between 2000 and 2006, there was no statistically significant increase or decrease in the lifetime or current prevalence of asthma in Tennessee
- Based on 2004-2006 Tennessee BRFSS data, both lifetime and current asthma prevalence rates were higher among adult females than adult males.
- Between 2004 and 2006, both lifetime and current asthma prevalence were highest among persons with an annual household income of less than \$15,000.
- Between 2004 and 2006, both lifetime and current asthma prevalence were highest among persons with less than a high school education.

Childhood Asthma Prevalence

State-specific asthma prevalence rates for children (0-17 years) are not available. Tennessee launched a coordinated school health program in 2006 and is collecting information on a variety of health conditions of school age children. In the 2008 Annual School Health Data & Compliance Report, the number of students diagnosed with asthma in LEA's increased from 47,035 in 2005-2006 to 48,902 in 2007-2008 suggesting that asthma is a significant problem for school age children.

The National Health Interview Survey (NHIS) does provide regional information compared to the United States on the prevalence of asthma among children. Tennessee, Kentucky, Mississippi, and Alabama are grouped as the southeast central region by the NHIS. The lifetime and current prevalence of asthma for children among these four states were 12.0% and 8.6%, respectively, compared to 12.4% and 8.7% for the nation.



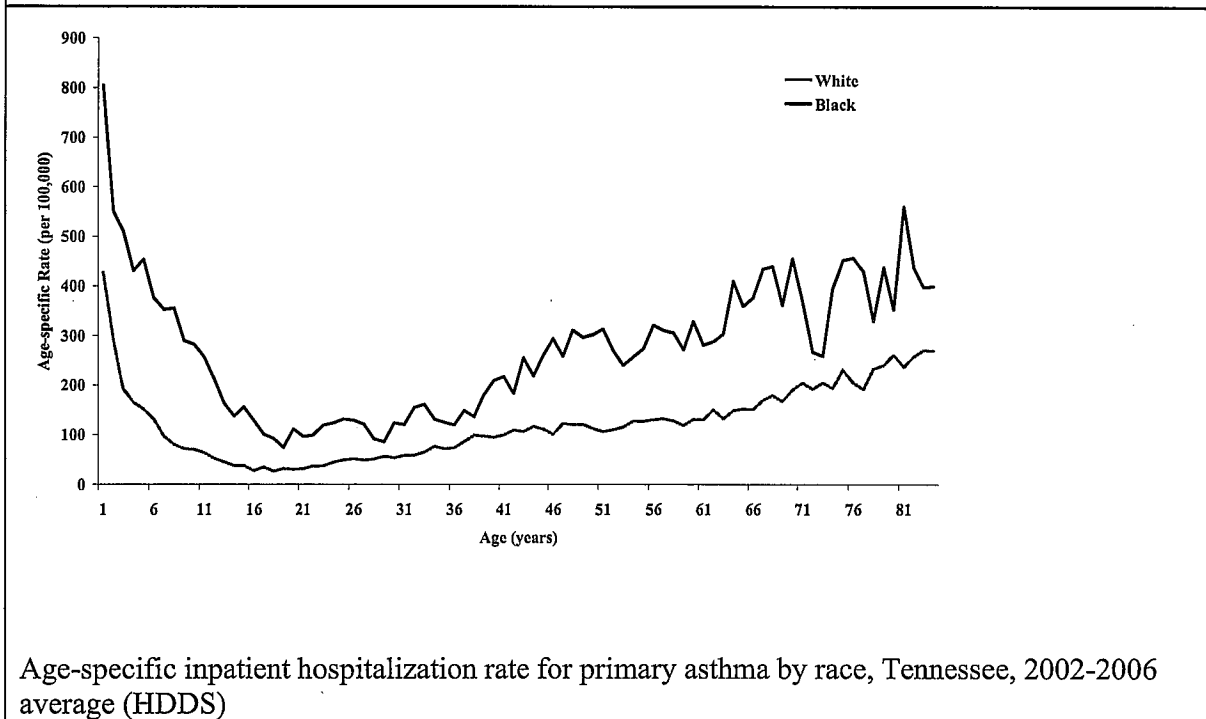
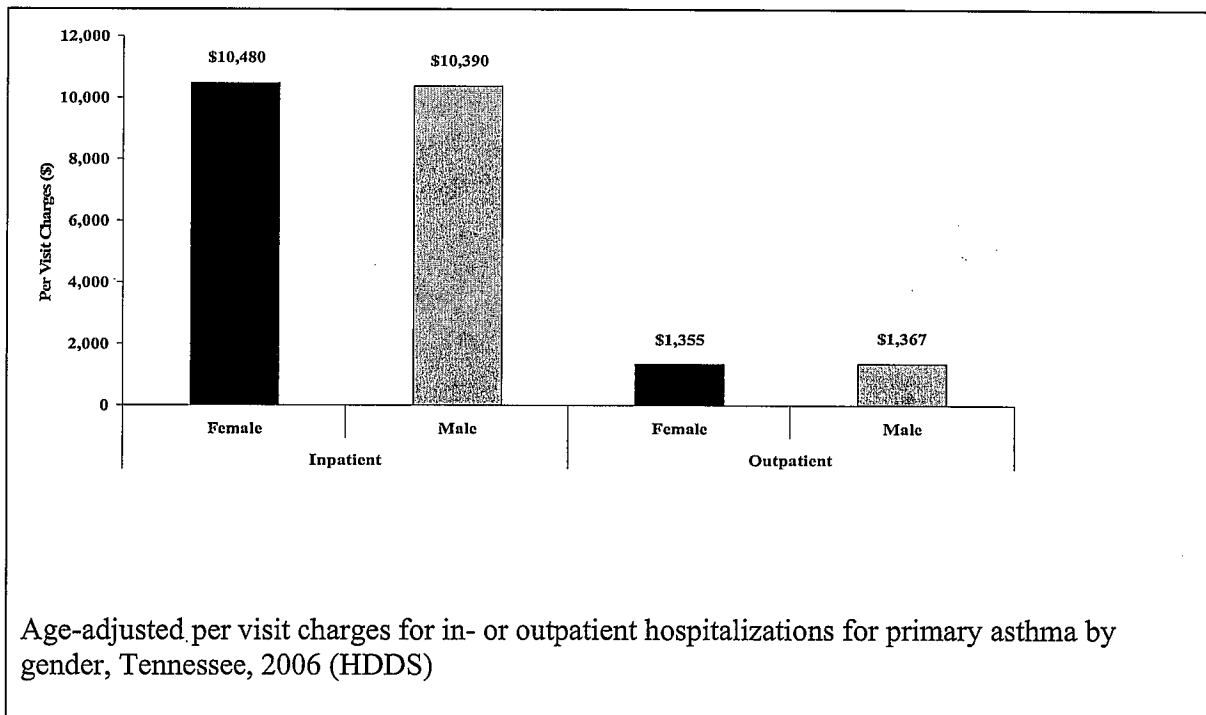


