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# INTRODUCTION

Asthma is a disease of the lungs which causes episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. The disease can be controlled by taking medicine and avoiding the triggers that can cause an attack, such as pollen, dust, animal dander, industrial chemicals, viral infections, changes in the weather, exercise, emotional stress, etc.

Since 2003, the Bureau of Health Promotion and Risk Reduction of the Pennsylvania Department of Health (PA DOH) has received funding from the Centers for Disease Control and Prevention (CDC) to address the burden of asthma in Pennsylvania. The first Pennsylvania Asthma Burden Report was published in 2006 and has been updated every year to describe the burden of asthma in Pennsylvania in different areas of the state. In 2009, PA DOH successfully competed for and was awarded a five-year cooperative agreement.

The 2010 *Asthma Burden in Medicaid Population* report describes the burden of asthma among children (0-17) and adults (18-64) in the Medicaid population for 2004-2008 in Pennsylvania, and includes recipients with full Medical Assistance (MA). Medicaid is a federal/state health insurance program that serves the nation's most vulnerable citizens, such as children, pregnant women, individuals with disabilities and seniors. In Pennsylvania, Medicaid-covered health care is available through about 68,000 providers, including hospitals, long-term care facilities, physicians and dentists. Approximately 15 percent of the residents of Pennsylvania are served by Medical Assistance Programs. Children represent the largest proportion of those enrolled in Pennsylvania's MA, with approximately one-third of children in the commonwealth covered. However, the proportion of children covered by Medicaid varies from county to county.

This report also provides information about the prevalence (percentage) of current and persistent asthma, hospitalizations, emergency department visits, outpatient visits and the financial cost of asthma on a state-wide level, as well as a detailed analysis of prevalence and hospitalizations among children and adults by age group, gender and geographical location.

The 2010 *Asthma Burden in Medicaid Population* report provides information about people with asthma and a better understanding of the burden of asthma in the Medicaid population. In addition, it will assist public health programs, policymakers, health providers and asthma stakeholders around the state to understand the burden of asthma in the Medicaid population to identify the scope of the problem and to focus efforts to reduce the burden of asthma, particularly in the Medicaid population.

The Pennsylvania Asthma Control Program will continue to monitor these indicators over time to increase and improve efforts to reduce the burden of asthma in the Medicaid population.

# METHODOLOGY

Asthma Medicaid data by age, gender and geographical area was provided to the Asthma Control Program by the Office of Clinical Quality Improvement within the Office of Medical Assistance Programs, Department of Public Welfare, Commonwealth of Pennsylvania. The data used in this report were based on medical and pharmacy claims of Pennsylvania Medicaid recipients from the calendar years 2004 to 2008. Data was combined for five years in order to increase the sample size and produce more reliable results.

All recipients with asthma were identified as recipients who had a claim with asthma as the principal diagnosis (ICD-9 code 493.00-499.00) within this period of time. Recipients (age 0-64) were eligible for MA as of the last day of each year. All methodology is based on HEDIS® (Healthcare Effectiveness Data and Information Set) 2007 Technical Specifications.

According to HEDIS® 2007 specifications, persistent asthma is defined in a patient by meeting one of four criteria:

- At least four outpatient asthma medication dispensing events. A dispensing event is one prescription of an amount lasting 30 days or less during a specified 12 months period of time.
- At least one emergency department (ED) visit with asthma as the principal diagnosis (ICD-9 code 493.00-499.00) during a specified 12 month period of time.
- At least one acute inpatient discharge with asthma as principal diagnosis (ICD-9 code 493.00-499.00) during a specified 12 month period of time.
- At least four outpatient asthma visits with asthma (ICD-9 code 493.00-499.00) as one of the listed diagnoses and at least two asthma medications dispensing events during a specified 12 months period of time

Rates were calculated by summing the data for the multi-year period and dividing it by the number of years.

Readmission rates for inpatient asthma hospitalization were calculated based on Medicaid data conveying the number of patients and number of admissions within a specified 12 months period of discharge.

Annual rates of outpatient/emergency room (ER) visits measure the number of outpatient/ emergency department visits for asthma per 1,000 Medicaid recipients.

Inpatient hospitalization rates with asthma as the primary discharge diagnosis were calculated per 10,000 Medicaid recipients.

Age-adjusted rates were adjusted to the 2000 U.S. standard population and have a 95 percent confidence interval.

Inpatient hospitalization, outpatient and ER visit rates reflect the number of admissions, not the number of patients.

Data were analyzed using SAS 9.1.3 and Excel.

All allowed and paid amounts were not inflation adjusted.

Other data included in this report include office visits, the annual cost of asthma medications and asthma-related services as well as the percentage of Medicaid recipients with persistent asthma receiving appropriate long-term control medications. There are two different types of medication for asthma—one for long-term control which prevents asthma attacks and another for treating acute symptoms for quick relief.

Only Pennsylvania Medicaid recipients who were admitted to Pennsylvania hospitals and who had persistent asthma are included in this report.

Both geographic (county, health district) and demographic (age group, gender) subpopulation analyses were conducted to identify disparities. Due to small size, descriptive information regarding age groups was limited, and estimated prevalence and hospitalizations rates of asthma for smaller geographical areas were not always available. Maps generated by geographic information system (GIS) tools are used for visual display of the data and for identification of areas with high burden.

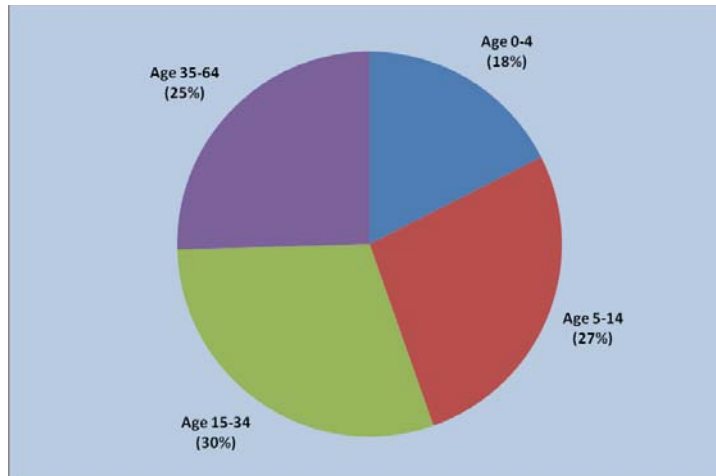
Notes: In 2004, the Department of Public Welfare converted to a new Medical Assistance Management Information System (MMIS), and data for 2004 may reflect underreporting for that year. Data for 2005–2008 were not affected by the data management conversion. Some figures concerning the prevalence of persistent asthma may not reflect actual numbers because the HEDIS® algorithm (from 2007) had been updated.

# SUMMARY (KEY FINDINGS):

- For the entire five-year period, the prevalence of asthma and inpatient hospitalization rates with asthma as the primary discharge diagnosis among Medicaid recipients was higher among children (0-17) than adults (18-64) [Figure 4 and Figure 14].
- During 2004-2008, the prevalence of persistent asthma and inpatient hospitalization rates with asthma as the primary discharge diagnosis among children (0-17) in Medicaid was on the rise, though it decreased in 2008. The prevalence of persistent asthma among adults (18-64) in Medicaid increased in 2005 and 2006 and then declined in 2007 and 2008. Inpatient hospitalization rates with asthma as the primary discharge diagnosis started to decline in 2007 (Figure 5 and Figure 14).
- During 2004-2008, the prevalence of persistent asthma and inpatient hospitalization rates with asthma as the primary discharge diagnosis was higher among male children than female children. However, among adults the prevalence of persistent asthma and inpatient hospitalization rates with asthma as the primary discharge diagnosis was higher among females than males (Figures 6, 7, 15, and 16).
- During 2004-2008, the highest prevalence of persistent asthma was observed in the 35-64 age group, and inpatient hospitalization rates with asthma as the primary discharge diagnosis was highest in the 0-4 age group (Figure 8 and Figure 17).
- During 2004-2008, there were no significant differences between males and females (who received appropriate long-term medications) in any age group, with the exception of the 35-64 age group (Figure 11).
- For the entire five-year period, annual paid claims for asthma emergency room visits and office visits increased. However, paid claims for asthma inpatient admissions in general decreased (Table 1).
- The total cost of asthma medications and asthma related services among Medicaid recipients increased for the five-year period (Table 2).
- During 2004-2008, the percentage of asthma readmissions was higher among adults than children; with the exception of 2004, the highest percent of asthma readmissions was in 35-64 age group (Table 3).
- During 2004-2008, the prevalence of persistent asthma, percentage of asthma readmissions and inpatient hospitalization rates with asthma as the primary discharge diagnosis among Medicaid recipients were highest in the Southeastern Health District (Figures 19-26 and Table 4).
- For the entire five-year period, the prevalence of persistent asthma was highest in Philadelphia, Allegheny and Washington Counties. Inpatient hospitalization rates with asthma as the primary discharge diagnosis among Medicaid recipients was highest in Philadelphia, Delaware and Berks Counties (Table 9 and Table 10).



**Figure 1:** Distribution of Pennsylvania Medicaid Recipients by Age Group, PA 2004-2008 (combined data)

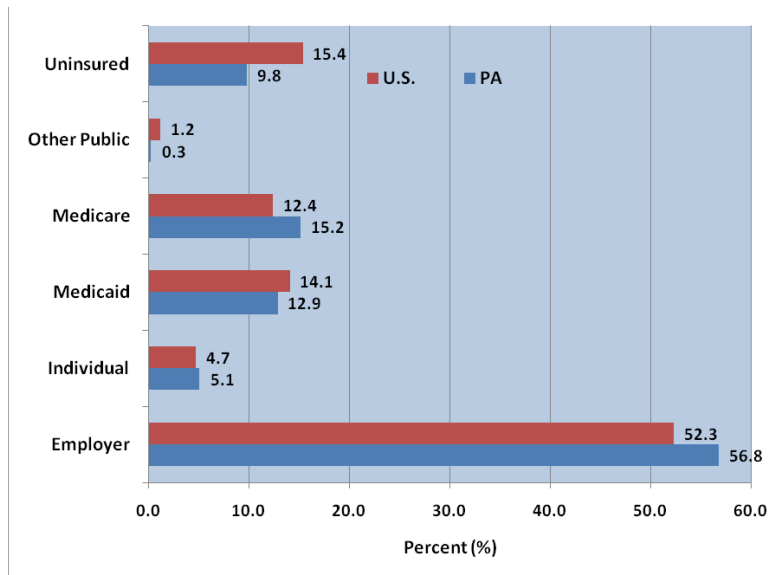


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, the distribution of Medicaid recipients was varied. The highest percentage of the Medicaid population was in the age group of 15-34 (30 percent), followed by age group 5-14 (27 percent). The next highest age group was 35-64 (25 percent), and the lowest (18 percent) accounts for the 0-4 age group.



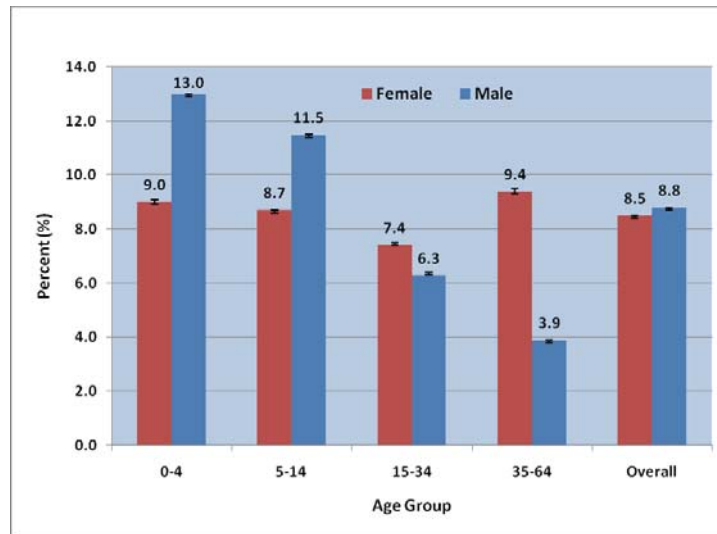
**Figure 2:** Percentage/Distribution of Pennsylvania Residents by Insurance Status, U.S.vs.PA 2007-2008



Data source: Pennsylvania-Kaiser State Health Facts.

In 2007/2008, approximately 12.9 percent of the population in Pennsylvania was covered by Medical Assistance. Compared to the U.S. (14.1 percent), the percentage was lower. According to the data, 9.8 percent of Pennsylvanians lacked health insurance coverage, more than 1.15 million people in total. According to the Small Area Health Insurance Estimates (SAHIE), Pennsylvania ranked 10th nationally in the number of people under the age of 65 without health insurance and 44th nationally in the percent of that age group without health insurance coverage. Of the 2,955,274 children under the age of 19 in Pennsylvania, 208,932 (or 7.1 percent) were without health insurance in 2007. Pennsylvania ranked 10th nationally in the number and 39th nationally in the percent of children without health insurance. According to the recently released 2008 American Community Survey, in Pennsylvania, there were 969,850 people, ages 18-64, lacking health insurance coverage in 2008 (12.7 percent of that age group). Including Pennsylvania residents, over half of the U.S. was covered by employer health coverage.

**Figure 3:** Prevalence of Asthma Among Medicaid Recipients by Age Group and Gender, PA 2004-2008 (combined data)

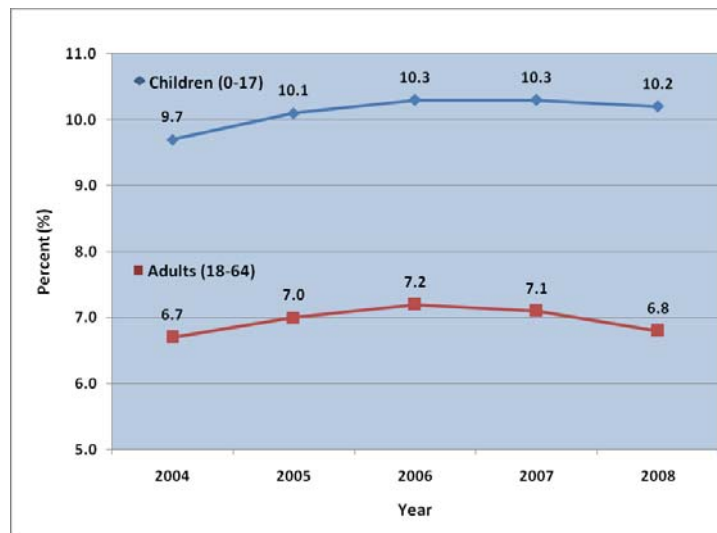


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, the highest asthma prevalence in the Medicaid population among females (9.4 percent) was in enrollees aged 35-64 years, and the lowest (7.4 percent) was in the 15-34 age group. Among males, the highest asthma prevalence (13.0 percent) was in the age group 0-4, and the lowest (3.9 percent) was in the 35-64 age group. Overall, in all age groups, the asthma prevalence among Medicaid recipients was significantly higher among males than females.



