

**PENNSYLVANIA ASTHMA
FOCUS REPORT
2015**

**INPATIENT HOSPITALIZATIONS
WITH A PRIMARY
DISCHARGE DIAGNOSIS OF ASTHMA**



pennsylvania
DEPARTMENT OF HEALTH

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INTRODUCTION

Asthma, a chronic disease of the lungs, continues to be an important public health issue. Asthma is characterized by wheezing, breathlessness, chest tightness, and coughing at night or early in the morning.⁴ Asthma has no cure; however, its effective management has been shown to reduce the severity of symptoms.

The two asthma prevalence measures in use by the Centers for Disease Control and Prevention (CDC) are the self-reported lifetime and current asthma. Lifetime asthma is defined as an affirmative response to the question “Have you ever been told by a doctor (nurse or other health professional) that you have asthma?”. Current asthma is defined as an affirmative response to that question followed by an affirmative response to the subsequent question “Do you still have asthma?”

In 2010, the Centers for Disease Control and Prevention (CDC), estimates that 25.7 million persons have current asthma, of which seven million were children and 18.7 million were adults². Among adults, an estimated 3.1 million people over sixty-five years of age are living with asthma. In 2010, of those with current asthma, 19.1 million were White, 4.7 million were Black and 1.9 million were other races.² Hispanics also make up 3.6 million of persons with current asthma while non-Hispanics make up 22.1 million persons with asthma.²

In 2010, the CDC conducted a national surveillance which shows that the prevalence of current asthma was higher in Blacks compared

to Whites and higher in Hispanics of Puerto Rican descent compared to Mexican descents. The Northeastern part of the United States, where the state of Pennsylvania is located, also has a higher prevalence of current asthma compared to the rest of the United States.

Asthma hospitalizations continue to serve as a marker for how effective measures put in place in asthma management and control has reduced asthma exacerbations. Any increase in asthma hospitalization rate represents adverse outcomes in overall management of asthma and directly increases the cost of care of persons with asthma.

The CDC estimates that both the direct cost associated with medical care and indirect cost associated with lost school and work days are over \$56 billion annually.² Data on asthma hospitalizations thus provide useful information that will assist in identifying at risk populations and those disproportionately affected by asthma.

This Asthma Hospitalization Focus Report provides information on the burden of asthma among residents of the state of Pennsylvania from 2009 to 2013 by age, race, ethnicity and gender at both the county and health district level. This report also provides more detailed information about total charges, length of hospital stay, trends in inpatient hospitalizations in the last five years, admission type and the payer categories. Asthma data in this report was provided by the Pennsylvania Health Care Cost Containment Council (PHC4).

METHODOLOGY

The data for the annual asthma hospitalization rates in the state of Pennsylvania was obtained primarily from the Pennsylvania Health Care Cost Containment Council (PHC4). A diagnosis of asthma at discharge using the ICD.9.CM code was used by all hospitals in the state of Pennsylvania reporting to PHC4 from 2009 to 2013.

The analysis is based on data obtained from Pennsylvania residents who were admitted to any non-federal Pennsylvania hospital with asthma as the primary discharge diagnosis. Out-

of-state residents hospitalized in Pennsylvania and those with unknown counties were excluded. Data was analyzed using SAS 9.2 and Microsoft Excel 2010. Age-adjusted rates were adjusted to the 2000 US standard population via the direct method¹. Crude rates were calculated using PHC4 hospitalization data and U.S census population estimates for Pennsylvania, per 10,000 Pennsylvania State residents.

2014 TIGER/Line Shape-files for Pennsylvania was obtained from the U.S Census Bureau.⁷ Maps were generated using ArcMap 10.1



SUMMARY

In 2009, the total inpatient asthma hospitalizations in Pennsylvania were 24,458 at an age-adjusted rate of 19.2 per 10,000. By 2013, the number of inpatient hospitalizations had decreased to 18,439 at an age-adjusted rate of 14.2 per 10,000.

Asthma inpatient hospitalizations rates have decreased over the period of five years from 19.2 per 10,000 residents in 2009 to 14.2 per 10,000 residents in 2013.



Inpatient hospitalizations rates with asthma as the primary discharge diagnosis were higher in females compared to males (19.6 vs. 13.0 per 10,000). The rates were also higher among Blacks compared to Whites (51.3 vs. 9.9 per 10,000) and higher among Blacks compared to other races (51.3 vs. 38.5 per 10,000). Hispanics also have a higher rate of hospitalizations compared to non-Hispanics (26.0 vs. 15.9 per 10,000).

The average charge for inpatient hospitalization with asthma has increased in the five year period from \$22,719 in 2009 to \$26,952 in 2013.

The total charges (excluding professional fees) for inpatient hospitalizations in Pennsylvania have decreased in the five year period from approximately \$556 million in 2009 to \$497 million in 2013.

Medicare and Medicaid payments account for 30.0 percent and 39.0 percent of all payments respectively, of all inpatient hospitalizations due to asthma from 2009- 2013.

Among all the age-group, children aged 0-4 years had the highest hospitalization rates (females 33.2/10,000 and males 54.0/10,000). The lowest rates were among age-group 15-34(female 9.1/10,000 and males 4.6/10,000).

Males' age 0-14 had higher rates of inpatient hospitalizations compared to females in the same age-group. For age-groups 15 and older, females had higher rates of inpatient hospitalizations compared to males.



SUMMARY (continued)

Admissions from the Emergency Room due to asthma as the primary discharge diagnosis remained at an all-time high through 2009 to 2013.

Overall, admissions from the Emergency Room made up 77 percent (N=80,633) of all asthma inpatient hospitalizations while urgent and elective admissions made up 20 percent (N=21,215) and 3 percent (N=3,128) of all admissions, respectively.

The average length of stay (LOS) for inpatient hospitalizations with asthma as the primary discharge diagnosis was higher in adults (4 days) than in children (2 days). The average LOS was higher in females compared to males (4 days vs. 3 days).

The average LOS between Hispanics and non-Hispanics are very similar (2.6 days and 2.8 days, respectively). Among the races, White patients spent an average of 4 days compared to Black patients (3 days) and other race group (2.4 days).

The highest rate for inpatient hospitalizations with asthma as the primary discharge diagnosis was in the Southeast region (23.0 per 10,000). This rate is higher than the overall rate in the Commonwealth of Pennsylvania of 16.3 per 10,000.

Philadelphia County has the highest rate of inpatient hospitalization with asthma in the years

2009 to 2013 at 46.7 per 10,000. This is followed by Lawrence County at 23.0 per 10,000.



HEALTH DISPARITIES IN ASTHMA HOSPITALIZATIONS

Health disparities have been defined as differences in the incidence, prevalence, mortality and burden of diseases and other adverse health conditions that exist among specific populations in the United States.⁵ Health disparities have also been defined as differences in health outcomes and their determinants between sub- population, as defined by social, demographic, environmental, and geographic attributes.³

In the hospitalization data, disparities did exist between different sub- populations analyzed. Although adults, females, Hispanics and Blacks had higher numbers, percentages and hospitalization rates compared to other sub-populations, the number and percentages of asthma hospitalizations by age, sex, ethnicity and race has decreased from 2009 to 2013.

Adults had higher hospitalization numbers and percentages compared to children. Likewise females had higher hospitalization numbers and percentages compared to males. Among those hospitalized due to a diagnosis of asthma, Hispanics had higher hospitalization numbers and percentages of hospitalizations compared to non-Hispanics. Among the races, Blacks had higher hospitalization numbers and percentages compared to Whites or other races [Table 1].

For all ages combined, rates of inpatient hospitalizations with asthma as the primary discharge diagnosis have decreased from 2009 to 2013 in females, males, Blacks, Whites, other races, Hispanics and Non-Hispanics. However, rates are higher in females (19.6/10,000) compared to males (13.0/10,000). Blacks have the highest rates of hospitalizations compared to Whites (51.3/10,000 vs. 9.9/10,000) and other races (51.3/10,000 vs. 38.5/10,000).

Table 1: Numbers and Percentages of Asthma Inpatient Hospitalization by Age, Sex, Ethnicity and Race, PA 2009-2013.

Selected Characteristics	2009		2010		2011		2012		2013	
	Number	%								
Adults	17,391	71.1	14,804	70.3	15,147	70.7	13,457	68.5	13,022	70.6
Children	7,067	28.9	6,257	29.7	6,263	29.3	6,182	31.5	5,417	29.4
Females	15,649	64.0	13,483	64.0	13,638	63.7	12,184	62	11,422	70.0
Males	8,809	36.0	7,578	36.0	7,771	36.3	7,454	38	7,017	38.1
Hispanic	2,160	8.8	1,825	8.7	1,943	9.1	1,734	8.8	1,704	9.2
Non-Hispanic	22,284	91.1	19,215	91.2	19,453	90.9	17,901	91.2	16,730	90.8
Blacks	8,239	33.7	7,096	33.7	7,423	34.7	6,924	35.3	6,188	33.6
Whites	13,430	54.9	11,550	54.9	11,421	53.4	10,147	51.7	9,620	52.2
Other Races	2,774	11.3	2,409	11.4	2,562	12.0	2,561	13.0	2,618	14.2
Total Asthma Inpatient Hospitalizations	24,458		21,061		21,410		19,639		18,439	
Rates/10,000	19.2/10,000		16.4/10,000		16.6/10,000		15.3/10,000		14.2/10,000	

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)
Other Races: Includes Asian, Pacific Islander and Unknown races

The rate among Blacks is approximately five times the rate observed among Whites. Hispanics have higher rates of hospitalizations than for non-Hispanics (26.0/10,000 vs. 15.9/10,000) [Table 2].

