Asthma Among Minnesota Health Care Program Enrollees, 2009

Introduction

Asthma is a chronic respiratory disease that is characterized by episodes of breathlessness. It is one of the most common chronic diseases in the U.S. Asthma can range from a relatively mild condition to quite severe, and is associated with missed school days, missed work days, disrupted sleep, and activity limitations. While it cannot be cured, asthma can be controlled with appropriate medication, regular doctor visits, and avoidance of asthma triggers (e.g., pollen or secondhand smoke).

This report describes the burden of asthma in the public health care programs overseen by the Minnesota Department of Human Services (DHS). **Medical Assistance** (MA) is Minnesota's Medicaid program, providing medical care and prescription medications for low income people and people with disabilities. Families and children are covered through a managed care program, referred to in this report as ***Medical Assistance-Families and Children (MA-F&C)***. Persons with disabilities and others who are in transition between programs are covered through a ***Fee-For-Service program (MA-FFS)***. ***MinnesotaCare*** is a program that provides health insurance for Minnesotans with low and moderate incomes who do not qualify for other health insurance coverage. Note that this report only includes individuals under the age of 65.

In 2001, the Minnesota Department of Human Services contracted with the Michigan Peer Review Organization for a study of the quality of asthma care among enrollees in Minnesota's health care programs. A key finding of this study was that enrollees with asthma who received care according to the national guidelines were less likely to have an asthma-related emergency department visit or hospitalization.

The MDH Asthma Program tracks asthma prevalence, hospitalizations and emergency department visits, and mortality, along with quality of life measures, among Minnesotans with asthma. It is important to characterize the burden of asthma in the Medical Assistance and MinnesotaCare programs because those in lower-income populations are more likely to have asthma (NHIS).

Methods

Queries of public health care program claims data for the years 2005 – 2007 were conducted by the Minnesota Department of Human Services.

Continuous enrollment

This analysis was limited to individuals under the age of 65 enrolled in MA-F&C, MA-FFS or MinnesotaCare for 11 or more months in the year being studied.

Asthma Prevalence

Because we used claims data for this analysis, medical records were not available to determine who had asthma. Instead, we identified individuals with asthma using a criteria based on patterns of health care utilization (i.e., office visits, emergency department visits, hospitalizations) and prescription-filling. This criteria identifies individuals likely to have persistent asthma, however, this is not based on an actual measure of asthma severity. For this reason, the term "persistent asthma" will be listed in quotes throughout this report.

Prevalence rates were calculated as follows:

$$\text{Asthma prevalence} = \frac{\text{Number of continuous enrollees with "persistent asthma"}}{\text{Total number of continuous enrollees}}$$

For the purposes of this report, enrollees meeting the following criteria during the study year were said to have "persistent asthma":

One or more emergency department visits for which asthma was the principal diagnosis,
OR
One or more hospitalizations for which asthma was the principal diagnosis,
OR
Four or more doctor visits for asthma and at least two asthma prescriptions filled,
OR
Four or more asthma prescriptions filled.

The above definition is a modification of the HEDIS (Health Plan Employer Data and Information Set) criteria for "persistent asthma". The HEDIS criteria requires that individuals be continuously enrolled for the study year plus the previous year; whereas, in this analysis, individuals only needed to be continuously enrolled for the study year. The HEDIS criteria also requires that the criteria for "persistent asthma" be met in both the study year and the year prior.

This definition is likely to miss some individuals with mild asthma (i.e., those needing only infrequent medication), but is less likely to pick up individuals for whom asthma was ruled out at an office visit. Because some medications used by people with asthma are also indicated for those with chronic obstructive pulmonary disease (e.g., ipratropium bromide), this definition may incorrectly include some people with COPD in the older age groups.

Typically data on asthma prevalence is based on an individual's self-reported asthma status in answer to survey questions like: "Has a doctor ever told you that you have asthma?" and "Do you still have asthma?" Asthma prevalence based on administrative data (like that used in this report) generally comes out lower than self-reported prevalence data based on survey data.

