

2009 Data

Diabetes Hospitalization Report



Pennsylvania Health Care
Cost Containment Council
November 2011

The Pennsylvania Health Care Cost Containment Council (PHC4) was established as an independent state agency in 1986 and reauthorized most recently in 2009. To help improve the quality and restrain the cost of health care, PHC4 promotes health care competition through the collection, analysis, and public dissemination of cost and quality-related information.

Acknowledgement

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Key Findings

- The number of hospitalizations with the principal diagnosis of diabetes grew by 10.5 percent, from 21,842 in 2000 to 24,143 in 2009.
- In 2009, there were 19.2 hospital admissions for diabetes for every 10,000 Pennsylvania residents. This represents a 7.7 percent increase from the rate of 17.8 in 2000.
- Rates declined for the age 65 to 84 years category between 2000 and 2009 but increased for the 18 to 44 years and 45 to 64 years groups.
- Hospitalization rates for diabetes were consistently higher for black non-Hispanic residents compared to all other groups across all years studied from 2002 to 2009.
- About 1 in every 4½ patients (21.8 percent) hospitalized for diabetes in 2009 was readmitted at least once within a one year period for treatment of their diabetes.
- Pennsylvania's total Medicaid fee-for-service payments for the 1,663 diabetes hospitalizations with available payment data were almost \$9.8 million. These 1,663 hospitalizations represent 6.9% of all diabetes hospitalizations in 2009.
- Pennsylvania's total Medicare fee-for-service payments for the 6,950 diabetes hospitalizations with available payment data were over \$59 million. These 6,950 diabetes hospitalizations represent 28.8% of all diabetes hospitalizations in 2009.



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Introduction

Diabetes is estimated to affect 25.8 million people of all ages (8.3 percent of the U.S. population and 11.3 percent among those ages 20 years or older). Diabetes can lead to serious complications including heart disease and stroke and is the leading cause of kidney failure, non-traumatic lower limb amputations, and new cases of blindness among adults in the United States. It is the seventh leading cause of death in the United States. In 2007, diabetes accounted for an estimated \$116 billion in direct medical costs and \$58 billion in indirect costs, including those associated with disability, work loss, and premature mortality. Medical expenses for those with diabetes are more than two times higher than for those without diabetes.¹

In Pennsylvania, for the three-year summary period 2008-2010, nine percent of adults 18 years of age and older had been told by a doctor that they have diabetes, according to the Behavioral Risk Factor Surveillance Survey conducted by the Pennsylvania Department of Health.²

The number of adults with diabetes is expected to rise sharply in the future. The number of new diabetes cases a year will increase from 8 per 1,000 people in 2008 to 15 per 1,000 in 2050, predicts the Centers for Disease Control and Prevention. By 2050, between one-fifth and one-third of all adults could have diabetes.¹

While these figures may be alarming, studies have shown that people can delay or avoid developing type 2 diabetes by maintaining a healthy weight, increasing levels of physical activity, and following a diet low in fat and calories.³ Moreover, preventive care practices can be effective in reducing the incidence and

progression of diabetes-related complications, including controlling blood sugar and cholesterol levels and by having regular eye and foot examinations.

What is Diabetes?

Diabetes mellitus, more often referred to as diabetes, occurs when the pancreas does not make enough insulin or the body does not use the insulin properly, which results in high levels of blood glucose (also known as blood sugar).

Type 1 diabetes occurs when the pancreas does not make enough insulin or no insulin at all resulting in the need to take insulin injections daily. Type 1 diabetes typically affects children but onset can occur at any age. In adults, type 1 diabetes accounts for about 5 percent of all diagnosed cases of diabetes.

Type 2 diabetes occurs when the body does not use insulin properly. Type 2 diabetes can often be controlled through diet, exercise, and weight loss. If these lifestyle modifications fail to control blood glucose, oral medication or insulin injections may be required. Type 2 diabetes typically affects adults and is more common than type 1 diabetes, accounting for about 90 to 95 percent of all diagnosed cases of diabetes.