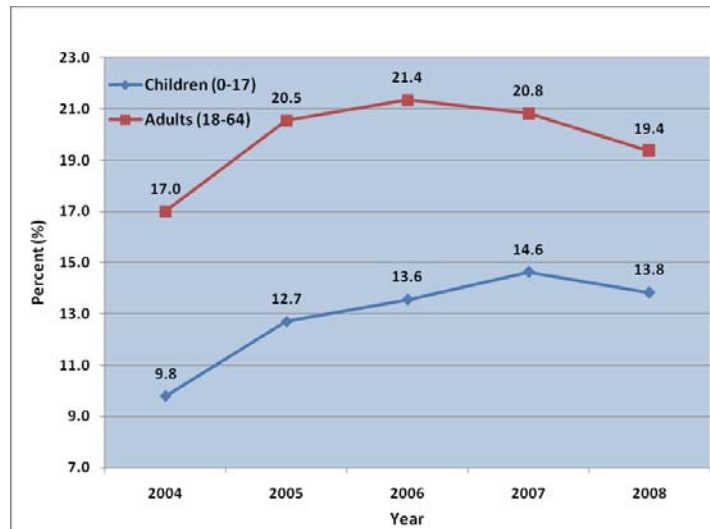
**Figure 4:** Prevalence of Asthma Among Medicaid Children (0-17) and Adults (18-64), PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, the asthma prevalence among Medicaid enrollees varied only slightly from year to year. Since 2004, the asthma prevalence among children has increased from 9.7 percent, reaching 10.3 percent in 2006. The percentage stabilized in 2007 and declined slightly in 2008. Among adults the highest asthma prevalence (7.2 percent) was in 2006 and had declined by 2008. Overall, for the entire five-year period, asthma prevalence was significantly higher among children than adults by approximately 50 percent.

**Figure 5:** Prevalence of Persistent Asthma Among Medicaid Children (0-17) and Adults (18-64) with Asthma, PA 2004-2008

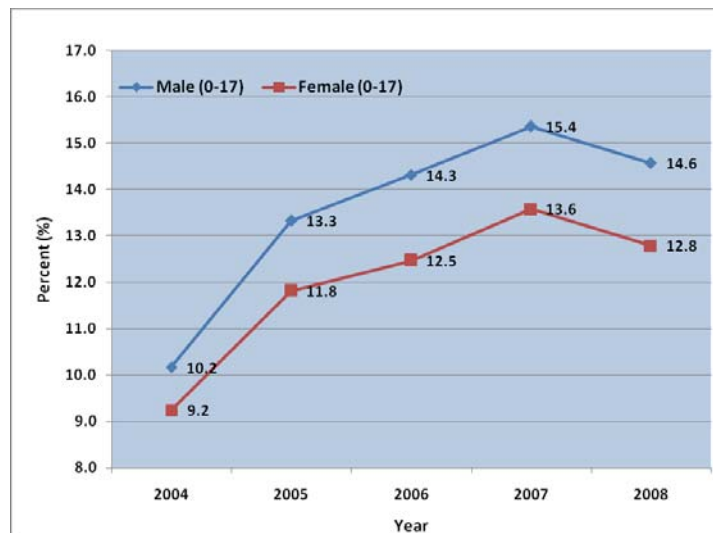


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, approximately 10,800 adults and 11,000 children with persistent asthma requested services from Medicaid every year. The prevalence of persistent asthma (PPA) among adults was higher for the entire five-year period compared to children. The highest PPA among adults took place in 2006 (21.4 percent), slowly declining and reaching 19.4 percent in 2008. For the five-year period, the PPA among children consistently rose and reached its highest point in 2007 (14.6 percent), before declining (13.8 percent) in 2008. Generally, the PPA among adults was significantly higher than among children (approximately 50 percent).



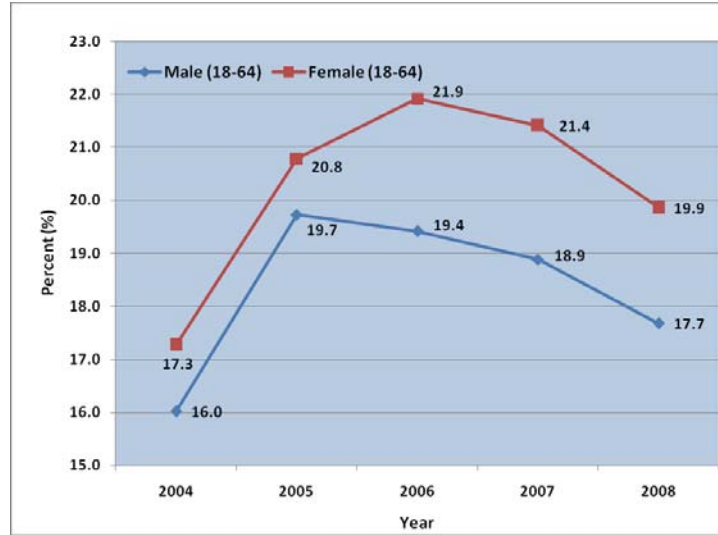
**Figure 6:** Prevalence of Persistent Asthma Among Medicaid Children (0-17) with Asthma by Gender, PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

From 2004 to 2008, the average number of people aged 0-17 with symptoms of persistent asthma was about 6,700 male children and 4,100 female children each year. The PPA for both boys and girls enrolled in Medicaid was highest in 2007 (15.4 percent and 13.6 percent, respectively). On average, during the five-year period the PPA among male children was higher by 13 percent than among female children.

**Figure 7:** Prevalence of Persistent Asthma Among Medicaid Adults (18-64) with Asthma by Gender, PA 2004-2008

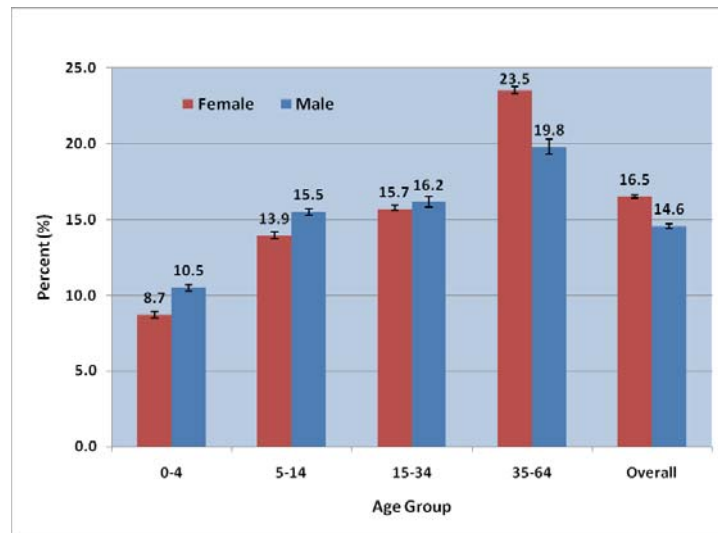


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

From 2004 to 2008, the average number of people aged 18-64 with symptoms of persistent asthma was about 2,200 males and 8,200 females each year. The PPA for females was highest in 2006 (21.9 percent); for males the highest PPA was in 2005 (19.7 percent). On average, during the five-year period, the PPA among females was higher than among males by approximately 10 percent.



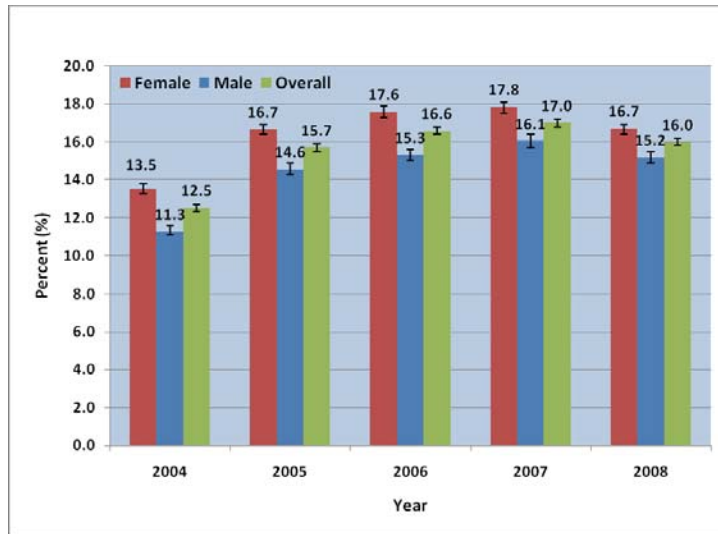
**Figure 8:** Prevalence of Persistent Asthma Among Medicaid Recipients with Asthma by Age Group and Gender, PA 2004-2008 (combined data)



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The PPA among Medicaid recipients varied by age. Females and males aged 35-64 had the highest prevalence rate (23.5 percent and 19.8 percent, respectively), followed by enrollees aged 15-34 years (15.7 percent and 16.2 percent, respectively). Enrollees aged 0-4 years had the lowest PPA (8.7 percent and 10.5 percent respectively). It seems that the PPA was significantly higher among males in 0-4 and 5-14 age groups compared to females and significantly higher in females in age group 35-64 than males. The same trend has been identified in asthma prevalence among the general population in Pennsylvania and U.S.

**Figure 9:** Prevalence of Persistent Asthma Among Medicaid Recipients with Asthma by Gender and Year, PA 2004-2008

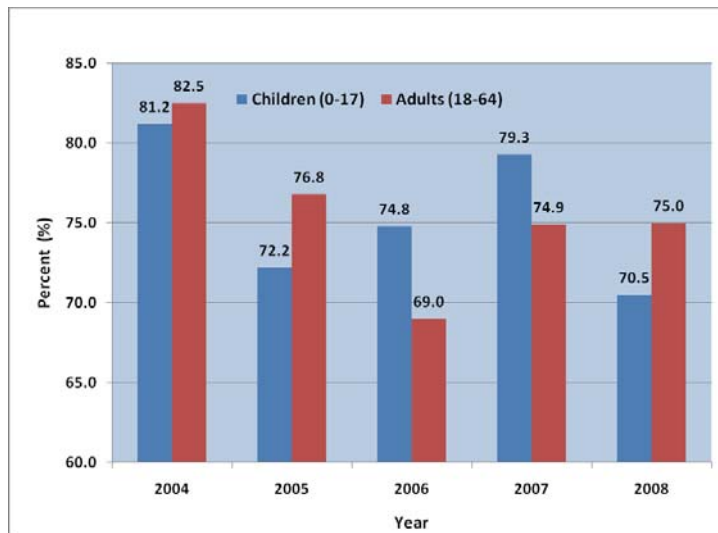


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The highest PPA among both females and males was in 2007; the lowest PPA for the same period was in 2004. The rates for both genders increased significantly from 2004 (13.5 percent for females and 11.3 percent for males) to 2007 (17.8 percent for females and 16.1 percent for males) and decreased significantly in 2008 (16.7 percent for females and 15.2 percent for males).



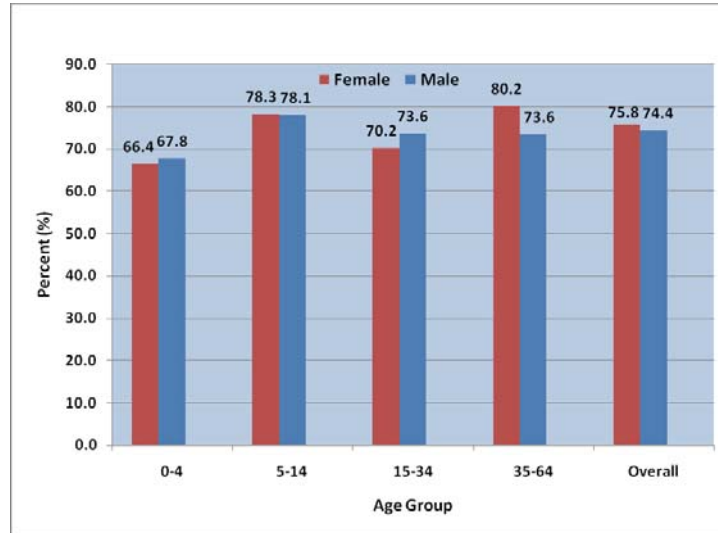
**Figure 10:** Percentage of Children (0-17) and Adults (18-64) in the Medicaid Population with Persistent Asthma Receiving Appropriate Long-Term Medications, PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Appropriate long-term control medications need to be taken daily to control chronic symptoms and prevent asthma attacks even when the asthma seems better. The percentage of children and adults taking this type of medicine varies from year to year. The proportion of adults who received appropriate medications declined from 2004 to 2006 and began to increase in 2007. Among children, the highest proportion receiving appropriate medications occurred in 2004 (81.2 percent), and the lowest occurred in 2008 (70.5 percent).

**Figure 11:** Percentage of Medicaid Recipients (0-64) with Persistent Asthma Receiving Appropriate Long-Term Medications by Age Group and by Gender, PA 2004-2008 (combined data)

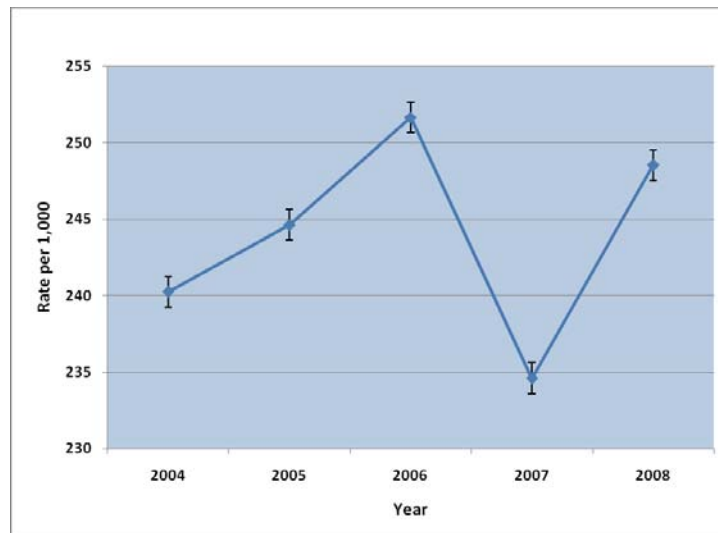


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

There were no significant differences between males and females who received appropriate medications over the five-year period. However, the highest proportion among females was in age group 35-64, and among males, the highest proportion was in age group 5-14. For both males and females, the lowest proportion was in age group 0-4 years.