Health Care Utilization Rates

In this report, health care utilization for asthma refers to asthma-related office visits (doctor visits), emergency department visits and hospitalizations. Office visits, emergency department visits and hospitalizations were identified as asthma-related when the principal diagnosis for the event was listed as asthma (International Disease Classification-Revision 9 (ICD-9) code 493).

Health care utilization rates were calculated as:

$$\text{Rate} = \frac{\text{Number of events}}{\text{Total number of continuous enrollees}} \times 10{,}000$$

Relative standard errors (RSEs) for the health care utilization rates were calculated as follows:

$$\text{RSE} = \frac{\text{Standard Error of the Rate}}{\text{Rate}} \times 100 = \frac{1}{\sqrt{\#\text{ of events}}} \times 100$$

Rates for which the relative standard error—an indication of statistical reliability—is greater than 23% are flagged as unreliable and should be interpreted with caution.

Appropriate Medication Use

This measure tracks the number of enrollees with "persistent asthma" who filled at least one prescription for asthma controller medication (i.e., inhaled corticosteroids, cromolyn sodium, leukotriene modifiers or methylxanthines) during the study year. According to the National Asthma Education and Prevention Program (NAEPP) clinical guidelines for asthma management, controller medication is considered the appropriate treatment for individuals who have been diagnosed with persistent asthma. This measure is a modification of the HEDIS measure for asthma care, which has slightly different criteria for identifying persons with "persistent asthma" as noted above.

Results

Demographics

Table 1 shows the demographics of the MA-F&C, MA-FFS and MinnesotaCare populations in 2007. The differences in demographics arise from the differences in eligibility for each of the programs. The majority of MA-F&C enrollees are children, while the majority of MA-FFS and MinnesotaCare enrollees are adults.

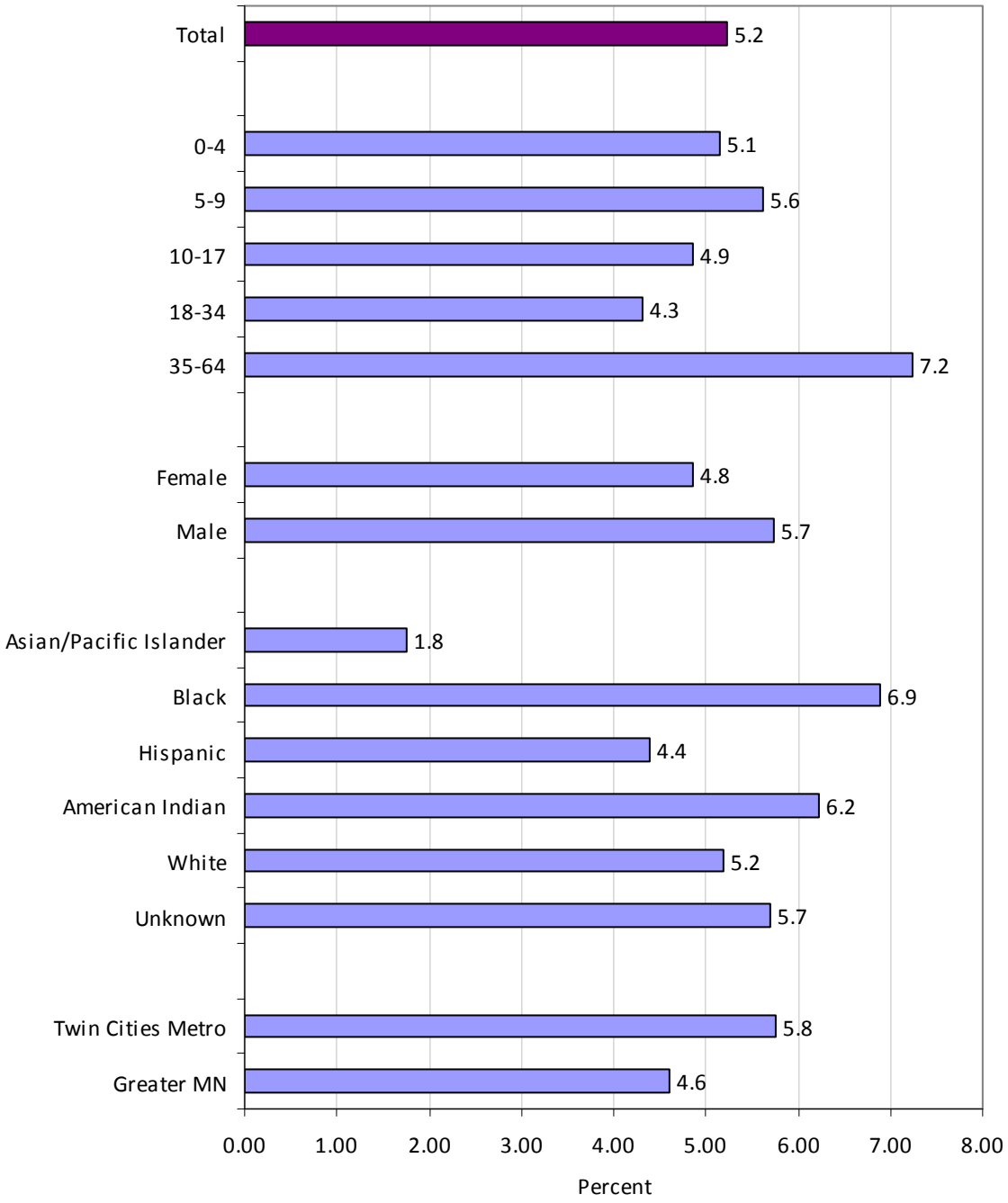
Table 1. Continuous Enrollees by Age, Sex, Race/Ethnicity and Residence, 2007