Pre-diabetes is a condition of higher-than-normal levels of blood sugar but not high enough for a diagnosis of diabetes. People with pre-diabetes are at an increased risk of developing type 2 diabetes, although a future diagnosis is not always inevitable. Over the years, studies have concluded that weight loss and increased physical activity among people with pre-diabetes may prevent or delay diabetes. An estimated 79 million Americans may have pre-diabetes.¹

1. Centers for Disease Control and Prevention. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011.

2. These data were provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions. http://app2.health.state.pa.us/epiqms/Asp/SelectParams_BRFSS_Tbl_State.asp. Accessed Oct 18 2011.

3. <http://diabetes.niddk.nih.gov/dm/pubs/preventionprogram/>. Accessed Oct 18 2011.

Hospital Admissions for Diabetes

Examining hospital admissions for diabetes is one way to observe the quality of care for those with diabetes, especially as it relates to primary care access or outpatient services. Timely diagnosis, effective outpatient care and appropriate disease management can potentially prevent the need for diabetes hospitalizations.

PHC4 is in a unique position to examine diabetes hospitalization rates through the inpatient data that it collects from Pennsylvania hospitals. The data in this report provides information about the number and rate of hospital admissions for people with diabetes, trends over the last decade, county-level admission rates, and more detailed data by patient age and race/ethnicity. Also included is information on Medicare and Medicaid payments for diabetes hospitalizations.

Table 1. Hospital Admissions for Diabetes, 2000-2009

Year	Number of Hospital Admissions	Hospital Days	
		Average Days	Total Days
2000	21,842	5.7	123,737
2001	22,526	5.7	127,892
2002	23,496	5.6	132,038
2003	23,614	5.7	133,915
2004	23,725	5.6	131,827
2005	23,791	5.5	130,829
2006	24,248	5.5	134,421
2007	24,646	5.4	132,256
2008	24,680	5.2	127,301
2009	24,143	5.1	122,496
Total	236,711	5.5	1,296,712

- The number of hospitalizations with the principal diagnosis of diabetes grew by 10.5 percent, from 21,842 in 2000 to 24,143 in 2009.
- The total number of hospitalizations in 2009 declined from the previous year when the total number was 24,680.
- In 2009, hospitalizations with the principal diagnosis of diabetes accounted for 122,496 hospitalization days, the lowest annual total days since 2000 despite an increase in the annual number of hospitalizations over that time.

Description of Study Population

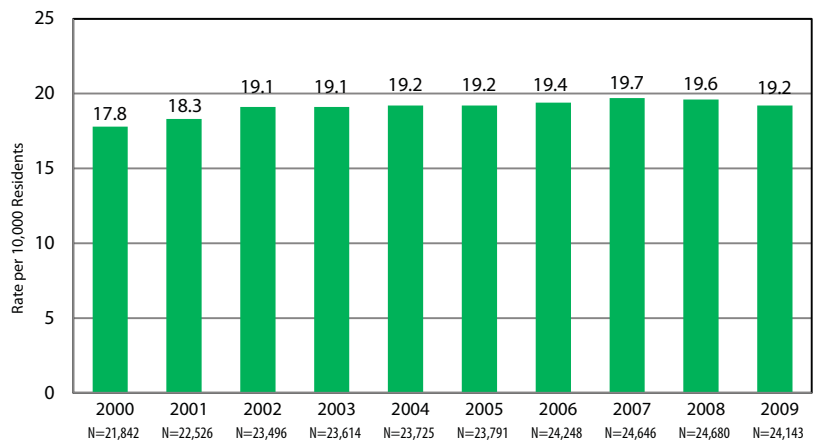
This report examines hospitalizations where the discharge occurred between January 1, 2000 and December 31, 2009. The analysis is based on PA residents who were admitted to any non-federal Pennsylvania hospital with the principal diagnosis of diabetes. Out-of-state residents hospitalized in PA were excluded, as were Pennsylvania residents hospitalized in another state. This analysis does not include data on patients treated in the physician's office or in an outpatient setting, or patients treated in the emergency department and then released.

