

Putting
Excellent Asthma Care
within REACH (2010-2014)

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Acknowledgements

This document is the result of collaborative efforts between the Missouri Asthma Coalition (MAC) and the Missouri Asthma Prevention and Control Program of the Missouri Department of Health and Senior Services (DHSS). The MAC is comprised of approximately 80 members. For additional information about members and activities of the coalition visit: www.asthma.org.

Putting Excellent Asthma Care Within Reach (2010-2014)

Authors

Sherri Homan, RN, PhD, Public Health Epidemiologist, Office of Epidemiology, Missouri Department of Health and Senior Services

Peggy Gaddy, RRT, MBA, Program Coordinator, Missouri Asthma Prevention and Control Program, Missouri Department of Health and Senior Services

Eric Armbrrecht, PhD, Principal, Open Health, LLC and Assistant Professor, Center for Outcomes Research, St. Louis University

Text Editing and Graphic Design

John C. Davis, Public Information Coordinator, Office of Community Health Information, Missouri Department of Health and Senior Services

Special Acknowledgements

Amy Kelsey, MPH, Senior Epidemiology Specialist, Bureau of Environmental Epidemiology, Missouri Department of Health and Senior Services

Shumei Yun, MD, PhD, Chronic Disease Epidemiologist, Office of Epidemiology, Missouri Department of Health and Senior Services

Data Systems

Janet Wilson, Med, MPA, Coordinator, Behavioral Risk Factor Surveillance System and Missouri County-level Study, Missouri Department of Health and Senior Services

William T. Wells, PhD, Director, Health and Behavioral Risk Research Center, Department of Health Management & Informatics, University of Missouri-Columbia

Mark VanTuinen, PhD, Research Manager, Health Care Data Analysis, Bureau of Health Informatics, Missouri Department of Health and Senior Services

Craig Ward, BSc, BA, MSW, Research Manager, Missouri Vital Statistics Analysis, Bureau of Health Informatics, Missouri Department of Health and Senior Services

Andrew Hunter, PhD, Research Analyst, Health Data Dissemination, Bureau of Health Informatics, Missouri Department of Health and Senior Services

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Additional Information

Missouri Asthma Prevention and Control Program
P.O. Box 570
Jefferson City, MO 65102-0570
573-522-2876 E-mail: info@dhss.mo.gov

List of Abbreviations

BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CLS	Missouri County-level Study
DHSS	Missouri Department of Health and Senior Services
ED	Emergency Department
EPR-3	Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma
HP	Healthy People
MAC	Missouri Asthma Coalition
MAPCP	Missouri Asthma Prevention and Control Program
NAEPP	National Asthma Education and Prevention Program
NHLBI	National Heart Lung and Blood Institute
SABA	Short-acting beta2-agonists

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Executive Summary

More than 500,000 Missourians live with asthma, and on average, 76 Missourians die each year as a result of their asthma.^{1,2} Among adults, current asthma is more common among women (10.0 percent) than men (7.0 percent) and among African-Americans (10.7 percent) and Hispanics (10.9 percent) than whites (8.2 percent).³ Among children and adolescents 17 years of age and younger, the racial/ethnic differences remain with African-American (11.3 percent) and other minority children (9.9 percent) having a higher prevalence of current asthma than white children (8.1 percent).¹ However, asthma is more common among boys (10.7 percent) than girls (6.4 percent).



Children are disproportionately affected by asthma based on emergency department (ED) visits and hospitalization data. The highest rates of asthma ED visits and hospitalizations are among children from 1 to 4 years of age followed by children 5 to 9 years of age.^{4,5} Additionally, asthma ED visits and hospitalization rates are higher among African-Americans than whites across all age groups.

Hospitalization charges with asthma as the principal diagnosis have totaled over \$50 million each year since 2002 and have steadily increased until in 2008 exceeded \$96 million in Missouri.⁵ Much of this cost is avoidable. Although there is no cure, asthma can be controlled with proper medical management and avoidance of certain factors and behaviors. People with poorly managed asthma suffer from lower quality of life, reduced activity and productivity, missed days of work or school, frequent ED visits or hospitalizations, and – although rare – death may occur.

Because asthma can be controlled, a statewide comprehensive public health approach is likely to have significant impact on morbidity and mortality. With an alarming rate of increase in asthma, it is crucial that actions are taken to address the asthma issue in Missouri.

The Missouri Asthma Prevention and Control Program (MAPCP) was formed with support from a Centers for Disease Control and Prevention (CDC) grant awarded in 2001. A multidisciplinary group of representatives from government agencies, schools, workplaces, nonprofit organizations, the health care industry, and universities

joined to create the Missouri Asthma Coalition (MAC) to address the asthma issue.

This diverse group of partners completed the initial state plan in 2005. The revised 2010-2014 state plan focuses on fewer objectives and is being built upon MAPCP experience, program evaluation findings, surveillance strengths, core competencies of partnering organizations, and new evidence regarding intervention effectiveness and feasibility.

The MAC utilized the Department of Health and Human Services' Healthy People 2010 and 2020 asthma objectives to form the basis for this revised plan, which include:^{6,7}

- Reduce asthma deaths
- Reduce hospital ED visits due to asthma
- Reduce hospitalizations due to asthma
- Reduce the number of school and work days missed due to asthma
- Reduce activity limitations due to asthma
- Increase the proportion of persons with asthma who receive formal patient education
- Increase the proportion of person with asthma who receive appropriate asthma care according to the National Asthma Education and Prevention Program (NAEPP) guidelines
- Reduce disparities in asthma outcomes among Missourians for all objectives

In order to advance the Healthy People (HP) and program objectives, the MAC is proud to present the state plan *Putting Excellent Asthma Care Within Reach*. The plan directs efforts toward people with asthma, their families, health care providers, educators, employers, policymakers and communities to control asthma in homes, schools, workplaces, childcare settings and the community.

The main goal of the state plan is to reduce the impact of asthma in Missouri by improving the quality of life for those with asthma and decrease the direct and indirect economic losses for all Missourians.

*More than 500,000
Missourians live
with asthma ... 76
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Background

Asthma is a serious chronic lung disease that causes inflammation and airway narrowing leading to periods of wheezing, chest tightness, shortness of breath and coughing. Symptoms often occur or worsen at night or in the early morning. Although factors that contribute to asthma attacks are well documented, its cause is unknown. While there is no cure for asthma, it can be treated and controlled. Possible consequences for those with poorly managed asthma are lower quality of life, reduced physical activity, missed days of work or school, frequent ED visits or hospitalizations, and in rare cases, death.

Asthma is a major public health problem in Missouri. More than one-half million Missourians live with asthma and for the period 1999-2008 an average of 76 people died due to asthma complications each year.^{1,2} The rate of asthma is on the rise, with 13.1 percent of adults diagnosed in 2007 compared to only 10.6 percent in 2000. ED visits and hospitalization data show that children are disproportionately affected by asthma. Gender and racial/ethnic disparities also exist. Hospitalization charges with asthma as the principal diagnosis have totaled over \$50 million each year since 2002 and in 2008 exceeded \$96 million.⁵

It is important to note that public health interventions aimed at people with asthma, their families, health care providers, and communities and limiting exposure to triggers in the environment where people spend a good deal of their time (home, work, school and day care), are likely to significantly impact asthma outcomes because the disease can be controlled. In fact, home-based interventions that address multiple triggers and include several components in addition to the home environment, such as training and education, social services, and coordinated clinical care, have been shown to be quite effective among children and adolescents with asthma.⁸ These interventions have shown increased symptom free days and productivity and savings from costly asthma care. It has been estimated that the home interventions with minor to moderate remediation are a good value with cost-benefit studies showing a return of \$5.30 to \$14.00 for each dollar invested.⁸ For these reasons, along with the seriousness and costs associated with the disease, asthma needs to be a public health priority in Missouri.

Home-based interventions that address multiple triggers and include other components in addition to the home environment, have been shown to be quite effective among children and adolescents with asthma.

Asthma Triggers

There are many irritants and allergens in the environment that can trigger an asthma attack or episode. Exposure to these agents may occur indoors or outdoors. Triggers vary between individuals but it is important for each person to identify and avoid their specific triggers, whenever possible, to minimize airway inflammation and prevent symptoms. When avoidance of a trigger is not possible, individuals and care providers need to be prepared to manage an attack should it occur.⁹

Common environmental allergens include: dust mites, cockroach particles, animal and rodent dander, mold and tobacco smoke. Asthma may also be triggered by strenuous physical activity; weather conditions (e.g., thunderstorms, high humidity or very cold temperatures); biomass smoke from burning wood, grass or other vegetation; some food and food additives; viral respiratory infections; stress and strong emotional states; and some medicines. Certain occupations and exposures are commonly associated with asthma including domestic and commercial cleaning (cleaning solutions); hair dressing (various aerosols and chemicals); car painting (isocyanates); health care professions (latex); and others. Air pollutants in communities such as industrial emissions, automobile exhaust and particulate matter may affect asthma incidence but more often worsen pre-existing asthma.^{9,10}

Asthma Control

Since there is no known cure for asthma, the goal of asthma therapy is control. According to the National Heart Lung and Blood Institute (NHLBI) 2007 Expert Panel Report 3 (EPR-3) the specific goals¹¹ of long-term asthma management are to:

Reduce impairment

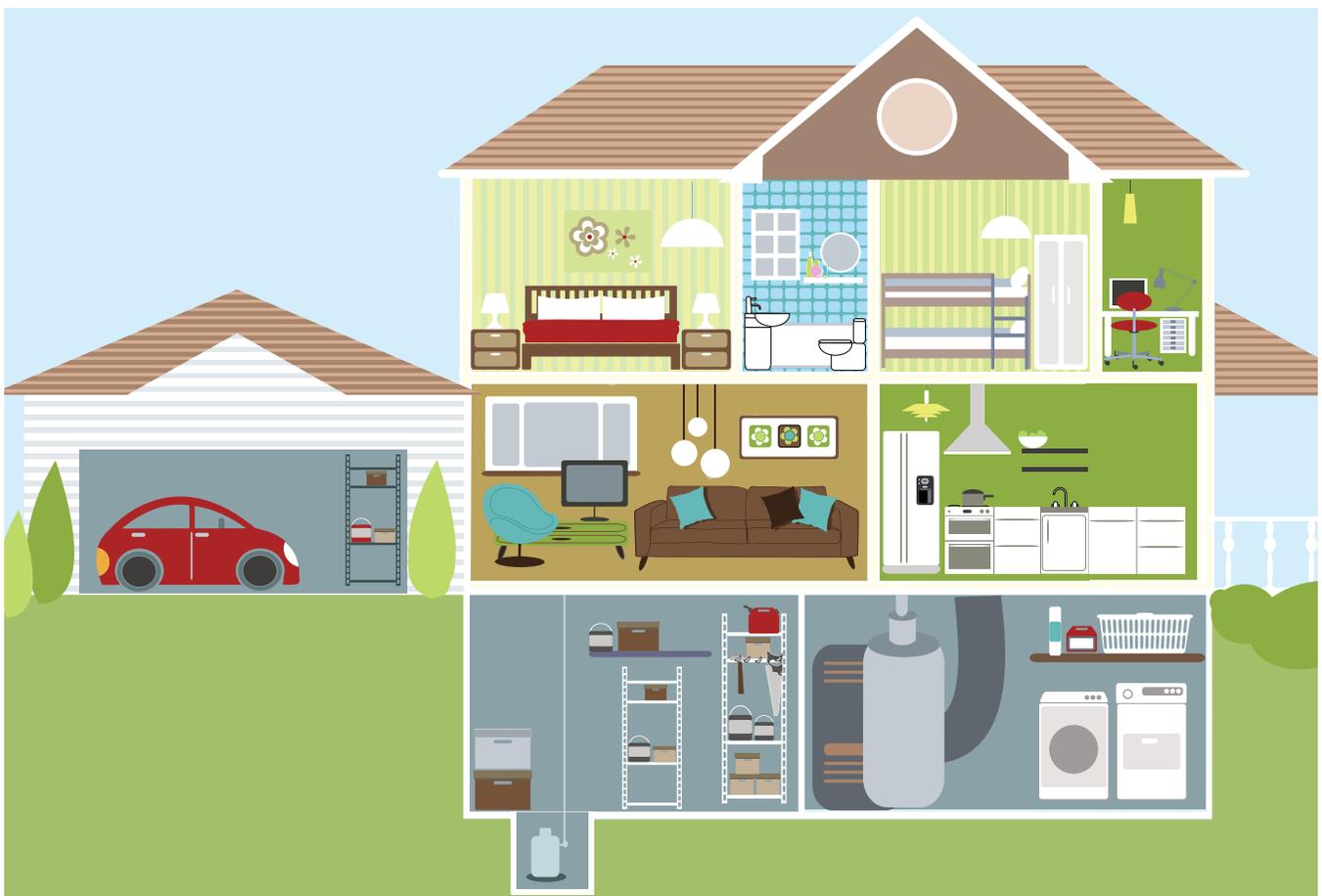
- Prevent chronic symptoms
- Require infrequent use of short-acting beta2-agonists (SABA) for quick relief of symptoms
- Maintain normal lung function
- Maintain normal activity levels
- Meet patients' and families' expectations of and satisfaction with asthma care



Reduce risk

- Prevent recurrent exacerbations
- Minimize the need for ED visits or hospitalizations
- Prevent loss of lung function, or for children, prevent reduced lung growth
- Provide optimal pharmacotherapy with minimal or no adverse effects

The asthma management guidelines emphasize four components of care: 1) assessment and monitoring of asthma severity and control; 2) self-management education; 3) control of environmental factors and co-morbid conditions; and 4) a stepwise approach to medications, emphasizing inhaled corticosteroids are the most effective long-term control therapy.



Asthma in Missouri

Healthy People Objectives

There are current data for Missouri on asthma deaths, ED visits and hospitalizations. Table 1 compares Missouri's baseline and current rates to the national baseline and current rates and the Healthy People (HP) 2010 target objectives. The Missouri Asthma Coalition (MAC) seeks to progress toward meeting the HP 2010 objectives related to deaths, ED visits and hospitalizations. If an HP 2010 objective has already been met, the MAC seeks to continue to improve the outcome.

Table 1. National objectives for Asthma deaths, emergency department visits, and hospitalizations, Missouri^{12,13} and United States¹⁴

	Age Group	Baseline		Progress		Healthy People 2010 Objective
		National	Missouri	National	Missouri	
Year		1999	1999-2000	2006[†]	2001-2008	2010
Asthma deaths Rate per million	Children less than age 5	1.7	*	1.6	4.2	0.9
	Children age 5-14	3.1	*	2.4 ^{††}	2.2	0.9
	Adolescents and adults aged 15 to 34 years	5.6	9.2	4.0	5.7	1.9
	Adults aged 35 to 64 years	15.5	14.1	12.1	13.7	8.0
	Adults aged 65 years and older	69.5	57.6	46.2	40.4 ^{**}	47.0
Year		1995-1997	2001	2004-2006	2007	2010
Emergency department visits due to asthma ^{†††} Rate per 10,000	Children less than age 5	150.0	153.8	148.3	128.5	80.0
	Children and adults aged 5-64 years	71.1	53.3	57.4	50.2	50.0
	Adults aged 65 years and older	29.5	13.7	22.8	13.0 ^{**}	15.0
Year		1998	2001	2006	2007	2010
Hospitalizations due to asthma Rate per 10,000	Children less than age 5	45.6	38.4	43.3	35.3	25.0
	Children and adults aged 5-64 years	12.5	12.6	10.8	10.7	7.7
	Adults aged 65 years and older	17.7	11.1	23.7	15.7	11.0

* Number of deaths too small for rate calculation

** Objective met.

[†] 2006 data unless otherwise noted

^{††} 2005 data

^{†††} ED visits include individuals treated and released or those who died

According to the latest available figures, asthma death rates in Missouri exceed the current national and HP 2010 objective rates for all children and adults to 64 years of age. For adults 65 and older, Missouri's asthma death rate is below the national average and HP 2010 objective. For children younger than age 5, Missouri's ED visit rate for asthma as the primary cause is below the national average but remains 60.6 percent higher than the HP 2010 objective. The ED visit rate in Missouri for children and adults aged 5 to 64 is close to achieving the HP 2010 objective and for seniors 65 and older the ED visit rate is below both the national average and HP 2010 target objective. In Missouri, the asthma hospitalization rates for children and adults are below the national average but above the HP 2010 objective. The hospitalization rates for children younger than age 5 are the highest among all age groups in Missouri and the nation.

According to the latest available figures, asthma-related death rates in Missouri exceed the current national and HP 2010 objective rates for all children and adults to 64 years of age.

Other asthma HP 2010 objectives involve:

- Activity limitation and school or work days missed
- Patient education emphasizing community and self-care resources
- Written management plans based on the National Asthma Education and Prevention Program (NAEPP) guidelines
- Inhalation instruction
- Use of long-acting control medications rather than short-acting rescue medications
- Environment assessments to reduce factors that trigger asthma episodes

The HP 2020 objectives will be released in 2010 with several of the asthma HP 2010 objectives retained including hospitalizations, ED visits and activity limitations.⁷ Other asthma HP 2010 objectives will be retained but modified. The MAC will seek to obtain and report state-specific information on these measures to compare with national averages and the HP 2010 and HP 2020 target objectives.

Asthma in Missouri

Asthma Burden

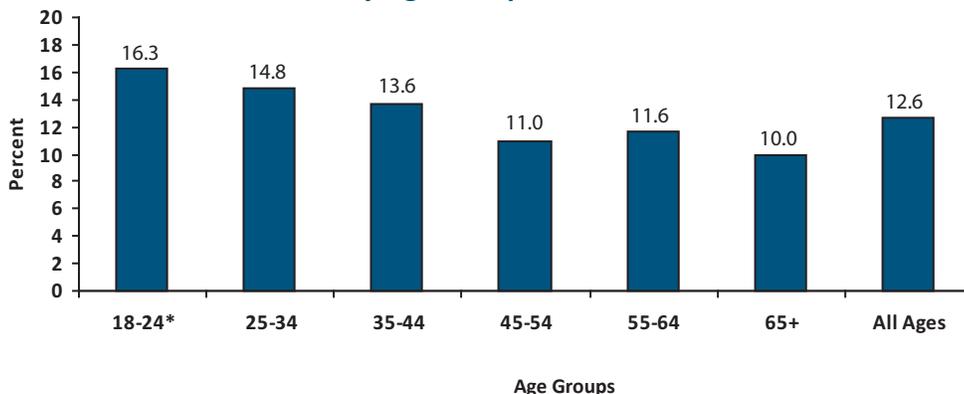
Prevalence: How common is asthma?

Based on the 2007 Behavioral Risk Factor Surveillance System (BRFSS), the lifetime prevalence of asthma among adults 18 years of age and older is 13.2 percent compared to the national median of 13.1 percent.¹ Similarly, the 2007 Missouri County-level Study (CLS), found the lifetime prevalence of asthma among Missouri adults to be 12.6 percent.³ Both surveys use the same questions to assess lifetime and current asthma prevalence. Lifetime prevalence is calculated based on the number of adults who say that a doctor has ever told them they have asthma and this represents more than 561,000 adults in Missouri. Lifetime asthma appears to be on the rise. In 2000, the adult lifetime asthma prevalence was 10.6 percent according to the BRFSS. This indicates an 18.9 percent increase from 2000 to the 2007 CLS lifetime asthma prevalence.