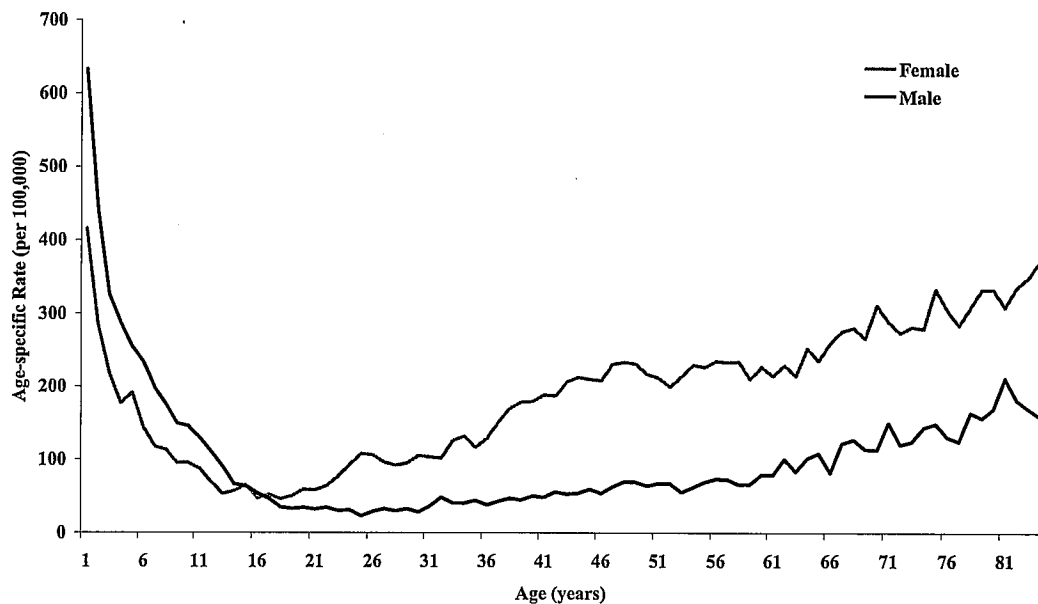
- Childhood asthma prevalence in the southeast central states was higher among males than among females.
- Childhood asthma prevalence in the southeast central states was higher among black non-Hispanics than white non-Hispanics.
- Average lifetime prevalence was 15.1% for black children and 10.8% for white children.
- Average current prevalence was 10.9% for black children and 7.9% for white children.
- Regional level data for Hispanics were not available from the NHIS.
- Nationally, lifetime prevalence among Hispanic children was 11.4% and current prevalence was 7.6%. These rates were similar to national-level prevalence rates for white non-Hispanic children.

HEALTH CARE UTILIZATION AND COST

Health care utilization includes emergency room visits, outpatient and inpatient hospitalizations for persons with asthma. The following table is taken from *The Burden of Asthma in Tennessee*, (2008). Asthma hospitalization rates were highest among very young children. Caution is recommended, however, because “asthma” is not generally diagnosed in children less than three years of age because of other common respiratory problems that may be present. As age increased, hospitalization rates decreased sharply until the mid to late teens, and then gradually increased again as age increased beyond age 30. This pattern held true for all gender and race groups. However, asthma hospitalization rates among children were higher for males than

females, while among adults they were higher for females. Asthma hospitalizations were higher among blacks than whites at all ages.





Age-specific inpatient hospitalization rate for primary asthma by gender, Tennessee, 2002-2006 average (HDDS)