Several factors are responsible for the disparities observed. Unfortunately, the hospitalization data does not provide this information. However, a complex web of interactions such as genetic differences, social factors, economic and cultural differences, lack of access to quality care might be contributing factors.

Substandard housing and work conditions might also predispose disadvantaged populations to increased risk and prolonged exposure to asthma triggers in the environment. One of the goals of the Pennsylvania Asthma Plan is to reduce disparities in Pennsylvania by identifying at-risk populations and providing targeted interventions.

Table 2: Age-Adjusted Inpatient Hospitalization Rates per 10,000 with Asthma as the Primary Discharge Diagnosis by Gender, Race and Ethnicity, PA 2009-2013.

Selected Characteristics	2009	2010	2011	2012	2013	Combined Rates per 10,000
Female	23.3	19.9	20.1	18.0	16.8	19.6
Male	14.9	12.8	13.1	12.6	11.8	13.0
Black	61.6	52.1	52.4	48.4	42.9	51.3
White	11.8	10.5	10.1	9.0	8.4	9.9
Other Races	60.6	27.0	40.7	37.5	37.8	38.5
Hispanic	35.3	27.7	26.9	21.3	21.1	26.0
Non-Hispanic	18.5	16.0	16.1	15.0	13.9	15.9

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)
Other Races: Includes Asian, Pacific Islander and unknown races



DECLINE IN ASTHMA AGE-ADJUSTED RATES FOR INPATIENT HOSPITALIZATIONS

Over a period of five years, there has been a gradual decrease in age-adjusted rates of inpatient hospitalizations with asthma as the primary discharge diagnosis from 2009-2013 (Figure 1).

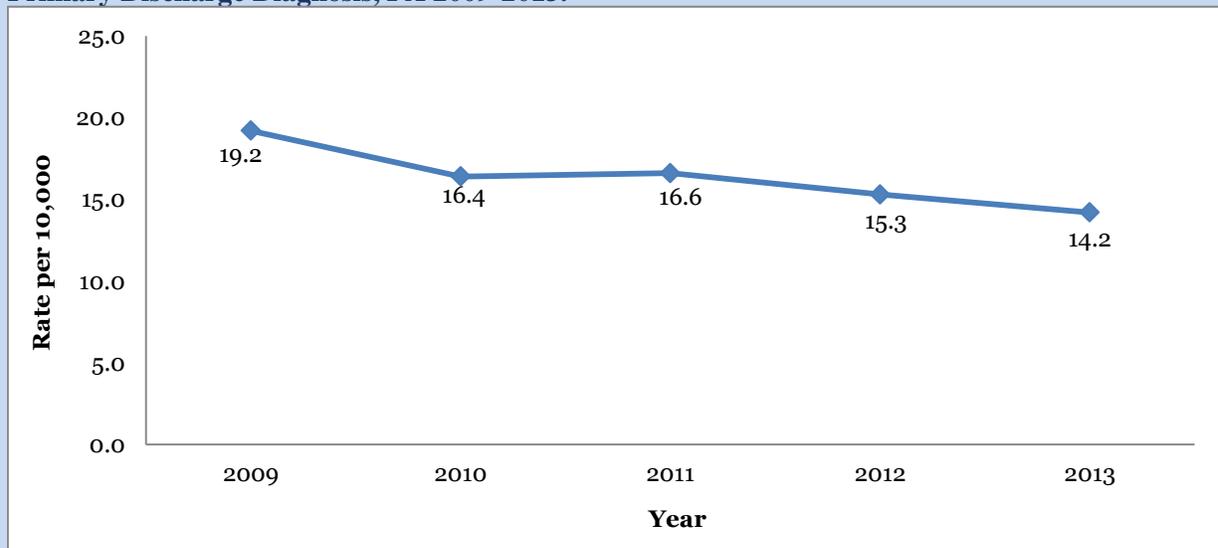
In 2009, the rate was 19.2 per 10,000 residents compared to the rate in 2013 which was 14.2 per 10,000 residents. This decrease represents a 24.2 percent reduction in inpatient hospitalizations from 2009 to 2013. The age-adjusted rates of inpatient hospitalization with asthma in Year 2010 and 2011 were approximately the same.

Several factors might be responsible for the decline in age-adjusted rates. These might include better asthma management plan, asthma education, patients' compliance with recommended plans or overall improvement in patients' environment.

The Commonwealth of Pennsylvania asthma program in conjunction with the Pennsylvania Asthma Partnership (PAP) will continue to provide resources to educate patients on asthma self-management, advocate for improved indoor and outdoor environmental quality, reduce asthma disparity and improve asthma surveillance.



Figure 1: Annual Age-Adjusted Rates per 10,000 for Inpatient Hospitalization with Asthma as the Primary Discharge Diagnosis, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

AVEARAGE AND TOTAL CHARGES FOR INPATIENT HOSPITALIZATIONS

The average charges for inpatient hospitalizations with asthma as the primary discharge diagnosis increased from 2009 to 2013 while the total charges decreased within this time period. This decrease in total charges might be due to decrease in total number of inpatient hospitalizations due to asthma. The average charge in 2009 was \$22,719 compared to \$26,952 in 2013. This represents an approximately 18.6 percent increase from 2009 to 2013(Table 3).



The total charges for inpatient hospitalizations with asthma as the primary discharge diagnosis have increased in the last decade. In the year 2006, the total charge for inpatient hospitalizations was approximately \$446 million. In 2009, this amount was approximately \$556 million. However, in 2010, the total charges fell by approximately 11.5percent from \$556 million to \$492 million. Subsequently there was an increase in total charges in 2011 with a gradual decline to \$497 million in 2013(Figure 2).



One of the goals of the state asthma plan with PAP is to ensure that resources are provided to reduce hospitalization rates, which will indirectly impact the cost of asthma hospitalizations and care.

Table 3: Average and Total Charges for Inpatient Hospitalization with Asthma as the Primary Discharge Diagnosis (professional fees not included), PA 2009-2013.

Year	Total Charges	Average Charges
2009	\$555,657,794	\$22,719
2010	\$492,484,476	\$23,384
2011	\$541,050,208	\$25,271
2012	\$517,983,943	\$26,375
2013	\$496,970,993	\$26,952

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Figure 2: Total Charges for Inpatient Hospitalization with Asthma as the Primary Discharge Diagnosis (professional fees not included), PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)



DIFFERENCES IN AVERAGE CHARGES FOR INPATIENT HOSPITALIZATIONS BY AGE, SEX, RACE AND ETHNICITY

There are differences in average charges by age, sex, race or ethnicity which reflects some degree of disparity. However the impact of these disparities on the quality of care cannot be assessed using the available data.

By age, comparing the charges between adults and children, the average charges for inpatient hospitalizations are higher in adults compared to children. However, charges in both groups are on the rise. In 2009, the average charge for inpatient hospitalizations with asthma as the primary discharge diagnosis in adult was \$25,550. This amount rose by approximately 19 percent over the course of five years to \$30,404 in 2013. In children in the same period, there is an increase of approximately 18 percent as the average charges increased from \$15,742 to \$18,654 (Figure 3).



By sex, differences do exist in average charges between the sexes. The average charges in females are much higher than that of males. In 2013 specifically, the average charge in females was \$29,141 compared to the average charge in males which was \$23,390. This difference in charges is approximately 26 percent higher in females compared to males (Figure 4).

Figure 3: Average Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Age, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Figure 4: Average Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Gender, PA 2009-2013.



