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Lehigh Valley Business Coalition on Healthcare

Type 2 Diabetes Report | 2016

SANOFI

MANAGED CARE DIGEST SERIES®

4th Edition

Introduction

Sanofi U.S. (Sanofi) and the Lehigh Valley Business Coalition on Healthcare (LVBCH) are pleased to present the fourth edition of the *Type 2 Diabetes Report* for 2016, an overview of key demographic, financial, utilization, pharmacotherapy, and health outcomes measures for Type 2 diabetes patients in the Allentown (including Bethlehem and Easton), Harrisburg, (including Lebanon and Carlisle), Reading, and Scranton (including Wilkes-Barre and Hazleton) Metropolitan Statistical Areas. The report also provides IMS Health's state and national benchmarks, which help providers and employers identify better opportunities to serve the needs of their patients. All data are drawn from the Sanofi **Managed Care Digest Series®.**

The data in this report (current as of calendar year 2015) were gathered by IMS Health, Parsippany, NJ, a leading provider of innovative health care data products and analytic services. A review process takes place, before and during production of this report, between IMS Health and Forte Information Resources LLC.

Sanofi, as sponsor of this report, maintains an arm's-length relationship with the organizations that prepare the report and carry out the research for its contents. The desire of Sanofi is that the information in this report be completely independent and objective.

Methodology

IMS Health generated most of the Type 2 diabetes data for this report out of health care professional (837p) and institutional (837i) insurance claims, representing more than 9 million unique patients nationally in 2015 with a diagnosis of Type 2 diabetes (ICD-9 codes 249.00–250.92; ICD-10 codes E08, E09, E11, E13). Data from physicians of all specialties and from all hospital types are included.

IMS Health also gathers data on prescription activity from the National Council for Prescription Drug Programs (NCPDP). These data account for some 2 billion prescription claims annually, or more than 86% of the prescription universe. These prescription data represent the sampling of prescription activity from a variety of sources, including retail chains, mass merchandisers, and pharmacy benefit managers. Cash, Medicaid, and third-party transactions are tracked.

Hospital discharge data are derived from IMS Health's *Hospital Procedure/Diagnosis* (HPD) database. This database contains an extensive set of hospital inpatient and outpatient discharge records, including actual diagnoses and procedures data for about 75% of all discharges nationwide (including 100% of Medicare-reimbursed discharges).

IMS Health uses Medicare procedure counts and additional hospital-level information to estimate procedure counts for the remaining 25% of discharges—the non-Medicare hospital discharge information in non-reporting states. The HPD inpatient database also reports the numbers of procedures performed on patients discharged from a hospital. The hospital inpatient data provided are current as of calendar year 2014.

DATA INTEGRITY

Data arriving into IMS Health are put through a rigorous process to ensure that data elements match to valid references, such as product codes, ICD-9/10 (diagnosis) and CPT-4 (procedure) codes, and provider and facility data.

Claims undergo a careful de-duplication process to ensure that when multiple, voided, or adjusted claims are assigned to a patient encounter, they are applied to the database, but only for a single, unique patient.

Through its patient encryption methods, IMS Health creates a unique, random numerical identifier for every patient, and then strips away all patient-specific health information that is protected under the Health Insurance Portability and Accountability Act (HIPAA). The identifier allows IMS Health to track disease-specific diagnosis and procedure activity across the various settings where patient care is provided (hospital inpatient, hospital outpatient, emergency rooms, clinics, doctors' offices, and pharmacies), while protecting the privacy of each patient.

LVBCH Employer Members work together to bring value and innovation in the health care marketplace. For a list of organizations, please visit www.lvbch.com. The role of LVBCH is to help make these data more widely available to interested parties.

CONTENTS

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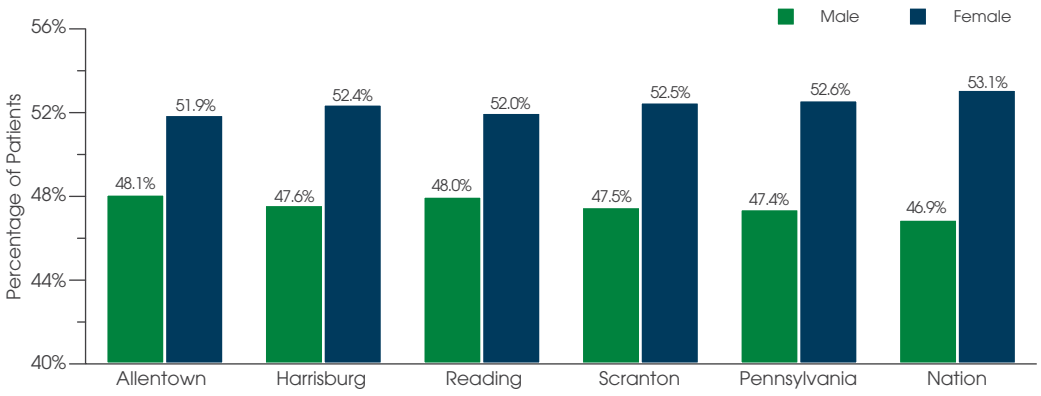
PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY AGE, 2014–2015

	0–17		18–35		36–64		65–79		80+	
MARKET	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Allentown	0.5%	1.3%	2.6%	2.6%	40.6%	41.6%	39.1%	38.4%	17.1%	16.2%
Harrisburg	0.7	1.6	2.1	2.5	39.4	39.8	40.8	40.8	17.0	15.4
Reading	0.3	0.4	2.4	2.5	41.6	42.2	38.5	38.4	17.2	16.5
Scranton	0.5	1.4	2.3	2.3	37.9	37.9	40.4	40.8	18.9	17.7
Pennsylvania	0.7	1.5	2.8	2.8	41.9	42.2	38.4	38.4	16.2	15.1
NATION	**0.5%**	**1.0%**	**2.9%**	**3.0%**	**45.1%**	**45.0%**	**38.4%**	**38.4%**	**13.2%**	**12.7%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY DIAGNOSING SPECIALIST, 2014–2015