	Medical Assistance-Families and Children		Medical Assistance Fee-For-Service		MinnesotaCare	
	#	%	#	%	#	%
Age Group (years)						
0-4	34,097	24	6,075	5	5,656	8
5-9	27,412	20	9,152	8	8,128	11
10-17	37,175	27	16,727	14	14,042	19
18-34	26,024	19	27,199	23	18,127	24
35-64	14,752	11	57,945	49	28,477	38
Sex						
Female	80,147	57	61,953	53	40,962	55
Male	59,313	43	55,145	47	33,468	45
Race/Ethnicity						
Asian/Pacific Islander	14,903	11	5,709	5	4,042	5
Black/African American	35,860	26	15,315	13	4,379	6
Hispanic	13,679	10	3,509	3	1,986	3
American Indian	4,341	3	10,080	9	608	1
White	65,979	47	77,192	66	57,982	78
Unknown	4,698	3	5,293	5	5,433	7
Residence						
Twin Cities Metro	73,864	53	53,315	46	29,151	39
Greater Minnesota	64,293	46	62,848	54	44,939	60
Total	139,460	100	117,098	100	74,430	100

Prevalence of "Persistent Asthma" Among MA-Families and Children Enrollees

Among the 139,460 individuals continuously enrolled in MA-F&C in 2007, 5.2% or more than 7,000 had "persistent asthma". As shown in Figure 1, "persistent asthma" prevalence was highest among 35-64 year olds and Blacks/African Americans. Prevalence was higher among Twin Cities residents than those in Greater Minnesota, and higher in males than females.