Hospitalization rates for PA residents were calculated using PHC4 hospitalization data and U.S. Census population estimates for Pennsylvania, 2009 (Vintage 2009). U.S. rates were calculated using data from the Healthcare Cost and Utilization Project (HCUP), which is sponsored by the Agency for Healthcare Research and Quality (AHRQ), and U.S. Census population estimates for the United States, 2009 (Vintage 2009). Rates for a specific demographic only include residents for that demographic and are reported per 10,000 residents.

The following ICD.9.CM codes (International Classification of Diseases, Ninth Revision, Clinical Modification) were used to identify hospitalizations with the principal diagnosis of diabetes: 249.xy; where, x=0,1,2,3,4,5,6,7,8,9 and y=0,1 and 250.xy; where, x=0,1,2,3,4,5,6,7,8,9 and y=0,1,2,3.

The following ICD.9.CM codes were used to differentiate between type 1 and type 2 diabetes: 250.xy in which y=1,3 indicates type 1 diabetes and y=0,2 indicates type 2 diabetes.

Figure 1. Hospital Admission Rates for Diabetes, 2000-2009



- In 2009, there were 19.2 hospital admissions for diabetes for every 10,000 Pennsylvania residents. This represents a 7.7 percent increase from the rate of 17.8 in 2000.
- However, the 2009 hospitalization rate declined 2.7 percent from the highest rate of 19.7 in 2007.

Table 2. Hospital Admissions for Diabetes, by Age, 2009

Age Category	Hospital Admissions		
	Number	Percent	Rate*
<1	1	<0.1%	0.1
1-17	1,305	5.4%	5.0
18-44	5,778	23.9%	13.1
45-64	8,813	36.5%	25.4
65-84	6,821	28.3%	41.7
85+	1,425	5.9%	46.1
Total	24,143	100.0%	19.2

* Rate per 10,000 Residents

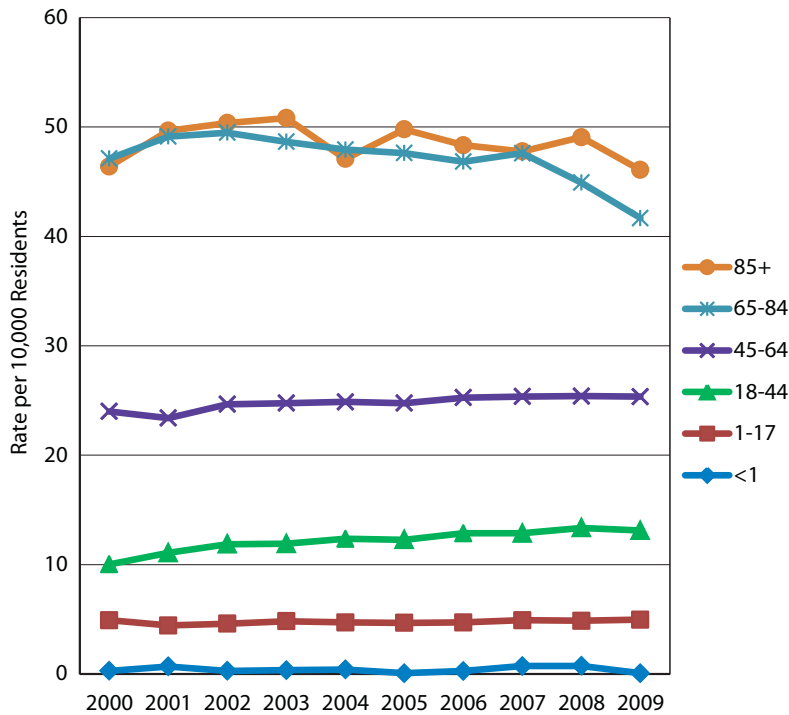
- In 2009, the hospitalization rate for diabetes increased by age, with the highest rate of 46.1 admissions for every 10,000 Pennsylvania residents occurring in the 85 years and older category, a rate more than 3½ times that of the youngest adult group (18 to 44 years) at 13.1.
- Patients age 45 to 64 years accounted for the highest percentage of diabetes hospitalizations at 36.5 percent.
- Patients under 65 years accounted for more than 65 percent (65.8%) of all diabetes hospitalizations.