	Primary Care[1]		Internal Medicine		Endocrinology		Cardiology	
MARKET	2014	2015	2014	2015	2014	2015	2014	2015
Allentown	22.2%	22.2%	19.2%	18.6%	2.6%	3.1%	4.1%	4.0%
Harrisburg	30.4	30.2	16.4	16.1	2.8	2.9	2.8	3.0
Reading	34.9	35.7	24.8	24.0	2.0	2.5	3.3	3.1
Scranton	28.3	26.8	21.3	20.8	6.6	5.7	3.0	3.1
Pennsylvania	28.3	28.3	21.4	21.3	5.8	5.6	4.3	4.3
NATION	**27.8%**	**27.8%**	**24.2%**	**23.7%**	**4.8%**	**4.7%**	**4.6%**	**4.5%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY GENDER, 2015



Data source: IMS Health © 2016

[1] "Primary care" consists of both general and family practitioners.

NOTE: Throughout this report, the Allentown market includes Bethlehem and Easton, the Harrisburg market includes Lebanon and Carlisle, and the Scranton market includes Wilkes-Barre and Hazleton. For a list of the counties included in each of the markets in this report, please visit http://www.census.gov/population/metro/

On all pages, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year. Unless otherwise noted, tables and graphs throughout this report represent data for all payer types.

PROPORTION OF TYPE 2 DIABETES PTS. AGED 36–64 RISES IN MOST PA MARKETS

From 2014 to 2015, the percentages of Type 2 diabetes patients aged 36 to 64 increased slightly in nearly all of the profiled Pennsylvania markets (Scranton excepted). In 2015, the share of such patients was highest, by profiled local market, in Reading (42.2%)—a portion that matched the corresponding mean for Pennsylvania overall.

TYPE 2 DIABETES PTS. ARE LESS APT TO BE DIAGNOSED BY PCPs IN ALLENTOWN, SCRANTON

Among the local profiled Pennsylvania markets in 2015, the percentage of Type 2 diabetes patients diagnosed by a primary care physician (PCP) was lowest in Allentown (22.2%). Type 2 diabetes patients in this market, along with Scranton (26.8%), were less likely to be diagnosed by a PCP than were such patients throughout the Commonwealth (28.3%) and the nation (27.8%) that year. Furthermore, the shares of such patients diagnosed by PCPs decreased in both Scranton (to 26.8% in 2015 from 28.3% in 2014) and Harrisburg (to 30.2% from 30.4%).

PATIENT DEMOGRAPHICS

SHARES OF COMMERCIALLY INSURED PENNSYLVANIA TYPE 2 DIABETES PTS. SHRINK

From 2013 to 2015, the percentages of commercially insured Type 2 diabetes patients declined in all of the profiled Pennsylvania markets, most notably in Harrisburg (4.9 percentage points). In 2015, this portion was lowest, by market, in Allentown (43.7%).

PA TYPE 2 DIABETES PATIENTS HAVE HIGH COMPLICATION, COMORBIDITY RATES

Pennsylvania Type 2 diabetes patients were more likely than those nationwide to have a complication of cardiovascular disease (49.1% versus 48.8%, respectively), retinopathy (18.8% versus 18.0%), hypoglycemia (9.9% versus 9.1%), or peripheral artery disease (PAD; 16.8% versus 15.0%) in 2015. That same year, Type 2 diabetes patients across the Commonwealth were more apt than their U.S. counterparts to have a comorbidity of congestive heart failure (13.2% versus 11.6%) or obesity (25.3% versus 19.5%).

[1] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

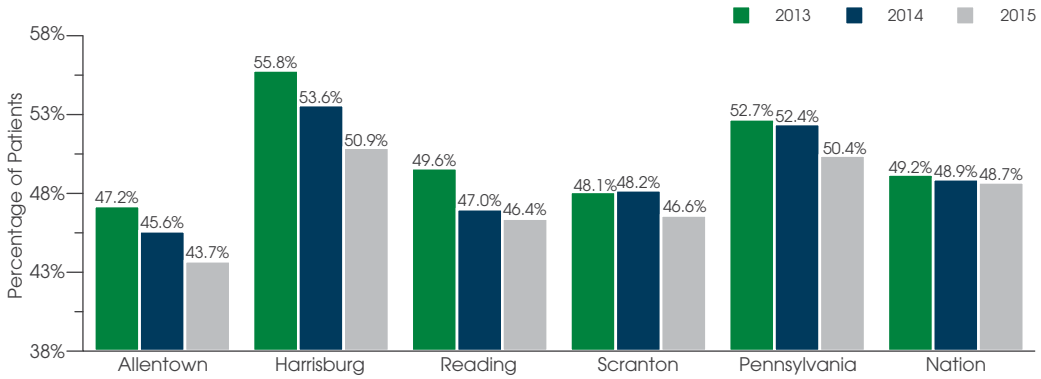
[2] A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, cardiovascular disease, hypoglycemia, nephropathy, neuropathy, peripheral artery disease (PAD), and retinopathy.

[3] A comorbidity is a condition a Type 2 diabetes patient may also have, which is not directly related to the diabetes. Comorbidities were narrowed down to a subset of conditions that are typically present in patients with Type 2 diabetes. Comorbidities of Type 2 diabetes may include, but are not limited to, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2014–2015

	Commercial Insurance[1]		Medicare		Medicaid	
MARKET	2014	2015	2014	2015	2014	2015
Allentown	45.6%	43.7%	43.9%	44.0%	10.5%	12.3%
Harrisburg	53.6	50.9	37.6	39.1	8.8	10.0
Reading	47.0	46.4	41.5	41.2	11.5	12.4
Scranton	48.2	46.6	44.7	44.9	7.1	8.6
Pennsylvania	52.4	50.4	35.2	35.8	12.5	13.3
NATION	**48.9%**	**48.7%**	**39.7%**	**38.5%**	**11.5%**	**12.7%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH COMMERCIAL INSURANCE, 2013–2015[1]



PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY TYPE OF COMPLICATION, 2015[2]

MARKET	Cardio-vascular Disease	Neuropathy	Nephropathy	Retinopathy	Hypo-glycemia	PAD
Allentown	45.6%	33.4%	24.6%	24.8%	6.9%	16.8%
Harrisburg	43.2	34.8	35.9	19.1	6.5	14.5
Reading	57.6	31.6	29.9	28.2	8.6	13.5
Scranton	47.9	31.9	23.2	29.9	5.3	20.5
Pennsylvania	49.1	36.1	32.4	18.8	9.9	16.8
NATION	**48.8%**	**36.3%**	**35.6%**	**18.0%**	**9.1%**	**15.0%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY TYPE OF COMORBIDITY, 2015[3]

MARKET	Hypertension	Hyperlipidemia	Congestive Heart Failure	Obesity	Dysmetabolic Syndrome
Allentown	73.4%	54.1%	11.9%	20.0%	0.6%
Harrisburg	77.8	51.4	13.0	18.9	0.5
Reading	81.7	67.4	11.6	26.7	1.5
Scranton	77.7	55.6	13.2	18.3	0.6
Pennsylvania	77.7	58.5	13.2	25.3	0.9
NATION	**79.4%**	**60.9%**	**11.6%**	**19.5%**	**0.7%**

Data source: IMS Health © 2016

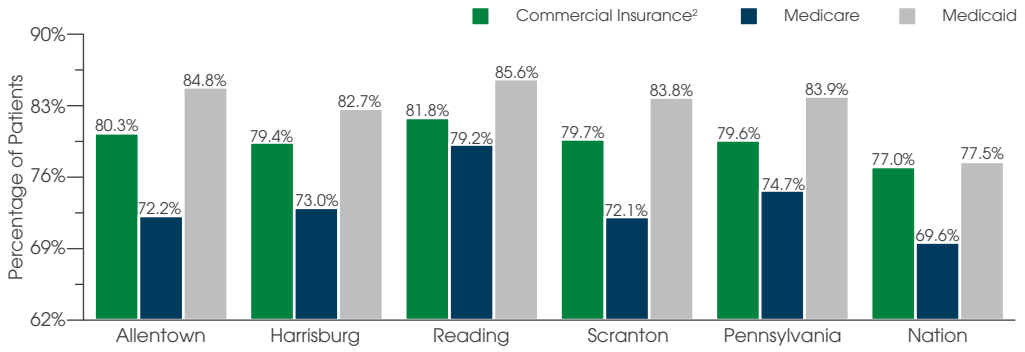
PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS SERVICES, BY PAYER, 2015

	A1c Test[1]			Blood Glucose Test			Serum Cholesterol Test			Eye Exam			Urine Glucose Test		
MARKET	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid
Allentown	80.3%	72.2%	84.8%	87.7%	87.8%	88.7%	86.8%	87.2%	87.2%	68.2%	73.4%	62.8%	85.4%	88.0%	86.5%
Harrisburg	79.4	73.0	82.7	87.5	88.8	88.6	86.5	87.1	85.8	68.9	72.4	60.5	85.8	87.4	86.7
Reading	81.8	79.2	85.6	86.1	88.3	89.3	85.1	86.5	85.3	74.7	83.9	62.2	85.9	86.6	87.6
Scranton	79.7	72.1	83.8	86.8	88.0	89.4	85.5	87.5	86.8	70.6	78.7	63.1	85.2	87.6	86.3
Pennsylvania	79.6	74.7	83.9	87.4	88.6	89.9	86.5	87.4	87.0	66.9	70.7	64.4	85.8	87.7	86.9
NATION	**77.0%**	**69.6%**	**77.5%**	**86.7%**	**86.4%**	**87.2%**	**84.4%**	**84.3%**	**83.9%**	**66.9%**	**73.5%**	**65.1%**	**82.9%**	**84.9%**	**83.3%**

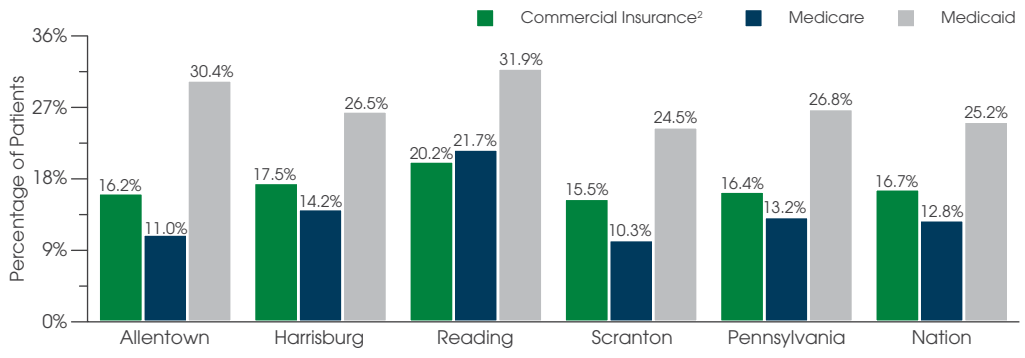
PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE: TOP-PERFORMING STATE, 2015

	A1c Test[1]	Blood Glucose Test	Serum Cholesterol Test	Eye Exam	Urine Glucose Test
TOP-PERFORMING STATE[3]	86.0%	93.6%	91.7%	79.1%	95.0%

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING A1c TESTS, BY PAYER, 2015[1]



PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH AN A1c LEVEL RANGE >9.0%, BY PAYER, 2015[1]



PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE: TOP-PERFORMING STATE, 2015[1]

	≤7.0%	7.1–7.9%	8.0–9.0%	>9.0%
TOP-PERFORMING STATE[3]	51.4%	25.5%	11.5%	11.6%

PA TYPE 2 DIABETES PATIENTS COVERED BY MEDICAID HAVE HIGH A1c TESTING RATES

In 2015, the percentage of Medicaid Type 2 diabetes patients in Pennsylvania who had an A1c test (83.9%) surpassed the corresponding shares of Medicare (74.7%) and commercially insured (79.6%) patients.