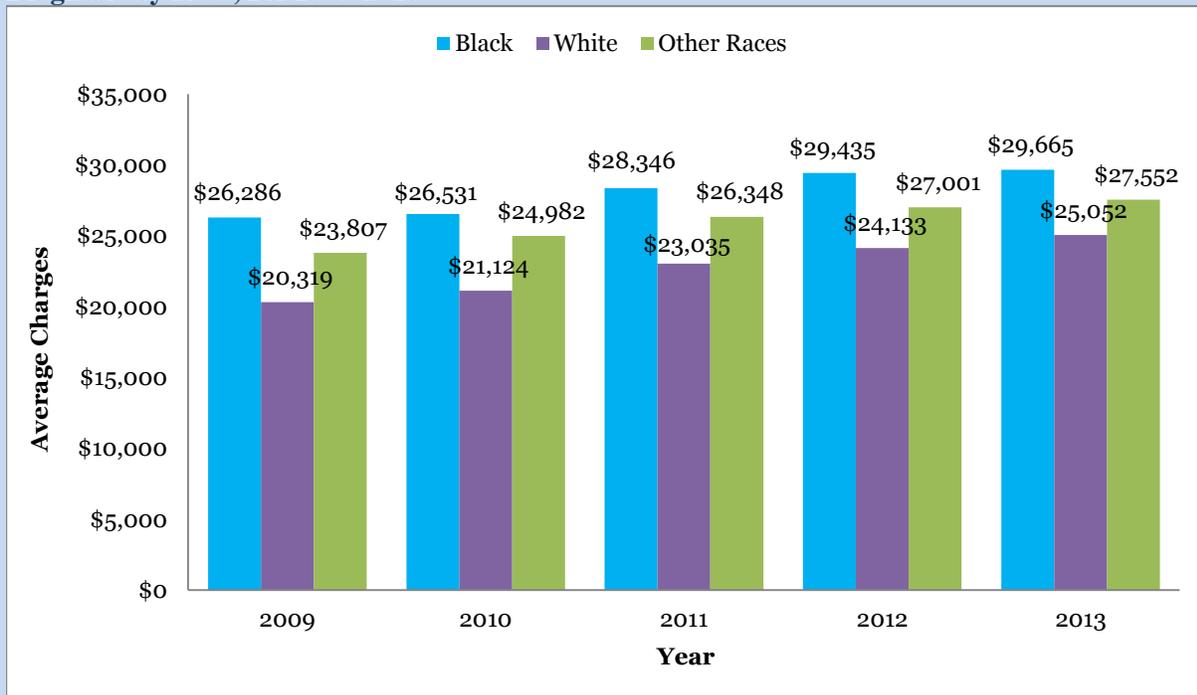
Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

By race, the average charges for inpatient hospitalizations with asthma as the primary discharge diagnosis are on the rise. However, the average charges for inpatient hospitalizations with asthma as the primary discharge diagnosis are much higher among Blacks compared to Whites and among Blacks compared to other races from 2009 to 2013. White patients had the lowest average charge in all three groups. This difference between average charges between Blacks and Whites has decreased gradually over the years. In 2009, the average charges in Blacks compared to Whites represented approximately 30 percent difference (\$26,286 vs. \$20,319) compared to approximately 18 percent difference in 2013 (\$29,665 vs. \$25,052) (Figure 5).

By ethnicities, in year 2009, 2010 and 2011, the average charges in Hispanics were higher than average charges in non-Hispanics

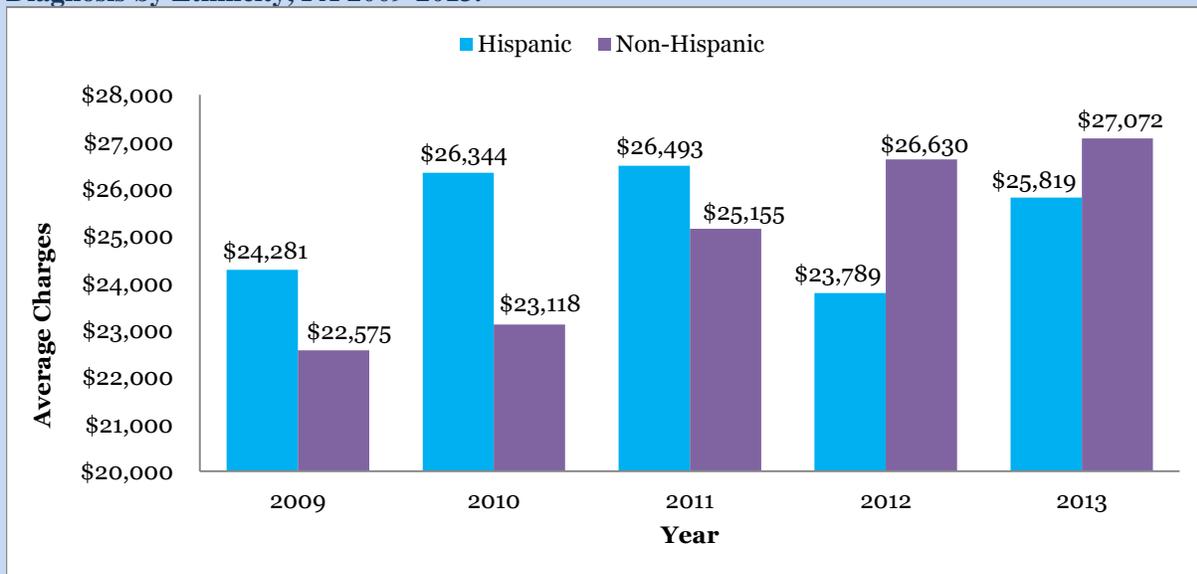
by approximately 7.5, 14.0 and 5.3 percent, respectively. However in 2012 and 2013, the average charges in Hispanics compared to non-Hispanics were less by approximately 10.7 and 4.6 percent, respectively (Figure 6). The average charges for inpatient hospitalizations with asthma as the primary discharge diagnosis increased gradually over the period from 2009 to 2013 in the non-Hispanics population representing a 19.9 percent increase in average charges from 2009 to 2013 (\$22,575 vs. \$27,072). In Hispanics, the average charge rose from 2009 to 2011 by approximately 9.0 percent. This is followed by a decrease of approximately 10.2 percent in 2012 (\$26,493 vs. \$23,789) and subsequent increase in 2013 by approximately 8.5 percent (\$23,789 vs. \$25,819).

Figure 5: Average Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Race, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)
 Other Races: Includes Asian; Pacific Islander and Unknown races

Figure 6: Average Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Ethnicity, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

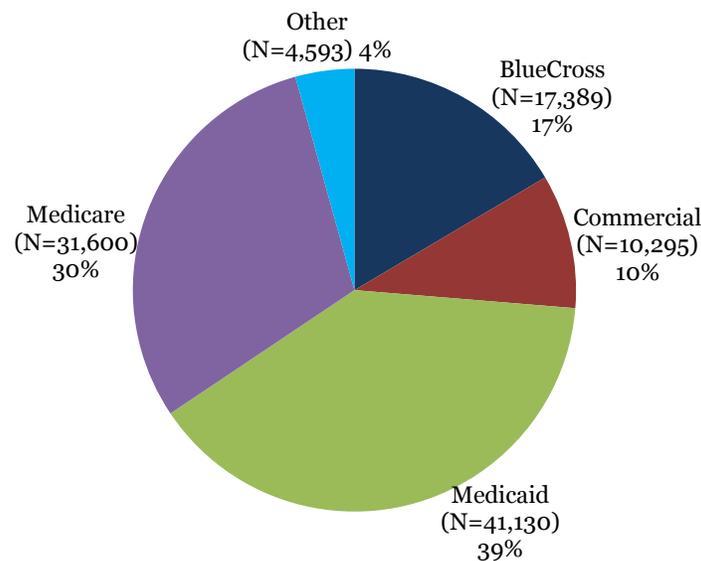
PRIMARY PAYERS FOR INPATIENT HOSPITALIZATIONS

The relationship between insurance status and health outcomes has been documented in several studies. Asthma patients insured by Medicaid have been shown to have poorer health outcomes than privately insured patients. It is probable that other demographic factors not available in the hospitalization data might be contributing to this disparity.

In this report the major primary payers for inpatient hospitalizations with asthma as the primary discharge diagnosis were Medicaid and Medicare. Medicare and Medicaid accounts for 30 percent and 39 percent of all payments from 2009 to 2013, respectively.

Medicare and Medicaid were the biggest primary payers for asthma inpatient hospitalizations in 2013 accounting for 70.8 percent of all payments (31.3 percent Medicare and 39.5 percent Medicaid). BlueCross accounts for 15.1 percent of all payments. Patients whose insurance status was uninsured or unknown account for 4.1 percent of inpatient hospitalizations with asthma in Pennsylvania. The distribution of payments observed in 2013 is similar to those of years 2009 to 2012 (Figure 7; Table 4). For patients admitted through the Emergency Room, Medicaid and Medicare account for 38.8 and 30.9 percent of all Emergency Room payments from 2009-2013 (Figure 8).