According to the 2007 CLS data for Missouri adults, females (15.4 percent) have a significantly higher lifetime prevalence of asthma than males (9.6 percent). Figure 1 shows lifetime asthma prevalence by age groups among adults.³ Among adults, people 18 to 24 years of age have the highest prevalence, which is 29.4 percent higher than the Missouri average prevalence. The lowest prevalence is among adults 65 and older. This rate is 20.6 percent lower than the overall state prevalence.



Figure 1. Lifetime Asthma Prevalence Among Adults, 18 Years and Older by Age Groups, Missouri, 2007



*Significantly higher than the age groups 45 to 54 and 65 and older

Current asthma prevalence is determined based on the number of adults who report an asthma diagnosis during their lifetime and who also report that they still have asthma. Based on the 2007 Missouri CLS, the prevalence of current asthma is 8.5 percent or more than 378,500 Missouri adults. Among adults, females (10.0 percent) have a significantly higher prevalence of current asthma than males (7.0 percent).³ Figure 2 shows the prevalence of current asthma is highest among 25-34 year olds and is lowest for those 65 years and older.³

Figure 2. Current Asthma Prevalence Among Adults, 18 Years and Older by Age Groups, Missouri, 2007

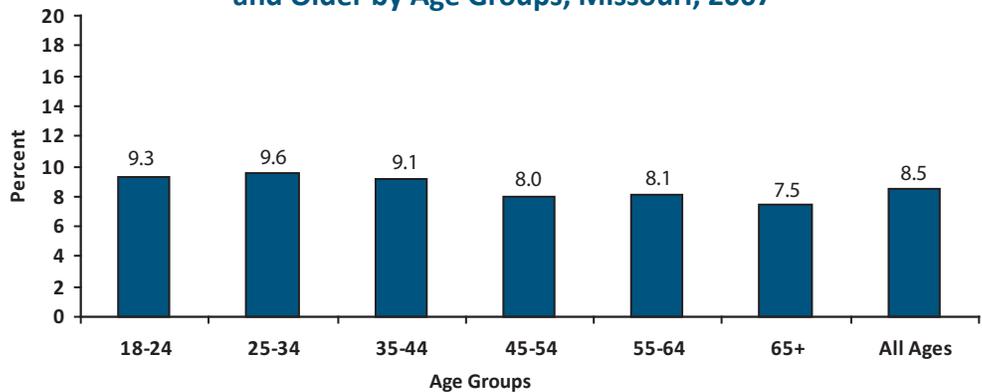


Figure 3. Lifetime Asthma Prevalence Among Adults, 18 Years and Older by Race/Ethnicity, Missouri, 2007

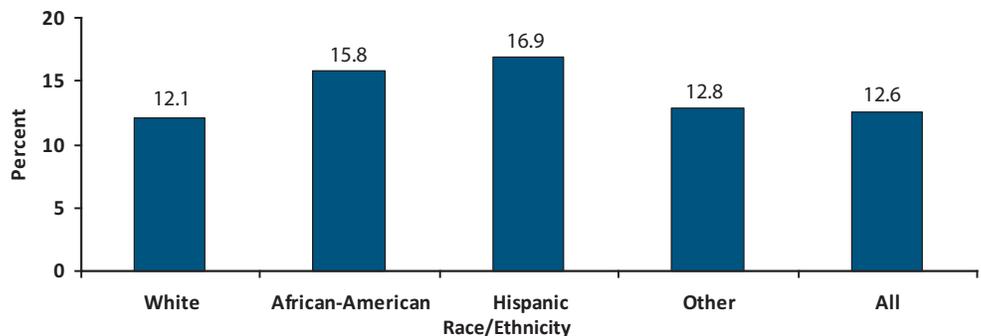
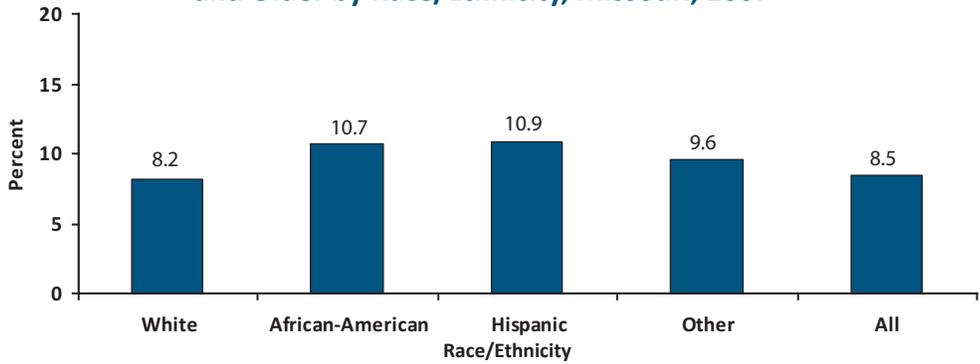


Figure 3 shows lifetime asthma prevalence by race and ethnicity, Figure 4 shows current asthma prevalence by race and ethnicity.³ Lifetime prevalence among whites is lower than the Missouri average. Hispanics have the highest prevalence followed by African-Americans and both, along with all other racial/ethnic groups combined have higher lifetime prevalence rates than whites and higher than the state average. The prevalence of current asthma showed similar patterns.

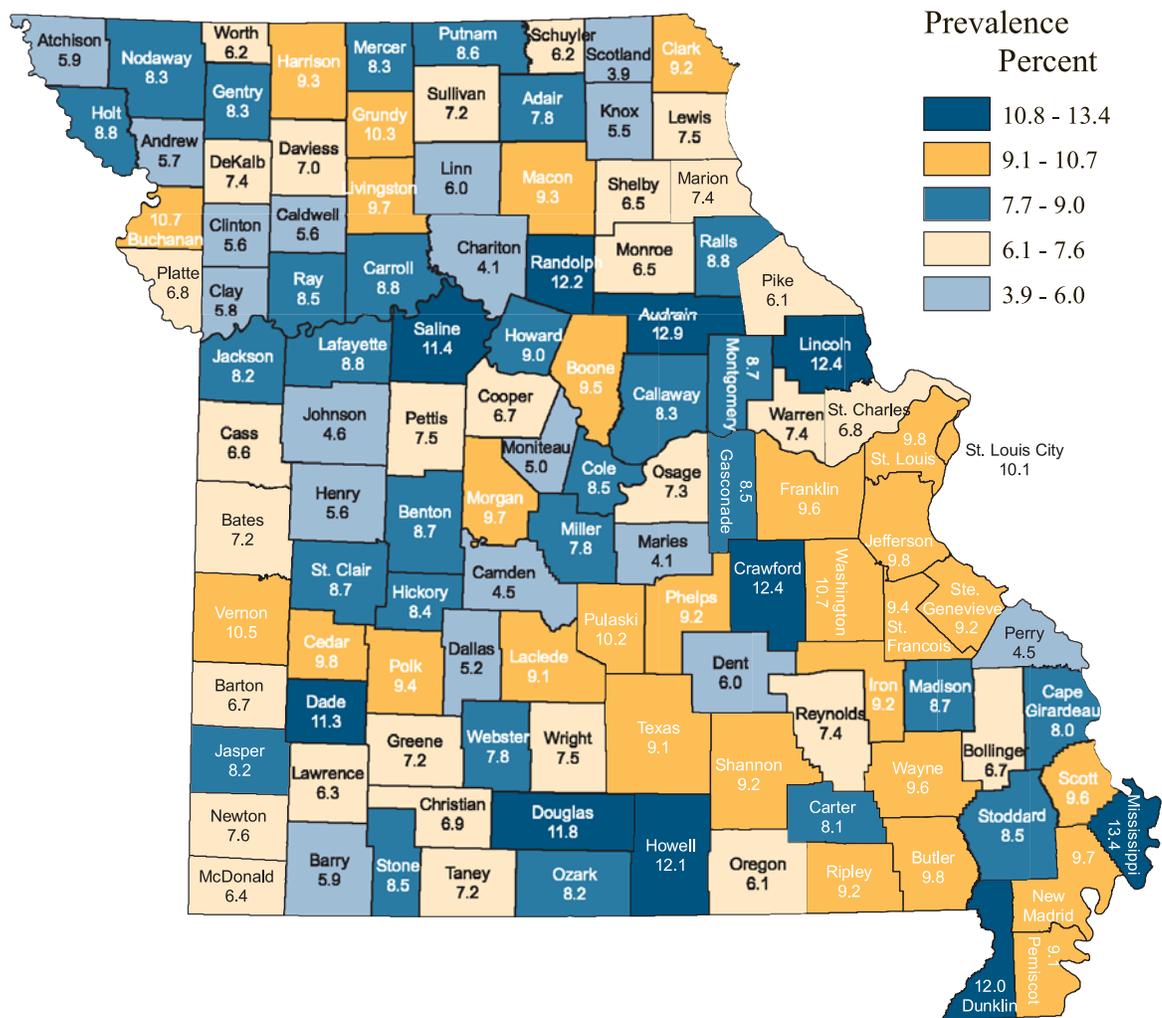
Figure 4. Current Asthma Prevalence Among Adults, 18 Years and Older by Race/Ethnicity, Missouri, 2007



As shown in Figure 5, the current age-adjusted asthma prevalence among adults in Missouri varies by county, from a low of 3.4 percent in Scotland County to a high of 13.7 percent in Mississippi County, which is significantly higher than the state prevalence of 8.5 percent.⁵