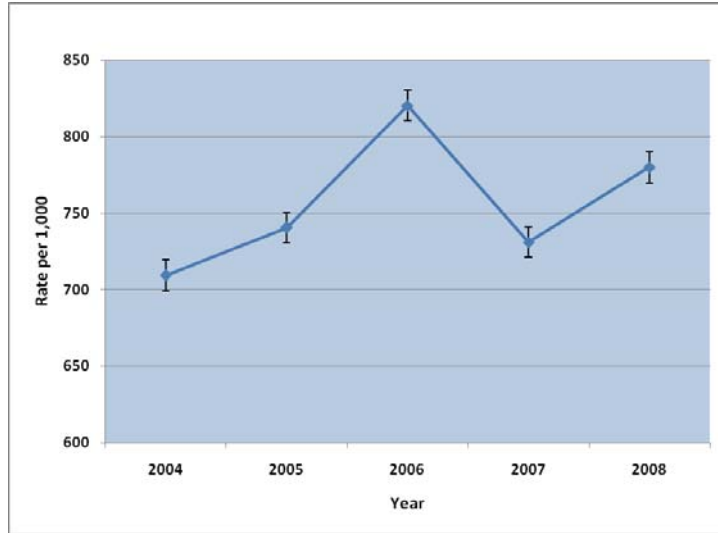
**Figure 12:** Rates of Asthma Emergency Room (ER) Visits Among Medicaid Recipients, PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

From 2004 to 2006, the rate of asthma emergency department visits per 1,000 MA recipients increased (240 visits in 2004 and 252 in 2006). Visits declined in 2007 (235) and increased in 2008 (249).

**Figure 13:** Rates of Outpatient Visits Among Medicaid Recipients, PA 2004-2008

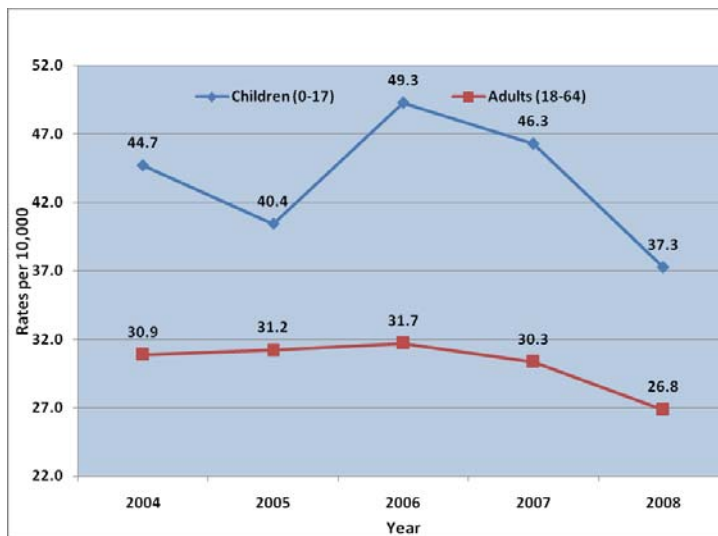


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

According to national guidelines, people with asthma should visit a primary care provider for routine asthma care at least twice per year. Overall, there were 88,617 physician visits in 2004; in 2008, there were 112,370 physician visits, an increase of about 25 percent. During 2004-2008, the trend in the rate of outpatient visits fluctuated, reaching its highest point (825) per 1,000 MA recipients in 2006.



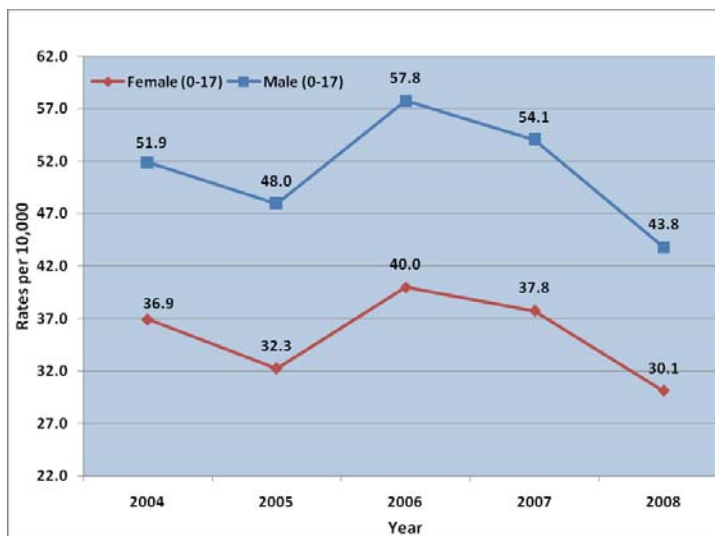
**Figure 14:** Annual Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Children (0-17) and Adults (18-64), PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Hospitalization rates of persons with asthma as the primary discharge diagnosis were significantly higher among children than adults in 2004-2006 (by approximately 50 percent). The highest rates among Medicaid recipients were in 2006 (49.3 for children and 31.7 for adults). The lowest rates were in 2008 (37.3 for children and 26.8 for adults). For both children and adults, hospitalization rates decreased in 2008 (about 25 and 15 percent, respectively) compared to 2006 ( $P < 0.005$ ).

**Figure 15:** Annual Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Children (0-17), PA 2004-2008

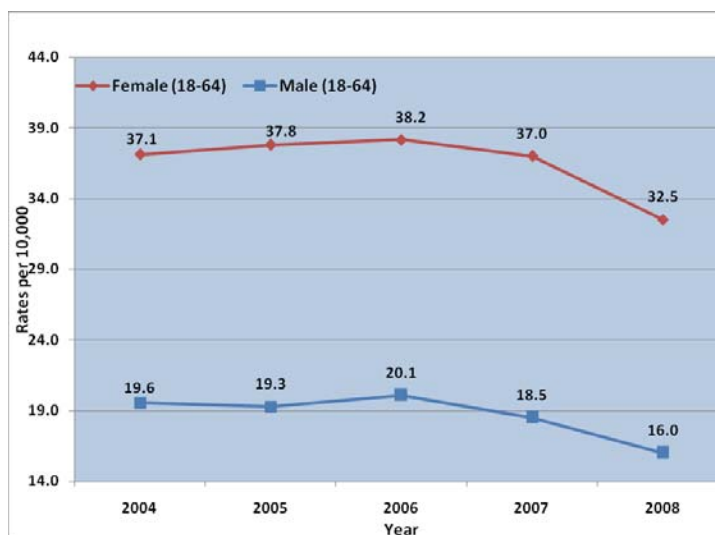


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Hospitalization rates with asthma as the primary discharge diagnosis among children were significantly higher among males than females for the entire five-year period. The highest rates among males and females were in 2006 (57.8 and 40.0 per 10,000, respectively). The lowest rates were in 2008 (43.8 for males and 30.1 for females). For both males and females, hospitalization rates decreased in 2008 (about 25 percent) compared to 2006 ( $P < 0.005$ ).



**Figure 16:** Annual Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Adults (18-64) by Gender, PA 2004-2008

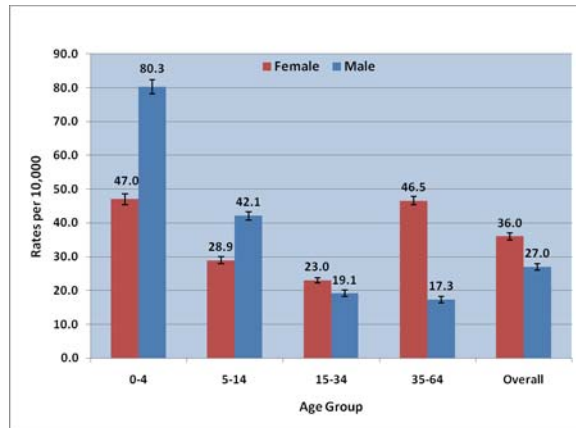


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Hospitalization rates with asthma as the primary discharge diagnosis among adults were significantly higher among females compared to males for 2004-2008. The highest rates among females and males were in 2006 (38.2 and 20.1 per 10,000, respectively). The lowest rates were in 2008 (32.5 for females and 16.0 for males). Hospitalization rates for both females and males decreased (about 20 percent) in 2008 compared to 2006 ( $P < 0.005$ ).



**Figure 17:** Annual Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients by Age Group and Gender, PA 2004-2008 (combined data)



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Among all age groups, females and males aged 0-4 years had the highest hospitalization rate (girls 47.0 per 10,000 and boys 80.3), while the lowest rates among females (23.0) were in the 15-34 age group and among males (17.3) in the 35-64 age group. Males younger than 15 years of age had higher rates compared to females. For age groups 15-34 and older, females had higher rates compared to males. Overall for 2004-2008, females had significantly higher rates than males ( $P < 0.005$ ).



**Table 1:** Direct Annual Asthma Paid Claims, Number of Visits and Allowed Amount per Visit for Asthma Emergency Room (ER) Visits, Asthma Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis (does not include admissions to the hospitals through ER), and Office Visits Due To Asthma, Pennsylvania 2004-2008

| Year | Asthma Emergency Room Visits |                  |                          | Asthma Inpatient Hospitalizations |                      |                         | Office Visits Due To Asthma |                  |                          |
|------|------------------------------|------------------|--------------------------|-----------------------------------|----------------------|-------------------------|-----------------------------|------------------|--------------------------|
|      | Allowed Amount               | Number of Visits | Allowed Amount Per Visit | Allowed Amount                    | Number of Admissions | Allowed Amount Per Stay | Allowed Amount              | Number of Visits | Allowed Amount Per Visit |
| 2004 | \$2,804,874                  | 30,010           | \$93.46                  | \$15,648,765                      | 5,755                | \$2,719.16              | \$1,127,857                 | 88,617           | \$12.73                  |
| 2005 | \$3,854,146                  | 33,150           | \$116.26                 | \$16,961,157                      | 5,652                | \$3,000.91              | \$1,172,746                 | 100,356          | \$11.69                  |
| 2006 | \$4,611,151                  | 34,962           | \$131.89                 | \$20,375,552                      | 6,449                | \$3,159.49              | \$2,220,147                 | 113,957          | \$19.48                  |
| 2007 | \$5,020,663                  | 33,800           | \$148.54                 | \$20,116,329                      | 6,023                | \$3,339.92              | \$1,936,125                 | 105,309          | \$18.39                  |
| 2008 | \$6,184,039                  | 35,807           | \$172.70                 | \$23,019,040                      | 5,402                | \$4,261.21              | \$3,016,795                 | 112,370          | \$26.85                  |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, annual paid claims for asthma emergency room visits increased more than 100 percent from \$2,804,874 in 2004 to \$6,184,039 in 2008. Annual paid claims for office visits due to asthma in 2008 were approximately 2.6 times higher than the claims in 2004. Total paid claims for asthma admissions increased about 50 percent from 2004 to 2008, while charge per visit and stay increased about 85 percent, 55 percent, 100 percent for ER, inpatient hospitalizations, and office visits, respectively (in 2008 compared to 2004).

Note: The claim amount per office visit and the total paid claim amount for office visits are believed to be underreported, due to the capitation of Medicaid Managed Care Plans.

**Table 2:** Direct Annual Cost of Asthma Medications and Asthma Related Services Among Medicaid Recipients (0-64) with Asthma, PA 2004-2008

| Year | Pharmacy Paid Amount |                    | Medical Service Paid Amount |                    | Cost of Asthma |                    |
|------|----------------------|--------------------|-----------------------------|--------------------|----------------|--------------------|
|      | Total Cost           | Cost Per Recipient | Total Cost                  | Cost Per Recipient | Total Cost     | Cost Per Recipient |
| 2004 | \$14,267,942         | \$114.22           | \$24,086,925                | \$192.82           | \$38,354,867   | \$307.04           |
| 2005 | \$14,228,231         | \$105.00           | \$26,522,374                | \$195.72           | \$40,750,605   | \$300.72           |
| 2006 | \$29,948,228         | \$215.56           | \$31,053,562                | \$223.51           | \$61,001,790   | \$439.08           |
| 2007 | \$52,135,668         | \$381.43           | \$28,265,374                | \$206.79           | \$80,401,042   | \$588.22           |
| 2008 | \$65,823,517         | \$456.86           | \$29,421,936                | \$204.21           | \$95,245,454   | \$661.07           |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, annual pharmacy paid claims for asthma medications and asthma related services among Medicaid recipients with asthma increased dramatically, with the exception of 2005. Overall, the pharmacy paid claim amount in 2008 increased by almost five times the cost in 2004. Medical services paid claims were approximately 22 percent more in 2008 than in 2004. The total number of paid claims for asthma among Medicaid recipients increased in 2008 by almost 2.5 times, compared to 2004, and the amount of paid claims for asthma per recipient doubled in 2008, compared to 2004.