MEDICAID TYPE 2 DIABETES PTS. IN PA ARE MORE LIKELY TO HAVE ELEVATED A1c LEVELS

The share of Pennsylvania Type 2 diabetes patients with an A1c level of 9.0% or greater was higher for Medicaid recipients (26.8%) than it was for those covered by Medicare (13.2%) or commercial insurance (16.4%) in 2015. All three proportions exceeded that of the all-payer average for the top-performing state (11.6%).

[1] The A1c test measures the amount of glucose present in the blood during the past 2–3 months. Figures reflect the percentage of Type 2 diabetes patients who have had at least one A1c test in a given year.

[2] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

[3] The top-performing state represents the state with the highest percentage of Type 2 diabetes patients receiving a given service, and may vary by service.

Data source: IMS Health © 2016

IP AND OP CASE COUNTS FOR DIABETES MELLITUS IN PA SURPASS NATIONAL MEANS

In every profiled Pennsylvania market, the numbers of inpatient (IP) and outpatient (OP) diabetes mellitus cases notably exceeded the national averages in 2014. For example, such inpatient and outpatient case volumes in Harrisburg were 2,491.6 and 26,500.4, respectively, versus 1,212.8 and 6,333.4 nationwide.

IP DIABETES MELLITUS CHARGES IN PENNSYLVANIA TOP THE NATIONAL AVERAGE

With the exception of Harrisburg ($30,969), average charges per inpatient (IP) diabetes mellitus case were higher in every selected Pennsylvania market than they were nationwide ($43,935) in 2014. Additionally, these charges increased from 2013 in all the profiled markets, most notably in Allentown (to $72,428 in 2014 from $65,403) and Scranton (to $47,431 from $42,817). The average length of stay per inpatient diabetes mellitus case in Pennsylvania (4.5 days) also eclipsed that of the nation (4.2) in 2014.

[1] Data reflect the charges generated for diabetes patients by the facilities that delivered care. The data also reflect the average amounts charged, not the amounts paid.

NOTE: Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's Hospital Procedure/Diagnosis (HPD) database and are current as of calendar year 2014.

NUMBERS OF INPATIENT AND OUTPATIENT CASES PER HOSPITAL, DIABETES MELLITUS, 2013–2014

	Inpatient Cases		Outpatient Cases	
MARKET	2013	2014	2013	2014
Allentown	1,989.4	1,809.8	13,358.2	13,694.6
Harrisburg	3,376.0	2,491.6	27,731.6	26,500.4
Reading	2,560.7	2,517.0	20,778.3	17,658.3
Scranton	1,384.5	1,485.5	10,397.0	11,537.5
Pennsylvania	1,755.0	1,620.4	11,392.8	10,308.3
NATION	**1,245.5**	**1,212.8**	**6,435.5**	**6,333.4**

NUMBERS OF INPATIENT AND OUTPATIENT CASES PER HOSPITAL, DIABETES MELLITUS, MEDICARE VS. NON-MEDICARE, 2014

	Inpatient Cases		Outpatient Cases	
MARKET	Medicare	Non-Medicare	Medicare	Non-Medicare
Allentown	1,534.9	788.5	5,145.5	8,549.1
Harrisburg	2,604.6	1,850.6	9,095.4	17,405.0
Reading	1,083.5	592.5	8,273.0	9,385.3
Scranton	1,114.2	418.1	6,062.3	5,475.2
Pennsylvania	890.6	469.7	4,418.5	6,119.1
NATION	**578.8**	**385.2**	**3,334.9**	**3,270.6**

AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER INPATIENT CASE, DIABETES MELLITUS, 2013–2014

	Average Length of Stay (Days)		Average Charges[1]	
MARKET	2013	2014	2013	2014
Allentown	4.3	4.2	$65,403	$72,428
Harrisburg	4.3	4.7	30,833	30,969
Reading	5.3	5.1	42,413	46,455
Scranton	7.2	6.9	42,817	47,431
Pennsylvania	5.0	4.5	49,527	51,903
NATION	**4.2**	**4.2**	**$41,107**	**$43,935**

DISTRIBUTION OF OUTPATIENT DIABETES MELLITUS CASES BY SETTING, 2014

MARKET	Emergency Department	Ambulatory Surgery	All Other Outpatient
Allentown	18.5%	13.9%	67.6%
Harrisburg	15.3	16.8	67.8
Reading	23.0	6.4	70.6
Scranton	21.0	12.0	67.1
Pennsylvania	20.7	11.8	67.5
NATION	**28.6%**	**13.7%**	**57.7%**

Data source: IMS Health © 2016

PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY SETTING, 2014–2015[1]

	Ambulatory Surgery Center		Emergency Room		Hospital Inpatient		Hospital Outpatient		Office/ Clinic	
MARKET	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Allentown	$2,763	$2,710	$987	$1,169	$2,292	$2,099	$1,145	$1,192	$1,390	$1,346
Harrisburg	2,165	2,174	1,169	1,390	2,946	3,021	1,219	1,221	1,498	1,484
Reading	3,391	3,024	781	1,114	5,305	5,071	883	1,059	2,176	2,157
Scranton	3,574	3,491	1,171	1,212	2,768	2,345	976	839	1,651	1,580
Pennsylvania	2,725	2,638	1,059	1,283	3,317	3,120	1,144	1,129	1,704	1,676
NATION	**$3,143**	**$2,963**	**$1,280**	**$1,534**	**$3,433**	**$3,316**	**$1,299**	**$1,291**	**$2,203**	**$2,163**

PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER, 2014–2015[1]