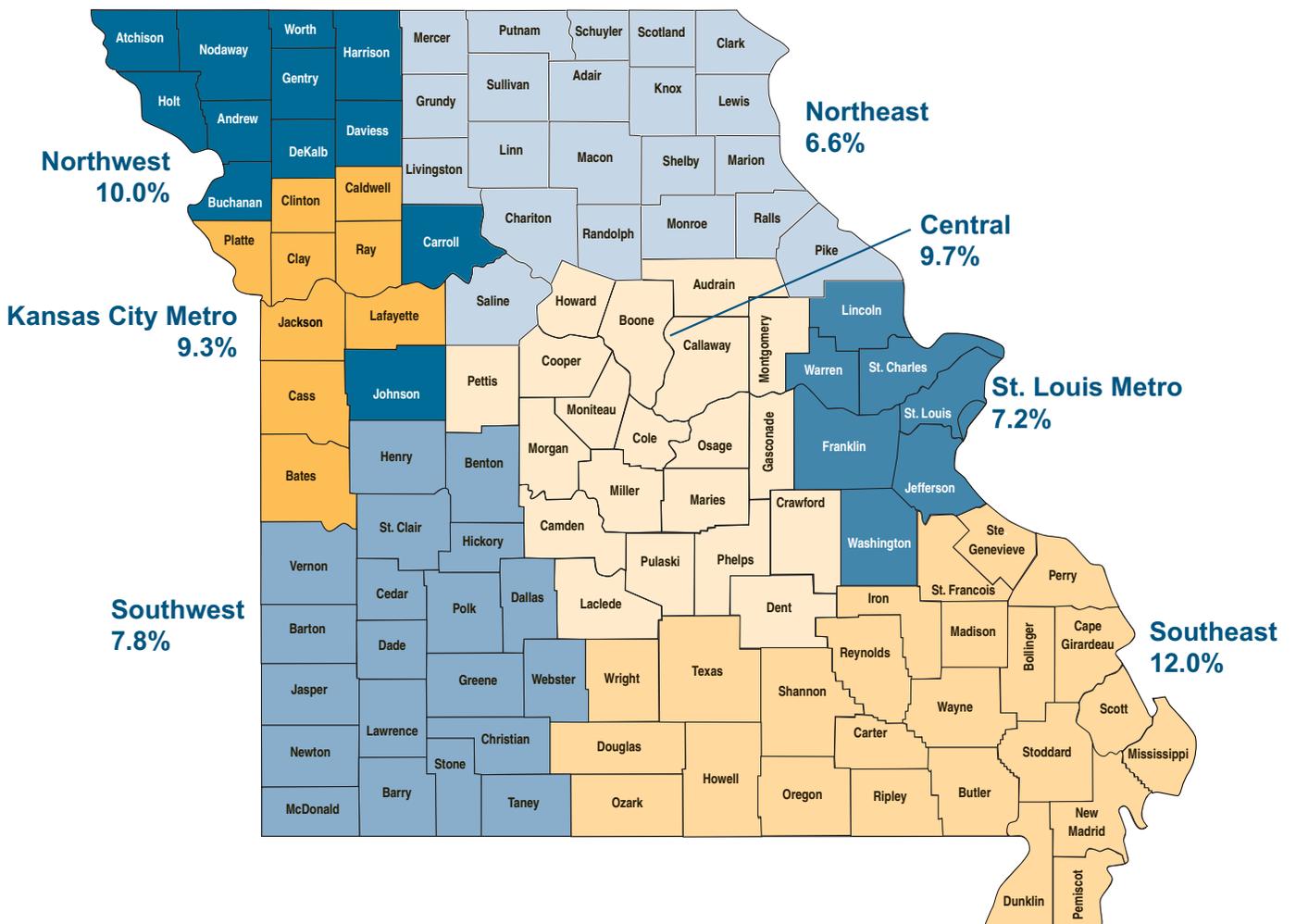
In addition to Mississippi County, there are several other Missouri counties in the group with the highest prevalence of current asthma among adults including Audrain, Crawford, Randolph, Lincoln, Dunklin, Howell, Douglas, Saline and Dade.

Figure 5. Current Asthma Prevalence Among Adults, 18 Years or Older by County, Missouri, 2007



Among children and teenagers less than 18 years of age in Missouri, 13.1 percent have been diagnosed with asthma during their lifetime and 8.6 percent (122,500 children) were reported to have current asthma in 2007.¹ As shown in Figure 6, among children (age 17 and younger) the current asthma prevalence rate was highest in the southeast region of the state. The childhood asthma prevalence rates were also high in the northwest and central regions.

Figure 6. Prevalence of Current Asthma Among Children, Age 17 and Younger, by Missouri BRFS Region, 2007



In 2007, the current asthma prevalence was highest for African-American children and teens (11.3 percent) followed by other minority races combined (9.9 percent) and whites (8.1 percent).¹ With respect to age, the reported childhood prevalence of current asthma was highest, but not significantly, in children age 5 to 9 (10.2 percent), followed by age 10 to 17 (9.9 percent), and age 0 to 4 (4.8 percent). Regarding gender, the prevalence of current asthma is reversed from the pattern among adults. In children, the prevalence of current asthma among boys is 67.2 percent higher than that of girls (10.7 percent versus 6.4 percent). This issue has been investigated but only theories exist. Several theories include: 1) a possible role for sex hormones like estrogen, progesterone and testosterone to account for gender differences in asthma progression, and 2) the possibility that body fat in females after age 15 may increase hyperactivity of the airways.^{10, 11, 19, 20}



However, these are only some factors that may play a role in the higher prevalence of asthma in population groups. Many other genetic, environmental and host factors may exist that contribute to asthma and these interactions are not fully understood.^{10, 11, 19, 20}

Morbidity: How many ED visits and hospitalizations are caused by asthma?

In 2007, there were 29,590 ED visits (5.2 per 1,000 people) with asthma as the primary cause and patients were treated and released or died.⁴ Figure 7 shows that when ED rates are stratified by age, the highest rates are for children, especially among children from 1 to 4 years of age and from 5 to 9 years of age. From ages 0 to 14, males visit the ED more than females; however, females aged 15 and older visit the ED more often than males. The overall rate shows that more females than males visit the ED due to asthma.

Figure 7. Asthma Emergency Department Visits by Gender and Age Groups, Missouri, 2007

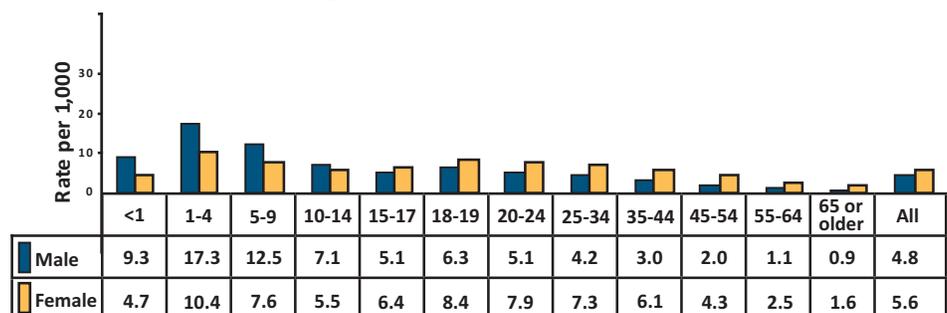
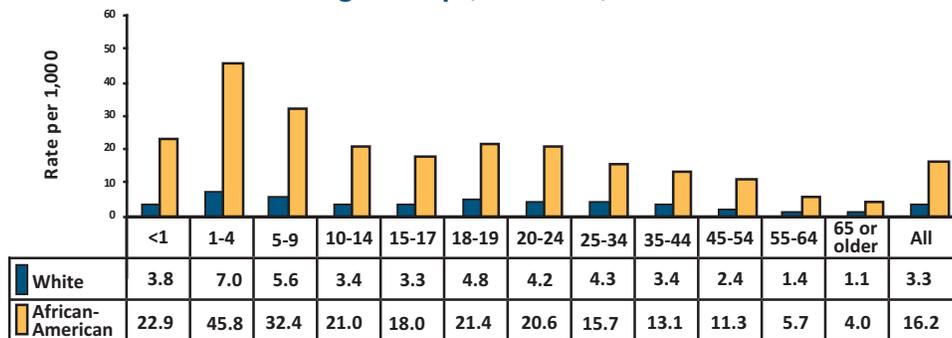


Figure 8 shows that African-Americans were almost five times as likely to visit the ED as whites (16.2 versus 3.3 per 1,000 people) in 2007. These differences remained after stratification by age. When combined, children younger than age 15 have significantly higher ED visits for asthma than older age groups.

Figure 8. Asthma Emergency Department Visits by Race and Age Groups, Missouri, 2007



There were 7,610 inpatient hospitalizations in 2007 (13.0 per 10,000 people) due to asthma with 33.7 percent of these hospitalizations among children younger than age 15.⁵ The highest inpatient hospitalization rates were among children 1 to 4 years of age and 5 to 9 years of age followed closely by infants in their first year of life. As shown in Figure 9, at age 15 and older, more females were hospitalized than males; however, at younger than age 15, more males were hospitalized than females. African-Americans were four times more likely to be hospitalized for asthma than whites.