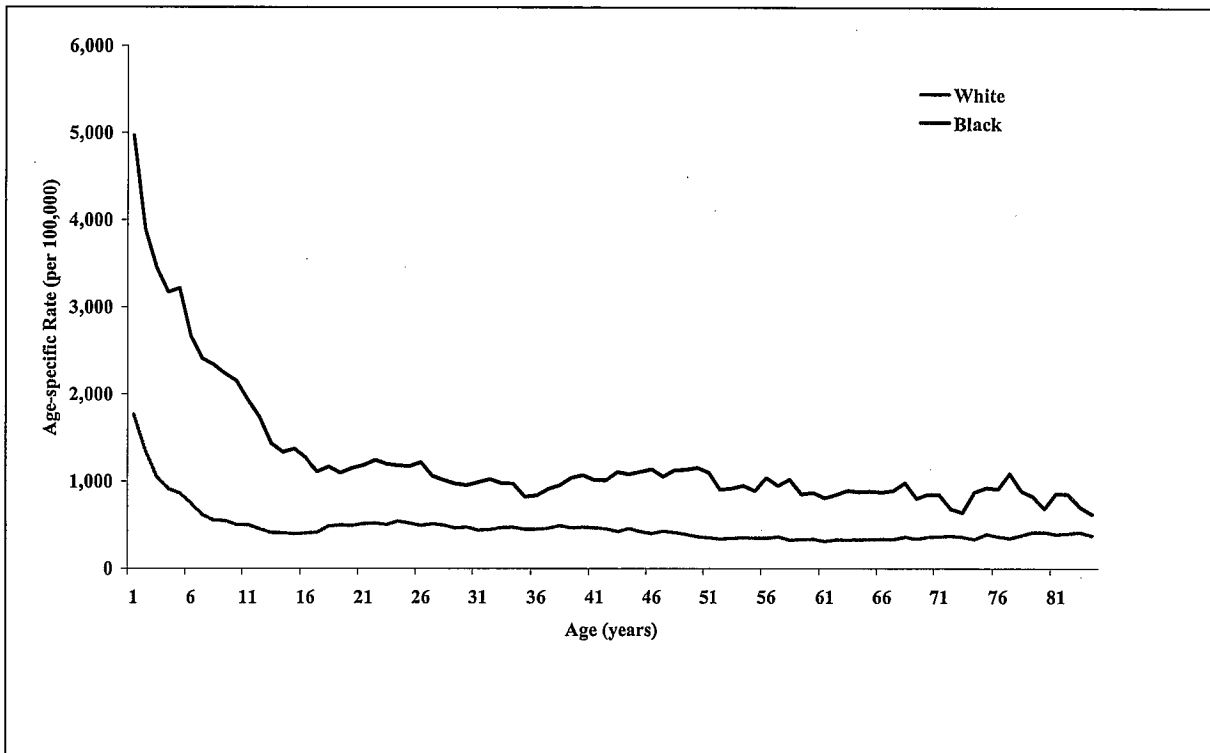
The counties with the highest asthma hospitalization rates per 100,000 were: Fentress (414), Polk (347), Coffee (279), Campbell (271) Lawrence (268), Trousdale (261), Haywood (255), Hardeman (251), Lauderdale (230), and Cocke (222). (Appendix 1).

Sometimes individuals are not able to manage their asthma episodes and emergency room visits and hospitalizations result. Reliance on these services is largely preventable with appropriate treatment and disease management. The number of inpatient hospitalizations for Tennesseans with a primary diagnosis of asthma reached 8,041 in 2006 with a rate of 133 per 100,000 (Office of Policy, Planning and Assessment, 2008). The rates were highest among very young children and older residents. This pattern held true across gender and races. Age-specific hospitalization rates per 100,000 population were: 293 for children aged 1-4, 158 for children aged 5-10, 66 for youth aged 11-17, 104 for adults aged 18-64, and 238 for residents aged 65 and older.

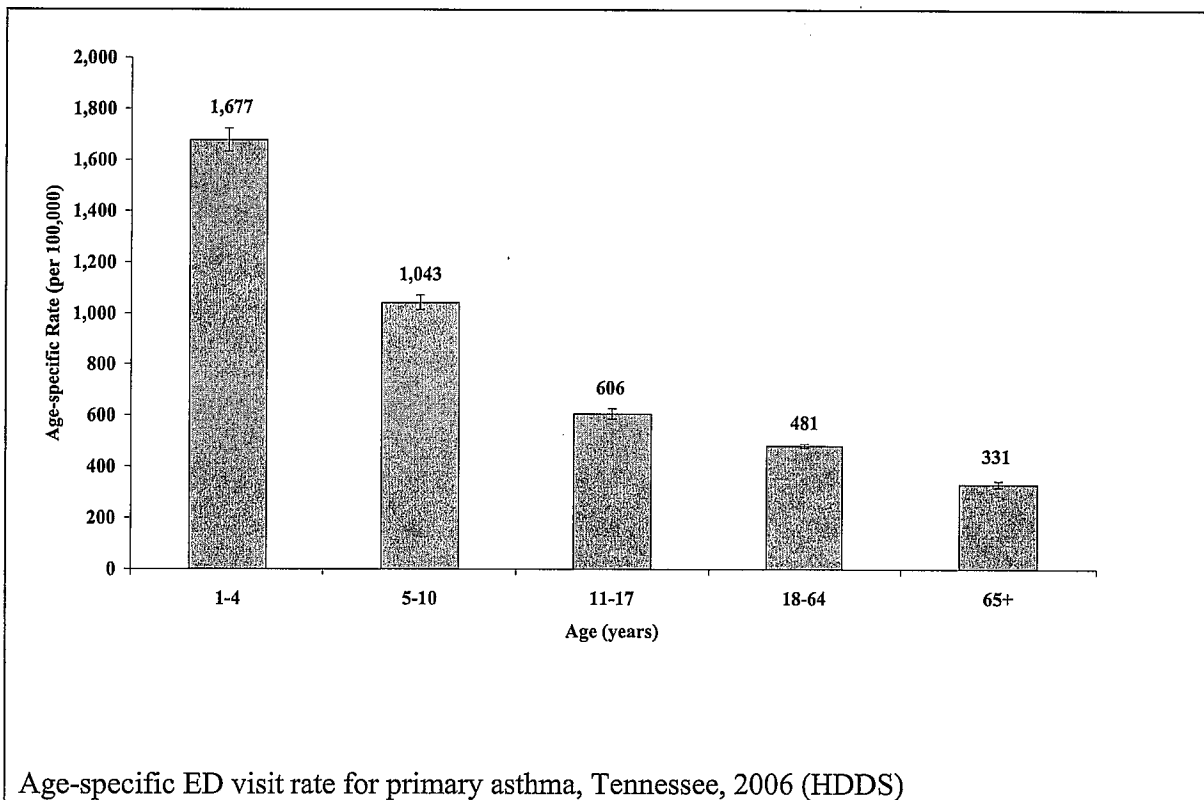
The cost analysis conducted by the Office of Policy, Planning and Assessment indicates an average cost of at \$10,434 per hospital stay in 2006. This represents a total of \$4,705,734 in hospitalization costs for the 451 children under age 10 and an additional \$2,483,292 estimated for the hospitalization costs for people over the age of 65. Women over the age of 18 are more likely than men to be hospitalized and blacks in all age groups are more likely to be hospitalized than whites. These and other data reflect a definite health disparity that must be addressed to reduce severe asthma episodes in Tennessee.