The percent of U.S. residents with diabetes varies by age:¹

- 3.7 percent of 20-44 year olds
- 13.7 percent of 45-64 year olds
- 26.9 percent of those 65 or older

1. Centers for Disease Control and Prevention. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011.

Figure 2. Hospital Admission Rates for Diabetes, by Age, 2000-2009



- The diabetes hospitalization rate for the 85 years and older category varied between 2000 and 2009, increasing from 46.4 in 2000 to its highest rate of 50.8 in 2003 and then declining to its lowest rate of 46.1 in 2009.
- Rates declined for the age 65 to 84 years category between 2000 and 2009 but increased for the 18 to 44 years and 45 to 64 years groups.
- Rates were relatively stable across time for the youngest categories (<1 year and 1 to 17 years) in which net changes were minimal.

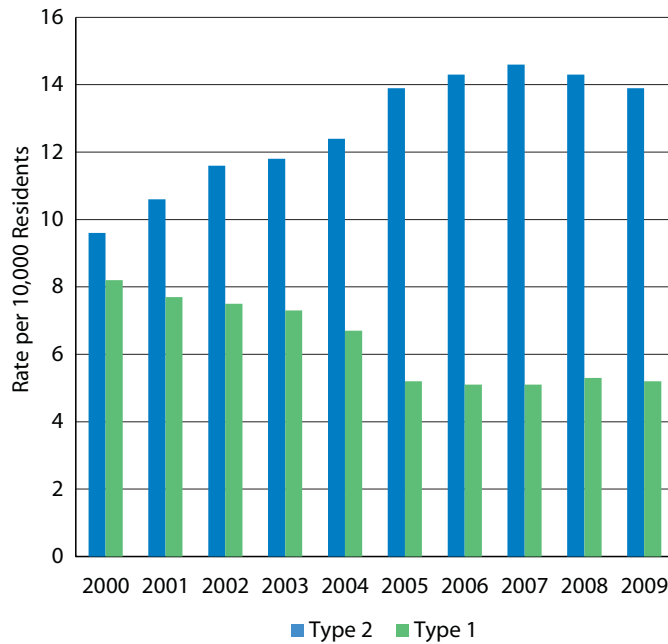
Table 3. Diabetes Hospitalization Rates,* Pennsylvania and United States, 2009

	PA	US
Total	19.2	17.7
By Age Group		
<1	0.1	0.2
1-17	5.0	3.9
18-44	13.1	13.8
45-64	25.4	25.4
65-84	41.7	39.7
85+	46.1	41.8
By Gender		
Male	20.8	18.9
Female	17.6	16.6