Figure 9. Asthma Hospitalizations by Gender and Age Groups, Missouri, 2007

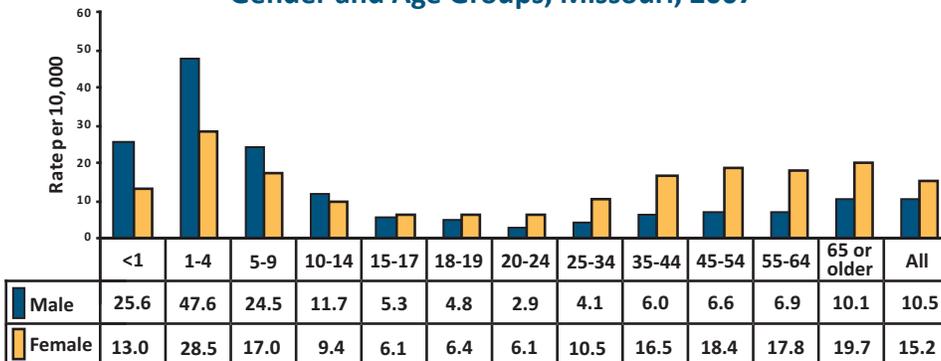
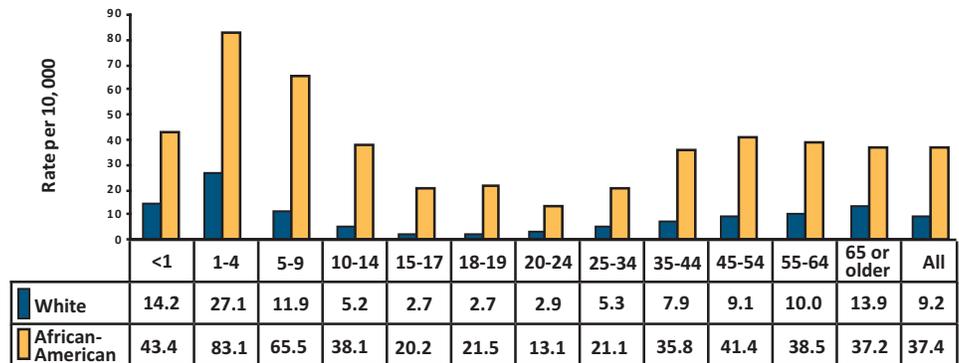
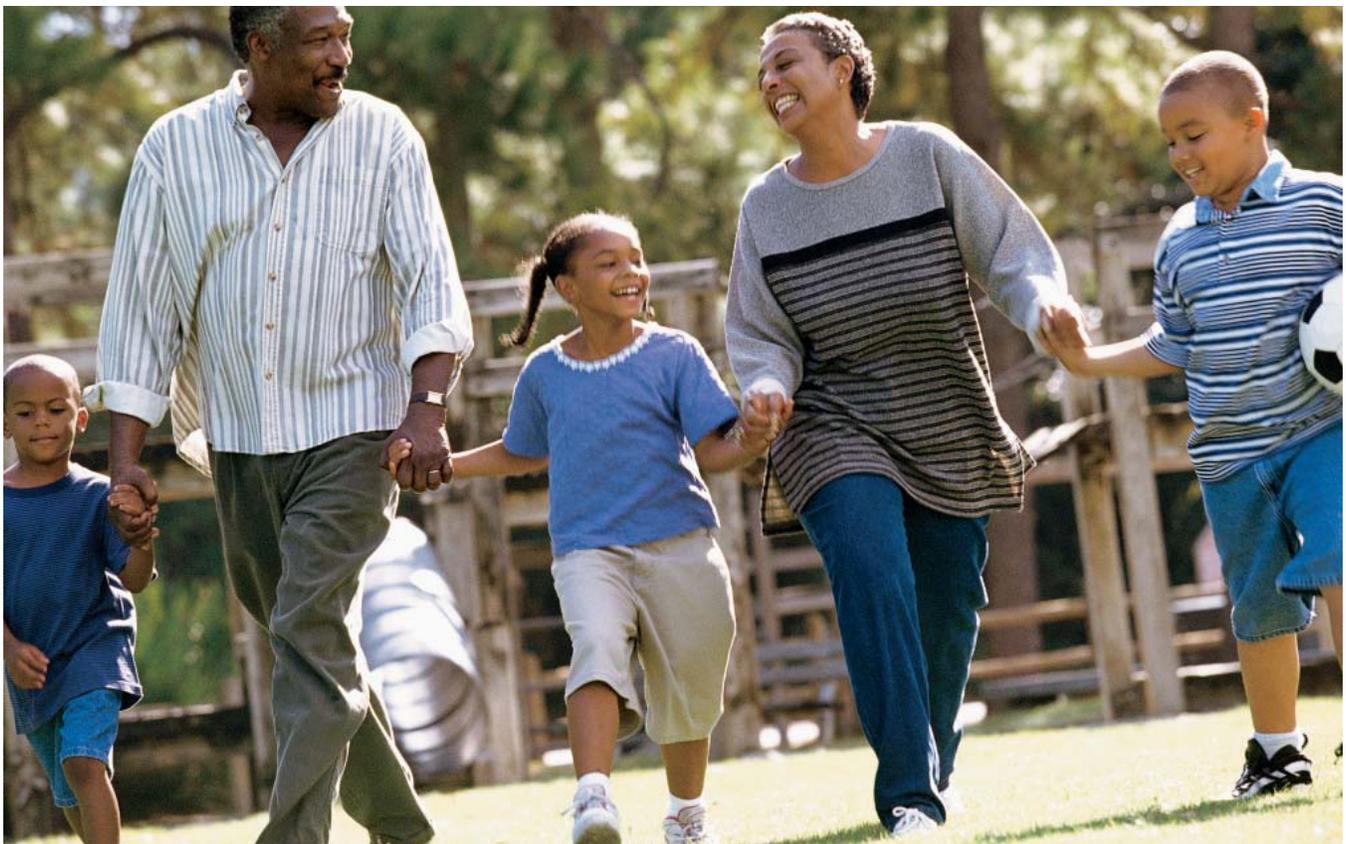


Figure 10 shows that rates for African-Americans are higher in every age category.

Figure 10. Asthma Hospitalizations by Race and Age Groups, Missouri, 2007



A more detailed description of the impact of asthma in Missouri can be found in the Missouri Asthma Burden Report. Please contact the Missouri Department of Health and Senior Services (DHSS) at 573-522-2876 or www.dhss.mo.gov/asthma for a copy of the report.

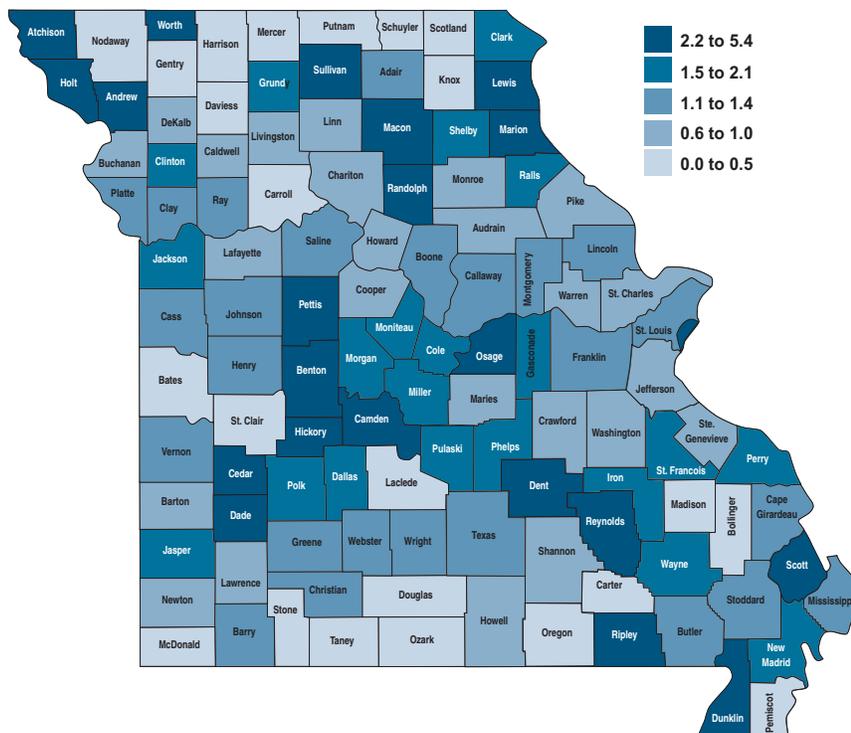


Mortality: How many people die from asthma?

Based on Missouri death certificate data, 71 people died with asthma as the underlying cause in 2007; six of these deaths were among children younger than age 15.² This is an overall mortality rate of 1.2 per 100,000 people for all ages combined. The 2007 mortality rate was highest among individuals 65 years and older at 2.8 per 100,000 people. Males and females had similar rates, at 1.0 and 1.3 per 100,000 people, respectively. For a three year period, 2005-2007, African-Americans had a significantly higher death rate from asthma than whites (2.5 per 100,000 people versus 0.9 per 100,000 people), which indicates that death occurs 2.8 times more frequently for African-Americans than for whites.

Geographically, asthma mortality in Missouri varies by county as shown in Figure 11. From 1997-2007, 35.8 percent of all deaths in Missouri occurred in St. Louis City, St. Louis County and Jackson County. However, a larger proportion of the deaths from asthma over this time period (41.3 percent) occurred in St. Louis City, St. Louis County and Jackson County.

Figure 11. Asthma Age-adjusted Death Rates by County, Missouri, 1997 - 2007



African-Americans were four times more likely to be hospitalized for asthma than whites.

Asthma Disparities

Although the reasons are unclear, disparities exist between African-Americans and whites and in younger versus older age groups in ED visits and hospitalizations due to asthma. Factors may include severity of disease, a lack of access to health care services, the quality of health care received, lack of opportunities for asthma self-management education, and a range of environmental health issues. Forty-seven percent of Missouri's African-American population resides in St. Louis City, Kansas City and the southeast area in Missouri known as the Bootheel.¹⁵ The asthma disparities that exist across Missouri are particularly evident in these areas.

In 2007, African-Americans made up almost 12 percent of the state's total population, but accounted for 41.8 percent of the ED visits and 34.6 percent of the hospitalizations for asthma in the state. Table 2 shows that the observed ED and hospitalization rates are exceeded by more than three times the expected rate. This demonstrates an increased burden of asthma among African-Americans in Missouri. These findings are paralleled in St. Louis City, Kansas City and the Bootheel.

