



Asthma Among Minnesota Health Care Program Enrollees

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).

The Minnesota Department of Human Services (DHS) oversees the state's public health care programs. **Medical Assistance** is Minnesota's Medicaid program, providing medical care and prescription medications for low income people and people with disabilities. DHS contracts with managed care organizations to cover the majority of enrollees eligible for Medical Assistance through the **Prepaid Medical Assistance Program (PMAP)**. Persons with disabilities and others who are in transition between programs are covered through a **Fee-For-Service program (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.

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 lower-income populations are often at higher risk for asthma.

Methods

Queries of public health care program claims data for the years 2003 – 2005 were conducted by the Minnesota Department of Human Services.

Continuous enrollment

This analysis was limited to individuals under the age of 65 enrolled in PMAP, 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:

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

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 PMAP, MA-FFS and MinnesotaCare populations in 2005. The differences in demographics arise from the differences in eligibility for the two programs. The majority of PMAP enrollees are children, while the majority of MA-FFS and MinnesotaCare enrollees are adults.

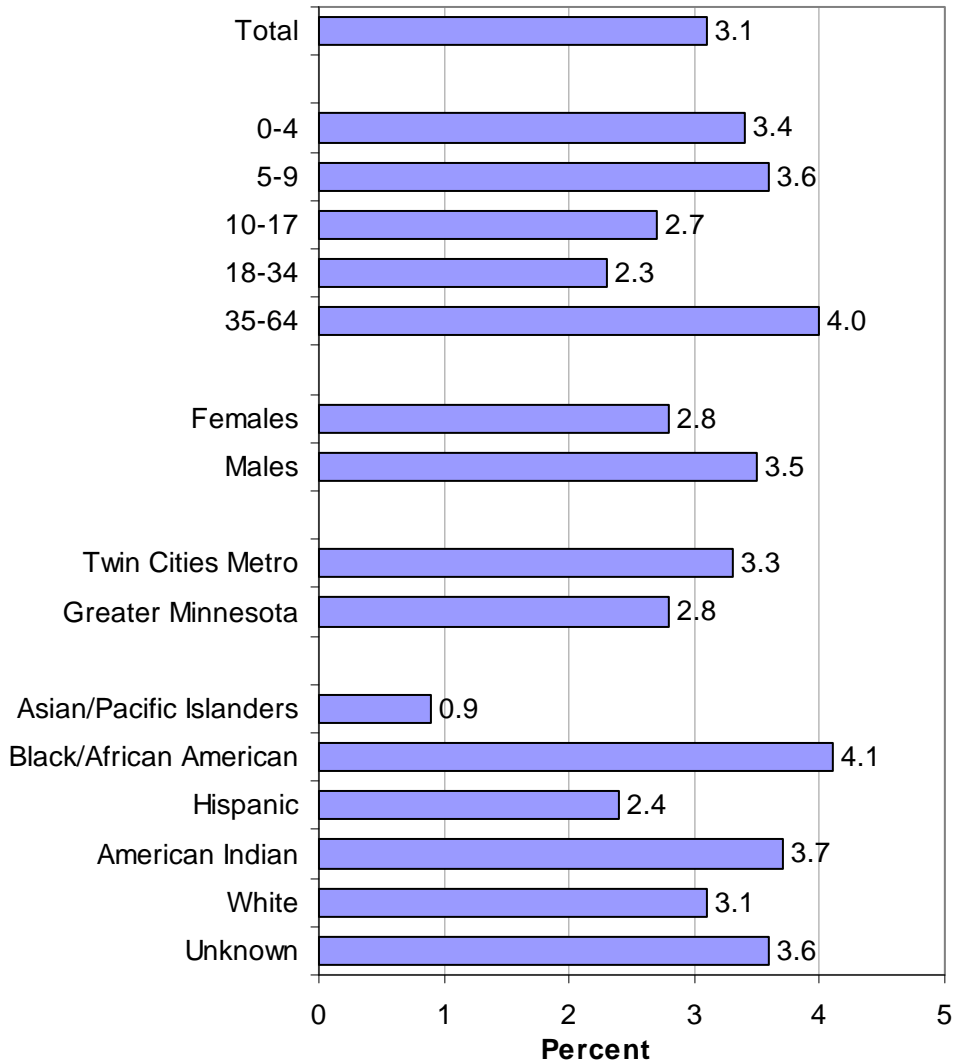
Table 1. Continuous Enrollees by Age, Sex, Race/Ethnicity and Residence, 2005