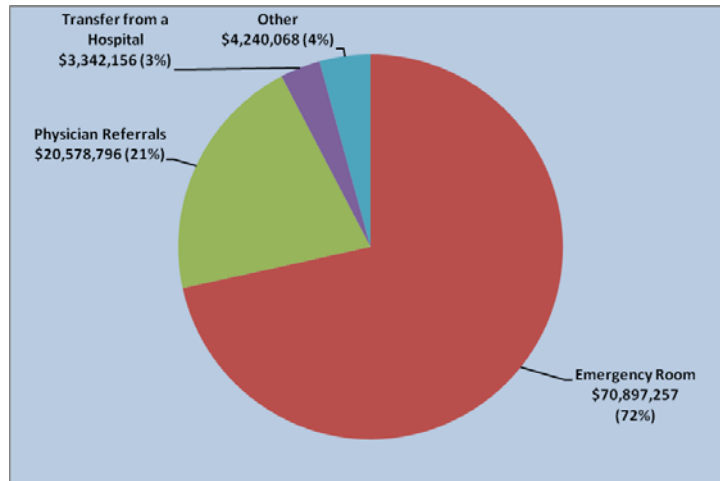
**Table 3:** Percentage of Asthma Readmissions Among Medicaid Recipients by Age Group, PA 2004-2008

| Age Group       | 2004                   | 2005                   | 2006                   | 2007                   | 2008                   | Combined Data (2004-2008)                |
|-----------------|------------------------|------------------------|------------------------|------------------------|------------------------|--|
|                 | Percent of Readmission | Percent of Readmission | Percent of Readmission | Percent of Readmission | Percent of Readmission | Average Percent of Readmission 2004-2008 |
| 0-4             | 18.9                   | 12.6                   | 16.9                   | 15.6                   | 14.4                   | 15.8                                     |
| 5-14            | 19.1                   | 15.9                   | 18.9                   | 17.9                   | 16.3                   | 17.7                                     |
| 15-34           | 22.5                   | 18.5                   | 20.2                   | 19.4                   | 17.8                   | 19.8                                     |
| 35-64           | 21.4                   | 19.4                   | 21.8                   | 21.0                   | 18.0                   | 20.3                                     |
| Children (0-17) | 19.2                   | 14.1                   | 17.9                   | 17.2                   | 15.2                   | 16.8                                     |
| Adults (18-64)  | 21.9                   | 19.5                   | 21.4                   | 19.8                   | 18.2                   | 20.2                                     |
| Total           | 20.2                   | 16.3                   | 19.2                   | 18.2                   | 16.4                   | 18.1                                     |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, the average percent of asthma readmission was highest in the 35-64 age group; the lowest was in the 0-4 age group (20.3 percent and 15.8 percent, respectively). Adults had a higher readmission percentage than children (20.2 percent and 16.8 percent, respectively). In general, from 2004 to 2008, the percentage of readmissions decreased in all age groups; in age group 0-4 approximately 25 percent, in the 5-14 age group roughly 15 percent, in the 15-34 age group almost 20 percent and in the 35-64 age group about 16 percent. Among children, the percent of asthma readmissions decreased approximately 20 percent in 2008 from 2004; in adults, for same time period the percent decreased almost 17 percent.

**Figure 18:** Total Charges for Inpatient Admissions with Asthma as the Primary Discharge Diagnosis by Admission Sources, Pennsylvania 2004-2008

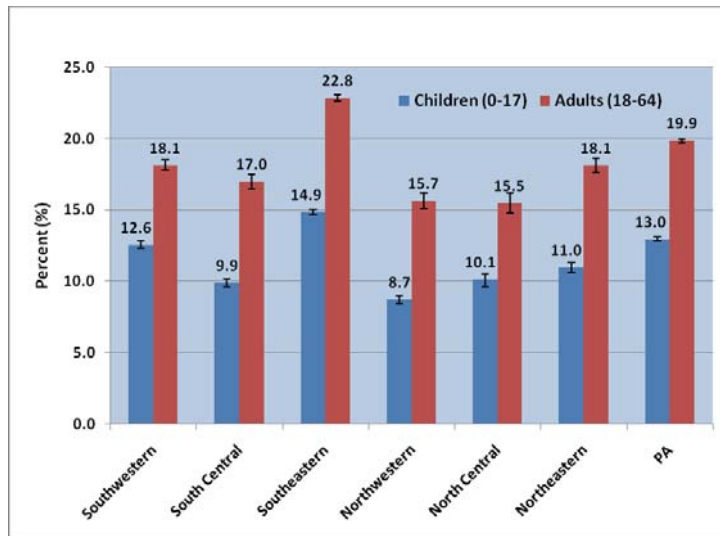


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, Emergency Room (ER) visits, as an admission source, accounted for almost 72 percent of the total charges for all hospital inpatient admissions with asthma as the primary discharge diagnosis, followed by physician’s referrals at 21 percent, and other, including transfers from other hospitals, at 7 percent. Overall, ER visits accounted for most of the hospital charges due to asthma.



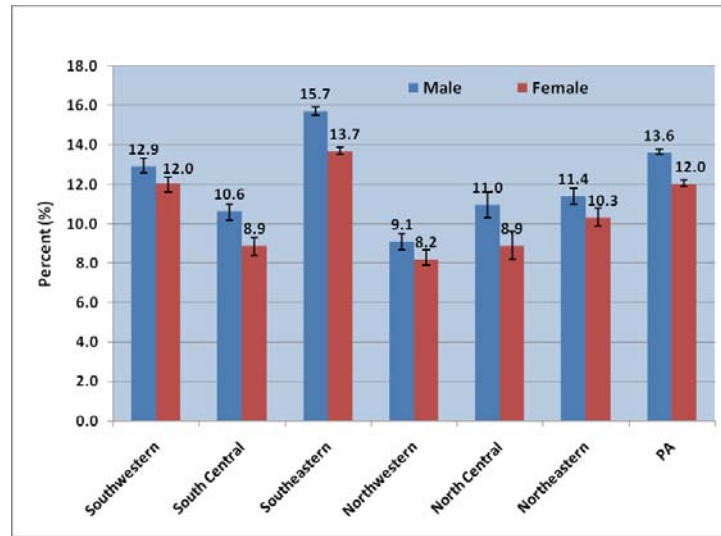
**Figure 19:** Prevalence of Persistent Asthma Among Medicaid Children (0-17) and Adults (18-64) by Health District, PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The prevalence of persistent asthma (PPA) among Medicaid recipients was significantly higher among adults than children in all health districts. The highest rates for both adults and children were in the Southeastern Health District (22.8 percent and 14.9 percent, respectively), followed by the Southwestern Health District (18.1 for adults and 12.6 percent for children) and then the Northeastern Health District (18.1 percent for adults and 11.0 percent for children). The lowest rate among children was in the Northwestern Health District (8.7 percent), while the lowest rate among adults was in the North Central Health District (15.5 percent).

**Figure 20:** Prevalence of Persistent Asthma Among Medicaid Children (0-17) by Gender and Health District, PA 2004-2008

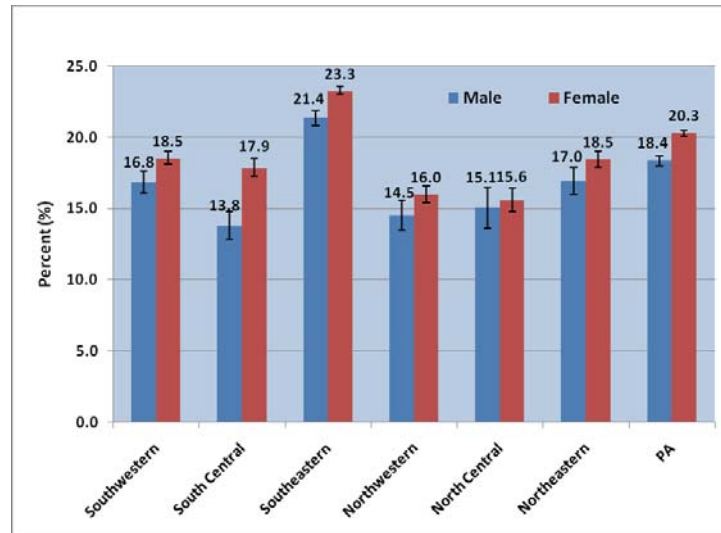


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Among children, PPA was significantly higher among males than females for all health districts. The highest rates for both males and females were in the Southeastern Health District (15.7 percent and 13.7 percent, respectively), followed by the Southwestern Health District (12.9 percent for males and 12.0 percent for females) and the Northeastern Health District (11.4 percent for males and 10.3 percent for females). The lowest rates for both males and females were in the Northwestern Health District (9.1 percent and 8.2 percent, respectively).



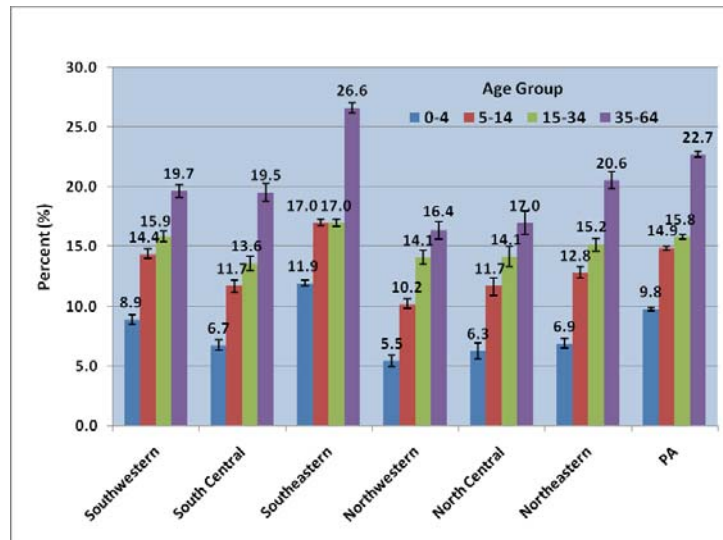
**Figure 21:** Prevalence of Persistent Asthma Among Medicaid Adults (18-64) by Gender and Health District, PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During the 2004-2008 period, PPA in adults was higher among females than males in all districts. The highest rates for both females and males were in the Southeastern Health District (23.3 percent and 21.4 percent, respectively), followed by the Southwestern and Northeastern Health District for females (tied at 18.5 percent) and the Northeastern Health District for males (17.0 percent). The lowest rates occurred in the North Central Health District for females (15.6 percent) and South Central Health District for males (13.8 percent).

**Figure 22:** Prevalence of Persistent Asthma Among Medicaid Recipients by Age Group and Health District, PA 2004-2008

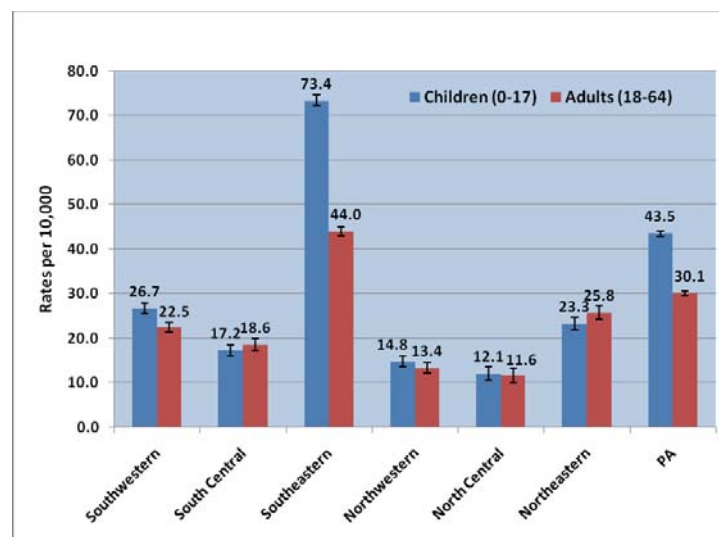


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2008, adults aged 35-64 had the highest PPA among all districts and in the entire state of Pennsylvania, followed by ages 15-34, 5-14 and 0-4. The highest rates for all age groups were in the Southeastern Health District (11.9 percent for ages 0-4, 17.0 percent for ages 5-14 and 15-34 and 26.6 percent for ages 35-64). Enrollees aged 0-4 and 5-14 years had the lowest PPA in the Northwestern Health District (5.5 percent and 10.2 percent, respectively). Enrollees age 15-34 years had the lowest PPA in the South Central Health District (13.6 percent).



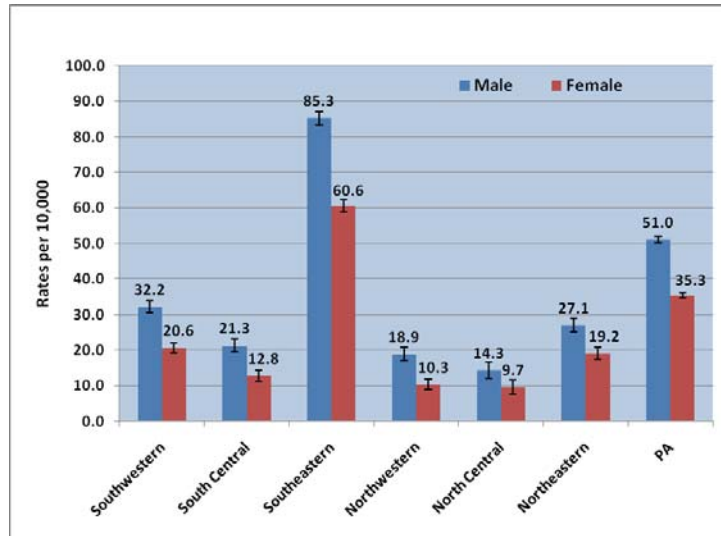
**Figure 23:** Percent Annual Medicaid Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Children (0-17) and Adults (18-64) by Health District, PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The Southeastern Health District had significantly higher hospitalization rates with asthma as the primary discharge diagnosis among children and adults (73.4 and 44.0 per 10,000, respectively). The lowest rate was in the North Central Health District (12.1 for children and 11.6 for adults). The discrepancy between rates among children and adults was greatest in the Southeastern Health District, at nearly 70 percent.

**Figure 24:** Annual Medicaid Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Children (0-17) by Gender and Health District, PA 2004-2008

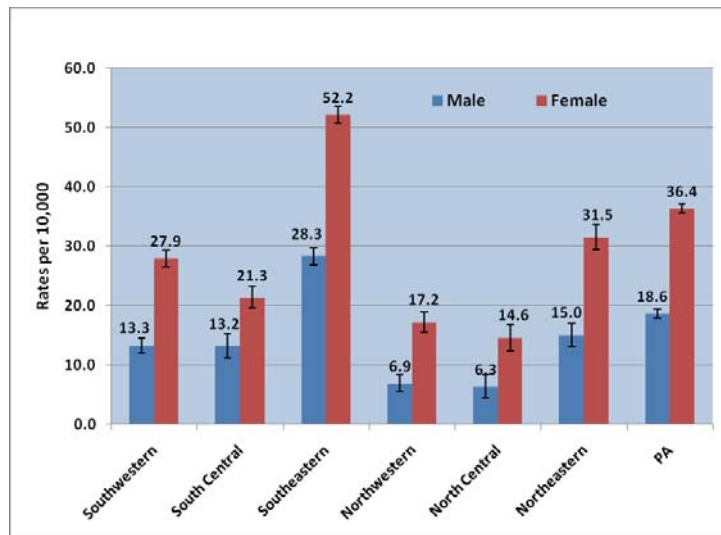


Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Hospitalization rates with asthma as the primary discharge diagnosis were significantly higher among males in all health districts. The highest rate for males and females was in the Southeastern Health District (85.3 and 60.6 per 10,000, respectively), followed by the Southwestern Health District (32.2 and 20.6, respectively) and the Northeastern Health District, with rates at 27.1 for males and 19.2 for females. The lowest rates for males and females were in the North Central Health District (14.3 and 9.7, respectively).