In 2006, the mean length of stay per admission for inpatient asthma hospitalizations was 3.3 days, with 66 days being the longest asthma related admission. Median length of stay was 3 days for females and 2 days for males. Median length of stay was 2 days for blacks and 3 days for whites. Elderly adults aged 65 years and older had the longest median length of stay (4 days), while children less than 18 years old had the shortest (2 days).

Persons experiencing a severe asthma episode, or who have unmanaged asthma, frequently go to the emergency department for immediate care. In 2006 there were 35,567 emergency department visits by persons with a primary diagnosis of asthma.



Age-specific ED visit rate for primary asthma by race, Tennessee, 2002-2006 average (HDDS)



The ten counties in Tennessee with the highest emergency department usage per 100,000 are Scott (984) Haywood (880), Cocke (878), Shelby (854), Hardeman (809), Coffee (793), Meigs (750), Campbell (746), Trousdale (738) and Houston (736). (Appendix 1).

ASTHMA AND TENNCARE ENROLLEES

Created in 1994, TennCare is the state's managed care Medicaid program. Tennessee was the first state in the nation to establish a managed care system to control costs and improve health access for eligible persons. Almost half the babies born in Tennessee are on TennCare; coverage is provided for low income children and families, pregnant women, disabled persons and persons in nursing homes. A special waiver also allows TennCare to enroll women who have been diagnosed with breast or cervical cancer who are uninsured and meet financial eligibility guidelines. Coverage has recently been extended to children who do not meet Medicaid guidelines but lack access to insurance.

Health care claims data was analyzed to study the utilization rate of those in the TennCare program. Claims data represented the amount an entity billed TennCare for specific services, not the actual amount reimbursed. The following points were extracted from *The Burden of Asthma in Tennessee* document

- Between 1995 and 2006, there was a statistically significant increase in the prevalence of asthma among TennCare enrollees. At least one reimbursement claim with asthma listed for the diagnosis was submitted for over 205,100 TennCare enrollees.

- Asthma prevalence was higher for women (11.7%) than men (8.6%) and highest for white women (12.4%).
- For those under age 18, asthma prevalence was highest among young children age 1 -4 (12.4%).
- There were 5,126 inpatient hospitalizations for a primary diagnosis of asthma and the hospitalization rate was 368/100,000.
- Between 1995 and 2006, hospitalization for any asthma diagnosis almost doubled.
- Even though asthma prevalence is higher for whites, hospitalization rates for both primary and any asthma diagnosis were higher for blacks (1,319/100,000).
- There were 19,383 emergency department visits in 2006 for a visit rate of 1,255/100,000.
- Between 1995 and 2006 there were statistically significant increases in emergency department visits by TennCare enrollees.
- Forty (40) percent of emergency department visits were for children under the age of 10.

The TennCare data is unique in that data for physician visits for asthma is available to compare with emergency department and hospitalization data. The Burden document analysis identified those cases in 2006 that had an emergency department visit resulting in a hospitalization. Data from these cases were then tracked back 18 months to see if they had seen a physician during the 18 month time period. The odds of having an emergency department visit were 2.5 times greater for those who had not seen a physician during the previous 18 months.

ASTHMA AND DISPARITY

Race and gender disparity have been cited in the discussion of asthma prevalence. Blacks in all age groups are more likely to be hospitalized than whites. These and other data reflect a definite health disparity that must be addressed to reduce severe asthma episodes in Tennessee. Blacks, regardless of age, are more likely to be hospitalized for asthma than other racial groups. We have also seen that TennCare enrollees have higher usage rates than non-TennCare enrolled persons, a fact which seems to indicate a relationship between those in lower socio-economic categories and asthma disease.

Poverty is thought to be associated with the incidence of asthma and disparity but there is a lack of consistent evidence of this link. One study indicated that black male children, regardless of socio-economic status, had higher prevalence rates for asthma than white children. Asthma triggers are more likely to be present in households with limited income or in substandard housing, but not all occupants have asthma or are sensitive to asthma triggers. Poverty and low income probably do increase the health risk of people with asthma because of the tendency to under-use primary care services, the lack of crisis management plans/poor compliance, and being under-medicated or incorrectly medicated during an asthma episode. Race and gender disparity must be addressed to effectively reduce asthma episodes in Tennessee's vulnerable populations.

ASTHMA AND MORTALITY

Asthma was determined to be the underlying cause of 80 deaths in Tennessee in 2006 with a rate of 13.1 per 1,000,000. The rates were similar for males (12.6) and females (13.7), though the mortality rate was significantly higher for blacks (33.1) than for whites (9.4). The mortality rate was lowest among children 1-17 years of age (6.5)—and highest among adults aged 65 and older (41.0). Asthma is common among older people, occurring in approximately 4-8 % of those over 65. Persons with asthma are at increased risk of death from causes other than asthma—one study indicated a six-fold increase in death from other lung diseases and cardiovascular disease in elderly adults with asthma as compared to the general population.

When the data are reviewed for deaths from any asthma diagnosis, a different picture is presented. In 2006, 192 deaths were reported in which asthma was listed as an underlying and/or contributing cause of death for a rate of 31.5 per 1,000,000. The mortality rate was higher for females (34.9) than for males (26.2) per 1,000,000. The rate was higher among blacks (59.6) than whites (26.8 per 1,000,000). Mortality rates were lowest among children 1-17 years of age and highest among adults 65 years of age and older (148.3 per 1,000,000). Tennessee residents with a secondary diagnosis of asthma had greater odds of dying due to underlying heart disease than those who did not have a secondary diagnosis of asthma. The odds ratio was highest among black males with a rate 3.7 times as high as those without secondary asthma. The odds of dying from heart disease among other racial or gender groups were about twice as high as those with a secondary asthma diagnosis.