	Prepaid Medical Assistance Program		Medical Assistance Fee-For-Service		MinnesotaCare	
	#	%	#	%	#	%
Age Group						
0-4	33,580	24	5,190	5	8,194	8
5-9	27,272	19	7,877	8	11,417	11
10-17	38,559	27	15,393	15	20,836	20
18-34	27,159	19	21,123	20	26,200	25
35-64	14,524	10	55,150	53	36,160	35
Sex						
Females	81,826	58	53,319	51	56,904	55
Males	59,268	42	51,414	49	45,903	45
Race/ethnicity						
Asian/Pacific Islander	15,293	11	5,308	5	5,744	6
Black/African American	35,272	25	13,307	13	5,946	6
Hispanic	12,860	9	2,690	3	2,807	3
American Indian	4,544	3	9,262	9	784	1
White	68,273	48	71,088	68	79,632	77
Unknown	4,852	3	3,078	3	7,894	8
Residence						
Twin Cities Metro	76,993	55	47,763	46	39,753	39
Greater Minnesota	62,613	44	56,970	54	62,465	61
Total	141,094	100	104,733	100	102,807	100

Prevalence of “Persistent Asthma” Among PMAP Enrollees

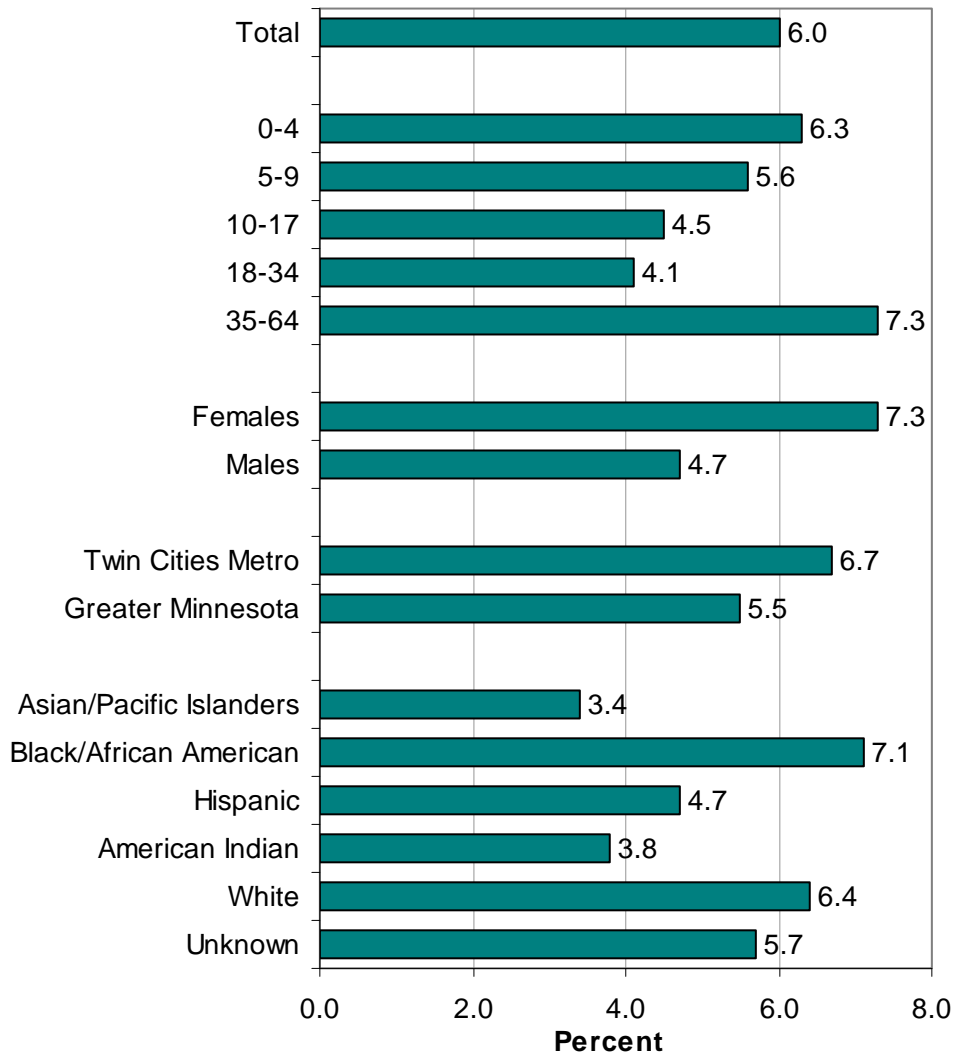
Among the 141,094 individuals continuously enrolled in PMAP in 2005, 3.1% or more than 4,000 had “persistent asthma”. As shown in Figure 1, “persistent asthma” prevalence was highest among 35-64 year olds and Blacks/African Americans. Prevalence was higher among Twin Cities residents than those in Greater Minnesota, and higher in males than females.