**Figure 25:** Annual Medicaid Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Adults (18-64) by Gender and Health District, PA 2004-2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During the 2004 to 2008 period, the asthma hospitalization rates among adults aged 18-64 years were significantly higher among females than males in all health districts. The highest rates for both females and males were in the Southeastern Health District (52.2 and 28.3 per 10,000, respectively), followed by the Northeastern Health District (31.5 and 15.0, respectively). The lowest rates for both females and males were in the North Central Health District (14.6 and 6.3, respectively). For Pennsylvania, the asthma hospitalization rates among females were nearly twice that of males.

**Table 4:** Percentage of Asthma Readmissions Among the Medicaid Population by Age Group and Health District, PA 2004-2008

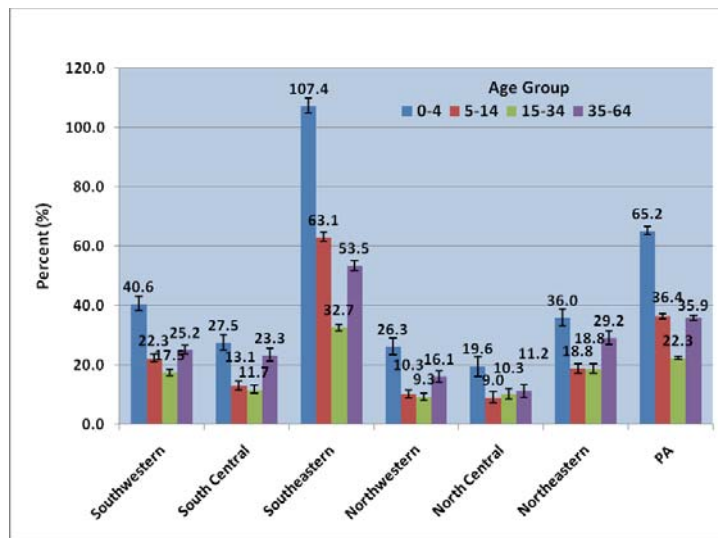
| Age Group       | Southwestern | South Central | Southeastern | Northwestern | North Central | Northeastern |
|-----------------|--------------|---------------|--------------|--------------|---------------|--------------|
| 0-4             | 12.5         | 11.6          | 17.4         | 9.9          | 7.6           | 12.3         |
| 5-14            | 15.3         | 11.6          | 19.2         | 10.2         | 8.0           | 13.9         |
| 15-34           | 19.1         | 13.2          | 22.1         | 10.2         | 11.1          | 15.7         |
| 35-64           | 14.7         | 16.4          | 23.9         | 12.7         | 11.1          | 13.2         |
| Children (0-17) | 14.3         | 11.1          | 18.5         | 9.4          | 7.4           | 12.7         |
| Adults (18-64)  | 16.2         | 15.9          | 23.3         | 12.4         | 11.7          | 14.8         |
| Average         | 15.2         | 13.3          | 20.2         | 10.8         | 9.5           | 13.7         |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

From 2004 to 2008, the percentages of asthma readmissions for 0-4, 5-14, 15-34 and 35-64 age groups were highest in the Southeastern Health District (17.4 percent, 19.2 percent, 22.1 percent and 23.9 percent, respectively). The North Central Health District had the lowest percentage of readmissions for age groups 0-4, 5-14 and 35-64 (7.6 percent, 8.0 percent and 11.1 percent, respectively). The Northwestern Health District had the lowest percent of readmissions for the 15-34 age group (10.2 percent). Among children and adults, the highest percentage of asthma readmissions was in the Southeastern Health District (18.5 percent and 23.3, respectively), and the lowest was in the North Central Health District (7.4 percent and 11.7, respectively).



**Figure 26:** Annual Medicaid Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis by Age Group and Health District, PA 2004-2008 (combined data)



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

During the 2004-2008 period, ages 0-4 had the highest asthma hospitalization rates among all health districts, as well as in the entire state of Pennsylvania, followed by ages 35-64, except for in the Southeast. Of all health districts, the southeast had the highest rates for all age groups (107.4 for ages 0-4, 63.1 for ages 5-14, 32.7 for ages 15-34, and 53.5 for ages 35-64). Enrollees aged 0-4, 5-14 and 35-64 years had the lowest rates in the North Central district (19.6, 9.0 and 11.2, respectively). Overall, Pennsylvania had the highest asthma hospitalization rate among the Medicaid population of the 0-4 age group and the lowest in ages 15-34 (65.2 and 22.3, respectively).

**Table 5:** Prevalence of Persistent Asthma Among Medicaid Recipients (0-64), Southwestern Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults  |           | Female  |           | Male    |           | Total   |           |
|--------------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | Percent  | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  |
| Allegheny          | 15.3     | 14.9-15.7 | 19.4    | 18.8-20.0 | 17.5    | 17.1-18.0 | 16.3    | 15.8-16.8 | 17.0    | 16.6-17.3 |
| Armstrong          | 8.8      | 7.5-10.1  | 17.2    | 15.1-19.4 | 12.7    | 11.1-14.3 | 12.1    | 10.3-13.8 | 12.4    | 11.2-13.6 |
| Beaver             | 9.4      | 8.5-10.3  | 14.5    | 13.2-15.7 | 12.0    | 11.0-13.0 | 11.0    | 10.0-12.1 | 11.6    | 10.9-12.3 |
| Butler             | 8.9      | 7.8-10.1  | 18.0    | 16.1-19.9 | 15.2    | 13.6-16.7 | 9.7     | 8.4-11.1  | 12.7    | 11.7-13.7 |
| Cambria            | 7.7      | 6.9-8.5   | 16.4    | 15.1-17.8 | 12.6    | 11.6-13.7 | 10.0    | 8.9-11.0  | 11.4    | 10.7-12.2 |
| Fayette            | 11.1     | 10.2-12   | 19.9    | 18.7-21.2 | 16.2    | 15.2-17.2 | 13.7    | 12.6-14.8 | 15.1    | 14.4-15.9 |
| Greene             | 10.3     | 8.8-11.8  | 20.8    | 18.2-23.4 | 16.6    | 14.6-18.6 | 12.2    | 10.3-14.1 | 14.7    | 13.3-16.1 |
| Indiana            | 9.9      | 8.5-11.3  | 16.0    | 14.1-17.9 | 13.9    | 12.3-15.6 | 11.3    | 9.7-12.9  | 12.7    | 11.6-13.9 |
| Somerset           | 6.9      | 5.8-7.9   | 14.4    | 12.4-16.5 | 10.6    | 9.2-12.0  | 8.1     | 6.7-9.4   | 9.5     | 8.5-10.5  |
| Washington         | 14.2     | 13.0-15.4 | 19.2    | 17.7-20.7 | 18.0    | 16.7-19.3 | 14.6    | 13.3-16.0 | 16.5    | 15.6-17.5 |
| Westmoreland       | 11.0     | 10.2-11.8 | 16.0    | 15.0-16.9 | 14.7    | 13.8-15.5 | 11.6    | 10.7-12.5 | 13.4    | 12.8-14.0 |
| District (Total)   | 12.6     | 12.3-12.8 | 18.1    | 17.8-18.5 | 15.8    | 15.5-16.1 | 13.8    | 13.5-14.1 | 14.9    | 14.7-15.1 |
| Pennsylvania/Total | 13.0     | 12.9-13.1 | 19.9    | 19.7-20.0 | 16.5    | 16.4-16.6 | 14.6    | 14.4-14.7 | 15.6    | 15.5-15.7 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The Southwestern Health District has a population of approximately 2,240,000, with almost 15.0 percent of its population eligible for Medical Assistance. Among children and males, Allegheny County had the highest PPA with approximately 30 percent of children (0-17) and 10 percent of adults (18-64) who were eligible for Medical Assistance. Among adults, Greene County had the highest prevalence during the 2004-2008 period, followed by Fayette and Allegheny. Among females, Washington County had the highest prevalence, followed by Allegheny and Greene. Overall, Allegheny County, followed by Washington and Fayette, had the highest PPA during this five-year period. The lowest PPAs were in Somerset, Cambria and Beaver Counties, respectively.



**Table 6:** Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients (0-64), Southwestern Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults |           | Female |           | Male |           | Total |           |
|--------------------|----------|-----------|--------|-----------|--------|-----------|------|-----------|-------|-----------|
|                    | Rate     | CI (95%)  | Rate   | CI (95%)  | Rate   | CI (95%)  | Rate | CI (95%)  | Rate  | CI (95%)  |
| Allegheny          | 38.3     | 36.3-40.3 | 28.2   | 26.5-30   | 32.7   | 31.0-34.5 | 34.2 | 32.2-36.2 | 33.4  | 32.0-34.7 |
| Armstrong          | 14.2     | 9.4-19.0  | 9.3    | 5.6-13    | 10.6   | 6.8-14.5  | 12.9 | 8.2-17.6  | 11.7  | 8.7-14.7  |
| Beaver             | 21.8     | 18.1-25.6 | 16.7   | 13.4-20.0 | 18.7   | 15.4-22.0 | 19.9 | 16.1-23.7 | 19.2  | 16.7-21.8 |
| Butler             | 14.6     | 10.7-18.4 | 16.7   | 12.6-20.9 | 17.3   | 13.2-21.3 | 13.7 | 9.8-17.6  | 15.6  | 12.8-18.5 |
| Cambria            | 14.1     | 10.7-17.4 | 13.1   | 10.0-16.1 | 12.4   | 9.5-15.4  | 14.9 | 11.4-18.4 | 13.6  | 11.3-15.8 |
| Fayette            | 14.0     | 11.2-16.8 | 16.7   | 13.9-19.6 | 17.0   | 14.2-19.8 | 13.6 | 10.8-16.4 | 15.5  | 13.5-17.4 |
| Greene             | 13.6     | 8.2-19.1  | 14.7   | 9.4-20.1  | 15.1   | 9.8-20.5  | 13.0 | 7.6-18.5  | 14.2  | 10.4-18.0 |
| Indiana            | 28.5     | 21.9-35   | 17.7   | 12.7-22.8 | 21.6   | 16.1-27.0 | 24.7 | 18.4-31.0 | 23.0  | 18.9-27.1 |
| Somerset           | 10.2     | 6.1-14.2  | 5.5    | 2.5-8.5   | 7.0    | 3.7-10.2  | 8.9  | 4.9-12.9  | 7.8   | 5.3-10.4  |
| Washington         | 13.6     | 10.7-16.6 | 21.8   | 18.1-25.6 | 19.8   | 16.4-23.2 | 15.3 | 12.0-18.6 | 17.8  | 15.4-20.2 |
| Westmoreland       | 21.9     | 18.9-24.9 | 27.8   | 24.5-31.1 | 27.3   | 24.2-30.5 | 21.8 | 18.7-24.9 | 24.9  | 22.7-27.1 |
| District/Total     | 26.7     | 25.6-27.8 | 22.5   | 21.5-23.5 | 24.8   | 23.8-25.8 | 24.3 | 23.2-25.4 | 24.6  | 23.8-25.3 |
| Pennsylvania/Total | 43.5     | 42.9-44.2 | 30.1   | 29.6-30.7 | 35.9   | 35.4-36.5 | 38.6 | 38.0-39.3 | 37.1  | 36.7-37.6 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Among children in the Southwestern Health District, Allegheny County had the highest asthma hospitalization rates during 2004-2008, followed by Westmoreland and Indiana. Among adults, Allegheny County had the highest inpatient asthma hospitalization rates, followed by Westmoreland and Washington. Overall, Allegheny County, followed by Westmoreland and Indiana, had the highest asthma hospitalization rates. The lowest asthma hospitalization rates were in Somerset, Armstrong and Cambria Counties, respectively.