Table 2. Proportion of Asthma ED Visits and Proportion of Hospitalizations by African-Americans and Geographic Area, Missouri, 2007

	African-Americans in Missouri Population	ED Visits by African-Americans	Hospitalizations by African-Americans
St. Louis City	49.9%	87.2%	85.4%
Kansas City	29.0%	70.1%	62.2%
Bootheel (10 counties)	6.7%	33.5%	22.7%
Overall (three areas combined)	47.4%	74.8%	64.6%
Missouri	11.9%	41.8%	34.6%

In Missouri, disparities exist within disparities regarding asthma morbidity and mortality. For example, children bear a disproportionate burden of asthma hospitalizations and ED visits and this is particularly acute among African-American children and especially preschoolers, 1 to 4 years of age.

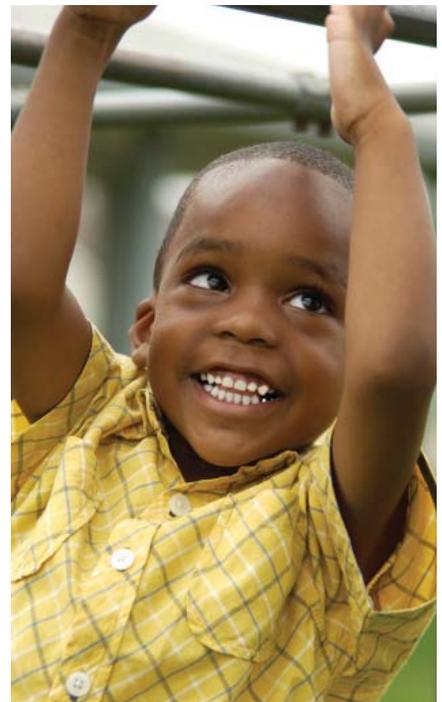
It is worthwhile to note that one of Missouri's largest metropolitan areas, where a large proportion of African-Americans reside, was ranked in the top ten of America's 100 "asthma capitals" for 2009. The American Academy of Allergy, Asthma, and Immunology, and the Asthma and Allergy Foundation of America ranked the 100 largest metropolitan areas in the nation by asthma severity based on prevalence, risk factors and medical factors. St. Louis City was ranked number 1 and Kansas City was ranked number 79.¹⁶

St. Louis City

Based on the 2007 Missouri population estimates, African-Americans make up 11.9 percent of Missouri's total population.¹⁵ St. Louis City is 49.9 percent African-American, and accounts for 25.4 percent of Missouri's total African-American population.

In 2007, in St. Louis City there were 4,293 ED visits due to asthma with 3,744 of these among African-Americans. Table 2 shows that African-Americans make up 49.9 percent of the city's population, but account for 87.2 percent of the ED visits, which is 1.7 times more than expected related to the proportion of the population. The rate of asthma ED visits for African-Americans in St. Louis City is over 6.8 times higher than for whites (19.8 per 1,000 people versus 2.9 per 1,000 people). Among children younger than age 15, St. Louis City had the highest rate of asthma ED visits at 26.2 per 1,000 people in 2007, more than 2.5 times higher than the overall state rate of 9.6 per 1,000 people.

This trend can also be seen for inpatient hospitalizations. In 2007, in St. Louis City, there were 1,051 hospitalizations due to asthma with 898 of those among African-Americans. This means that 49.9 percent of the city's population accounts for 85.4 percent of the hospitalizations (Table 2).



Kansas City

According to the 2007 Missouri population estimates, Kansas City is 29 percent African-American, and accounts for 19.8 percent of the state's total African-American population.¹⁵ In 2007, 2,655 out of 3,790 ED visits for asthma in Kansas City were among African-Americans. Table 2 shows that African-Americans in Kansas City visited the ED due to asthma 2.4 times more than expected. This trend was also observed with inpatient hospitalizations at twice the expected rate; 577 out of 928 total asthma hospitalizations were among African-Americans. The age disparity also exists in Kansas City with the highest ED visit and hospitalization rates among children younger than 15, with preschool children, age 1 to 4, significantly exceeding the overall state rates.



The Bootheel

The Bootheel area of Missouri is located in the southeast corner of the state. For this report, 10 Missouri counties are included in this area: Butler, Carter, Dunklin, Mississippi, New Madrid, Pemiscot, Ripley, Scott, Stoddard and Wayne. According to the 2007 Missouri population estimates, about 6.7 percent of the Bootheel is African-American; however, great variation can be seen within the region.¹⁵ For example, Carter County has the lowest number of African-American residents (7 per 5,913 people) at 0.1 percent, while Pemiscot County has the highest number in the region (4,794 per 18,740 people), at 25.6 percent.

In the Bootheel, 33.5 percent of the 847 ED visits for asthma reported in 2007 were among African-Americans, who make up only 6.7 percent of the region's population (Table 2). This is a rate nearly four times greater than expected based on the proportion of African-Americans living in the Bootheel. The Bootheel counties with the highest number of African-Americans also have the highest ED visit rates for asthma. In Pemiscot County, African-Americans make up 25.6 percent of the population, but they represented 55.6 percent of the ED visits for asthma in the county. In Scott County, African-Americans make up 11.7 percent of the population, but they accounted for 47.2 percent of the ED visits for asthma in the county. In Mississippi County, African-Americans make up 20.8 percent of the population, but they accounted for 25.0 percent of the asthma ED visits. In New Madrid County, African-Americans make up 15.2 percent of the population, but had 51.8 percent of the ED visits for asthma in the county.

Detailed county-level inpatient hospitalization rates are not available due to small numbers and possible confidentiality issues. As a whole, however, the area is 6.7 percent African-American, which accounts for 22.7 percent (106 of 467) of the inpatient hospitalizations in 2007. Sixty-nine percent of these inpatient hospitalizations for asthma were residents from four counties: Pemiscot, Butler, Dunklin and Scott.

Surveillance and Evaluation

The information on racial and age disparities in Missouri described above are examples of how surveillance data can be used for program improvement. All surveillance and program data gathered will be analyzed, evaluated and used to shape policy and asthma management strategies in the future. This may include finding and closing surveillance gaps, identifying people at risk for poor asthma outcomes and maintaining or redirecting asthma interventions. The objectives and strategies listed in this plan were developed based on current data and will be adjusted to reflect future findings.



Missouri Asthma Prevention and Control Program

Impact Model

The MAPCP impact model, shown in the Appendix, focuses specifically on the intended short-, intermediate- and long-term outcomes of the program and the links among these outcomes. Desired short-term results of MAPCP include increased awareness, knowledge, attitudes and behaviors in relation to asthma management.



Intermediate program results include reductions in exposures to triggers; improved medical management of asthma; and public, organizational policies and systems supportive of asthma management practices.

The long-term and ultimate outcomes focus on reducing morbidity and mortality from asthma; reducing asthma disparities; improving productivity and the quality of life for asthma patients and their families; and sustaining and improving the overall program.

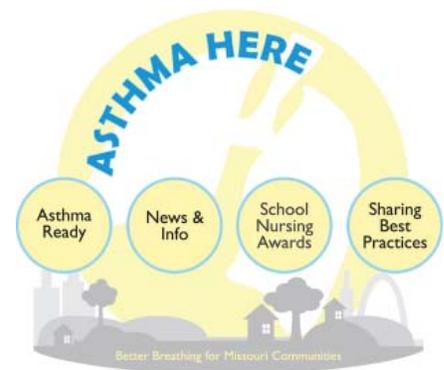
Program Diagram

MAPCP and partners acknowledge that asthma control is a complex public health problem. MAPCP has developed programs around key areas: Needs assessment and surveillance, resource development, partnership engagement, workforce development, community engagement and effective interventions.

Guiding Principles

These guiding principles form the basis of the MAPCP and provide an overview of the key elements of asthma management and care. The principles are based on the best evidence available for addressing asthma in Missouri.

- **Disparities:** Address groups at highest risk for asthma morbidity and mortality
- **Partnership:** Promote inclusion with all stakeholders actively engaged
- **Communication:** Foster information sharing, resources and collaboration between partners
- **Education:** Ensure access to essential information through a variety of delivery systems for self-management and quality care
- **Environment:** Promote safe and clean environments for people to live, work, learn and play
- **Sustainability:** Implement lasting, systems-based change
- **Evaluation:** Measure the impact of the State Plan and interventions on asthma outcomes
- **Quality Improvement:** Use and share lessons learned to maximize the potential benefit of evidence-based practices and resources



For more information on partners and asthma control activities in Missouri, visit our Asthma Here and Now website at www.asthmahere.org.

Missouri Asthma Coalition

The MAPCP appreciates the importance of involving a diverse group of stakeholders in planning and implementing activities. MAPCP staff identified and invited stakeholders according to recommendations presented in the CDC's *Guide to Developing a State Asthma Program* and the American College of Chest Physicians' *A Descriptive Study of Asthma Coalitions*. During the iterative development process for the state plan, many stakeholders became core members of the MAC, a statewide body of partners committed to asthma care improvement.

The MAC is comprised of institutions and organizations, including public health departments/divisions, government departments, non-profits, educational institutions, environmental health entities, health care institutions, pharmaceutical and medical device companies, community-based and advocacy organizations, as well as people with asthma and their caregivers.

The MAC is the resultant organization of the MAPCP's formal partnering efforts during its formative years and serves as a statewide collaborative effort for planning, resource sharing and technical assistance. MAPCP has established relationships with the clinical community, local health agencies, physician organizations, community health centers, asthma and respiratory health organizations, education agencies, as well as organizations that serve populations experiencing a disproportionate burden of asthma.