According to the TN Child Fatality Review, nine children under age 10 died from complications of asthma between 2005 and 2008. Data for this report are summarized in 5 year increments so the death total for children under ten will likely be higher by 2010, the end date for the next five year report.

TARGET POPULATIONS FOR ASTHMA CONTROL

Based on data from *The Burden of Asthma in Tennessee* (2008), the Tennessee Asthma Plan targets specific age groups to reduce asthma episodes, emergency department visits and hospitalizations.

The targets are:

1. Children 0-5 years old and their caregivers and families
2. School age children 10 years and younger including their parents and the school environment and
3. Tennesseans age 30 and older

Asthma and Preschool Children

Children under five were identified as the first priority because of the data presented and access to families with young children through several statewide programs managed by the Departments of Health, Education and Bureau of TennCare. These programs include home visiting services, Women, Infant and Children (WIC) services, Head Start, pre-kindergarten

programs offered by local education agencies, well child health exams at local health departments and through TennCare MCOs, and collaborative services offered to the early child care network through the Early Childhood Comprehensive Systems (ECCS) initiative. ECCS provides continuing education for licensed child care providers through regional Child Care Resource and Referral Centers. ECCS also has a strong partnership with the state child care training and certificate program offered for individuals seeking certification or an associate's degree prior to being hired by child care facilities.

Asthma and School Age Children

Asthma is one of the most common causes of school absenteeism and affects approximately 1 in 10 children in the United States. Good asthma control for children means reduced school absenteeism, full participation in school and other activities, and uninterrupted sleep at night—leading to improved school performance. Asthma in school age children is one of many important issues being addressed through the activities of the Tennessee Coordinated School Health (CSH) Program.

CSH was funded in 2006 and the Department of Education was charged with the responsibility of instituting coordinated school health in all Local Education Agencies (LEAs) statewide. Each school system hired a school health coordinator to work with local administrators, teachers, school personnel, interested parents and community members to implement the eight components of a comprehensive school health system.

The Tennessee Department of Education defines Coordinated School Health (CSH) as a system designed to integrate physical, emotional and social aspects of health with learning. The eight components for a comprehensive school health program are as follows:

- 1) Comprehensive Health Education – Health education is a sequential program for pre-K-12 program addressing the physical, mental and emotional, and social aspects of health.
- 2) Health Services – Health Services are provided and/or supervised by school health nurses to assess and promote student health.
- 3) Nutrition Services - Nutrition services assures access to a variety or nutrition meals accommodating the health and nutrition needs of all students.
- 4) Physical Education/Physical Activity - Physical education is a sequential pre-k -12 curriculum program that follows national standards in providing developmentally appropriate, cognitive content and learning experiences in a variety of physical activity areas such as basic movement skills; physical fitness; rhythm and dance; cooperative games; team, dual, and individual sports; tumbling and gymnastics; and aquatics.
- 5) Healthy School Environment - Healthy school environment concerns the quality of the physical and aesthetic surroundings; the psychosocial climate, safety, and culture of the school; the school safety and emergency plans; and the periodic review and testing of the factors and conditions that influence the environment.
- 6) School Counseling, Psychological and Social Services - Counseling, mental health, and social services are provided to assess and improve the mental, emotional, and social health of every student.
- 7) Student, Family and Community Involvement - Involvement of students, parents, community representatives, health specialists, and volunteers in schools provides an

integrated approach for enhancing the health and well being of students both at school and in the community.

- 8) School-Site Health Promotion for Staff - Wellness opportunities such as health assessments, health education and physical fitness activities are provided to all school staff, including the administrators, teachers and support personnel, to improve their health status.

The Tennessee Coordinated School Health Report of 2007 states that 135 of the 136 school systems have implemented a CSH Initiative. Approximately 115,965 students have a diagnosis of chronic illness or disability. Among them, 48,902 or 42.1% have a primary diagnosis of asthma. School health data and compliance highlights include:

- 50% of all school systems have used the EPA Indoor Air Quality Tools for Schools Kit to assess and plan at the school level
- 63,574 students self-administer medications at school. Of the total number of students self-administering medications, 17,747, or 28%, of students self-administered inhalants.
- 72,339 students received medications at school, administered by a health care professional.
- 6,823 students received a health care procedure on a daily or routine basis at school from a licensed health care professional.
- School personnel are trained to handle medications and record keeping, including 921 principals/assistant principals (9.6%), 4,782 educators (47%), 241 counselors (2.3%), 2,361 secretaries (23%), nurses (11%), and 701 other staff(6.9%).
- Of the 140 school systems, 126 have developed an individual health plan (IHP) for all students with chronic or long-term illnesses including asthma.

In June of 2008, the state of Tennessee passed a bill (Public Chapter 1154, Appendix 5) mandating that the Department of Health collaborate on the problem of asthma with both the Department of Education and the Bureau of TennCare, in order to coordinate plans for reducing the burden of asthma on the state's school children.

Asthma and Adult Tennesseans over Age 30

After early childhood, hospitalizations and emergency room visits decrease until age 30 when asthma admissions begin to increase again. Persons with lifetime prevalence of asthma are in the workforce and exposed to asthma triggers or occupational related substances that may increase the occurrence of asthma episodes. Adults who have not experienced an asthma episode in many years may have become lax in monitoring and managing their asthma, resulting in a recurrence of episodes. Adults over the age of 65 have a higher risk of asthma episodes either as a primary diagnosis or an underlying cause when the primary diagnosis is for other lung or breathing problems, heart disease or COPD. Asthmatic adults who smoke are at higher risk of serious asthma episodes than those who don't smoke. In 2003, asthma accounted for an estimated 10.1 million lost work days for adults nationally.

ASTHMA MANAGEMENT IN TENNESSEE

The goals and objectives for the Tennessee Asthma Plan were developed by identifying needs and disparities reflected in the Office of Policy, Planning and Assessment's *Burden of Asthma in Tennessee* (2008), by reviewing recent legislation passed to address school age asthma incidence, by reviewing Healthy People 2010 goals for asthma, and by assessing available resources to address asthma in Tennessee. The STAT team formed four workgroups to address asthma control issues related to Surveillance and Epidemiology, Environmental Quality, Education and Clinical Care (Appendix 3).