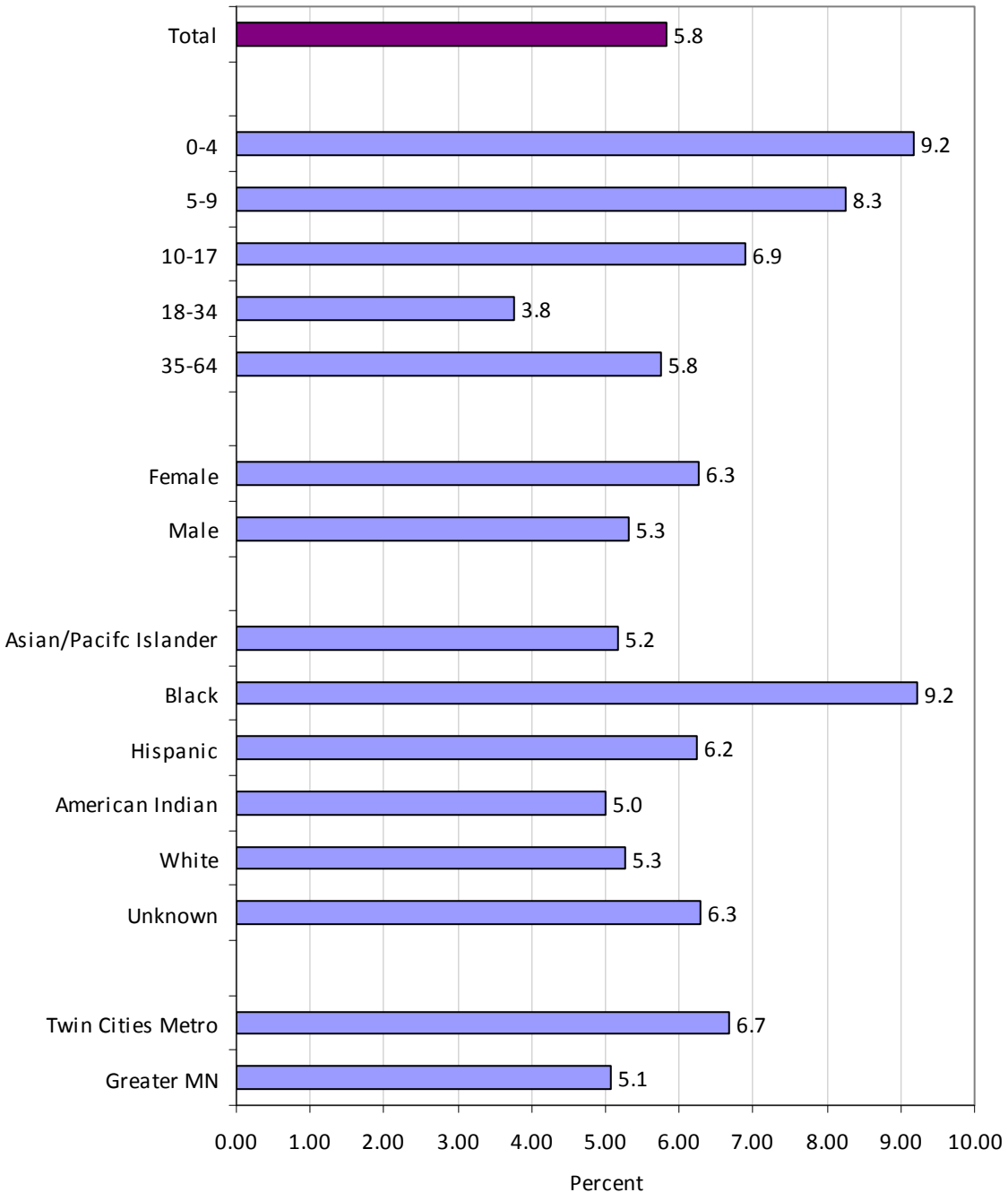
Figure 1. Percentage of MA-Families and Children Enrollees With "Persistent Asthma", 2007



Prevalence of "Persistent Asthma" Among Medical Assistance Fee-for-Service Enrollees

Among the 117,098 individuals continuously enrolled in Medical Assistance-FFS in 2007, 5.8% or 6,820 had "persistent asthma", higher than the overall prevalence seen in MA-F&C and MNCare. As shown below, "persistent asthma" prevalence was by far the highest among 0-4 year olds, females and Blacks/African Americans. Prevalence was higher among Twin Cities residents than those in Greater Minnesota.