	Commercial Insurance[2]		Medicare		Medicaid	
MARKET	2014	2015	2014	2015	2014	2015
Allentown	$2,891	$2,541	$1,579	$1,338	$1,952	$2,491
Harrisburg	2,483	2,906	2,461	2,175	2,437	3,050
Reading	3,980	4,659	5,038	4,498	4,872	4,133
Scranton	2,566	2,416	2,277	1,706	2,461	2,813
Pennsylvania	2,668	2,578	2,919	2,508	3,518	3,709
NATION	**$3,196**	**$3,078**	**$2,838**	**$2,627**	**$3,246**	**$3,322**

PROFESSIONAL INPATIENT CHARGES PER YEAR, TYPE 2 DIABETES PATIENTS OVERALL VS. TYPE 2 DIABETES PATIENTS WITH A COMPLICATION OF HYPOGLYCEMIA, 2015[1,3]

MARKET	Overall	With Hypoglycemia
Allentown	$2,099	$4,656
Harrisburg	3,021	6,137
Reading	5,071	9,041
Scranton	2,345	5,005
Pennsylvania	3,120	5,714
NATION	**$3,316**	**$5,927**

PROFESSIONAL INPATIENT CHARGES FOR TYPE 2 DIABETES PATIENTS, BY COMPLICATION, 2015[1]

MARKET	Cardiovascular Disease	Neuropathy	Nephropathy	Retinopathy	PAD
Allentown	$2,956	$3,367	$3,460	$2,292	$3,411
Harrisburg	4,108	4,656	4,357	4,232	5,148
Reading	6,086	7,159	7,316	5,610	7,612
Scranton	3,009	3,471	3,702	2,303	3,529
Pennsylvania	4,252	4,513	4,871	3,729	5,169
NATION	**$4,377**	**$4,773**	**$5,004**	**$4,069**	**$5,415**

Data source: IMS Health © 2016

ER PROVIDER CHARGES FOR TYPE 2 DIABETES PATIENTS CLIMB BY MORE THAN 20%

From 2014 ($1,059) to 2015 ($1,283), average annual professional charges for Pennsylvania Type 2 diabetes patients treated in emergency rooms (ERs) rose by 21.2%; such Pennsylvania charges fell in the other four profiled settings and were highest in the inpatient setting in 2015 ($3,120).

HYPOGLYCEMIA DX LEADS TO ELEVATED CHARGES AMONG IP TYPE 2 DIABETES PATIENTS

In every profiled market, average annual inpatient (IP) professional charges for Type 2 diabetes patients with a complication of hypoglycemia were notably higher than those for Type 2 diabetes patients overall in 2015. Furthermore, in Allentown, Harrisburg, and Scranton, these charges for Type 2 diabetes patients with hypoglycemia were more than double those for Type 2 diabetes patients overall. For example, in Harrisburg, charges were $6,137 for the former versus $3,021 the latter.

[1] Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.

[2] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

[3] A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, cardiovascular disease, hypoglycemia, nephropathy, neuropathy, PAD, and retinopathy.

PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS INSULIN THERAPIES, BY PAYER TYPE, 2015[1]

	Any Insulin Products			Long-Acting Insulin			Short-Acting Insulin			Rapid-Acting Insulin			Mixed Insulin		
MARKET	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid	Comm. Ins.[2]	Medi-care	Medi-caid
Allentown	30.0%	40.8%	53.7%	21.4%	31.9%	42.6%	17.3%	18.6%	31.1%	16.6%	17.8%	30.0%	2.5%	6.1%	6.1%
Harrisburg	30.9	38.8	55.2	24.0	31.6	44.7	17.0	21.7	36.9	16.5	20.9	35.3	2.4	4.2	5.8
Reading	27.6	36.9	52.7	20.6	29.0	42.9	17.4	21.6	34.6	16.8	20.9	34.3	2.1	5.1	8.3
Scranton	30.9	35.4	49.3	22.4	27.4	40.4	20.4	19.4	35.5	19.9	18.8	34.6	2.8	5.2	2.7
Pennsylvania	32.6	36.7	51.4	23.6	28.0	40.4	18.8	18.1	30.6	18.1	17.1	29.2	3.6	6.2	9.1
NATION	**30.6%**	**35.5%**	**47.0%**	**23.0%**	**27.5%**	**37.8%**	**16.8%**	**17.0%**	**28.0%**	**15.9%**	**15.7%**	**26.0%**	**2.9%**	**5.5%**	**6.3%**

MEDICARE, MEDICAID PA TYPE 2 DIABETES PATIENTS HAVE HIGH INSULIN FILL RATES

In 2015, Type 2 diabetes patients in each of the profiled Pennsylvania markets were more likely to fill a prescription for any insulin products if they were covered by Medicaid or Medicare than if they were commercially insured. For example, fill rates in Reading were 52.7% for Medicaid recipients, 36.9% for Medicare beneficiaries, and 27.6% for commercially insured patients.

PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS INSULIN THERAPIES, 2015[1]

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
MARKET		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Allentown	38.6%	23.8%	7.3%	12.5%	7.5%	12.5%	8.4%	2.9%	2.2%
Harrisburg	37.8	25.4	6.6	16.0	6.2	16.0	7.1	2.4	1.5
Reading	34.7	22.8	5.7	15.1	6.5	15.1	7.2	2.4	2.1
Scranton	34.3	18.8	8.9	12.5	8.9	12.5	9.7	2.5	1.7
Pennsylvania	36.6	21.7	7.8	13.1	6.8	13.1	7.8	3.3	2.6
NATION	**34.0%**	**19.1%**	**8.9%**	**10.7%**	**7.1%**	**10.7%**	**8.4%**	**2.3%**	**2.4%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, 2014–2015[1]