The current goals of the STAT team are designed to be overarching as they relate to the problem of asthma. To begin addressing these goals, each workgroup developed specific objectives, which will be used to develop annual work plans as the STAT team evolves. The STAT teams will monitor the effectiveness of efforts to control the impact of asthma in Tennessee. Partnerships with the American Lung Association, regional children's hospitals, Tennessee Respiratory Care Association, coordinated school health personnel, the Tennessee Department of Education, local health departments, the Tennessee Association of School Nurses, the Tennessee Medical Association, the Tennessee Commission on Children and Youth, the Tennessee Department of Environment and Conservation, and other agencies have been invaluable resources in the development of this plan. The STAT team will continue to expand group membership to improve asthma management in Tennessee and thus improve the lives of all Tennesseans with asthma.

The overarching goal of the State of Tennessee Asthma Plan is to reduce the burden of asthma in Tennessee. To this end, the Plan seeks to improve:

1. continued surveillance of asthma to identify needs and gaps in asthma management;
2. public awareness and education as a public health problem;
3. medical management of asthma as a chronic disease by both the health care provider and the patient and
4. reduction of indoor and outdoor environmental triggers relevant to asthma management and control.

GOALS AND OBJECTIVES

The goals and objectives for the next five years of implementation are organized in four broad areas that define the work to be done through public health and population based strategies.

Surveillance and Epidemiology

GOAL: Identify and continuously monitor populations at risk for asthma in Tennessee.

Objective 1. At least every three years, review the current data on asthma prevalence and health care costs to update the *Burden of Asthma in Tennessee, 2008* and disseminate information to asthma stakeholders and members of the State of Tennessee Taskforce (STAT).

Objective 2. By July 2010, develop and implement an asthma data surveillance and evaluation plan to continuously track data elements and evaluate the impact of STAT activities.

Public Awareness and Education

Goal: Increase public awareness and education for all Tennesseans and specifically those affected by asthma.

Objective 1. By December 2010, launch an asthma education and awareness plan to educate all Tennesseans about asthma incidence in Tennessee emphasizing the counties with the highest hospitalization and emergency room visits.

Objective 2. By July 2010, increase the opportunities for training and the number of child care providers trained in asthma education and asthma management.

Objective 3. By June 2011, increase the opportunities for training and the number of students, staff, faculty, administration, coaches and school health professionals trained in asthma education and asthma management.

Objective 4. By June 2010, disseminate age appropriate asthma management education programs to Tennesseans with emphasis on children and their families that includes asthma facts, asthma triggers, appropriate use of medications and the importance of self monitoring.

Objective 5. By June 2011, increase public awareness about modifiable, environmental asthma triggers emphasizing second-hand smoke and its relationship to asthma.

Objective 6. By December 2012, promote the 100% tobacco free schools policy and enforcement which follows the Centers for Disease Control and Prevention guidelines that all school buildings and school grounds are 100% tobacco free at all times.

Medical Management

GOAL: Promote the use of best practices, guidelines and evidence from the literature regarding the diagnosis and management of asthma.

Objective 1. By December 2011, promote asthma continuing education and web-based programs for health professionals to increase knowledge and adherence to national guidelines for asthma diagnosis and management.

Objective 2. Continuously promote the federally recognized standard of one nurse per 750 students in grade K through 12 to improve school attendance and assist students with asthma in episode management.

Objective 3. Continuously improve group and educational settings for children and adults with asthma by reducing environmental triggers and increasing asthma management skills, through training, monitoring, technical assistance and evaluation.

Objective 4. In partnership with the Department of Education Coordinated School Health Program, develop and implement an emergency action plan for schools in the event of an acute asthma exacerbation by September 2010.

Objective 5. By December 2014, all children with an asthma diagnosis will have an individualized asthma plan from the patient's medical home on file in the school, child care facility or other out-of-home group care setting and used in the home for asthma management.

Objective 6. By December 2010, develop partnerships to educate parents to the signs and symptoms of asthma and the details of asthma management for children ages 1 through 4.

Environmental Management

Goal: Ensure that all community settings for children and adults with asthma are safe and healthy environments.

Objective 1. By July 2011, ensure that the annual monitoring visits to licensed child care facilities conducted by DHS include an assessment of asthma triggers and asthma action plans for children with asthma.

Objective 2. By December 2014, increase public awareness about second hand smoke exposure and other environmental triggers (e.g. cockroaches, pet dander, mold, dust mites) in the home, child care setting or school through a community wide campaign.

Objective 3. By December 2014, at least 70 percent of the school systems will use the Indoor Air Quality- Tools for Schools program developed by EPA to improve indoor air quality.

The objectives listed above will be tied to annual work plans that will focus on and elucidate the strategies selected for each objective. The work plan will be reviewed at least annually. The annual review process will allow the STAT and the executive committee to revise and add to these objectives as the Department and its partners work to achieve the goals and objectives of the State Asthma Plan.

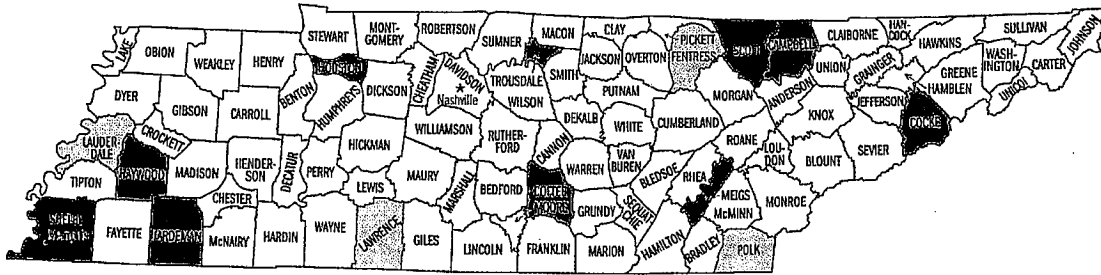
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Appendices

1. Map Depicting Highest Hospital and Emergency Department Rates in TN Counties
2. Stakeholder List
3. State of Tennessee Asthma Taskforce (STAT) Workgroups
4. Summary of *The Burden of Asthma* document
5. Public Chapter 1154

Appendix 1.