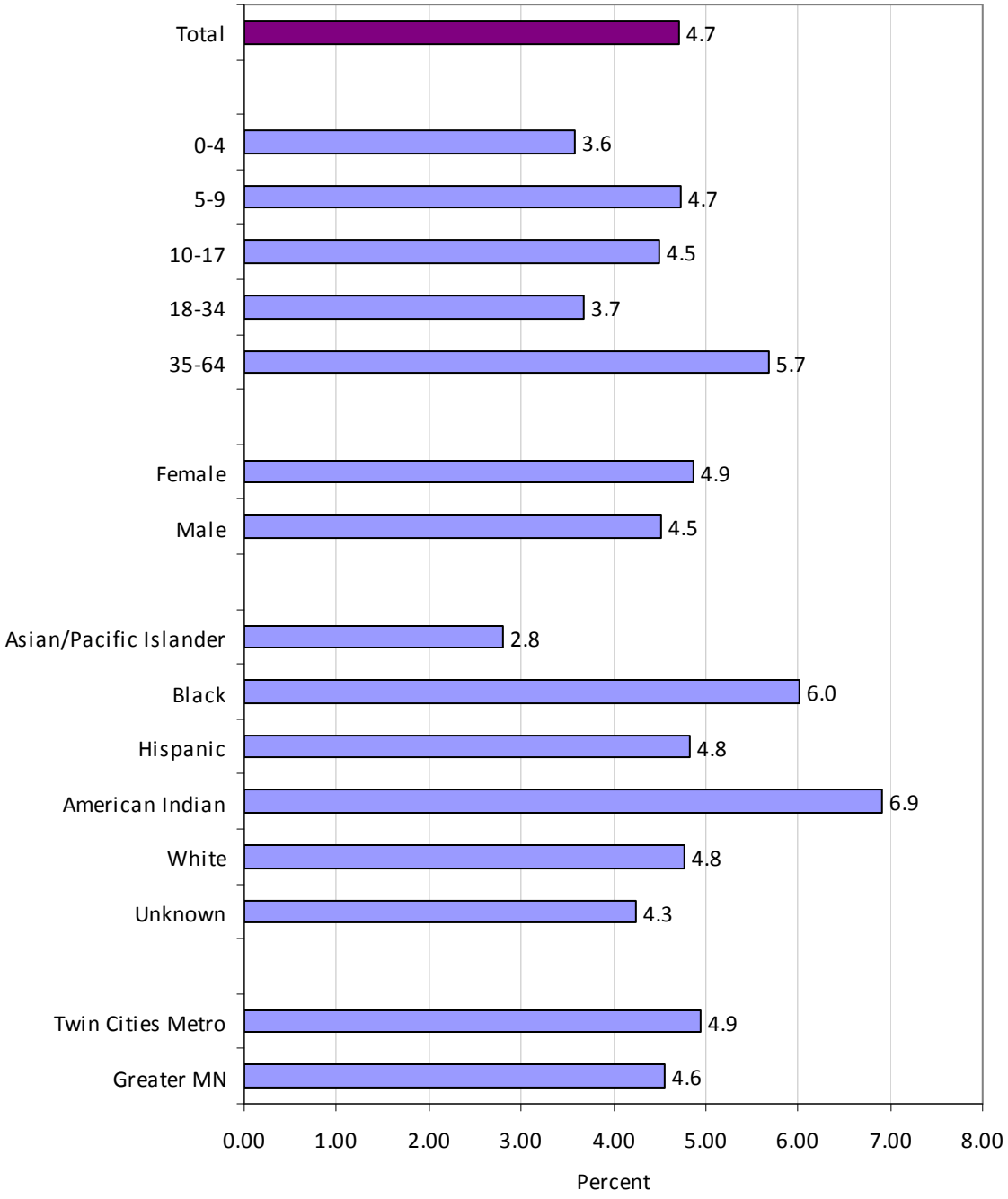
Figure 2. Percentage of Medical Assistance Fee-for-Service Enrollees With "Persistent Asthma", 2007



Prevalence of "Persistent Asthma" Among MinnesotaCare Enrollees

Among the 74,430 individuals continuously-enrolled in MinnesotaCare in 2007 4.7% or 3,505 had "persistent asthma". As seen in Figure 3, the prevalence of "persistent asthma" was highest among American Indians and adults aged 35-64. In contrast to the MA-F&C and MA-FFS enrollees, there was little difference in prevalence between males and females and between MinnesotaCare enrollees living in the Twin Cities metro area and those living in Greater Minnesota.

Figure 3. Percentage of MinnesotaCare Enrollees With "Persistent Asthma", 2007



Prevalence of "Persistent Asthma" by Program, 2005-2007

As shown in Table 2, the prevalence of "persistent asthma" increased among MinnesotaCare enrollees, decreased in MA-FFS enrollees and remained steady in MA-F&C enrollees from 2005-2007. Generally, increasing prevalence is explained by increasing numbers of people developing asthma over time and/or increasing numbers of people living with symptoms who are going to the doctor for a diagnosis due to broadening awareness of the disease. Because of the definition used to identify "persistent asthma" in this analysis, the increasing asthma prevalence is an indication of increasing rates of health care utilization and/or medication use over this time period (see Table 6).