Figure 7: Distribution of Primary Payers for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis (Combined), PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

**Other: Includes government insured, uninsured and unknown*

N= Total number of inpatient hospitalizations due to asthma

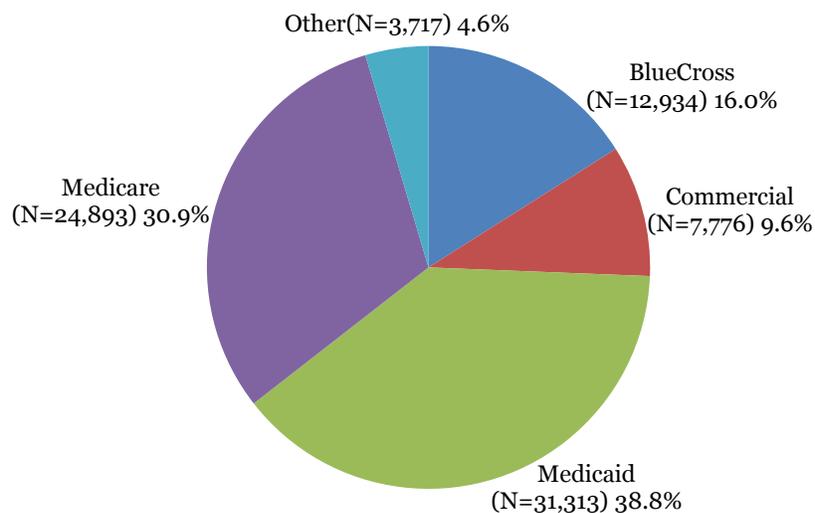
Table 4: Distribution of Primary Payers for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis, PA 2009-2013.

Primary Payer	2009	2010	2011	2012	2013	Combined 2009-2013
BlueCross	18.4%	17.5%	15.8%	15.5%	15.1%	17.0%
Commercial	10.6%	9.8%	9.5%	9.4%	9.5%	10.0%
Government	0.6%	0.5%	0.6%	0.5%	0.5%	1.0%
Medicaid	37.5%	38.8%	39.5%	41.0%	39.5%	39.0%
Medicare	29.2%	29.7%	30.8%	29.8%	31.3%	30.0%
Other	3.6%	3.7%	3.9%	3.8%	4.1%	4.0%

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

*Other: Includes government insured, uninsured and unknown

Figure 8: Distribution of the Primary Payers for Inpatient Hospitalizations for Patients Admitted to the Hospital through the Emergency Room with Asthma as the Primary Discharge Diagnosis, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

*Other: Includes uninsured and unknown

N=Total number of inpatient hospitalizations due to asthma

AGE-SPECIFIC INPATIENT HOSPITALIZATION RATES WITH ASTHMA AS THE PRIMARY DISCHARGE DIAGNOSIS BY AGE-GROUP, SEX, RACE AND ETHNICITY.

By sex, males age 0-14 had higher rates of inpatient hospitalizations compared to females in the same age-group. For age-groups 15 and older, females had higher rates compared to males. Among all the age-group, children aged 0-4 years had the highest hospitalization rates (females 33.2/10,000 and males 54.0/10,000). This is followed by rates in female adults aged 65 and older (29.9/10,000). The lowest rates were among age-group 15-34 (female 9.1/10,000 and males 4.6/10,000). The highest rates observed among males were in the age-group 0-4 years (54.0/10,000). The rate of asthma hospitalization tends to gradually decrease from age 0-34 in both males and females, and then followed by an increase from age 35 (Figure 9).

By race, Blacks ages 0-64 had a higher hospitalization rate compared to Whites and other races. The highest rate of inpatient hospitalizations due to asthma is observed in age-group 0-4 in both Blacks and other races. The rates in Blacks were approximately 7 times higher than rates among Whites in age-group 0-4. The highest rate among Whites was in the age-group 65 and older. Overall, the lowest hospitalization rates were in age-group 15-34 for all races (Figure 10).

By ethnicity, asthma hospitalization rates were higher among Hispanics compared to non-Hispanics. The highest rates of hospitalization were observed in the age-group 0-4 in both Hispanics and non-Hispanics (69.3 and 40.6 per 10,000, respectively). The lowest rates of hospitalization were in age-group 15-34 in both

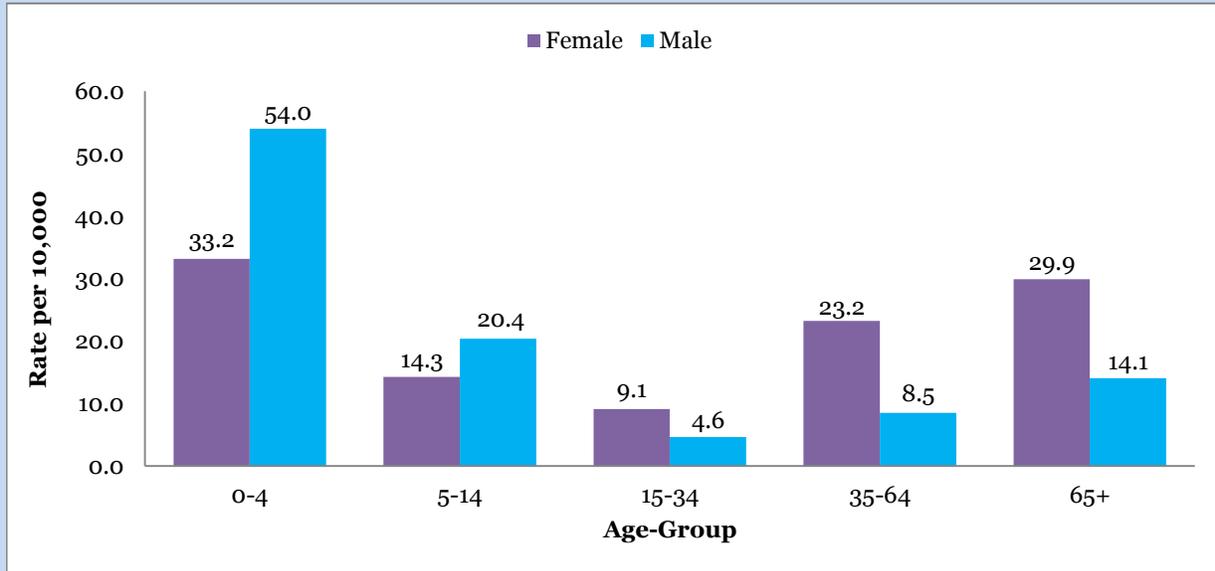
ethnicities (7.7/10,000 in Hispanics; 6.8 /10,000 in non-Hispanics) (Figure 11).

KEY POINTS

- Males age 0-14 had higher rate of inpatient hospitalizations compared to females.
- Females age-groups 15 and older, had higher inpatient hospitalizations rate compared to males.
- Blacks' ages 0-64 had a higher hospitalization rate compared to Whites and other races.
- Hispanics had a higher hospitalization rate compared to non-Hispanics.
- The highest rate of inpatient hospitalizations due to asthma is observed in age-group 0-4

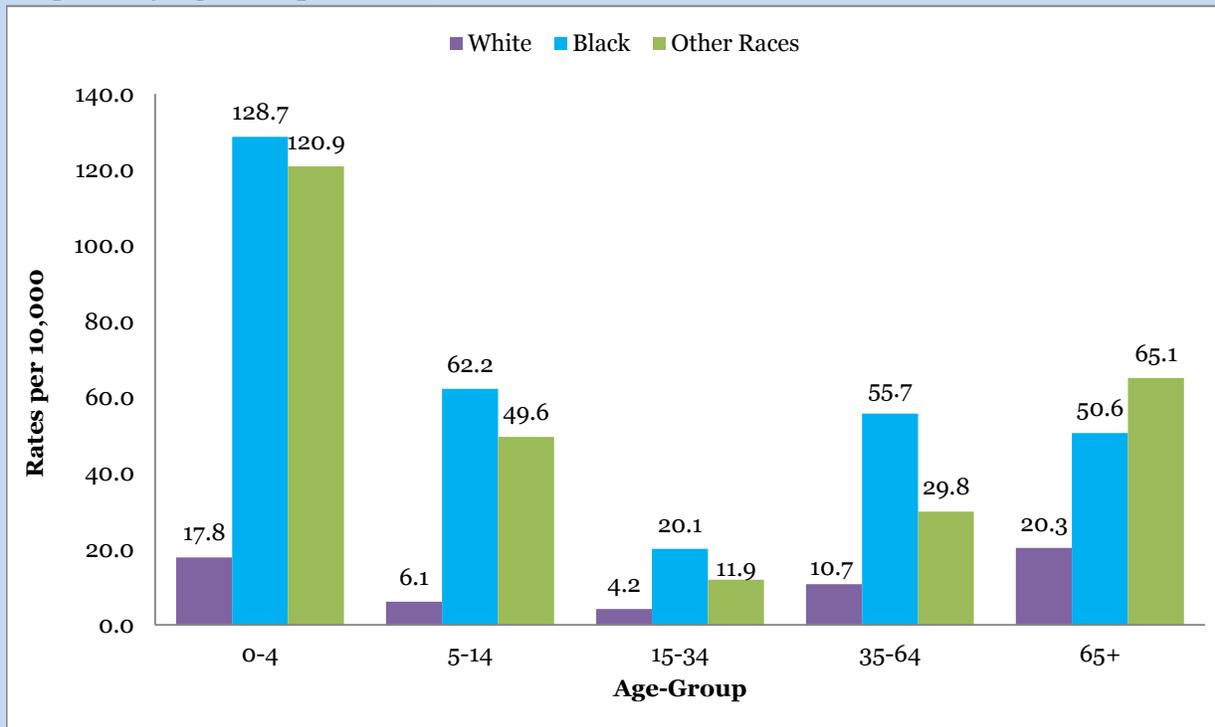


Figure 9: Age-Specific Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis by Age-Group and Gender, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