Figure 1. Percentage of PMAP Enrollees With “Persistent Asthma”, 2005



Prevalence of “Persistent Asthma” Among Medical Assistance Fee-for-Service Enrollees
 Among the 104,733 individuals continuously enrolled in Medical Assistance-FFS in 2005, 6.0% or 6,284 had “persistent asthma”, higher than the overall prevalence seen in PMAP and MinnesotaCare. As shown below, “persistent asthma” prevalence was by far the highest among 35-64 year olds, females and Blacks/African Americans. Prevalence was higher among Twin Cities residents than those in Greater Minnesota.

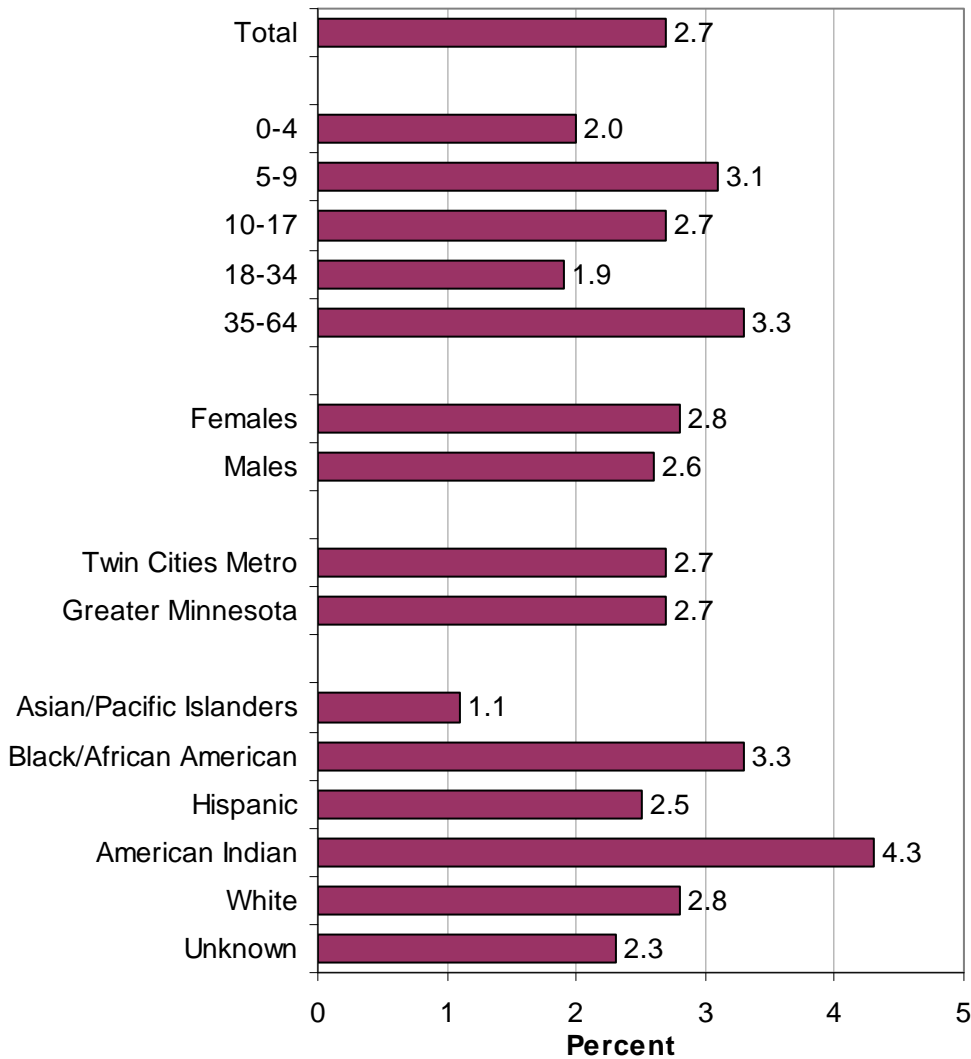
Figure 2. Percentage of Medical Assistance Fee-for-Service Enrollees With “Persistent Asthma”, 2005