**Table 7:** Prevalence of Persistent Asthma Among Medicaid Recipients (0-64), South Central Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults  |           | Female  |           | Male    |           | Total   |           |
|--------------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | Percent  | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  |
| Adams              | 10.3     | 8.8-11.8  | 19.4    | 16.6-22.2 | 15.1    | 13.1-17.1 | 11.4    | 9.6-13.3  | 13.4    | 12.1-14.8 |
| Bedford            | 6.6      | 5.1-8.1   | 12.3    | 9.7-14.9  | 9.5     | 7.5-11.4  | 8.1     | 6.2-10.0  | 8.8     | 7.5-10.2  |
| Blair              | 6.5      | 5.8-7.2   | 13.4    | 12.2-14.6 | 10.0    | 9.1-10.9  | 8.5     | 7.5-9.4   | 9.4     | 8.7-10.0  |
| Cumberland         | 9.0      | 8.0-10.1  | 16.1    | 14.1-18.0 | 11.7    | 10.3-13.0 | 11.1    | 9.7-12.5  | 11.4    | 10.4-12.4 |
| Dauphin            | 10.5     | 9.8-11.2  | 18.8    | 17.5-20.1 | 14.4    | 13.5-15.2 | 11.8    | 11.0-12.7 | 13.2    | 12.6-13.8 |
| Franklin           | 11.0     | 9.8-12.3  | 15.0    | 13.0-17.0 | 12.2    | 10.7-13.7 | 12.7    | 11.1-14.3 | 12.4    | 11.3-13.5 |
| Fulton             | 14.3     | 9.7-19.0  | 12.5    | 7.4-17.6  | 13.9    | 9.3-18.5  | 13.1    | 7.9-18.4  | 13.6    | 10.1-17.0 |
| Huntingdon         | 8.5      | 6.9-10.1  | 12.3    | 10.2-14.4 | 10.6    | 8.9-12.3  | 9.7     | 7.7-11.6  | 10.2    | 8.9-11.5  |
| Juniata            | 13.6     | 9.9-17.2  | 15.8    | 11.5-20.2 | 15.5    | 11.7-19.3 | 13.4    | 9.3-17.4  | 14.6    | 11.8-17.4 |
| Lebanon            | 11.0     | 9.9-12.1  | 21.0    | 19.1-22.9 | 17.9    | 16.4-19.3 | 11.2    | 9.9-12.6  | 14.9    | 13.9-16.0 |
| Mifflin            | 16.4     | 14.2-18.6 | 16.2    | 14.1-18.3 | 16.2    | 14.3-18.2 | 16.4    | 14.0-18.8 | 16.3    | 14.8-17.8 |
| Perry              | 8.1      | 6.2-10.1  | 14.4    | 11.2-17.7 | 11.9    | 9.4-14.4  | 9.2     | 6.8-11.6  | 10.6    | 8.9-12.4  |
| York               | 10.2     | 9.5-10.8  | 18.5    | 17.5-19.6 | 15.2    | 14.4-16.0 | 11.5    | 10.7-12.3 | 13.6    | 13.0-14.1 |
| District (Total)   | 9.9      | 9.6-10.2  | 17.0    | 16.5-17.5 | 13.8    | 13.4-14.2 | 11.2    | 10.8-11.6 | 12.6    | 12.4-12.9 |
| Pennsylvania/Total | 13.0     | 12.9-13.1 | 19.9    | 19.7-20.0 | 16.5    | 16.4-16.6 | 14.6    | 14.4-14.7 | 15.6    | 15.5-15.7 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The South Central Health District has a population of approximately 1,385,000, with almost 12.0 percent of its population eligible for Medical Assistance. Among children and males in the South Central Health District, Mifflin County had the highest PPA, followed by Fulton and Juniata. Among adults, Lebanon County had the highest prevalence, followed by Adams and Dauphin. Among females in the South Central Health District, Lebanon County had the highest prevalence, followed by Mifflin and Juniata during the 2004-2008 period. Overall, Mifflin County, followed by Lebanon and Juniata, had the highest PPA. The lowest PPAs were in Bedford, Blair and Huntingdon Counties, respectively.

**Table 8:** Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients (0-64), South Central Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults |           | Female |           | Male |           | Total |           |
|--------------------|----------|-----------|--------|-----------|--------|-----------|------|-----------|-------|-----------|
|                    | Rate     | CI (95%)  | Rate   | CI (95%)  | Rate   | CI (95%)  | Rate | CI (95%)  | Rate  | CI (95%)  |
| Adams              | 16.1     | 10.8-21.5 | 11.4   | 5.8-17.1  | 14.5   | 9.2-19.8  | 14.0 | 8.1-19.8  | 14.3  | 10.4-18.2 |
| Bedford            | 7.6      | 3.5-11.7  | N/D    | N/D       | N/D    | N/D       | 9.0  | 4.1-13.9  | 6.8   | 4.0-9.6   |
| Blair              | 13.8     | 10.5-17.0 | 12.5   | 9.5-15.6  | 10.6   | 7.9-13.3  | 16.3 | 12.6-20.0 | 14.7  | 10.8-18.7 |
| Cumberland         | 14.7     | 10.8-18.7 | 11.3   | 7.4-15.2  | 11.5   | 8.0-15.0  | 15.4 | 10.9-20.0 | 13.2  | 10.4-16.0 |
| Dauphin            | 27.5     | 24.1-30.9 | 25.5   | 21.8-29.2 | 24.5   | 21.3-27.7 | 29.4 | 25.4-33.4 | 26.6  | 24.1-29.2 |
| Franklin           | 18.5     | 14.0-23.0 | 13.6   | 9.1-18.1  | 14.5   | 10.5-18.5 | 19.0 | 13.7-24.3 | 16.5  | 13.2-19.7 |
| Fulton             | N/D      | N/D       | N/D    | N/D       | N/D    | N/D       | N/D  | N/D       | N/D   | N/D       |
| Huntingdon         | 23.2     | 15.6-30.7 | 21.2   | 13.7-28.6 | 26.5   | 18.8-34.3 | 16.7 | 9.7-23.6  | 22.2  | 16.9-27.5 |
| Juniata            | N/D      | N/D       | N/D    | N/D       | N/D    | N/D       | N/D  | N/D       | 12.0  | 5.5-18.5  |
| Lebanon            | 22.8     | 17.9-27.7 | 21.9   | 16.5-27.4 | 19.1   | 14.6-23.5 | 26.8 | 20.7-32.8 | 22.4  | 18.8-26.0 |
| Mifflin            | 20.3     | 13.4-27.2 | 13.1   | 7.6-18.6  | 13.6   | 8.3-18.9  | 20.5 | 13.1-27.8 | 16.6  | 12.2-21.0 |
| Perry              | 14.4     | 7.3-21.4  | N/D    | N/D       | N/D    | N/D       | 13.2 | 5.7-20.7  | 10.3  | 5.9-14.8  |
| York               | 10.3     | 8.4-12.2  | 25.6   | 22.2-29.0 | 19.7   | 17.1-22.3 | 13.3 | 10.8-15.7 | 16.9  | 15.1-18.7 |
| District/Total     | 17.2     | 16.0-18.4 | 18.6   | 17.2-20.0 | 17.3   | 16.1-18.5 | 18.5 | 17.1-19.9 | 17.8  | 16.9-18.7 |
| Pennsylvania/Total | 43.5     | 42.9-44.2 | 30.1   | 29.6-30.7 | 35.9   | 35.4-36.5 | 38.6 | 38.0-39.3 | 37.1  | 36.7-37.6 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

N/D=Not displayed if count ≤ 10

Among children in the South Central Health District, Dauphin County had the highest asthma hospitalization rates, followed by Huntingdon and Lebanon during the 2004-2008 period. Among adults, York County had the highest asthma hospitalization rates, followed by Dauphin and Lebanon. Among females, Huntingdon County had the highest asthma hospitalization rates, followed by Dauphin and York. Among males, Dauphin County had the highest asthma hospitalization rates, followed by Lebanon and Mifflin during this five-year period. Overall, Dauphin County, followed by Lebanon and Huntingdon, had the highest asthma hospitalization rates. The lowest asthma hospitalization rates were in Bedford, Perry and Juniata Counties, respectively.

**Table 9:** Prevalence of Persistent Asthma Among Medicaid Recipients (0-64), Southeastern Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults  |           | Female  |           | Male    |           | Total   |           |
|--------------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | Percent  | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  |
| Berks              | 9.0      | 8.6-9.5   | 19.8    | 18.9-20.7 | 15.1    | 14.5-15.8 | 10.5    | 9.9-11.1  | 13.0    | 12.6-13.5 |
| Bucks              | 10.4     | 9.7-11.2  | 16.9    | 15.6-18.1 | 13.6    | 12.6-14.5 | 11.8    | 10.9-12.7 | 12.7    | 12.1-13.4 |
| Chester            | 7.5      | 6.9-8.2   | 14.1    | 12.7-15.5 | 10.1    | 9.2-11.0  | 8.9     | 8.0-9.8   | 9.5     | 8.9-10.2  |
| Delaware           | 12.1     | 11.6-12.6 | 17.8    | 16.9-18.7 | 14.3    | 13.7-15.0 | 13.3    | 12.7-14.0 | 13.9    | 13.4-14.3 |
| Lancaster          | 9.8      | 9.3-10.4  | 17.7    | 16.8-18.6 | 13.9    | 13.2-14.6 | 11.8    | 11.1-12.5 | 13.0    | 12.5-13.4 |
| Montgomery         | 10.7     | 10.0-11.3 | 18.0    | 16.8-19.2 | 14.0    | 13.2-14.8 | 12.2    | 11.3-13.0 | 13.1    | 12.5-13.7 |
| Philadelphia       | 17.4     | 17.1-17.6 | 25.4    | 25.1-25.8 | 21.0    | 20.8-21.3 | 19.4    | 19.1-19.7 | 20.3    | 20.1-20.5 |
| Schuylkill         | 9.6      | 8.7-10.6  | 15.2    | 13.8-16.6 | 12.0    | 10.9-13.1 | 12.0    | 10.8-13.3 | 12.0    | 11.2-12.9 |
| District/Total     | 14.9     | 14.7-15.0 | 22.8    | 22.6-23.1 | 18.6    | 18.4-18.8 | 16.7    | 16.5-16.9 | 17.7    | 17.6-17.9 |
| Pennsylvania/Total | 13.0     | 12.9-13.1 | 19.9    | 19.7-20.0 | 16.5    | 16.4-16.6 | 14.6    | 14.4-14.7 | 15.6    | 15.5-15.7 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The Southeastern Health District has a population of approximately 4,260,000, with nearly 16.0 percent of its population eligible for Medical Assistance. Among children, adults, males and females, Philadelphia County had the highest PPA, almost 30 percent more than the average in Pennsylvania. More than 50 percent of children (0-17), approximately 25 percent of adults (18-64) and more than 30 percent of the county (with a total population of around 1,260,000) were eligible for Medical Assistance. In general, Philadelphia County, followed by Delaware and Montgomery, had the highest PPA in the Southeastern Health District during the 2004-2008 period. The lowest PPAs were in Chester, Schuylkill and Bucks Counties, respectively.



**Table 10:** Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients (0-64), Southeastern Health District, PA 2004-2008 (combined data)

| County             | Children |             | Adults |           | Female |           | Male |           | Total |           |
|--------------------|----------|-------------|--------|-----------|--------|-----------|------|-----------|-------|-----------|
|                    | Rate     | CI (95%)    | Rate   | CI (95%)  | Rate   | CI (95%)  | Rate | CI (95%)  | Rate  | CI (95%)  |
| Berks              | 29.3     | 26.6-32.1   | 39.8   | 36.0-43.6 | 34.9   | 31.8-38.0 | 32.2 | 28.9-35.6 | 33.7  | 31.5-36.0 |
| Bucks              | 27.8     | 24.4-31.3   | 24.0   | 20.6-27.4 | 26.6   | 23.2-30.0 | 25.4 | 21.8-28.9 | 26.0  | 23.6-28.5 |
| Chester            | 19.2     | 15.9-22.5   | 35.4   | 30.1-40.6 | 30.8   | 26.5-35.2 | 20.4 | 16.6-24.2 | 26.0  | 23.1-28.9 |
| Delaware           | 62.4     | 58.5-66.3   | 34.3   | 31.5-37.1 | 41.7   | 38.9-44.6 | 57.6 | 53.5-61.7 | 48.1  | 45.7-50.5 |
| Lancaster          | 15.3     | 13.2-17.4   | 17.7   | 15.2-20.3 | 16.3   | 14.1-18.5 | 16.5 | 14.0-19.0 | 16.4  | 14.7-18.0 |
| Montgomery         | 25.6     | 22.7-28.6   | 25.5   | 22.1-28.8 | 25.9   | 22.9-29.0 | 25.1 | 21.9-28.4 | 25.6  | 23.3-27.8 |
| Philadelphia       | 103.5    | 101.5-105.5 | 54.0   | 52.5-55.5 | 74.1   | 72.5-75.7 | 86.8 | 84.9-88.8 | 79.6  | 78.4-80.9 |
| Schuylkill         | 27.0     | 22.1-31.9   | 17.2   | 13.3-21.1 | 19.4   | 15.5-23.4 | 25.5 | 20.5-30.6 | 22.1  | 19.0-25.3 |
| District/Total     | 73.4     | 72.2-74.7   | 44.0   | 43.0-45.0 | 56.0   | 54.9-57.0 | 64.0 | 62.7-65.3 | 59.5  | 58.7-60.3 |
| Pennsylvania/Total | 43.5     | 42.9-44.2   | 30.1   | 29.6-30.7 | 35.9   | 35.4-36.5 | 38.6 | 38.0-39.3 | 37.1  | 36.7-37.6 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

Among all selected Medicaid subpopulations, Philadelphia accounts for the highest asthma hospitalization rates in the Southeastern Health District and in the entire state of Pennsylvania. During 2004-2008, Asthma hospitalization rates in Philadelphia were more than double those of the entire state in all categories of Medicaid recipients. Second after Philadelphia in all asthma hospitalization rates, except adults, was Delaware County. Among adults in the southeast, Berks County had the second highest asthma hospitalization rates after Philadelphia, and third place was held by Chester County. Overall, the lowest asthma hospitalization rates were in Lancaster, Schuylkill and Montgomery Counties, respectively.

**Table 11:** Prevalence of Persistent Asthma Among Medicaid Recipients (0-64), Northwestern Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults  |           | Female  |           | Male    |           | Total   |           |
|--------------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | Percent  | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  |
| Cameron            | N/D      | N/D       | 11.6    | 4.7-18.4  | N/D     | N/D       | N/D     | N/D       | 7.2     | 3.4-10.9  |
| Clarion            | 7.2      | 5.6-8.8   | 17.9    | 15.1-20.7 | 12.8    | 10.7-14.9 | 10.8    | 8.6-13.1  | 12.0    | 10.4-13.5 |
| Clearfield         | 7.6      | 6.8-8.5   | 15.0    | 13.5-16.5 | 11.7    | 10.6-12.7 | 8.8     | 7.7-9.9   | 10.5    | 9.7-11.2  |
| Crawford           | 8.2      | 7.0-9.3   | 16.6    | 15.0-18.3 | 14.7    | 13.3-16.1 | 8.6     | 7.3-9.9   | 12.3    | 11.3-13.3 |
| Elk                | 8.2      | 6.2-10.1  | 12.8    | 10.4-15.3 | 11.9    | 9.7-14.1  | 8.5     | 6.4-10.7  | 10.5    | 8.9-12.0  |
| Erie               | 9.3      | 8.7-9.9   | 16.9    | 15.8-18.0 | 13.1    | 12.3-13.9 | 11.2    | 10.4-12   | 12.3    | 11.7-12.8 |
| Forest             | N/D      | N/D       | N/D     | N/D       | N/D     | N/D       | N/D     | N/D       | 10.9    | 6.0-15.8. |
| Jefferson          | 7.6      | 6.5-8.8   | 13.4    | 11.2-15.5 | 9.7     | 8.3-11.2  | 9.4     | 7.9-10.9  | 9.6     | 8.5-10.6  |
| Lawrence           | 11.1     | 9.8-12.4  | 14.2    | 12.7-15.8 | 12.9    | 11.5-14.2 | 12.1    | 10.6-13.7 | 12.6    | 11.5-13.6 |
| McKean             | 7.7      | 6.5-8.8   | 14.7    | 12.6-16.8 | 11.0    | 9.5-12.5  | 9.4     | 7.9-10.9  | 10.3    | 9.2-11.3  |
| Mercer             | 8.9      | 8.0-9.8   | 16.0    | 14.6-17.4 | 13.0    | 11.9-14.1 | 10.9    | 9.7-12.0  | 12.0    | 11.2-12.8 |
| Venango            | 8.5      | 7.1-9.9   | 13.6    | 11.7-15.5 | 11.7    | 10.1-13.2 | 9.9     | 8.3-11.6  | 10.9    | 9.8-12.0  |
| Warren             | 11.1     | 8.8-13.4  | 18.6    | 15.2-21.9 | 16.2    | 13.5-18.9 | 12.0    | 9.2-14.7  | 14.4    | 12.5-16.4 |
| District/Total     | 8.7      | 8.4-9.1   | 15.7    | 15.1-16.2 | 12.7    | 12.2-13.1 | 10.3    | 9.9-10.7  | 11.6    | 11.3-11.9 |
| Pennsylvania/Total | 13.0     | 12.9-13.1 | 19.9    | 19.7-20.0 | 16.5    | 16.4-16.6 | 14.6    | 14.4-14.7 | 15.6    | 15.5-15.7 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.  
N/D=Not displayed if count ≤ 10

The Northwestern Health District has a population of approximately 770,000, with almost 19.0 percent of its population eligible for Medical Assistance. Among children and males, Lawrence County had the highest PPA, followed by Warren and Erie during the 2004-2008 period. Among adults in the Northwestern Health District, Warren County had the highest prevalence, followed by Clarion and Erie. Among females, Warren County had the highest prevalence, followed by Crawford and Erie. Overall, Warren County, followed by Lawrence and Erie, had the highest PPA in the Northwestern Health District during 2004-2008. The lowest PPAs were in Cameron, Jefferson and McKean Counties, respectively.