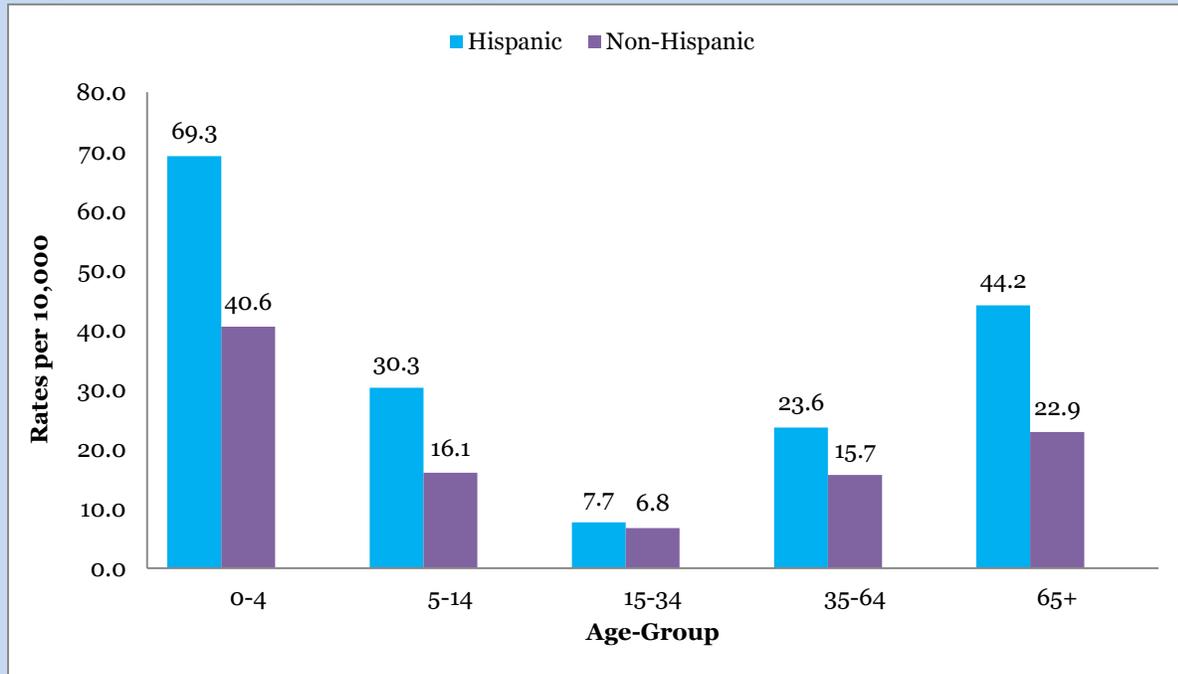
Figure 10: Age-Specific Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis by Age-Group and Race, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Other Races: Includes Asian; Pacific Islander and unknown races

Figure 11: Age-Specific Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis by Age-Group and Ethnicity, PA 2011-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

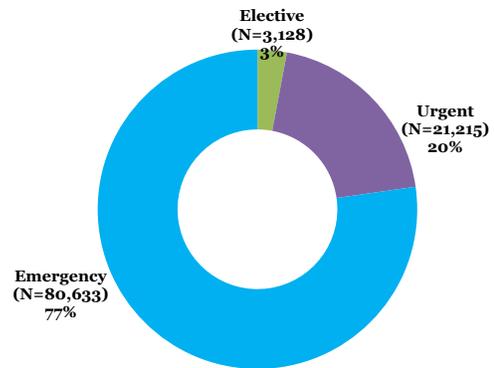


ADMISSION TYPES FOR INPATIENT HOSPITALIZATION WITH ASTHMA AS THE PRIMARY DISCHARGE DIAGNOSIS

The percentage of elective admissions has remained approximately the same at approximately 3.0 percent from 2011- 2013. Year 2009 had the highest percentage of elective admissions for all inpatient hospitalizations at 3.4 percent. For urgent admissions the percentage of inpatient hospitalizations has declined from 25.9 percent to 12.4 percent from 2009 to 2013. The number of admissions through the emergency room increased from 2009 through 2013 (70.7 vs. 84.7 percent) (Figure 13). See technical note for more information.

Emergency room admissions due to asthma as the primary discharge diagnosis remained all-time high from 2009 through 2013. Overall, emergency room admissions made up 77 percent (N=80,633) of all inpatient hospitalizations while urgent and elective admissions made up 20 percent (N=21,215) and 3 percent (N=3,128) of all admissions, respectively (figure 12).

Figure 12: Total Number and Distribution of the Admission Types for Inpatient Hospitalization with Asthma as the Primary Discharge Diagnosis, PA 2009-2013.

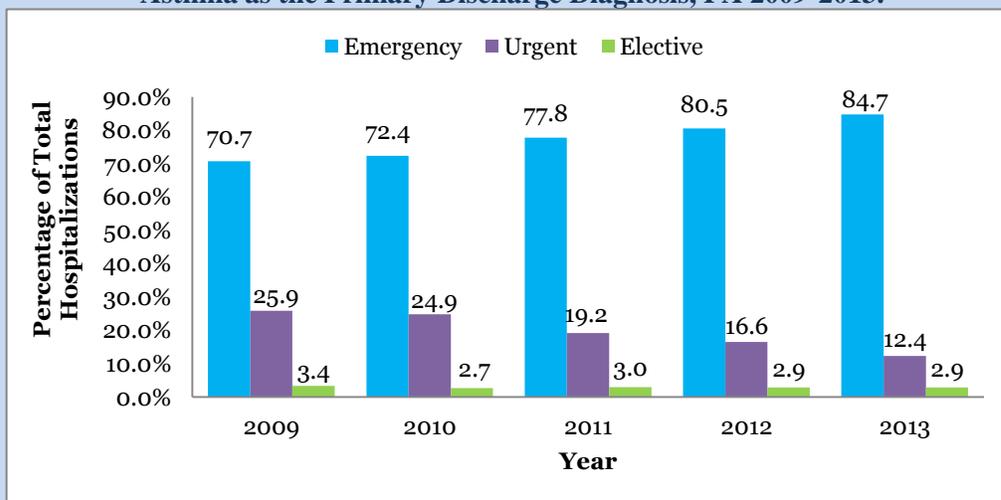


Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

N= Total number of inpatient hospitalizations due to asthma

See technical note for more information.

Figure 13: Distribution of the Admission Types for Inpatient Hospitalization with Asthma as the Primary Discharge Diagnosis, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

AVERAGE LENGTH OF STAY (LOS) IN DAYS FOR INPATIENT HOSPITALIZATIONS WITH ASTHMA AS THE PRIMARY DISCHARGE DIAGNOSIS BY AGE, SEX, ETHNICITY AND RACE.

The average LOS for inpatient hospitalizations with asthma as the primary discharge diagnosis did not change significantly from 2009 to 2013. In 2009 and 2010, the average LOS was 3.4 days. In 2011, the average LOS was 3.3; in 2012, it was 3.2 days and in 2013, it was 3.3 days. However, differences do exist between the demographic categories. The average LOS was higher in adults (four days) than in children (two days). Female spent on the average an extra day in hospitalization compared to males (four days vs. three days). The average LOS between Hispanics and non-Hispanics are close in value (2.6 days and 2.8 days, respectively).

White patients spent an average of four days compared to Black patients (three days) and other race group (2.4 days) (Table 5). Using the LOS as a proxy for cost is quite challenging considering the differences in the LOS and the average charges based on demographics. Comparing the average charges by race, White patients had the least average charges compared to other races but had a longer LOS compared to other races. Females have a longer LOS and a higher average charge compared to males. Whereas the average LOS between Hispanics and non-Hispanics are close in value, Hispanics have a higher average charge compared to non-Hispanics.

Table 5: Average Length of Stay (LOS) in days for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Age, Gender, Ethnicity and Race, PA 2009-2013.