* Rate per 10,000 Residents

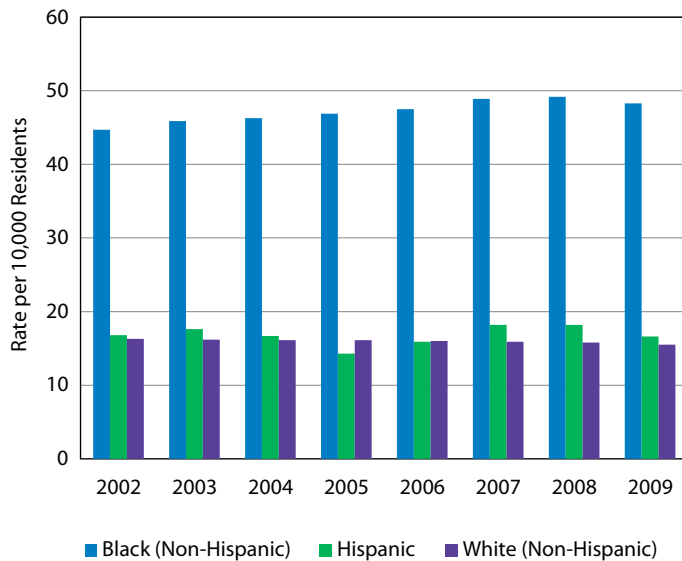
- Pennsylvania's total diabetes hospitalization rate in 2009 was higher than the total national rate.
- Pennsylvania's diabetes hospitalization rates were higher than the national rates for persons age 1 to 17, 65 to 84, and 85 and older.
- Diabetes hospitalization rates increased with age in Pennsylvania and the U.S.
- Diabetes hospitalization rates were higher among males than females in Pennsylvania and the U.S.

Figure 3. Hospital Admission Rates for Diabetes, by Type, 2000-2009



- The hospital admission rate for type 2 diabetes increased consistently, reaching its highest level of 14.6 hospitalizations per 10,000 residents in 2007, but then declined to 13.9 in 2009.
- The hospital admission rate for type 1 diabetes decreased consistently, reaching its lowest level of 5.1 hospitalizations per 10,000 residents in 2006/2007, but then increased slightly to 5.2 in 2009.
- The pattern of increasing hospital admission rates for type 2 diabetes and decreasing rates for type 1 diabetes across time is consistent with national trends (data not shown).

Figure 4. Hospital Admission Rates* for Diabetes, by Race/Ethnicity, 2002-2009



- In 2009, black non-Hispanic residents were hospitalized for diabetes at a rate of 48.3 per 10,000 in the population, more than three times the rate for white non-Hispanic residents at 15.5 per 10,000 people.
- Hospitalization rates for diabetes were consistently higher for black non-Hispanic residents compared to all other groups across all years studied from 2002 to 2009.

The percent of U.S. residents with diabetes varies by race and ethnicity:¹

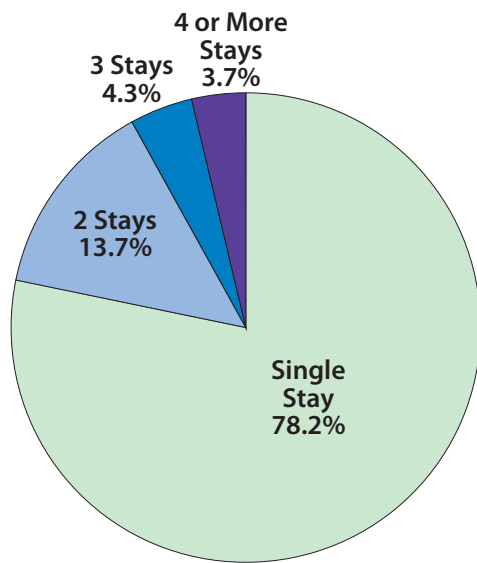
- 10.2 percent of white non-Hispanic residents ages 20 years or older
- 18.7 percent of black non-Hispanic residents ages 20 years or older

Note: The CDC notes that sufficient data to estimate diabetes prevalence for other racial/ethnic populations was not available.

* Internal PHC4 analysis suggests that Hispanic ethnicity may be slightly underreported. In addition, admission rates for 2000 and 2001 are not shown here since the coding of race/ethnicity changed in 2002.