The above map depicts the Tennessee counties with the highest rates for Hospitalizations and Emergency Department visits for asthma.

- **Red Counties** (Scott, Shelby, Meigs, and Houston) have the highest emergency department visit rates
- **Gray Counties** (Lauderdale, Lawrence, Polk, and Fentress) have the highest hospitalization rates.
- **Orange Counties** (Haywood, Hardeman, Coffee, Campbell, Cocke, and Trousdale) have the highest rates for both emergency department visits and hospitalizations.

Appendix 2.

Stakeholder Group Membership List
State of Tennessee Asthma Task Force

NAME	ORGANIZATION
Areola, Sanmi	Metro Public Health Department of Nashville/Davidson County
Baggett, Pam	TN Department of Health – TennCare services
Banerjee, Sumita	TN Commission on Children and Youth
Bashor, Bonnie	TN Department of Health- Communicable and Environmental Diseases
Bauer, Audrey	TN Department of Health
Bawuah, Kwame	TN Department of Health- Maternal and Child Health
Bost, Gail	American Lung Association of TN
Bufwack, Mary	United Neighborhood Health Services
Bunting, Sandy	BlueCross BlueShield of Tennessee
Clayton-Davis, Joan	National Heart Lung Blood Institute Asthma Initiative
Crawford, Gail	Department of Human Services
Cushman, Donnell	Respiratory Care Consulting Services, Inc.
Dewey, Mary Jane	TN Department of Health
Duddy, Barbara	TN Association of School Nurses
Eidson, Kevin	TN Department of Health – Health Related Boards
Elolia, Robin	Sullivan County Health Dept
Ferguson, Edie	AmeriChoice MCO
Fontaine, Anna Mary	Sumner County Schools - Pupil Services
Fort, Brittany	TN Department of Health - Tobacco Use Prevention and Control Program
Givens, Connie	TN Dept of Education - Office of Coordinated School Health
Gunn, Veronica	TN Department of Health - Chief Medical Officer
Hackler, Rachael	Vanderbilt Children's Hospital
Hamblen, Amanda	AmeriChoice MCO
Harris-Hayes, Audrey	LeBonheur Children's Medical Center
Hicks, Lynette	TN Department of Health- MCH- Helping Us Grow Successfully (HUGS)
Hitz, Dee	TN Department of Health- MCH- Children's Special Services
Hogg, Cindy	LeBonheur Community Outreach
Holland, Cindy	BlueCross BlueShield of Tennessee
Hunter, Jim	American Lung Association of TN
James, Jeanne	Bureau of TennCare
Johnson, Jacqueline	TN Department of Health - Maternal & Child Health, Children's Special Services
Keane, Brendie	CareHere, LLC
Keel, Martha	UT Extension- Housing and Environmental Health

Kelly, Kay	LeBonheur
Kranz, Melissa	TN Department of Health - Communicable & Environmental Disease Services
Lawhorn, Carolyn	Hardeman County Community Health Center, Inc.
Li, Yinmei	TN Department of Health - Surveillance, Epidemiology and Evaluation
Mack, Yvette	TN Department of Health- Asthma, Adolescent Health, Abstinence
Malone, Alisa	Amerigroup Community Care MCO
May, Andrew Stephen	Sullivan County Regional Health Dept
McCabe, Bridget	TN DOH - Division of Quality Improvement
McLean, Amy	CSH/LeBonheur Children's Med Center
Morton, Melanie	BlueCross BlueShield of Tennessee
Mouser, Mary Kate	Vanderbilt University Children's Health Improvement
Nafe, Ken	TN Dept of Environment and Conservation
Napier, Jena	TN Governor's Office of Children's Care Coordination (GOCCC)
Newman, Heather	Office of the Commissioner of Health
Norris, Casey	East TN Children's Hospital
Owten, Willa	LeBonheur Children's Medical Center
Patterson, Lorraine	Vanderbilt Children's Hospital
Perez, Erika	United Neighborhood Health Services
Petrie, Phil	Office of Environmental Assistance
Potash, Dru	TN DOH - Division of Quality Improvement
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Sartin, Joan	TennCare
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Smith, Margaret	American Lung Association of TN
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Thompson, Sharon	Community Health Lebonheur Children's Med Center
VanDyke, Karen	TN DOH Project Teach
Watson, Paige	The Allergy, Asthma & Sinus Center
Williamson, Elizabeth	TN DOH
Williford, Kristen	LeBonheur Community Outreach
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Wyche-Etheridge, Kimberly	Metro Public Health Department of Nashville/Davidson County

Appendix 3.

STAT Workgroups

**SURVEILLANCE & EPIDEMIOLOGY
WORK GROUP**

Audrey Bauer, Epidemiologist
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LeBonheur Children's Medical Center

CLINICAL CARE WORKGROUP

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United Neighborhood Health Services

Sandy Bunting, Director of Total
HealthCare Management
BlueCross BlueShield of Tennessee

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Chief Medical Director
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Dru Potash, RN, Nurse Practitioner
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Rosie Wooten, Director
Early Childhood Comprehensive Systems/
Child Care Resource & Referral
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University of Tennessee at Knoxville -
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Tobacco Use Prevention and Control
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Tennessee Environment & Conservation

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Pam Baggett, Director
TENnderCare Program
Tennessee Department of Health

Sumita Banerjee, Policy Advocate
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Bonnie Bashor, Director
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American Lung Association of TN

Gail Crawford, Director of Infant/Toddler
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Audrey Harris-Hayes, Asthma Case
Manager
LeBonheur Children's Medical Center

Donna Henry, Former Director
Tobacco Prevention Program
Tennessee Department of Health

Lynette Hicks, Program Director
Help Us Grow Successfully
Tennessee Department of Health

Dee Hitz, Nurse Consultant
Children's Special Services
Tennessee Department of Health

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BlueCross BlueShield of Tennessee

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TN Governor's Office of Children's Care
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Special Assistant, Commissioner of Health
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Asthma Project Development
United Neighborhood Health Services

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Kristen Williford
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Coordinated School Health
Jackson-Madison County Schools

Kimberly Wyche-Etheridge, MD
Nashville Metropolitan Health Departmen

Appendix 4.