Categories	2009	2010	2011	2012	2013	Average LOS*
Adult	4.0	4.0	4.0	4.0	4.0	4.0
Children	2.0	2.0	2.0	2.0	2.0	2.0
Female	4.0	4.0	4.0	4.0	4.0	4.0
Male	3.0	3.0	3.0	3.0	3.0	3.0
Hispanic	3.0	3.0	2.0	3.0	2.0	2.6
Non-Hispanic	3.0	3.0	3.0	2.0	3.0	2.8
Black	3.0	3.0	3.0	3.0	3.0	3.0
White	4.0	4.0	4.0	4.0	4.0	4.0
Other Races	3.0	3.0	2.0	2.0	2.0	2.4

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

LOS: Length of Stay*

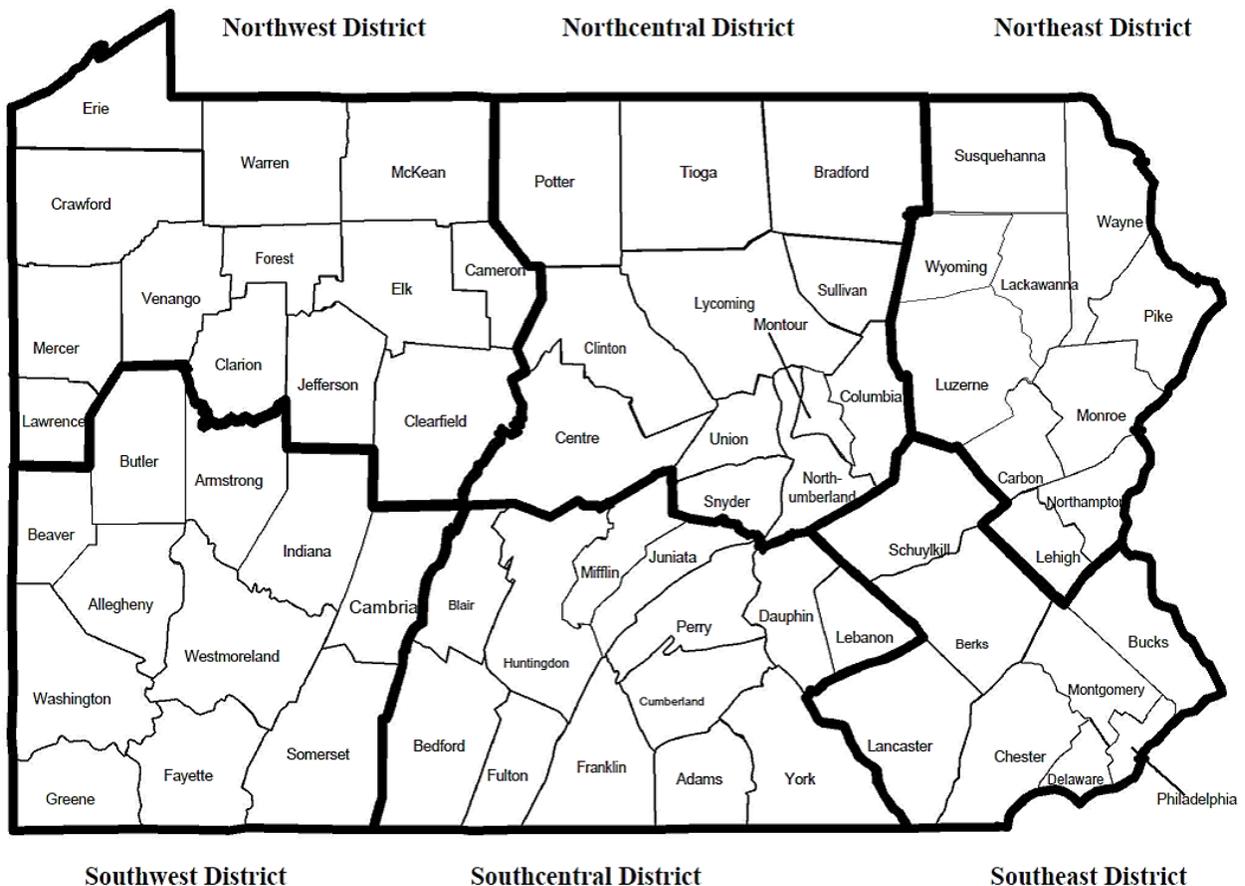
Other Races: Includes Asian; Pacific Islander and unknown races

INPATIENT HOSPITALIZATIONS BY HEALTH DISTRICT

The Commonwealth of Pennsylvania is divided into the six health districts (Map 1). Implementation of the Department of Health’s public health programs is carried out by the Bureau of Community Health Systems, through the six Community Health Districts. Hence the need for information of on inpatient hospitalizations due to asthma in these districts.

Also, the asthma program in conjunction with Pennsylvania Asthma Partnership (PAP) has dedicated resources to the south east health district, specifically in Philadelphia. This is because of the high inpatient hospitalization and prevalence rates in Philadelphia. However, the partnership is in the process of expanding services to other health districts in the state.

Map 1: Commonwealth of Pennsylvania Health Districts



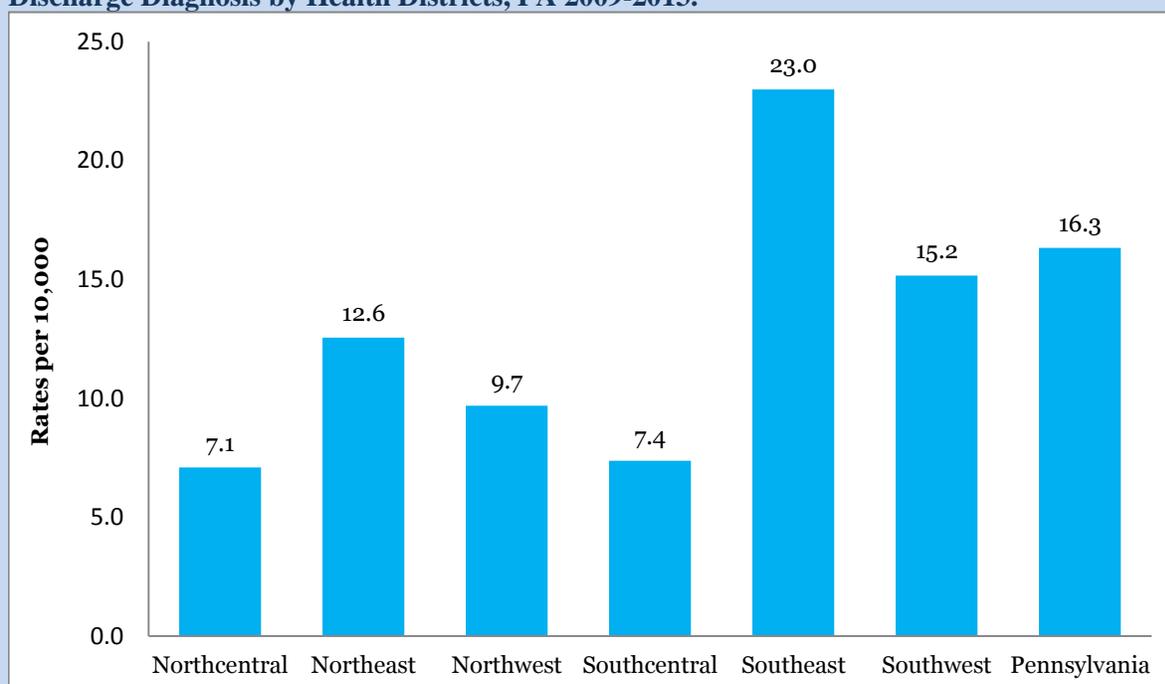
Data Source: Pennsylvania Department of health, Bureau of health Statistics and Research

By Health Districts, the highest rate for inpatient hospitalizations with asthma as the primary discharge diagnosis was in the Southeast Health District (23.0 per 10,000). This rate is higher than the overall Pennsylvania rate of 16.3 per 10,000 in Pennsylvania in a combined five year period. The Southwest Health District had a rate of 15.2 per 10,000. The lowest rates were observed in the Southcentral and Northcentral Health District at 7.4 and 7.1 per 10,000, respectively. All Health Districts except the Southeast Health District had lower rates than that of Pennsylvania at 16.3 per 10,000 (Figure 14).

By gender, females in all Health Districts have higher age- adjusted rates of inpatient hospitalizations with asthma as the primary discharge diagnosis compared to males. The Southeast Health District (13.4 per 10,000 in females and 9.6 per 10,000 in males) and Southwest Health District (10.0 per 10,000 in females and 5.2 per 10,000 in males) have the highest rates of inpatient hospitalizations in both females and males. The lowest rates were observed in Northcentral and Southcentral Health Districts in both females and males (figure 15).