The MAC's original structure served its purpose well for planning and development tasks, but staff identified opportunities for improvement as the MAPCP emphasis migrated to implementation activities. In 2007, a revised organizational structure emphasizing functional areas was proposed and accepted by the MAC members. The revised structure illustrates MAPCP's commitment to the sustainability of the MAC by modifying its approach to partnership development according to the needs of the stakeholders and their contributions.

Core of Strong Partnerships

The MAC creates "room at the table" for many organizations for planning as well as fostering collaboration. Implementation of initiatives is achieved through a smaller core group of strong partnerships and includes the University of Missouri-Columbia School of Medicine, Missouri School Boards Association, DHSS School Health Program, national Association of Asthma Educators, DHSS Bureau of Child Care, Southeast Missouri State University, DHSS Bureau of Health Informatics, MO HealthNet, and the Missouri Foundation for Health.

In 2008, the MAPCP and members of this core group received the Missouri Governor's Award for Quality and Productivity.

State Plan Development Process

The planning process has incorporated:

- Feedback from an independent evaluation of the initial 2005 state plan conducted by CDC
- State Plan Index method, a CDC developed tool for evaluating state plans
- Program evaluation results from four years of implementing projects
- New EPR-3 national guidelines

At the MAC's spring meeting (April 21, 2009) members re-organized 10 goals into three categories – partnership, surveillance and evaluation, and interventions – under the theme *Putting Excellent Asthma Care within Reach*. This state plan focuses on fewer objectives and is being built upon MAPCP experience, program evaluation findings, surveillance strengths, core competencies of partnering organizations, and new evidence regarding intervention effectiveness and feasibility.

Considering the work completed over the past four years, approximately 80 people contributed to this revised plan, an increase of 60 percent over the original state plan. With a clearer purpose, a refined focus and partner capacity, MAC leadership envisions this as an enhanced state plan that continues to align the work of statewide stakeholders to eliminate disparities and improve health-related outcomes for all Missourians with asthma.

MAC leadership envisions this as an enhanced state plan that continues to align the work of statewide stakeholders to eliminate disparities and improve health-related outcomes for all Missourians with asthma.

Goals, Objectives, Strategies and Measures of Success

Partnership Goal

- Build and maintain relationships among organizations and individuals for alignment of effort and resources



Objective 1 - Cultivate community leaders to lead asthma control efforts

Rationale:

Widespread adoption of evidence-based strategies depends on leadership capacity in local communities across the state. Thus, MAPCP supports approaches that develop and link strong leadership through coordinating organizations at state and local levels.

Strategies:

- Support community organizations in efforts to communicate and share best practices, resources, and issues
- Promote, implement and evaluate school- and community-based asthma initiatives
- Manage and support systems for asthma-friendly schools and child care centers
- Provide education and tools necessary to increase the number of asthma ready communities, hospitals, clinics, schools and child care facilities

Measure of Success 1.1:

Number of people and organizations who lead and support community-based initiatives.

Objective 2 - Network stakeholders for idea-sharing, consensus-building and coordination of statewide efforts

Rationale:

The inter-connectedness of stakeholders has provided stability, strength and creativity to MAPCP and its related activities. The role of MAPCP is to provide a platform for stakeholders to interact and create meaningful relationships that facilitate sharing of ideas and coordination of efforts.

Strategies:

- Coordinate quarterly meetings of the MAC Executive Committee
- Coordinate an annual meeting of the MAC
- Continuously seek new opportunities for collaboration and new members for the MAC
- Review the state plan and other information to set priorities, responsibilities and directions for addressing asthma
- Enhance partnership by gaining feedback on function, satisfaction, improvement areas and coordinating activities
- Maintain Asthma Here and Now website

Measure of Success 2.1:

Accurate listing of stakeholders and their current roles is maintained.

Measure of Success 2.2:

Statewide stakeholders are convened regularly and make contributions to state plan implementation and revision.

Measure of Success 2.3:

New stakeholders are recruited to assure statewide representation and diversity.

Measure of Success 2.4:

A communication system for sharing news, information and resources is maintained and upgraded.

Measure of Success 2.5:

Stakeholder satisfaction with and support of MAPCP.



Objective 3 - Leverage resources among stakeholders to enhance efficiency, reach and sustainability

Rationale:

Maximization of potential benefit is a guiding principal for MAPCP and its efforts to identify opportunities for stakeholder collaboration. In the short-term, program reach and impact are directly related to the leveraging of public and private resources. Over the long-term, partner investment in coordinated asthma control efforts leads to ownership, which is the cornerstone of sustainability.

Strategies:

- Provide technical assistance to community partners in seeking funding opportunities
- Work with coalitions to coordinate and evaluate interventions
- Support existing community coalitions in sustaining asthma interventions and activities
- Maintain existing and develop new partnerships with organizations that invest resources in asthma issues
- Promote effectiveness of evidence-based medical services to third party payers
- Work with communities and organizations on core components that have demonstrated the potential to deliver scalable and sustainable system-level change
- Promote reimbursement for evidence-based care

Measure of Success 3.1:

Financial resources are invested in coordinated asthma control efforts.

Measure of Success 3.2:

Evidence-based educational and treatment services receive appropriate reimbursement.

Measure of Success 3.3:

Partners incorporate a systems-based approach to interventions and collaborations.

Measure of Success 3.4:

Partners proactively establish plans for sustaining successful programs.

Partner investment in coordinated asthma control efforts leads to ownership, which is the cornerstone of sustainability.

Surveillance & Evaluation Goal

- *Establish, enhance and share data that inform public health planning and intervention effectiveness*

Objective 4 - Detect and describe burden over time

Rationale:

Public health planning depends on timely access to reliable data about the burden of asthma. When communicated effectively, surveillance data educates the public, community leaders and other stakeholders. MAPCP is committed to maintaining a robust system that responds to stakeholder needs for asthma surveillance data.

Strategies:

- Utilize core Behavioral Risk Factor Surveillance System (BRFSS), Patient Abstract System, Missouri Information for Community Assessment, Missouri County-level Studies, vital statistics, asthma call-back studies, Youth Tobacco Survey and additional data sources for describing the burden of asthma
- Assess stakeholders' access and use of asthma data and utilize results to prioritize analyses and methods of asthma information dissemination
- Incorporate the responsiveness of available asthma information to stakeholders needs in partnership assessment
- Collaborate with environmental public health tracking and illness surveillance efforts



Measure of Success 4.1:

Data are collected on morbidity, mortality, clinical, health services utilization, pharmacy, socio-demographic and environmental variables.

Measure of Success 4.2:

Stakeholders have access to and use data and reports.

Measure of Success 4.3:

Stakeholders report surveillance system is responsive to needs.

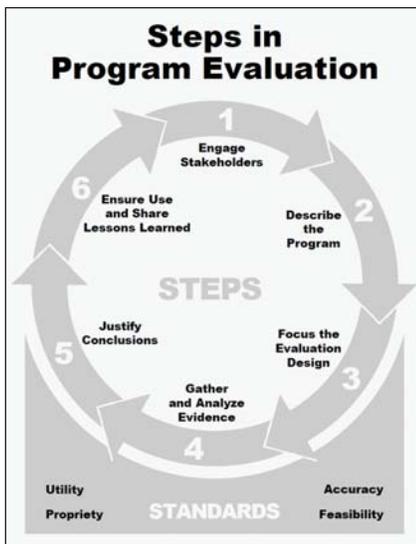
Objective 5 - Analyze and share intervention effectiveness and scalability

Rationale:

Evidence-based public health practice depends on capacity to measure outcomes and commitment to quality improvement. The rapid adoption of promising practices hinges on sharing results derived from properly evaluated strategies. The role of MAPCP is to improve, maintain or re-direct intervention and program strategies per evaluation findings.

Strategies:

- Coordinate meetings of Evaluation Advisory Committee (EAC)
- Support the development of a strategic evaluation plan for asthma interventions
- Provide access to evidenced-based practices in asthma management
- Disseminate tools for and results of intervention evaluations for enhancing effectiveness
- Identify and disseminate information on the geographical areas (counties and zip codes) disproportionately affected by asthma



Measure of Success 5.1:

A specialized committee guides plans for evaluation.

Measure of Success 5.2:

Evaluation study results are published for community and academic audiences.

Measure of Success 5.3:

Methods are established for categorizing differences in structure, practices, policies and outcomes among providers and payers.

Measure of Success 5.4:

Stakeholders have access to field-usable methods and tools for assessing intervention effectiveness in diverse settings.

Objective 6 - Inform deployment of resources proportionate to disparate needs

Rationale:

Health disparities exist, especially for people with asthma. The disparities are associated with race/ethnicity, poverty, gender, age, neighborhood and other factors. Sophisticated data systems are necessary to identify disparate populations and assure priorities are set accordingly.

Strategies:

- Identify population groups disproportionately affected by asthma
- Provide information for program planning on the geographic areas of Missouri experiencing significantly higher than the state asthma rates of emergency department visits and hospitalizations
- Disseminate information on interventions effectiveness in reducing the asthma burden on disparate affected population groups

Measure of Success 6.1:

Communities recognize the health disparities associated with asthma.

Measure of Success 6.2:

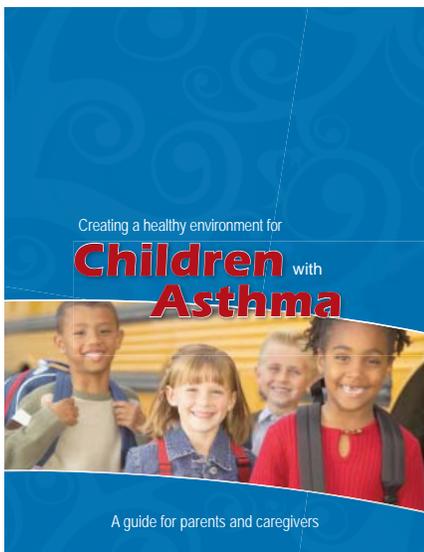
Resources are focused on strategies for reducing health disparities.