**Table 12:** Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients (0-64), Northwestern Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults  |           | Female  |           | Male    |           | Total   |           |
|--------------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | Percent  | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  |
| Cameron            | N/D      | N/D       | 11.6    | 4.7-18.4  | N/D     | N/D       | N/D     | N/D       | 7.2     | 3.4-10.9  |
| Clarion            | 7.2      | 5.6-8.8   | 17.9    | 15.1-20.7 | 12.8    | 10.7-14.9 | 10.8    | 8.6-13.1  | 12.0    | 10.4-13.5 |
| Clearfield         | 7.6      | 6.8-8.5   | 15.0    | 13.5-16.5 | 11.7    | 10.6-12.7 | 8.8     | 7.7-9.9   | 10.5    | 9.7-11.2  |
| Crawford           | 8.2      | 7.0-9.3   | 16.6    | 15.0-18.3 | 14.7    | 13.3-16.1 | 8.6     | 7.3-9.9   | 12.3    | 11.3-13.3 |
| Elk                | 8.2      | 6.2-10.1  | 12.8    | 10.4-15.3 | 11.9    | 9.7-14.1  | 8.5     | 6.4-10.7  | 10.5    | 8.9-12.0  |
| Erie               | 9.3      | 8.7-9.9   | 16.9    | 15.8-18.0 | 13.1    | 12.3-13.9 | 11.2    | 10.4-12   | 12.3    | 11.7-12.8 |
| Forest             | N/D      | N/D       | N/D     | N/D       | N/D     | N/D       | N/D     | N/D       | 10.9    | 6.0-15.8. |
| Jefferson          | 7.6      | 6.5-8.8   | 13.4    | 11.2-15.5 | 9.7     | 8.3-11.2  | 9.4     | 7.9-10.9  | 9.6     | 8.5-10.6  |
| Lawrence           | 11.1     | 9.8-12.4  | 14.2    | 12.7-15.8 | 12.9    | 11.5-14.2 | 12.1    | 10.6-13.7 | 12.6    | 11.5-13.6 |
| McKean             | 7.7      | 6.5-8.8   | 14.7    | 12.6-16.8 | 11.0    | 9.5-12.5  | 9.4     | 7.9-10.9  | 10.3    | 9.2-11.3  |
| Mercer             | 8.9      | 8.0-9.8   | 16.0    | 14.6-17.4 | 13.0    | 11.9-14.1 | 10.9    | 9.7-12.0  | 12.0    | 11.2-12.8 |
| Venango            | 8.5      | 7.1-9.9   | 13.6    | 11.7-15.5 | 11.7    | 10.1-13.2 | 9.9     | 8.3-11.6  | 10.9    | 9.8-12.0  |
| Warren             | 11.1     | 8.8-13.4  | 18.6    | 15.2-21.9 | 16.2    | 13.5-18.9 | 12.0    | 9.2-14.7  | 14.4    | 12.5-16.4 |
| District/Total     | 8.7      | 8.4-9.1   | 15.7    | 15.1-16.2 | 12.7    | 12.2-13.1 | 10.3    | 9.9-10.7  | 11.6    | 11.3-11.9 |
| Pennsylvania/Total | 13.0     | 12.9-13.1 | 19.9    | 19.7-20.0 | 16.5    | 16.4-16.6 | 14.6    | 14.4-14.7 | 15.6    | 15.5-15.7 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.  
N/D=Not displayed if count ≤ 10

Among children in the Northwestern Health District, Lawrence County had the highest asthma hospitalization rates, followed by McKean and Jefferson during this five-year period. Among adults, Elk County had the highest asthma hospitalization rates, followed by Lawrence and Mercer. Jefferson County had the highest asthma hospitalization rates among female Medicaid recipients, followed by Lawrence and Mercer. Among males in the Northwestern Health District, Lawrence County had the highest asthma hospitalization rates, followed by McKean and Elk. Overall, Lawrence County, followed by Jefferson and McKean, had the highest asthma hospitalization rates in the northwest during the 2004-2008 period. The lowest asthma hospitalization rates were in Clarion, Venango and Warren Counties, respectively.

**Table 13:** Prevalence of Persistent Asthma Among Medicaid Recipients (0-64), Northern Central Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults  |           | Female  |           | Male    |           | Total   |           |
|--------------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | Percent  | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  |
| Bradford           | 8.1      | 6.9-9.3   | 18.3    | 16.1-20.6 | 13.1    | 11.5-14.6 | 10.8    | 9.1-12.5  | 12.1    | 10.9-13.2 |
| Centre             | 8.8      | 7.4-10.2  | 13.1    | 11.2-14.9 | 10.3    | 8.8-11.7  | 11.6    | 9.8-13.5  | 10.8    | 9.7-11.9  |
| Clinton            | 13.9     | 11.5-16.2 | 13.5    | 10.8-16.3 | 11.8    | 9.5-14.1  | 15.8    | 13.1-18.6 | 13.7    | 12.0-15.5 |
| Columbia           | 9.9      | 8.4-11.4  | 14.9    | 12.7-17.0 | 12.8    | 11.1-14.5 | 10.9    | 9.0-12.7  | 12.0    | 10.7-13.2 |
| Lycoming           | 12.5     | 11.3-13.6 | 17.4    | 15.9-18.9 | 15.0    | 13.8-16.2 | 14.2    | 12.8-15.6 | 14.6    | 13.7-15.5 |
| Montour            | 12.1     | 8.7-15.4  | 13.6    | 10.0-17.3 | 10.8    | 7.8-13.8  | 15.5    | 11.4-19.7 | 12.8    | 10.3-15.3 |
| Northumberland     | 12.4     | 10.9-13.9 | 15.6    | 13.9-17.4 | 14.2    | 12.7-15.7 | 13.7    | 11.9-15.4 | 14.0    | 12.8-15.1 |
| Potter             | 4.1      | 2.7-5.4   | 12.8    | 9.3-16.4  | 8.5     | 6.3-10.8  | 5.1     | 3.3-6.9   | 6.9     | 5.4-8.4   |
| Snyder             | 10.0     | 7.6-12.4  | 11.4    | 8.5-14.4  | 11.5    | 8.9-14.1  | 9.5     | 6.9-12.1  | 10.6    | 8.7-12.5  |
| Sullivan           | 11.3     | 4.6-18.0  | 15.4    | 6.7-24.1  | 10.3    | 4.2-16.4  | 16.2    | 7.0-25.4  | 13.1    | 7.8-18.5  |
| Tioga              | 5.6      | 4.4-6.7   | 14.2    | 11.4-17.1 | 10.0    | 8.1-11.8  | 6.5     | 5.0-7.9   | 8.2     | 7.0-9.4   |
| Union              | 11.4     | 8.9-13.9  | 16.1    | 12.5-19.6 | 14.1    | 11.3-16.9 | 12.3    | 9.3-15.4  | 13.4    | 11.3-15.4 |
| District/Total     | 10.1     | 9.6-10.6  | 15.5    | 14.8-16.2 | 12.8    | 12.2-13.3 | 11.9    | 11.3-12.5 | 12.4    | 12.0-12.8 |
| Pennsylvania/Total | 13.0     | 12.9-13.1 | 19.9    | 19.7-20.0 | 16.5    | 16.4-16.6 | 14.6    | 14.4-14.7 | 15.6    | 15.5-15.7 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The North Central Health District of Pennsylvania has a population of approximately 571,000, with almost 13.0 percent of its population eligible for Medical Assistance. Among children in the Northern Central Health District, Clinton County had the highest PPA, followed by Lycoming and Northumberland during the 2004-2008 period. Among adults, Bradford County had the highest prevalence, followed by Lycoming and Union. Among females in the Northern Central Health District, Lycoming County had the highest prevalence, followed by Northumberland and Union. Sullivan County had the highest PPA among male Medicaid recipients, followed by Clinton and Montour. Overall, Lycoming County, followed by Northumberland and Clinton, had the highest PPA during this five-year period. The lowest PPAs were in Potter, Tioga and Snyder Counties, respectively.



**Table 14:** Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients (0-64), Northern Central Health District, PA 2004-2008 (combined data)

| County             | Children |             | Adults |           | Female |           | Male |           | Total |           |
|--------------------|----------|-------------|--------|-----------|--------|-----------|------|-----------|-------|-----------|
|                    | Rate     | CI (95%)    | Rate   | CI (95%)  | Rate   | CI (95%)  | Rate | CI (95%)  | Rate  | CI (95%)  |
| Berks              | 29.3     | 26.6-32.1   | 39.8   | 36.0-43.6 | 34.9   | 31.8-38.0 | 32.2 | 28.9-35.6 | 33.7  | 31.5-36.0 |
| Bucks              | 27.8     | 24.4-31.3   | 24.0   | 20.6-27.4 | 26.6   | 23.2-30.0 | 25.4 | 21.8-28.9 | 26.0  | 23.6-28.5 |
| Chester            | 19.2     | 15.9-22.5   | 35.4   | 30.1-40.6 | 30.8   | 26.5-35.2 | 20.4 | 16.6-24.2 | 26.0  | 23.1-28.9 |
| Delaware           | 62.4     | 58.5-66.3   | 34.3   | 31.5-37.1 | 41.7   | 38.9-44.6 | 57.6 | 53.5-61.7 | 48.1  | 45.7-50.5 |
| Lancaster          | 15.3     | 13.2-17.4   | 17.7   | 15.2-20.3 | 16.3   | 14.1-18.5 | 16.5 | 14.0-19.0 | 16.4  | 14.7-18.0 |
| Montgomery         | 25.6     | 22.7-28.6   | 25.5   | 22.1-28.8 | 25.9   | 22.9-29.0 | 25.1 | 21.9-28.4 | 25.6  | 23.3-27.8 |
| Philadelphia       | 103.5    | 101.5-105.5 | 54.0   | 52.5-55.5 | 74.1   | 72.5-75.7 | 86.8 | 84.9-88.8 | 79.6  | 78.4-80.9 |
| Schuylkill         | 27.0     | 22.1-31.9   | 17.2   | 13.3-21.1 | 19.4   | 15.5-23.4 | 25.5 | 20.5-30.6 | 22.1  | 19.0-25.3 |
| District/Total     | 73.4     | 72.2-74.7   | 44.0   | 43.0-45.0 | 56.0   | 54.9-57.0 | 64.0 | 62.7-65.3 | 59.5  | 58.7-60.3 |
| Pennsylvania/Total | 43.5     | 42.9-44.2   | 30.1   | 29.6-30.7 | 35.9   | 35.4-36.5 | 38.6 | 38.0-39.3 | 37.1  | 36.7-37.6 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

N/D=Not displayed if count ≤ 10

It is difficult to arrive at any definite conclusion in terms of asthma hospitalization rates in the Northern Central Health District due to the small number of admissions. Overall, Columbia County, followed by Potter and Montour, had the highest asthma hospitalization rates in this region during the 2004-2008 period.