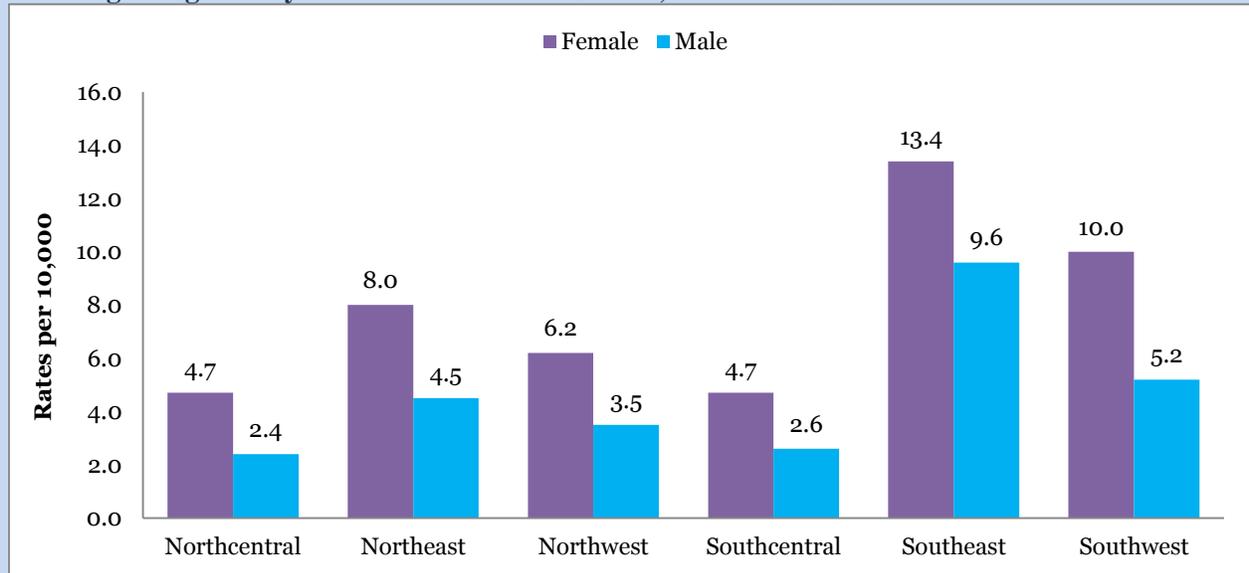
By gender and average charges, females in all the Health Districts had higher average charges for inpatient hospitalization with asthma as the primary discharge diagnosis compared to males. The Southeast Health District had the highest average charge in both females and males. This is followed by Northeast Health District. In the Southeast Health District, the difference in average charge between females and males is approximately \$8,760. In the Northeast Health District, this difference is approximately \$3,785. The average charges in the Southeast Health District are approximately twice the average charges in Southcentral Health District (Figure 16).

Figure 14: Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Health Districts, PA 2009-2013.



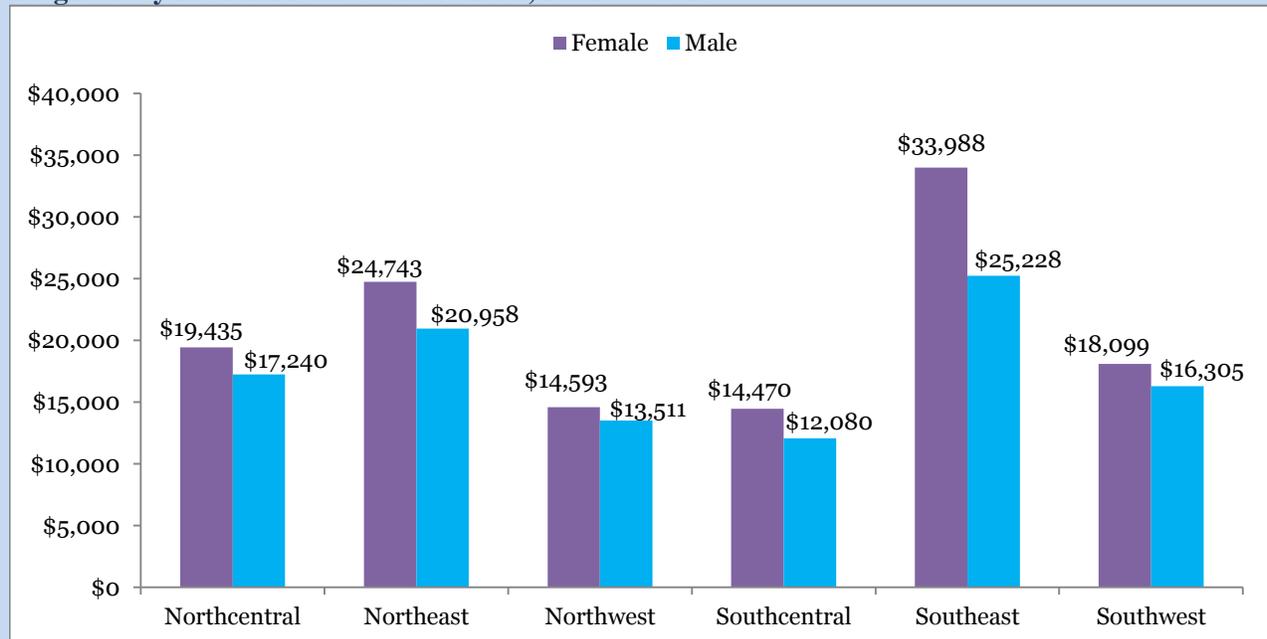
Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Figure 15: Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Health Districts and Gender, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Figure 16: Average Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Health Districts and Gender, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

INPATIENT HOSPITALIZATIONS BY REGIONS

The Pennsylvania Health Care Cost Containment Council (PHC4), for the purpose of reporting divided the counties in Pennsylvania into nine regions (Map 2). Region 9 representing Philadelphia accounts for 34.6 percent (N=36,377) of all inpatient hospitalizations with asthma as the Primary Discharge Diagnosis from 2009 to 2013. Region 1 which consists of Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Washington and Westmoreland counties account for 19.8 percent (N=20,827) of all inpatient hospitalizations with asthma as the Primary Discharge Diagnosis from 2009 to 2013.

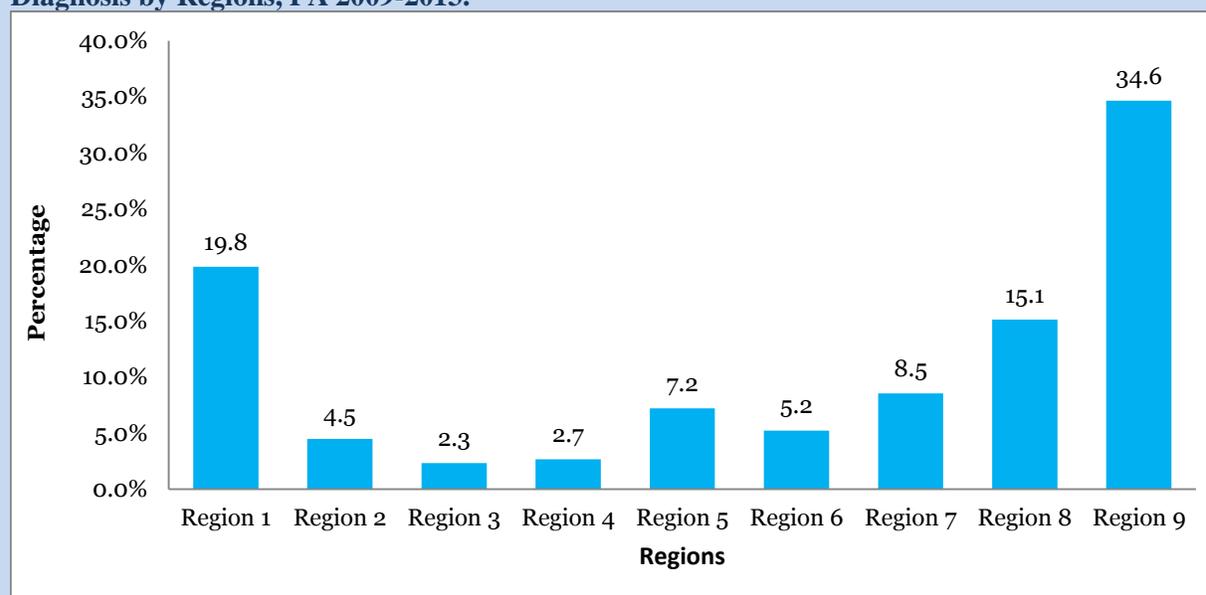
Region 8 which consists of Bucks, Chester, Delaware and, Montgomery counties make up 15.1 percent (N=15,881) of all inpatient hospitalizations with asthma as the primary discharge diagnosis from 2009 to 2013. Region 3 and 4 representing Bedford, Blair, Cambria, Indiana, Somerset, Centre, Clinton, Columbia, Lycoming, Mifflin, Montour, Northumberland, Snyder, Tioga and Union had the lowest number of inpatient hospitalizations in the state of Pennsylvania during the period of 2009 to 2013(Figure 17, Table 6).