Prevalence of “Persistent Asthma” Among MinnesotaCare Enrollees

Among the more than 100,000 individuals continuously-enrolled in MinnesotaCare, 2.7% or 2,775 had “persistent asthma”. As seen in Figure 3, the prevalence of “persistent asthma” was highest among American Indians. Prevalence was higher among adults aged 35-64 than the other age groups, and higher among females than males. In contrast to the PMAP and MA-FFS enrollees, there was no difference in prevalence 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”, 2005



Prevalence of “Persistent Asthma” by Program, 2003-2005

As shown in Table 2, the prevalence of “persistent asthma” increased slightly in all three programs between 2003 and 2005. 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, 2003-2005

	2003	2004	2005
Prepaid Medical Assistance Program	2.8	2.8	3.1
Medical Assistance Fee-For-Service	5.6	5.5	6.0
MinnesotaCare	2.4	2.5	2.7

Asthma-Related Health Care Utilization Among PMAP 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 visits and hospitalizations were higher among children under 5, males and Blacks/African Americans. 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.

PMAP enrollees averaged 1.3 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, Prepaid Medical Assistance Program, 2005

<i>Rate per 10,000</i>	Office visits	Emergency department visits	Hospitalizations
Age Group			
0-4	754.3	258.2	88.4
5-9	824.3	141.5	32.3
10-17	627.4	96.7	26.2
18-34	444.4	148.4	37.6
35-64	573.5	136.3	55.8
Sex			
Females	587.5	144.3	43.1
Males	748.0	176.5	53.3
Race/ethnicity			
Asian/Pacific Islander	255.7	29.4	15.7
Black/African American	847.1	271.3	69.7
Hispanic	609.6	153.2	42.0
American Indian	664.6	259.7	55.0
White	636.6	116.3	39.1
Unknown	884.2	239.1	109.2
Residence			
Twin Cities Metro	699.4	199.4	62.0
Greater Minnesota	601.6	106.7	30.3
Total	654.7	157.8	47.4

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

Children aged 5-9, 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 children under 5 and adults ages 35-64, females and Blacks/African Americans. 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, 2005

<i>Rate per 10,000</i>	Office visits	Emergency department visits	Hospitalizations
Age Group			
0-4	778.4	188.8	161.8
5-9	705.9	166.3	96.5
10-17	608.7	121.5	67.6
18-34	525.5	175.2	83.3
35-64	640.8	187.3	208.5
Sex			
Females	763.9	218.7	207.2
Males	480.0	127.0	94.3
Race/ethnicity			
Asian/Pacific Islander	604.7	54.6	67.8
Black/African American	1058.1	431.4	335.9
Hispanic	672.9	156.1	107.8
American Indian	539.8	200.8	133.9
White	556.2	133.6	128.0
Unknown	575.0	123.5	142.9
Residence			
Twin Cities Metro	742.6	218.6	194.7
Greater Minnesota	526.0	134.7	113.4
Total	624.5	173.7	151.8

Asthma-Related Health Care Utilization Among MinnesotaCare Enrollees

As with the PMAP enrollees, children ages 5-9 and Blacks/African Americans 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 and hospitalizations. Twin Cities residents had higher rates than those in Greater Minnesota for all of these measures.

MinnesotaCare enrollees averaged 1.2 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, 2005

<i>Rate per 10,000</i>	Office visits	Emergency department visits	Hospitalizations
Age Group			
0-4	574.8	97.6	33.0
5-9	727.0	56.1	27.2
10-17	637.8	56.6	23.0
18-34	357.6	51.5	13.7
35-64	355.4	33.5	20.2
Sex			
Females	465.2	45.9	21.1
Males	480.4	56.0	20.7
Race/ethnicity			
Asian/Pacific Islander	336.0	20.9	8.7
Black/African American	825.8	143.0	69.0
Hispanic	587.8	71.3	17.8
American Indian	739.8	102.0	12.8
White	449.4	44.5	18.5
Unknown	463.6	49.4	20.3
Residence			
Twin Cities Metro	539.8	63.6	28.9
Greater Minnesota	428.6	42.4	16.0
Total	472.0	50.4	20.9

Asthma-Related Health Care Utilization by Program, 2003-2005

Table 6 shows asthma-related health care utilization rates for 2003-2005. These rates have been age-adjusted to account for the differences in age breakdown between the programs.