Table 2. Percentage of Enrollees With "Persistent Asthma" by Program, 2005-2007

	2005	2006	2007
Medical Assistance-Families and Children	5.1	5.2	5.2
Medical Assistance Fee-For-Service	9.0	5.7	5.8
MinnesotaCare	4.2	4.5	4.7

Asthma-Related Health Care Utilization Among MA-Families and Children Enrollees

Children aged 5-9, males and Blacks/African Americans were by far the most likely to have had an office visit for asthma. Rates of asthma-related emergency department were higher among children under 5 while hospitalizations were most likely among adults aged 35-64. Residents of the Twin Cities were twice as likely as residents of Greater Minnesota to have had an emergency department visit or hospitalization for asthma.

Enrollees in MA-F&C averaged 1.4 emergency department visits per enrollee who had at least one visit.

Table 3. Asthma-Related Health Care Utilization by Age, Sex, Race/Ethnicity and Residence, Medical Assistance-Families and Children, 2007

Rate per 10,000	Office Visits	Emergency Department Visits	Hospitalizations
Age Group (years)			
0-4	683.6	281.3	89.2
5-9	841.6	166.0	40.9
10-17	623.5	97.9	30.7
18-34	445.7	148.3	38.8
35-64	587.0	160.7	138.3
Sex			
Female	564.1	153.2	59.8
Male	752.1	197.8	60.0
Race/Ethnicity			
Asian/Pacific Islander	283.2	36.2	8.73[#]
Black/African American	892.4	310.4	104.3
Hispanic	691.6	176.9	49.7
American Indian	711.8	267.2	89.8
White	572.8	112.9	44.6
Unknown	693.9	278.8	100.0
Residence			
Twin Cities Metro	729.6	223.8	79.2
Greater Minnesota	545.6	112.1	37.8
Total	644.1	172.2	59.9

[#]Because the relative standard error is high, the rate may be unreliable and should be interpreted with caution.

Asthma-Related Health Care Utilization Among Medical Assistance Fee-For-Service Enrollees

Children under age 5, Blacks/African Americans and females were by far the most likely to have had an office visit for asthma. Rates of asthma-related emergency department visits and hospitalizations were higher among females and Blacks/African Americans, with children age 5-9 having the highest rate of ED visits and adults ages 35-64 having the highest rate of hospitalizations. Residents of the Twin Cities were twice as likely as residents of Greater Minnesota to have had an emergency department visit or hospitalization for asthma.

MA-FFS enrollees averaged 1.5 emergency department visits per enrollee who had at least one visit.

Table 4. Asthma-Related Health Care Utilization by Age, Sex, Race/Ethnicity and Residence, Medical Assistance Fee-For-Service, 2007

Rate per 10,000	Office Visits	Emergency Department Visits	Hospitalizations
Age Group (years)			
0-4	816.5	194.2	138.3
5-9	738.6	205.4	90.7
10-17	598.4	138.1	71.1
18-34	360.3	143.0	78.7
35-64	590.0	189.5	212.6
Sex			
Female	648.9	198.7	194.8
Male	462.8	143.8	95.2
Race/Ethnicity			
Asian/Pacific Islander	579.8	57.8	75.3
Black/African American	956.6	549.8	432.9
Hispanic	766.6	173.8	105.4
American Indian	573.4	156.7	99.2
White	472.7	109.9	105.7
Unknown	529.0	154.9	137.9
Residence			
Twin Cities Metro	680.5	246.1	215.5
Greater Minnesota	457.6	110.6	89.9
Total	561.2	172.8	147.9

Asthma-Related Health Care Utilization Among MinnesotaCare Enrollees

As with the MA-F&C enrollees, children ages 5-9 and Blacks/African Americans enrolled in MinnesotaCare had the highest rates of office visits for asthma. Children under age 5 and Blacks/African Americans had the highest rates of asthma-related ED visits. Children under the age of 5 and American Indians had the highest rates of hospitalization. Twin Cities residents had higher rates than those in Greater Minnesota for all of these measures.