1. Centers for Disease Control and Prevention. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011.

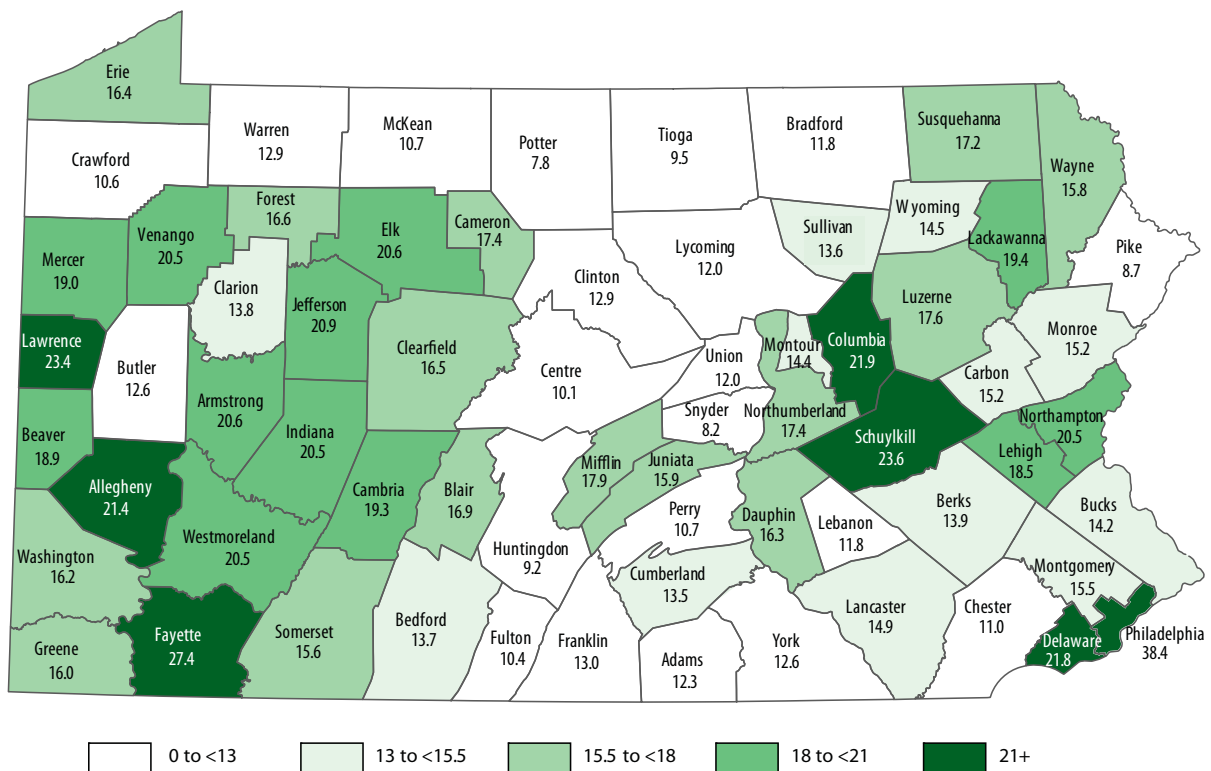
Figure 5. Multiple Hospitalizations for Patients with Diabetes, 2009



- About 1 in every 4½ patients (21.8 percent) hospitalized for diabetes in 2009 was readmitted at least once within a one year period for treatment of their diabetes.
- Within a one year period, 3.7 percent of patients hospitalized for diabetes had four or more separate stays for the treatment of their diabetes.

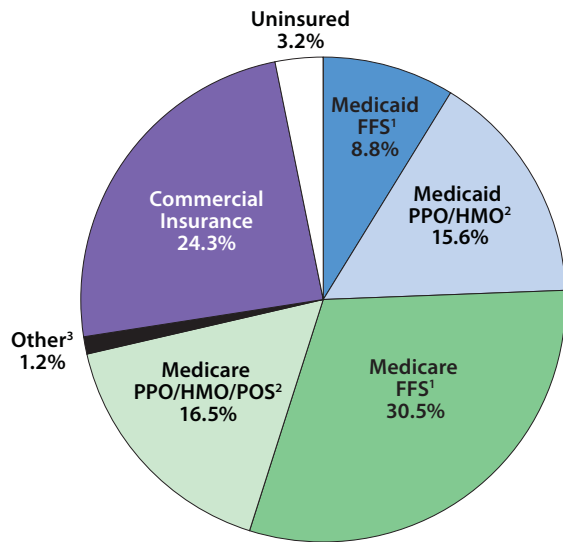
Figure 6. Hospital Admission Rates* for Diabetes, by County, 2009