Intervention Goal

- *Promote a systems-based approach to delivering optimal asthma care and self-management support without barriers for people with asthma*

Objective 7 - Enhance workforce competencies for optimal diagnosis, management and coordination



Rationale:

The availability of high quality medical care and associated support services contributes substantially to asthma care outcomes for individuals and communities. The role of MAPCP is to develop a workforce that assures appropriate and timely evidence-based care across a range of settings.

Strategies:

- Provide workforce development training through hospitals and clinics
- Provide education and tools necessary to maximize the school nurses capacity for the daily management of asthma in schools
- Provide education to child care health educators and child care workers on the management of asthma
- Partner with key stakeholders to provide online trainings for school nurses, health professionals and pharmacists

Measure of Success 7.1:

A scalable system engages health care workers in ongoing training opportunities to assure core competencies.

Measure of Success 7.2:

Statewide access to asthma care management and support services is provided through a diverse network of trained professionals.

Measure of Success 7.3:

Tailored training programs are available for physicians, nurses, social workers, pharmacists, school personnel, respiratory therapists, nutritionists, childcare providers and public health workers.

Objective 8 - Assure access to self-management education and quality care

Rationale:

There is a wealth of evidence that shows successful asthma control depends on patient self-management skills and quality medical care. Quality, in the case of asthma, can be assessed by adherence to EPR-3 guidelines. Yet, many patients do not have access to educational services and medical care can vary considerably in Missouri.

Strategies:

- Promote asthma-ready clinics, hospitals and child care centers
- Promote the National Asthma Education and Prevention Program Expert Panel Report 3 guidelines and provide technical support to selected communities on implementing evidence-based interventions
- Collaborate with partners on chronic care improvement projects to promote the appropriate use of control medication and reimbursement for asthma education and equipment
- Seek opportunities to include asthma measures in electronic medical records systems
- Partner with existing chronic disease and aging programs to expand the Chronic Disease Self-Management Course for people with asthma
- Promote asthma self-management education through local public health agencies

Measure of Success 8.1:

Major health plans and employers reimburse for self-management education services.

Measure of Success 8.2:

Federally-qualified health centers and local public health agencies promote and provide asthma care according to the EPR guidelines, including the provision of self-management education services.

Measure of Success 8.3:

Evidence-based clinical asthma management resources for the primary care setting are available online.

Measure of Success 8.4:

Hospitals are recognized by independent programs for providing guideline-based care.

Measure of Success 8.5:

Disease management services provided by health plans, including Medicaid and Medicare, coordinate the provision of guideline-based care and self-management education services.



Successful asthma control depends on patient self-management skills and quality medical care.

Objective 9 - Identify and reduce trigger exposure

Rationale:

Irritants and allergens in the environment often cause asthma attacks. The reduction or elimination of these triggers can prevent disability and excess health service utilization, when paired with appropriate medical management and support services.

Strategies:

- Promote and support asthma education and awareness programs for students and school staff
- Promote home and environmental assessments
- Promote information on recognizing and reducing environmental asthma triggers
- Partner with Missouri Tobacco Use and Prevention Program to reduce exposure to environmental tobacco smoke and promote utilization of the Missouri tobacco toll-free quitline, 1-800-Quit-Now
- Partner with Missouri Integrated Pest Management Program to promote safe environments in schools

Keeping indoor air clean

Clear indoor air clean is key to controlling asthma. There are many things you can do to help keep the air in your home clean.



Measure of Success 9.1:

Communities address environmental exposures through a continuum of services, policy recommendations and advocacy efforts.

Measure of Success 9.2:

Indoor environments where people live, work, learn and play are assessed at regular intervals by trained personnel to identify triggers and poor air quality conditions.

Measure of Success 9.3:

Statewide access to inter-professional training that supports trigger reduction.

Measure of Success 9.4:

Public is informed about the relationship between asthma and environmental triggers.

Objective 10 - Disseminate creative solutions that employ evidence-based strategies

Rationale:

Rapid statewide adoption of evidence-based strategies depends on many partners. The innovative packaging and marketing of interventions, which fully consider partner readiness and resource availability, drive successful implementation and lead to sustainability. MAPCP serves its partners as a communication hub and distribution point for new and established efforts to improve asthma care locally and statewide.

Strategies:

- Promote the use of the asthma component of the online Community Health Information Resources (CHIR)
- Enhance and promote utilization of the Asthma Here and Now website
- Package results of data analysis and interpretation and disseminate in an updated burden report, fact sheets, press releases, issue briefs and other media
- Make presentations at local, regional and national meetings and conferences
- Produce scientific manuscripts on the effectiveness of interventions and lessons learned

Measure of Success 10.1:

A catalog of setting-specific interventions is accessible to partners.

Measure of Success 10.2:

New opportunities and methods for distribution of evidence-based strategies are developed.

Measure of Success 10.3:

Interventions promoted by MAPCP are implemented by new and established partners.



Evaluation Plan and Future Direction

Evaluation Plan

The findings will be widely disseminated through the MAC, websites and other communication channels.

The MAPCP interventions and activities will be continually evaluated for success through qualitative and quantitative methods to assess process, intermediate outcomes and long-term impact. A sequence of evaluations is being created and agreed upon by the Evaluation Advisory Committee. According to that sequence, individual evaluation plan work groups will be established as needed to develop the individual evaluation plans according to the *Learning and Growing Through Evaluation: State Asthma Program Evaluation Guide* and utilize the CDC Framework for Evaluation.^{17,18}

The first step will be to engage stakeholders.

The second step will be to develop a logic model that describes what is being evaluated in the individual evaluation plan. In addition, a narrative will be developed to explain how what is being evaluated contributes to accomplishing intended outcomes. It will also describe important features of what is being evaluated, such as the context in which it operates, the characteristics of the population it is intended to reach and its stage of development.

Step three will complete a final set of evaluation questions and the evaluation design that will be used to answer the question.

Step four will develop data collection methods and indicators that will be used to answer the evaluation questions.

Step five will develop performance standards with stakeholders that will create a shared vision as to what constitutes success and how to interpret.

The findings will be widely disseminated through the MAC, websites and other communication channels.

Future Direction

This state plan primarily focuses on existing interventions and programs. However, there are some potential new or expanded asthma control areas being considered for future activities.

- **Partnership Expansion** – Children are disproportionately affected by asthma based on ED visits and hospitalizations. However, individuals age 65 and older have one of the highest rates of asthma mortality in the state. Partnerships will be further expanded to extend invitations to organizations such as athletic associations, Parents-As-Teachers, and agencies on aging in both urban and rural areas to enlist their support in asthma control efforts.
- **Addressing Impairment** – Eliminating impairment is a major focus of the current EPR-3 clinical guidelines. Among Missouri adults with asthma in 2006, one-fourth (25.3 percent) reported symptoms within the past day and 60.9 percent reported limiting their usual activities some or a lot in the past 12 months. A large proportion of adults with asthma (59.5 percent) reported being taught to recognize the early signs and symptoms of an asthma episode, but only 7.4 percent reported ever taking a course or class on how to manage their asthma. Expanding access to asthma self-management information as new information is released will continue to be a key focus.
- **Emerging Issues** – MAPCP and its partners are committed to staying abreast of the latest asthma control guidelines and research. The program will also remain responsive to emerging issues impacting asthma management and care such as H1N1 and new treatment options. As new information and issues emerge, they will be incorporated into State Plan updates.



Eliminating impairment is a major focus of the current EPR-3 clinical guidelines.

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Appendix

Asthma State Plan Impact Model -- Missouri

Program Areas and Goals	Activities	Short-Term Outcomes	Implementation Outcomes	Program Impacts
Interventions	Identify, prioritize and implement interventions to decrease disparities and reduce the state and national asthma burden	Increase awareness of asthma burden, disparities, local and statewide efforts and ability to control asthma	Increased recognition of asthma symptoms and improved asthma self-management behaviors	Asthma symptoms, impairment and risk decreased
Promote a systems-based approach to delivering optimal asthma care	Build, maintain and enhance statewide asthma partnerships Promote efforts on multiple fronts to ensure that collaboration is ongoing and self-sustaining	Improved knowledge and understanding of asthma diagnosis, severity, and evidence-based management practices	Improved medical management of asthma and better coordination of services	Improved productivity and quality of life and increased patient and family satisfaction with care
Partnerships	Maintain and enhance statewide asthma coalition and cultivate community leaders to lead asthma control efforts	Improved attitudes towards asthma diagnosis, need for care and employing a comprehensive approach to management	Reduced production and exposure to asthma triggers (decrease use of rescue medications and asthma exacerbations; increase use of control medication)	Asthma morbidity (e.g., ED visits and hospitalizations) decreased
Build and maintain relationships among organizations and individuals for alignment of effort and resources	Coordinate statewide asthma activities through creation, implementation, and revision of statewide asthma plan	Increased coordination of asthma control efforts across the state and improved use of available resources	Improved partnership functioning and use of available resources	Asthma geographic, racial and socioeconomic disparities decreased
Surveillance and Evaluation	Maintain and enhance statewide asthma surveillance and evaluation activities	Improved skills through health literacy and workforce development	Public and organizational policies and systems supportive of asthma management	Asthma mortality and economic impact decreased
Establish, enhance and share data that inform public health planning and intervention effectiveness	Evaluate state asthma program and modify statewide plans and activities based upon findings Share findings from surveillance and evaluation efforts	Increased awareness of asthma surveillance and evaluation information	Increased translation and application of surveillance and evaluation information	Increased funding of asthma activities and statewide asthma efforts sustained and improved

Underlying Themes: Disparities, Partnership, Communication, Education, Environment, Sustainability, Evaluation, and Quality Improvement

THE STATE PLAN