MinnesotaCare enrollees averaged 1.3 emergency department visits per enrollee who had at least one visit.

Table 5. Asthma-Related Health Care Utilization Rates Per 10,000 Enrollees by Age, Sex, Race/Ethnicity and Residence, MinnesotaCare, 2007

Rate per 10,000	Office Visits	Emergency Department Visits	Hospitalizations
Age Group (years)			
0-4	553.4	143.2	69.0
5-9	668.1	75.0	22.1#
10-17	578.3	49.1	17.1
18-34	353.6	46.3	13.2
35-64	365.6	44.2	21.1
Sex			
Female	437.2	53.7	22.9
Male	465.8	60.1	21.2
Race/Ethnicity			
Asian/Pacific Islander	351.3	39.6#	22.3#
Black/African American	803.8	171.3	77.6
Hispanic	785.5	80.6#	30.2#
American Indian	674.3	98.7#	98.7#
White	414.8	47.4	17.1
Unknown	467.5	60.7	20.2#
Residence			
Twin Cities Metro	536.9	70.7	29.5
Greater Minnesota	395.0	47.4	17.4
Total	450.1	56.6	22.2

#Because the relative standard error is high, the rate may be unreliable and should be interpreted with caution.

Asthma-Related Health Care Utilization by Program, 2005-2007

Table 6 shows asthma-related health care utilization rates for 2005-2007. These rates have been age-adjusted to account for the differences in age breakdown between the programs.

Rates of asthma-related office visits decreased among enrollees of all three programs between 2005 and 2007.

Rates of asthma-related emergency department visits decreased in the MA-FFS population, while rates remained relatively stable among MA-F&C and MinnesotaCare enrollees.

Rates of asthma hospitalizations among MA-FFS enrollees decreased significantly over 2005-2007. There was a marked increase in hospitalizations among MA-F&C enrollees over the period. There was no change among MinnesotaCare enrollees.

Table 6. Age-adjusted Asthma-Related Health Care Utilization Rates Per 10,000 by Program, 2005-2007

	2005	2006	2007
Office Visits			
Medical Assistance-Families and Children	593.0	485.1	509.8
Medical Assistance Fee-For-Service	621.7	477.8	489.2
MinnesotaCare	446.0	360.6	376.8
Emergency Department Visits			
Medical Assistance-Families and Children	140.3	117.3	139.1
Medical Assistance Fee-For-Service	166.7	132.2	150.4
MinnesotaCare	47.4	38.6	48.8
Hospitalizations			
Medical Assistance-Families and Children	48.8	58.0	74.5
Medical Assistance Fee-For-Service	137.1	103.5	123.9
MinnesotaCare	20.4	13.6	19.5

Use of Appropriate Medications Among Enrollees With "Persistent Asthma"

Overall, enrollees in MinnesotaCare with "persistent asthma" were more likely than those in MA-F&C or MA-FFS to be using appropriate medication for asthma.

Table 7. Percentage of Enrollees With "Persistent Asthma" Who Used Appropriate Asthma Medications by Program, 2007

	Medical Assistance-Families and Children	Medical Assistance Fee-For-Service	MinnesotaCare
Age Group	%	%	%
0-4	74	87	84
5-9	87	90	91
10-17	84	84	87
18-34	71	69	77
35-64	75	67	82
Total	79	75	83

Use of Appropriate Medications Among Enrollees With "Persistent Asthma", 2005-2007

The overall percentage of enrollees with "persistent asthma" using appropriate medications decreased in MA-FFS enrollees and did not change in MA-F&C or MinnesotaCare enrollees between 2005 and 2007.