- In 2009, the lowest rate of hospital admissions for diabetes was 7.8 hospitalizations per 10,000 residents in Potter County.
- Philadelphia County had the highest hospital admission rate in Pennsylvania at 38.4 per 10,000 residents.



* Per 10,000 residents. Rates are adjusted for age and sex differences among county populations. Sources: PHC4 2009 inpatient data and U.S. Census population estimates for 2009 (Vintage 2009).

Figure 7. Diabetes Hospitalizations by Payer, 2009



- In 2009, Medicare was the primary payer for 47.0% of diabetes hospitalizations as compared to 43.4% of all acute care hospitalizations (not limited to diabetes).
- Medicaid was the primary payer for 24.4% of diabetes hospitalizations as compared to 18.3% of all acute care hospitalizations (not limited to diabetes).
- Together, Medicare and Medicaid were the primary payers for 71.4 % of diabetes hospitalizations for Pennsylvanians in 2009.

1 FFS = Fee-for-Service

2 PPO = Preferred Provider Organization, HMO = Health Maintenance Organization, POS = Point-of-Service

3 Includes other government payers and hospitalizations where the payer was unknown or designation was invalid or missing.

Table 4. Diabetes Hospitalizations for Medicare and Medicaid Fee-for-Service (FFS) Patients, 2009

Primary Payer	Number of Hospital Admissions	Average Hospital Days	Payment	
			Average	Total
Medicaid FFS*	1,663	4.9	\$5,886	\$9,788,099
Medicare FFS**	6,950	5.9	\$8,496	\$59,050,661

* Medicaid FFS was assigned as the primary payer when the payment value was greater than the Medicare FFS payment (if present), when the payment was greater than zero, and when the payer (Medicaid) indicated the primary payer was Medicaid FFS. The Medicaid FFS numbers may include patients previously uninsured and without any structured plans to help manage their diabetes and therefore may require additional resources.

** Medicare FFS was assigned as the primary payer when the payment value was greater than the Medicaid FFS payment (if present), when the payment was greater than zero, and when the primary payer listed in the discharge record was Medicare FFS.

- In 2009, there were 2,122 diabetes hospitalizations for which Medicaid fee-for-service (FFS) was identified as the primary payer in the discharge record. The payment data in Table 4 is associated with the 1,663 hospital admissions for which PHC4 was able to match Medicaid FFS payment data.
- Similarly, there were 7,365 diabetes hospitalizations for which Medicare FFS was identified as the primary payer in the discharge record. The payment data in Table 4 is associated with the 6,950 hospital admissions for which PHC4 was able to match Medicare FFS payment data.
- Pennsylvania's total Medicaid FFS payments for the 1,663 diabetes hospitalizations were almost \$9.8 million. These hospitalizations, which represent 6.9% of all diabetes hospitalizations, include only a subset of the Medicaid FFS hospitalizations (those where payment data could be matched to PHC4 data).
- Pennsylvania's total Medicare FFS payments for the 6,950 diabetes hospitalizations were over \$59 million. These hospitalizations, which represent 28.8% of all diabetes hospitalizations, include only a subset of the Medicare FFS hospitalizations (those where payment data could be matched to PHC4 data).



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The information contained in this report and other PHC4 publications is available online at www.phc4.org. Additional financial, hospitalization and ambulatory procedure health care data is available for purchase. For more information, contact PHC4's Data Requests Unit at specialrequests@phc4.org or 717-232-6787.