Rates of asthma-related office visits increased significantly among PMAP enrollees between 2003 and 2005. The increase in rates of office visits observed among MinnesotaCare enrollees was not statistically significant. Rates of office visits among MA-FFS enrollees did not change significantly over this period.

Rates of asthma-related emergency department visits decreased significantly in the MinnesotaCare population, but there was no significant change in rates of asthma hospitalizations. Among PMAP enrollees, rates of asthma-related hospitalizations decreased significantly, however, the decrease in emergency department visits was not significant. Rates of asthma hospitalizations among MA-FFS enrollees increased significantly over 2003-2005, while rates of emergency department visits decreased only slightly.

It is unclear why the rates in 2004 differ so greatly from 2003 and 2005 for many of the measures.

Table 6. Age-adjusted Asthma-Related Health Care Utilization Rates Per 10,000 by Program, 2003-2005

	2003	2004	2005
Office visits			
Prepaid Medical Assistance Program	569.8	574.3	580.5 [#]
Medical Assistance Fee-For-Service	617.5	586.7	621.3
MinnesotaCare	407.0	399.6	441.4
Emergency department visits			
Prepaid Medical Assistance Program	148.4	134.7	144.3
Medical Assistance Fee-For-Service	176.6	147.0	173.7
MinnesotaCare	54.4	48.9	48.3 [#]
Hospitalizations			
Prepaid Medical Assistance Program	62.5	61.5	47.5 [#]
Medical Assistance Fee-For-Service	136.3	138.2	142.8 [#]
MinnesotaCare	19.1	23.8	20.4

[#]Statistically significant trend over 2003-2005 (p<0.05)

Use of Appropriate Medications Among Enrollees With “Persistent Asthma”

Overall, enrollees in MinnesotaCare and MA-FFS with “persistent asthma” were more likely than those in PMAP to be using appropriate medication for asthma. The higher percentages in the 35-64 year olds may be due in part to people taking COPD medications since some of the same medications are used for both COPD and asthma.

Table 7. Percentage of Enrollees With “Persistent Asthma” Who Used Appropriate Asthma Medications by Program, 2005

	Prepaid Medical Assistance Program	Medical Assistance Fee-For-Service	MinnesotaCare
Age Group			
0-4	73.1%	90.0%	85.1%
5-9	87.6%	91.2%	95.7%
10-17	89.0%	92.2%	96.1%
18-34	75.6%	88.0%	89.3%
35-64	91.6%	93.6%	96.0%
Total	83.0%	92.3%	94.2%

Use of Appropriate Medications Among Enrollees With “Persistent Asthma”, 2003-2005

The overall percentage of enrollees with “persistent asthma” using appropriate medications increased significantly in all three programs between 2003 and 2005.

Table 8. Use of Appropriate Medications Among Enrollees With “Persistent Asthma” by Program, 2003-2005

	2003	2004	2005
Prepaid Medical Assistance Program	76.5	80.5	83.0 [#]
Medical Assistance Fee-For-Service	90.8	91.9	92.3 [#]
MinnesotaCare	90.7	93.0	94.2 [#]

[#]Statistically significant trend over 2003-2005 (p<0.05)

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 2005, the statewide asthma hospitalization rate per 10,000 for persons under 65 was 8 per 10,000 versus 21 per 10,000 for MinnesotaCare, 47 for PMAP and 152 for MA-FFS. The 2005 statewide rate of asthma-related emergency department visits per 10,000 for persons under 65 was 34 per 10,000 versus 50 per 10,000 for MinnesotaCare, 158 for PMAP and 174 for MA-FFS.

The good news, however, is that there were decreases in asthma-related health care utilization rates between 2003 and 2005—notably significant decreases in asthma hospitalizations for PMAP and asthma-related emergency department visits for MinnesotaCare—while the percentage of people with “persistent asthma” using appropriate medications increased to some degree in each program. 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 asthma prevalence and health care utilization. Because the majority in this program are disabled, these rates are probably attributable to the fact that enrollees have co-morbid conditions, including other disabling conditions besides asthma.

The difference in rates of appropriate medication use between the programs is also striking. PMAP 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 PMAP enrollees than among MinnesotaCare enrollees. Interestingly, rates of asthma-related office visits were also higher among PMAP enrollees. This suggests that the PMAP enrollees weren’t just using the emergency department instead of going to the doctor; both rates were higher than for MinnesotaCare. 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 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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