Table 8. Percentage of Enrollees With "Persistent Asthma" who used Appropriate Medications by Program, 2005-2007

	2005	2006	2007
	%	%	%
Medical Assistance-Families and Children	79	80	79
Medical Assistance Fee-For-Service	80	76	75
MinnesotaCare	84	85	83

Discussion

The burden of asthma is greater among public health insurance enrollees than the general population. Asthma-related health care utilization rates among public health insurance enrollees are much higher than the statewide average. In 2006, the statewide age-adjusted asthma hospitalization rate per 10,000 for persons under 65 was 7 per 10,000 versus 19.5 per 10,000 for MinnesotaCare, 74.5 for MA-F&C and 123.9 for MA-FFS enrollees in 2007. The 2006 statewide age-adjusted rate of asthma-related emergency department visits per 10,000 for persons under 65 was 33 per 10,000 versus 48.8 per 10,000 for MinnesotaCare, 139.1 for MA-F&C and 150.4 for MA-FFS in 2007.

The good news, however, is that there were decreases in asthma-related health care utilization rates between 2005 and 2007—notably significant decreases in asthma-related hospitalizations and emergency department visits for MA-FFS—while the percentage of people with "persistent asthma" using appropriate medications decreased to some degree in MA-FFS enrollees. All three programs saw decreases in asthma related office visits. Future years of data will be needed to determine whether these trends are continuing.

The difference in rates of asthma-related office visits, emergency department visits and hospitalizations between the different programs is striking. Enrollees in Medical Assistance-Fee-For-Service by far had the highest rates of ED visits and hospitalizations. Because the majority in this program are disabled, these rates are probably attributable to the fact that enrollees have other disabling conditions besides asthma.

The difference in rates of appropriate medication use between the programs is also striking. MA-FFS enrollees with "persistent asthma" were the least likely to be taking appropriate medications for asthma. This could be due to differential prescribing practices and/or barriers to filling prescriptions (e.g., limited transportation, distance to pharmacy, perceived lack of need for preventative medication due to lack of symptoms).

Overall, asthma morbidity was much greater (higher prevalence and higher rates of asthma-related emergency department visits and hospitalizations) among MA-F&C enrollees than among MinnesotaCare enrollees. Interestingly, rates of asthma-related office visits were also higher among MA-F&C enrollees. This suggests that the MA-F&C enrollees weren't just using the emergency department instead of going to the doctor; both rates were higher compared to MinnesotaCare rates. Office visits could be an indication of preventive care, but could also be for worsening symptoms. In any case, this finding points to the clinic setting as an opportunity for intervention efforts to increase asthma control in this population.

Both asthma prevalence and health care utilization rates were higher in the Twin Cities metro area than Greater Minnesota for enrollees in all three programs. This finding is consistent with surveys of self-reported asthma among adults in Minnesota as well as trends in asthma-related hospitalizations and emergency department visits among all Minnesotans.

Limitations

Because this study was based on claims data, estimates of asthma prevalence are not comparable with estimates of asthma prevalence in the general population that are based on surveys.

Because this analysis identified people with asthma based on asthma-related health care utilization and prescription-filling, people with mild asthma were less likely to be included, thus underestimating the overall prevalence of asthma in these groups. Because some of the medications taken by those with COPD are the same as those for asthma, people with COPD (and no asthma) may inadvertently be included in the older age groups.

This analysis tracked rates of prescription-filling, which is not necessarily the same as medication use. For example, records may show that two prescriptions for albuterol were filled for a child in less than month (which would be a red flag if they were using a quick reliever that often), but this could also represent prescriptions for inhalers to have at both home and school.

Summary

Minnesotans with disabilities and those with the lowest incomes, especially residents of the Twin Cities, children, Blacks/African-Americans and American Indians, are experiencing the greatest burden of asthma in Minnesota, with rates of asthma hospitalizations and emergency department visits that are much higher than the state average. While those living in the Twin Cities metropolitan area have the highest rates of health care utilization for asthma, rates for enrollees living in Greater Minnesota are also higher than the state average. The high rates of emergency department visits are an indication of uncontrolled asthma (i.e., continuing symptoms) and/or a lack of a medical home, although the fact that the rate of office visits for children is also high suggests that enrollees are seeking primary care at least for their children. The high rates of asthma-related health care utilization could also be an indication of higher prevalence of asthma in these populations (i.e., more people with asthma), greater severity of disease and/or greater exposure to asthma triggers. Factors related to poverty that have also been associated with increased asthma morbidity include substandard housing, stress, and poor air quality.

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