Summary of Key Findings from *The Burden of Asthma*

Asthma Prevalence

- There was no increase or decrease in asthma prevalence in Tennessee between 2000 and 2006.
- Current prevalence of asthma in Tennessee was 8.5% in children and 8.4% in adults.
- Among adults, asthma was more common among women than men. However, among children asthma prevalence rates were higher among boys.
- Asthma was more common among black children than white children. However, there were no racial differences in asthma prevalence among adults.
- Asthma prevalence increased with decreasing income and education.

Health Care Utilization and Cost

Inpatient Hospitalizations

- Between 1997 and 2006, there was no increase or decrease in inpatient hospitalizations for a primary diagnosis of asthma in Tennessee. However, hospitalizations for which asthma was listed as a secondary diagnosis approximately doubled.
- In 2006, there were 8,041 inpatient hospitalizations for a primary diagnosis of asthma, and the hospitalization rate was 133/100,000.
- Among children, boys had higher hospitalization rates than did girls. Among adults, females had higher hospitalization rates.
- Blacks had higher asthma hospitalization rates than whites at all ages.
- Inpatient hospitalization rates were highest among young children (1-4 years old) and among the elderly (65+ years old).
- Inpatient hospitalizations for asthma peaked during the fall (October and November) and were at their lowest in the summer (June and July).
- Hospital stays for asthma ranged from 0 to 66 days, with a median of 3 days. Median length of stay was longest among the elderly.

Emergency Department Visits

- Between 1997 and 2006, emergency department (ED) visits for a primary diagnosis of asthma increased 35%, while those for a secondary diagnosis of asthma more than quadrupled.
- In 2006, there were 35,567 ED visits for a primary diagnosis of asthma, and the ED visit rate was 604/100,000.
- Among children, boys had higher ED visit rates than girls. Among adults, females had higher rates.
- Blacks had higher ED visit rates than whites at all ages.
- ED visit rates were highest among young children and decreased with increasing age. However, elderly patients were more likely to be subsequently admitted to

the hospital following an emergency department visit than younger adults and children.

- Seasonal trends in ED visits were similar to those observed for inpatient hospitalizations.

Hospital Charges

- Between 1997 and 2006, per visit inpatient hospitalization charges for a primary diagnosis of asthma increased 60% and per visit outpatient hospitalization charges increased 136%.
- In 2006, inpatient charges averaged \$10,434 per visit and outpatient charges averaged \$1,361 per visit.
- Both inpatient and outpatient per visit charges were similar among females and males, and slightly higher among blacks compared to whites.
- Both inpatient and outpatient per visit charges were highest among the elderly.

Asthma among TennCare Enrollees

Prevalence

- Between 2004 and 2006, the prevalence of asthma among TennCare enrollees was 10.6%.
- Prevalence was higher among females than among males and higher among whites than among blacks.
- Asthma prevalence was highest among young children.

Inpatient Hospitalizations and Emergency Department Visits

- Between 1995 and 2006, there was no increase or decrease in inpatient hospitalizations for a primary diagnosis of asthma among TennCare enrollees. However, hospitalizations for any asthma diagnosis almost doubled.
- During this same time period, ED visits for a primary asthma diagnosis approximately doubled and those for any asthma diagnosis more than quadrupled.
- In 2006, the inpatient hospitalization rate for primary asthma was 368/100,000 and the ED visit rate was 1,255/100,000 – both rates were higher than those observed in the overall Tennessee population.
- Hospitalization and ED visit rates for both a primary and for any asthma diagnosis were higher among females than among males and higher among blacks than among whites.
- Young children had the highest hospitalization and ED visit rates for primary asthma.
- Elderly adults had the highest inpatient hospitalization rate for any asthma and the lowest ED visit rate for any asthma.

Physician Visits

- Between 1995 and 2004, there was an increase in physician visits for any diagnosis of asthma among TennCare enrollees. However, due to a steep decline in 2004-2006, the overall trend in physician visits between 1995 and 2006 was not statistically significant.

- In 2006, the physician visit rate for any asthma diagnosis was 8,768/100,000.
- Physician visit rates were higher among females than males, but similar among blacks and whites.
- Young children had the highest physician visit rates.
- The majority of TennCare healthcare encounters for primary asthma were physician visits (82%). Whites had a higher percentage of physician visits (as compared to in- and outpatient hospitalizations) than did blacks.
- The odds of having an ED visit for primary asthma were higher among those who had not visited a physician in the past 18 months than among those who had seen a physician.

Asthma Mortality

- Between 1995 and 2006, the asthma mortality rate in Tennessee declined.
- In 2006, the mortality rate for a primary diagnosis of asthma was 13.1 deaths per million people in Tennessee. For any asthma diagnosis the mortality rate was 31.5/1,000,000.
- The mortality rate for primary asthma was similar among females and males, while the mortality rate for any asthma diagnosis was slightly higher among females.
- The mortality rates for both primary and any asthma diagnosis were higher among blacks than whites.
- Elderly adults had the highest asthma mortality rates.
- Between 1999 and 2006, persons with a secondary asthma diagnosis had greater odds of dying due to an underlying diagnosis of heart disease than did those without a secondary asthma diagnosis.

The Burden of Asthma in Tennessee may be read in its entirety at:
<http://health.state.tn.us/statistics/PdfFiles/burdenofasthma.pdf>