Map 2: Pennsylvania Counties by Regions



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Figure 17: Percentage of Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Regions, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

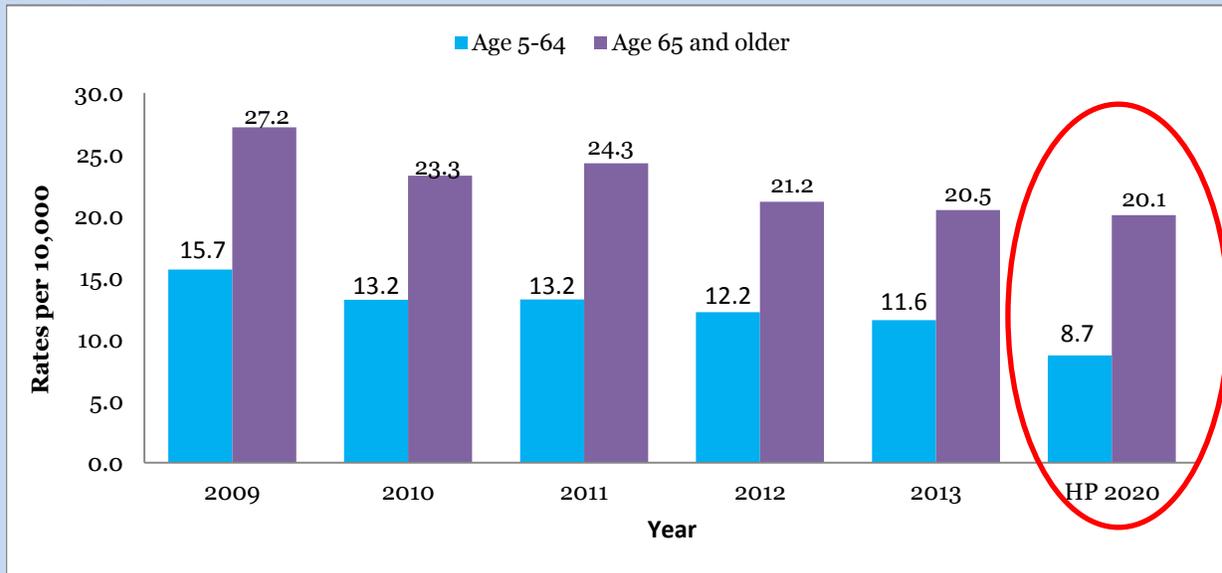
Table 6: Total Number of Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Regions, PA 2009-2013.

Regions	2009	2010	2011	2012	2013	Total
Region 1	4,848	4,574	4,350	3,697	3,358	20,827
Region 2	1,196	1,026	893	787	791	4,693
Region 3	576	496	479	443	434	2,428
Region 4	671	538	575	542	476	2,802
Region 5	1,794	1,366	1,487	1,409	1,508	7,564
Region 6	1,363	1,129	1,104	948	918	5,462
Region 7	1,980	1,774	1,870	1,711	1,638	8,973
Region 8	3,817	3,187	3,194	2,932	2,751	15,881
Region 9	8,213	6,971	7,458	7,170	6,565	36,377
Total	24,458	21,061	21,410	19,639	18,439	105,007

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

PENNSYLVANIA AND HEALTHY PEOPLE (HP) 2020 OBJECTIVES

Figure 19: Age-Adjusted Rate of Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Age-Group in Comparison to Healthy People (HP) 2020 Objectives, PA 2009-2013.



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Pennsylvania has yet to achieve the Healthy People (HP) 2020 objectives of inpatient hospitalization rates of 8.7/10,000 in ages 5 to 64. However, the rates have been decreasing in both groups from 2009 to 2013. In age-groups 5 to 64, the rates decreased from 15.7 per 10,000

in 2009 to 11.6 per 10,000 in 2013 while in age-group 65 and older, the rates decreased from 27.2 per 10,000 in 2009 to 20.1 per 10,000 in 2013. This rate in ages 65 and older is close to the 2020 HP objectives of 20.5 per 10,000.



CONCLUSION

One of the goals of effective asthma management and control is to reduce the number of inpatient hospitalizations due to asthma. In Pennsylvania the total annual hospitalizations with asthma as the primary diagnosis has been decreasing. However, disparities do exist as females, Blacks and Hispanics are disproportionately affected. The Pennsylvania State Asthma Strategic Plan identifies disparities as a priority issue and it continues to focus its efforts in reducing these disparities in counties that have been disproportionately affected by asthma.

Asthma hospitalizations continue to serve as a marker for how effective asthma management and control measures are.

Fortunately, asthma inpatient hospitalizations have decreased over the period of five years from 19.2 per 10,000 residents in 2009 to 14.2 per 10,000 residents in 2013.

In Pennsylvania we will continue to ensure that we achieve better asthma management outcomes which will directly reduce the cost of care of persons with asthma.



TECHNICAL NOTE

Interpreting Emergency Room admissions

PHC4 provides hospitalization data and not Emergency Department visits. In this report, emergency room admission is a type of admission. This should not be confused with Emergency Department visits.

Approximately 4% of these records during 2009-2013 do not have emergency services revenue codes in PHC4's database. Of these, some were transferred into the hospital from another health care facility. Furthermore, approximately 14% of records coded with an 'urgent' priority (type) of admission have emergency services revenue codes reported. Thus, exercise caution in the interpretation of these data on page 18, Figure 12 and 13 of this report.

APPENDIX

Table 1: Pennsylvania Health Districts

SOUTHWEST	SOUTHCENTRAL	SOUTHEAST	NORTHWEST	NORTHCENTRAL	NORTHEAST
Allegheny	Adams	Berks	Cameron	Bradford	Carbon
Armstrong	Bedford	Bucks	Clarion	Centre	Lackawanna
Beaver	Blair	Chester	Clearfield	Clinton	Lehigh
Butler	Cumberland	Delaware	Crawford	Columbia	Luzerne
Cambria	Dauphin	Lancaster	Elk	Lycoming	Monroe
Fayette	Franklin	Montgomery	Erie	Montour	Northampton
Greene	Fulton	Philadelphia	Forest	Northumberland	Pike
Indiana	Huntingdon	Schuylkill	Jefferson	Potter	Susquehanna
Somerset	Juniata		Lawrence	Snyder	Wayne
Washington	Lebanon		McKean	Sullivan	Wyoming
Westmoreland	Mifflin		Mercer	Tioga	
	Perry		Venango	Union	
	York		Warren		

Table 2: Age-Adjusted Rates of Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by County, PA 2009-2013.

COUNTY	Rates per 10,000	COUNTY	Rates per 10,000
Adams	6.3	Lackawanna	13.1
Allegheny	19.1	Lancaster	8.2
Armstrong	11.7	Lawrence	23.0
Beaver	14.0	Lebanon	7.7
Bedford	6.7	Lehigh	14.0
Berks	15.9	Luzerne	13.5
Blair	7.5	Lycoming	7.3
Bradford	8.2	McKean	8.0
Bucks	12.2	Mercer	10.9
Butler	9.9	Mifflin	11.7
Cambria	11.2	Monroe	12.7
Cameron	12.0	Montgomery	11.9
Carbon	14.9	Montour	9.3
Centre	6.1	Northampton	14.9
Chester	7.7	Northumberland	8.3
Clarion	6.5	Perry	5.5
Clearfield	9.9	Philadelphia	46.7
Clinton	7.0	Pike	4.3
Columbia	13.1	Potter	6.7
Crawford	11.6	Schuylkill	12.7
Cumberland	6.9	Snyder	3.4
Dauphin	11.2	Somerset	7.9
Delaware	19.1	Sullivan	4.4
Elk	12.5	Susquehanna	9.7
Erie	6.5	Tioga	5.7
Fayette	19.7	Union	3.4
Forest	8.0	Venango	15.4
Franklin	5.8	Warren	5.3
Fulton	7.8	Washington	13.7
Greene	17.7	Wayne	7.7
Huntingdon	9.8	Westmoreland	18.0
Indiana	17.0	Wyoming	15.8
Jefferson	9.7	York	6.7
Juniata	7.1		

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Table 3: State of Pennsylvania Counties by Region

Region 1 	Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Washington, and Westmoreland
Region 2 	Cameron, Clarion, Clearfield, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Potter, Venango, and Warren
Region 3 	Bedford, Blair, Cambria, Indiana, and Somerset
Region 4 	Centre, Clinton, Columbia, Lycoming, Mifflin, Montour, Northumberland, Snyder, Tioga, and Union
Region 5 	Adams, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Perry, and York
Region 6 	Bradford, Lackawanna, Luzerne, Monroe, Pike, Sullivan, Susquehanna, Wayne, and Wyoming
Region 7 	Berks, Carbon, Lehigh, Northampton, and Schuylkill
Region 8 	Bucks, Chester, Delaware, and Montgomery
Region 9 	County of Philadelphia

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4)

Glossary of Terms:

Admission Types:

Emergency – the patient requires immediate medical intervention as a result of severe, life threatening asthma attack.

Urgent – the patient requires immediate attention for the care and treatment of asthma attack.

Elective – the patient’s condition permits adequate time to schedule the availability of suitable accommodation.

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 of “2000 U.S. Standard Million Population”.

Total Charges: The sum of the hospital charges (excluding professional fees) for an entire year.

Average Charges: The average sum of the hospital charges (excluding professional fees) for each hospitalization.

Average Length of Stay (LOS): The average number of days per hospitalization that patient stayed in the facility.

Inpatient Hospitalization Rate: Inpatient hospitalizations with asthma as the primary discharge diagnosis reflecting the number of admissions (not the number of patients) per 10,000 residents.

Primary Payer: The main source from which hospitals expect to receive payment for hospitalization charges.

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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