**Table 15:** Prevalence of Persistent Asthma Among Medicaid Recipients (0-64), Northeastern Health District, PA 2004-2008 (combined data)

| County             | Children |           | Adults  |           | Female  |           | Male    |           | Total   |           |
|--------------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | Percent  | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  | Percent | CI (95%)  |
| Carbon             | 10.3     | 8.9-11.8  | 16.1    | 13.9-18.3 | 14.0    | 12.2-15.8 | 11.0    | 9.2-12.7  | 12.6    | 11.4-13.9 |
| Lackawanna         | 9.0      | 8.3-9.7   | 14.8    | 13.7-15.9 | 11.6    | 10.8-12.5 | 10.7    | 9.9-11.6  | 11.2    | 10.6-11.8 |
| Lehigh             | 11.3     | 10.7-11.9 | 19.9    | 19.0-20.9 | 16.0    | 15.2-16.7 | 13.3    | 12.6-14.0 | 14.8    | 14.3-15.3 |
| Luzerne            | 12.0     | 11.3-12.8 | 17.2    | 16.1-18.2 | 15.5    | 14.6-16.4 | 12.7    | 11.8-13.6 | 14.2    | 13.6-14.9 |
| Monroe             | 12.8     | 11.7-13.9 | 20.4    | 18.8-22.0 | 17.0    | 15.7-18.3 | 14.7    | 13.3-16.0 | 16.0    | 15.0-16.9 |
| Northampton        | 12.5     | 11.6-13.3 | 20.1    | 18.8-21.4 | 16.9    | 15.8-17.9 | 14.1    | 13.0-15.2 | 15.6    | 14.9-16.4 |
| Pike               | 10.0     | 8.3-11.8  | 18.7    | 15.5-21.9 | 14.2    | 11.9-16.6 | 11.9    | 9.7-14.0  | 13.1    | 11.5-14.7 |
| Susquehanna        | 5.7      | 4.5-6.9   | 12.8    | 10.3-15.3 | 8.4     | 6.8-10.1  | 7.6     | 6.1-9.2   | 8.0     | 6.9-9.2   |
| Wayne              | 9.6      | 8.1-11.1  | 17.2    | 14.6-19.8 | 13.9    | 12.0-15.9 | 10.5    | 8.5-12.4  | 12.5    | 11.1-13.8 |
| Wyoming            | 8.3      | 6.2-10.4  | 11.7    | 8.6-14.8  | 11.0    | 8.4-13.5  | 8.1     | 5.7-10.5  | 9.6     | 7.9-11.4  |
| District/Total     | 11.0     | 10.7-11.3 | 18.1    | 17.6-18.6 | 14.9    | 14.6-15.3 | 12.5    | 12.1-12.9 | 13.9    | 13.6-14.1 |
| Pennsylvania/Total | 13.0     | 12.9-13.1 | 19.9    | 19.7-20.0 | 16.5    | 16.4-16.6 | 14.6    | 14.4-14.7 | 15.6    | 15.5-15.7 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

The Northeastern Health District has a population of approximately 1,312,000, with almost 15.0 percent of its population eligible for Medical Assistance. Among children in this health district, Monroe County had the highest PPA, followed by Northampton and Luzerne during the 2004-2008 period. Among adults, both male and female, Monroe County had the highest prevalence, followed by Northampton and Lehigh. Overall, Monroe County had the highest prevalence of persistent asthma among Medicaid recipients in the Northeastern Health District, followed by Northampton and Lehigh. The lowest PPAs were in Susquehanna, Wyoming and Lackawanna Counties, respectively.



**Table 16:** Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients (0-64), Northeastern Health District, PA 2004-2008 (combined data)

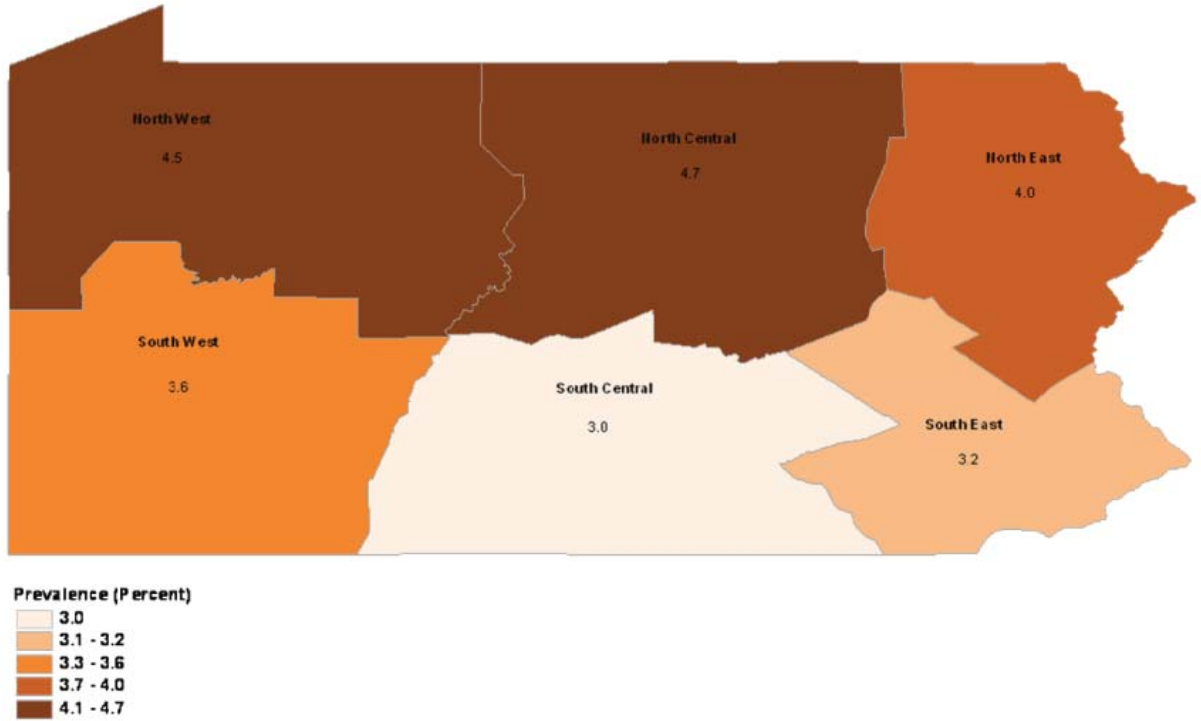
| County             | Children |           | Adults |           | Female |           | Male |           | Total |           |
|--------------------|----------|-----------|--------|-----------|--------|-----------|------|-----------|-------|-----------|
|                    | Rate     | CI (95%)  | Rate   | CI (95%)  | Rate   | CI (95%)  | Rate | CI (95%)  | Rate  | CI (95%)  |
| Carbon             | 20.9     | 14.2-27.6 | 16.4   | 10.2-22.6 | 21.6   | 15.0-28.2 | 15.2 | 9.0-21.4  | 18.7  | 14.1-23.3 |
| Lackawanna         | 19.0     | 15.7-22.3 | 22.0   | 18.4-25.7 | 21.4   | 18.1-24.8 | 19.3 | 15.7-22.8 | 20.5  | 18.0-22.9 |
| Lehigh             | 28.6     | 25.7-31.6 | 39.0   | 35.0-43.0 | 35.1   | 31.8-38.5 | 30.6 | 27.1-34.1 | 33.1  | 30.7-35.6 |
| Luzerne            | 20.7     | 18.0-23.4 | 19.5   | 16.8-22.3 | 21.2   | 18.6-23.9 | 18.8 | 16.0-21.6 | 20.2  | 18.2-22.1 |
| Monroe             | 14.9     | 11.6-18.3 | 17.6   | 13.5-21.7 | 16.8   | 13.3-20.4 | 15.2 | 11.4-19.0 | 16.1  | 13.5-18.7 |
| Northampton        | 29.9     | 25.8-33.9 | 34.4   | 29.7-39.2 | 33.7   | 29.5-38.0 | 29.7 | 25.2-34.2 | 31.9  | 28.8-35.0 |
| Pike               | 18.5     | 11.5-25.5 | 18.6   | 10.3-27.0 | 20.1   | 12.5-27.7 | 16.7 | 9.2-24.2  | 18.6  | 13.2-23.9 |
| Susquehanna        | 39.9     | 29.7-50.1 | 24.0   | 15.5-32.4 | 30.5   | 21.7-39.3 | 34.9 | 24.6-45.2 | 32.5  | 25.8-39.2 |
| Wayne              | 13.1     | 7.5-18.7  | 9.1    | 4.2-14.1  | 10.3   | 5.4-15.2  | 12.3 | 6.4-18.1  | 11.2  | 7.4-15.0  |
| Wyoming            | 14.6     | 6.9-22.2  | 17.5   | 8.7-26.4  | 20.8   | 11.9-29.8 | N/D  | N/D       | 16.0  | 10.2-21.8 |
| District/Total     | 23.3     | 22.0-24.7 | 25.8   | 24.3-27.3 | 25.8   | 24.4-27.2 | 22.7 | 21.3-24.2 | 24.4  | 23.5-25.5 |
| Pennsylvania/Total | 43.5     | 42.9-44.2 | 30.1   | 29.6-30.7 | 35.9   | 35.4-36.5 | 38.6 | 38.0-39.3 | 37.1  | 36.7-37.6 |

Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

N/D=Not displayed if count ≤ 10

Among children in the Northeastern Health District, Susquehanna County had the highest asthma hospitalization rates, followed by Northampton and Lehigh during the 2004-2008 period. Among adults and females, Lehigh County had the highest asthma hospitalization rates, followed by Northampton and Susquehanna. Among males in this district, Susquehanna County had the highest asthma hospitalization rates, followed by Lehigh and Northampton. Overall, Lehigh County, followed by Susquehanna and Northampton, had the highest asthma hospitalization rates during this five-year period. The lowest asthma hospitalization rates were in Wayne, Wyoming and Monroe Counties, respectively.

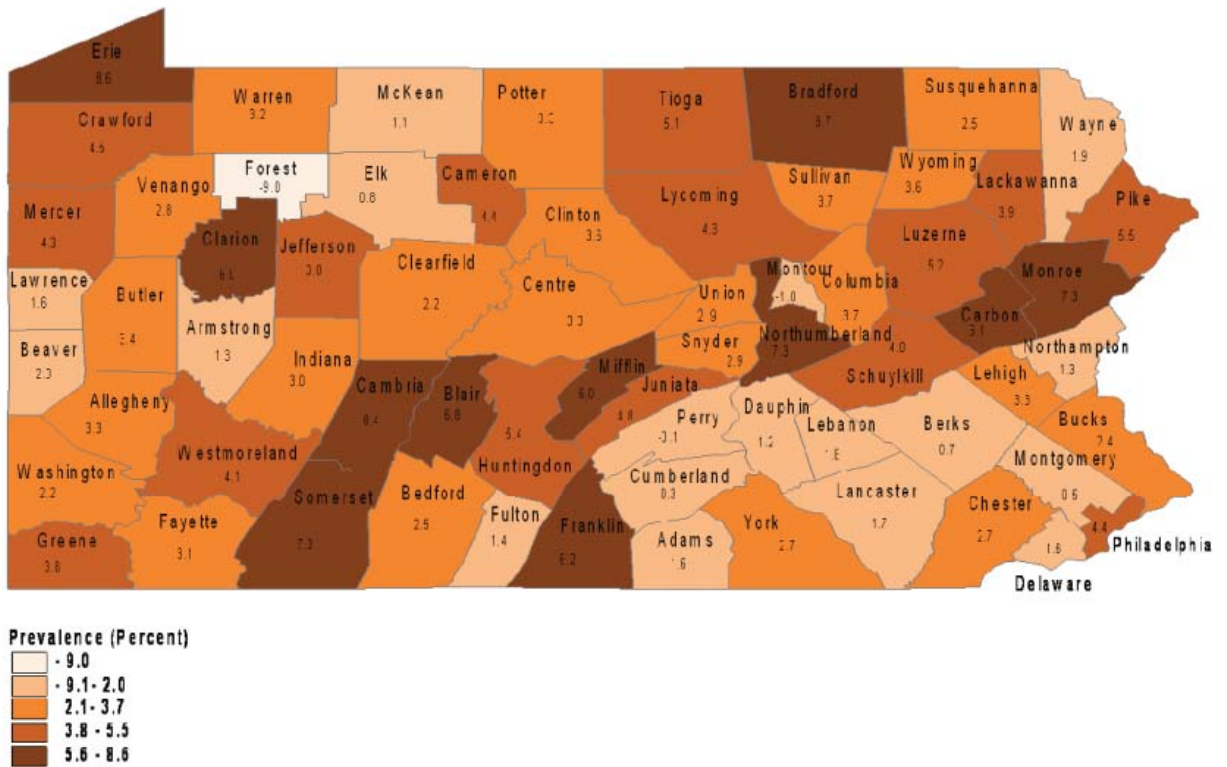
**Figure 27:** Change in Prevalence of Persistent Asthma Among Medicaid Recipients by Health District, PA 2004 to 2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.



**Figure 28:** Change in Prevalence of Persistent Asthma Among Medicaid Recipients by County, PA 2004 to 2008



Data source: Department of Public Welfare, Commonwealth of Pennsylvania.

## RECOMMENDATIONS:

- Continue to evaluate trends in the prevalence of persistent asthma, asthma hospitalizations rates, readmission rates and percentage of Medicaid recipients who receive appropriate long-term medications
- Improve asthma management to reduce asthma burden in the Medicaid population
- Develop and improve current interventions to target the Medicaid population
- Improve asthma health surveillance to ensure appropriate care for those enrolled in the Medicaid program

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# GLOSSARY OF TERMS

**Age-Adjusted Rate:**

A rate calculated in a manner that allows areas with different age structures to be compared. Rates are standardized to a control population (2000 year)

**Allowed Amount:**

is the total amount approved to pay for services provided to a recipient. This is the amount before co-pay and third party liability are deducted.

**Confidence Interval (CI):**

is a way to measure sampling error and to define the range of values where percentages are estimated by multiple samples of the same population.

**Emergency Room (ER) Visit Rate:**

Asthma ER visit rate reflects the number of visits (not the number of patients) per 1,000 Medicaid recipients. Rates were calculated by dividing the number of visits (state, health district, county) by the total number of Medical recipients over a specified period.

**Hospitalization Rate:**

Inpatient hospitalization rate with asthma as the primary discharge diagnosis reflects the number of admissions (not the number of patients) per 10,000 Medicaid recipients. Rates were calculated by dividing the number of admissions (state, health district, county) by the total number of Medical recipients over a specified period.

**Outpatient Visit Rate:**

Asthma outpatient visit rate reflects the number of visits (not the number of patients) per 1,000 Medicaid recipients. Rates were calculated by dividing the number of outpatient visits (state, health district, county) by the total number of Medical recipients over a specified period.

**Prevalence of Asthma in the Medicaid Population:**

The proportion of Medicaid recipients with asthma symptoms (state, health district, county) divided by the total number of people who are eligible for a Medical Assistance Program over a specified period.

**Prevalence of Persistent Asthma in Medicaid Population:**

The proportion of Medicaid recipients with persistent asthma (state, health district, county) divided by the total number of people who have asthma symptoms and stay in the Medical Assistance Program over a specified period. According to HEDIS® 2007 specifications, persistent asthma is defined in a patient by meeting one of four criteria (See section "Methodology").

**Readmission Hospitalization Rate:**

Represents the rate at which patients return to the hospital within 12 months of discharge following an inpatient stay due to asthma.

**Statistically Significant:**

In this report, a P-value<0.05 was considered statistically significant.

**Surveillance:**

The ongoing systematic collection, analysis and interpretation of health-related data essential to the planning, implementation and evaluation of public health practice.



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The Asthma Burden in the Medicaid Population can be downloaded from the Pennsylvania DOH website:

[www.health.state.pa.us](http://www.health.state.pa.us)

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