	Any Non-Insulin Antidiabetic Product		DPP-4 Inhibitors		GLP-1 Receptor Agonists		Insulin Sensitizing Agents		SGLT-2 Inhibitors		GLP-1 + Long-Acting Insulin	
MARKET	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Allentown	82.8%	83.8%	16.9%	16.2%	4.5%	5.3%	3.4%	3.1%	4.5%	8.2%	1.9%	1.9%
Harrisburg	83.0	83.4	13.3	13.6	4.7	5.3	4.4	4.5	4.5	6.9	1.8	1.9
Reading	83.1	83.5	13.9	14.2	3.3	3.5	3.9	3.3	5.7	8.6	0.8	1.0
Scranton	84.0	84.2	14.7	15.7	4.1	4.8	4.7	4.1	4.9	7.2	1.4	1.8
Pennsylvania	83.5	83.1	13.2	13.2	4.1	4.8	4.3	4.0	3.3	5.5	1.3	1.6
NATION	**85.1%**	**85.8%**	**12.4%**	**12.5%**	**5.5%**	**6.4%**	**5.1%**	**5.1%**	**4.1%**	**6.8%**	**1.7%**	**2.2%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS THERAPIES, BY PRESCRIBING SPECIALIST, 2015[1]

	Primary Care[3]		Internal Medicine		Endocrinology	
MARKET	Any Insulin Product	Any Non-Insulin Antidiabetic Product	Any Insulin Product	Any Non-Insulin Antidiabetic Product	Any Insulin Product	Any Non-Insulin Antidiabetic Product
Allentown	32.7%	84.3%	32.1%	83.9%	64.6%	63.2%
Harrisburg	33.1	83.8	35.4	79.8	65.8	59.9
Reading	29.4	85.7	31.3	80.8	64.5	52.6
Scranton	28.9	84.8	29.2	85.5	54.6	62.9
Pennsylvania	31.1	84.3	32.6	82.2	59.9	61.9
NATION	**28.7%**	**87.1%**	**30.7%**	**84.9%**	**58.1%**	**65.4%**

Data source: IMS Health © 2016

[1] Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.

[2] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

[3] "Primary care" consists of both general and family practitioners.

Dipeptidyl Peptidase 4 (DPP-4) Inhibitors
Inhibit DPP-4 enzymes and slow inactivation of incretin hormones, helping to regulate glucose homeostasis through increased insulin release and decreased glucagon levels.

GLP-1 Receptor Agonists
Used in conjunction with oral agents; increase glucose-dependent insulin secretion and pancreatic beta-cell sensitivity, reduce glucagon production, slow rate of absorption of glucose in the digestive tract by slowing gastric emptying, and suppress appetite.

Insulin Sensitizing Agents
Increase insulin sensitivity by improving response to insulin in liver, adipose tissue and skeletal muscle, resulting in decreased production of glucose by the liver and increased peripheral uptake and use of circulating glucose.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors
Lowers blood glucose concentration so that glucose is excreted instead of reabsorbed.

ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT USING VARIOUS INSULIN THERAPIES, BY PAYER TYPE, 2015[1,2]

	Any Insulin Products			Long-Acting Insulin			Short-Acting Insulin			Rapid-Acting Insulin			Mixed Insulin		
MARKET	Comm. Ins.[3]	Medi-care	Medi-caid	Comm. Ins.[3]	Medi-care	Medi-caid	Comm. Ins.[3]	Medi-care	Medi-caid	Comm. Ins.[3]	Medi-care	Medi-caid	Comm. Ins.[3]	Medi-care	Medi-caid
Allentown	$3,231	$3,668	$4,312	$2,320	$2,532	$2,665	$2,331	$2,430	$3,181	$2,255	$2,362	$3,185	$2,535	$3,576	$2,815
Harrisburg	3,166	4,041	3,860	2,156	2,772	2,406	2,315	2,463	2,415	2,281	2,429	2,460	2,593	3,258	2,468
Reading	3,348	3,577	4,057	2,014	2,303	2,230	2,581	2,229	2,647	2,554	2,242	2,640	2,209	2,891	3,122
Scranton	3,968	4,100	3,070	2,322	2,612	1,750	2,928	2,671	2,040	2,905	2,590	2,030	3,421	3,668	2,643
Pennsylvania	3,273	3,472	3,845	2,112	2,341	2,324	2,441	2,266	2,504	2,411	2,252	2,508	2,685	3,076	2,752
NATION	**$3,669**	**$3,486**	**$3,767**	**$2,491**	**$2,493**	**$2,412**	**$2,704**	**$2,205**	**$2,399**	**$2,681**	**$2,220**	**$2,411**	**$2,833**	**$2,836**	**$2,554**

ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT USING VARIOUS INSULIN THERAPIES, 2015[1]

	Long-Acting Insulin		Short-Acting Insulin		Rapid-Acting Insulin		Mixed Insulin	
MARKET	Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Allentown	$2,454	$2,538	$2,216	$2,865	$2,216	$2,774	$3,673	$2,740
Harrisburg	2,528	2,572	2,309	2,565	2,309	2,542	3,263	2,502
Reading	2,194	2,257	2,399	2,367	2,399	2,370	2,881	2,586
Scranton	2,473	2,633	2,597	3,145	2,597	3,078	3,881	3,550
Pennsylvania	2,247	2,285	2,288	2,459	2,288	2,458	3,446	2,299
NATION	**$2,440**	**$2,445**	**$2,290**	**$2,512**	**$2,290**	**$2,556**	**$3,372**	**$2,225**

INSULIN PAYMENTS FOR TYPE 2 DIABETES PTS. WITH COMM. INS. IN PA ARE BELOW U.S. MEAN

For commercially insured Type 2 diabetes patients in four of the five profiled Pennsylvania markets (Scranton excepted), average annual payments for any insulin products in 2015 were lower than those of their counterparts nationally.

ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT USING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, 2014–2015[1,2]

	Any Non-Insulin Antidiabetic Product		DPP-4 Inhibitors		GLP-1 Receptor Agonists		Insulin Sensitizing Agents		SGLT-2 Inhibitors		GLP-1 + Long-Acting Insulin	
MARKET	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Allentown	$1,021	$1,318	$2,077	$2,536	$2,884	$3,256	$452	$323	$1,273	$2,231	$1,995	$2,461
Harrisburg	848	1,016	2,163	2,396	2,737	3,115	521	256	1,394	2,237	1,984	2,457
Reading	869	1,127	2,050	2,444	2,695	3,151	499	266	1,369	2,383	1,845	2,052
Scranton	866	1,175	2,126	2,586	2,706	3,370	447	319	1,283	2,322	1,953	2,442
Pennsylvania	802	956	2,126	2,400	2,794	3,011	469	256	1,288	2,087	2,038	2,186
NATION	**$820**	**$1,048**	**$2,036**	**$2,387**	**$2,754**	**$3,227**	**$294**	**$164**	**$1,304**	**$2,165**	**$2,054**	**$2,430**

Data source: IMS Health © 2016

Dipeptidyl Peptidase 4 (DPP-4) Inhibitors
Inhibit DPP-4 enzymes and slow inactivation of incretin hormones, helping to regulate glucose homeostasis through increased insulin release and decreased glucagon levels.

GLP-1 Receptor Agonists
Used in conjunction with oral agents; increase glucose-dependent insulin secretion and pancreatic beta-cell sensitivity, reduce glucagon production, slow rate of absorption of glucose in the digestive tract by slowing gastric emptying, and suppress appetite.

Insulin Sensitizing Agents
Increase insulin sensitivity by improving response to insulin in liver, adipose tissue and skeletal muscle, resulting in decreased production of glucose by the liver and increased peripheral uptake and use of circulating glucose.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors
Lowers blood glucose concentration so that glucose is excreted instead of reabsorbed.

[1] Figures reflect the per-patient yearly payments for Type 2 diabetes patients receiving a particular type of therapy. Prescription costs are based on the total amount paid for each prescription (insurance + patient amounts paid).

[2] Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.

[3] Includes HMOs, PPOs, point-of-service plans and exclusive provider organizations.

PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS THERAPIES, 2014–2015

	Use of 1 Product		Use of 2 Products						Use of 3 Products					
	Use of 1 Non-Insulin Product		Use of 2 Non-Insulin Products		Use of 2 Products: 1 Insulin, 1 Non-Insulin		Use of 2 Insulin Products		Use of 3 Non-Insulin Products		Use of 3 Products: 1 Insulin, 2 Non-Insulins		Use of 3 Products: 2 Insulins, 1 Non-Insulin	
MARKET	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Allentown	37.6%	36.6%	17.5%	17.8%	6.8%	6.8%	7.6%	6.9%	6.4%	7.1%	6.3%	6.8%	7.3%	7.5%
Harrisburg	36.8	36.4	19.7	18.8	5.3	5.8	8.7	8.7	6.9	7.0	5.4	5.9	7.6	8.1
Reading	39.6	39.7	18.4	18.2	5.0	5.0	8.8	8.7	6.9	7.3	5.0	4.7	7.0	7.2
Scranton	37.7	36.7	19.2	19.5	4.4	4.3	8.1	7.9	8.8	9.5	5.2	5.6	7.4	7.3
Pennsylvania	38.5	38.5	18.9	18.0	5.7	5.9	8.0	8.1	6.8	6.8	5.5	5.6	6.9	7.0
NATION	**39.6%**	**39.4%**	**18.9%**	**18.7%**	**5.6%**	**5.5%**	**6.9%**	**6.6%**	**7.2%**	**7.8%**	**5.8%**	**6.1%**	**6.7%**	**6.8%**

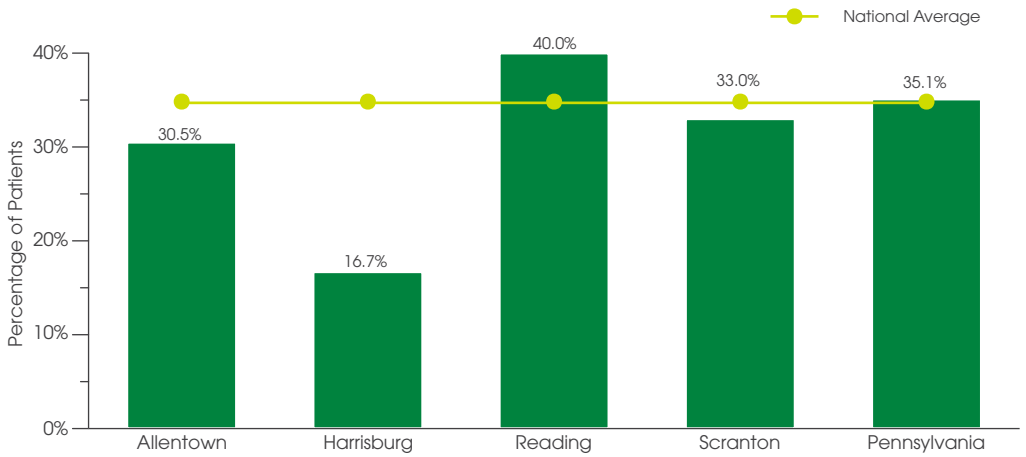
ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT USING VARIOUS THERAPIES, 2014–2015[1]

	Use of 1 Product		Use of 2 Products						Use of 3 Products					
	Use of 1 Non-Insulin Product		Use of 2 Non-Insulin Products		Use of 2 Products: 1 Insulin, 1 Non-Insulin		Use of 2 Insulin Products		Use of 3 Non-Insulin Products		Use of 3 Products: 1 Insulin, 2 Non-Insulins		Use of 3 Products: 2 Insulins, 1 Non-Insulin	
MARKET	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Allentown	$405	$520	$1,293	$1,538	$3,134	$3,500	$4,122	$4,917	$2,726	$3,515	$4,220	$5,298	$5,996	$7,147
Harrisburg	300	358	974	1,174	2,607	3,042	4,646	5,166	2,777	3,082	3,846	4,479	6,088	6,934
Reading	394	456	1,104	1,424	2,604	3,003	4,103	4,638	2,644	3,506	3,550	4,591	5,452	6,403
Scranton	283	360	976	1,279	2,786	3,493	4,387	5,643	2,569	3,400	3,826	4,733	5,537	7,190
Pennsylvania	288	331	966	1,141	2,661	2,898	4,224	4,780	2,598	3,119	3,682	4,337	5,412	6,407
NATION	**$292**	**$336**	**$977**	**$1,205**	**$2,595**	**$3,110**	**$4,099**	**$4,902**	**$2,568**	**$3,242**	**$3,782**	**$4,742**	**$5,333**	**$6,629**

USE OF THREE NON-INSULINS IS MORE COMMON IN PROFILED LOCAL PA MARKETS

In 2015, the percentages of Type 2 diabetes patients who filled prescriptions for three non-insulin products in Allentown (7.1%), Harrisburg (7.0%), Reading (7.3%), and Scranton (9.5%) all surpassed that of Pennsylvania (6.8%). Nationally, the share of such patients who received three non-insulin products was 7.8%.

PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH AN A1c LEVEL >9.0% USING ANY INSULIN PRODUCTS, COMMERCIAL INSURANCE, 2015[2,3,4]



Data source: IMS Health © 2016

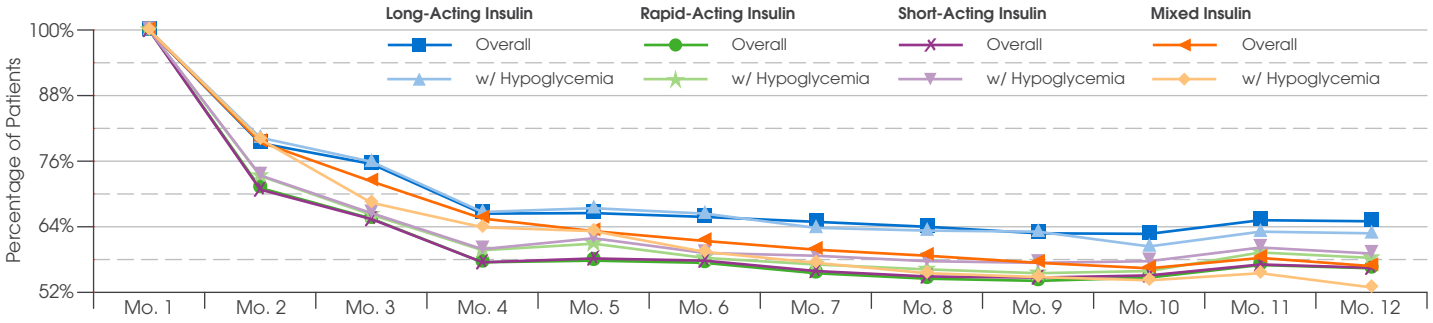
1 Figures reflect the per-patient yearly costs for Type 2 diabetes patients receiving a particular type of therapy.

2 The A1c test measures the amount of glucose present in the blood during the past 2–3 months. Figures reflect the percentage of Type 2 diabetes patients who have had at least one A1c test in a given year.

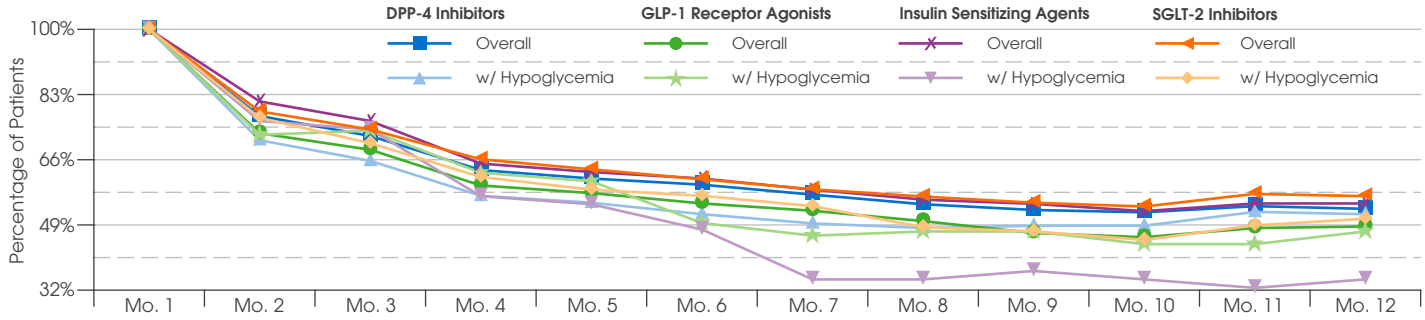
3 Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.

4 Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

PERSISTENCY: TYPE 2 DIABETES PATIENTS OVERALL VS. TYPE 2 DIABETES PATIENTS WITH HYPOGLYCEMIA, VARIOUS INSULIN THERAPIES, PENNSYLVANIA, 2015[1]



PERSISTENCY: TYPE 2 DIABETES PATIENTS OVERALL VS. TYPE 2 DIABETES PATIENTS WITH HYPOGLYCEMIA, VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, PENNSYLVANIA, 2015[1]



Emergency Department

EMERGENCY DEPARTMENT (ED) UTILIZATION FOR PATIENTS DIAGNOSED WITH TYPE 2 DIABETES, BY TYPE OF THERAPY, 2013–2015[2,3]

	Any Insulin Products		Three Non-Insulin Antidiabetic Products	
MARKET	Percentage of Unique Patients with at Least One ED Visit	ED Visits per Patient	Percentage of Unique Patients with at Least One ED Visit	ED Visits per Patient
Pennsylvania	16.8%	2.0	18.8%	2.1
Northeast Region	16.5	2.1	17.4	2.2
NATION	**18.3%**	**2.1**	**20.9%**	**2.2**

Readmissions

READMISSION RATES FOR PATIENTS DIAGNOSED WITH TYPE 2 DIABETES, BY TYPE OF THERAPY, 2013–2015[3,4]

	Three-Day Readmissions		30-Day Readmissions	
MARKET	Any Insulin Products	Three Non-Insulin Antidiabetic Products	Any Insulin Products	Three Non-Insulin Antidiabetic Products
Pennsylvania	7.7%	14.8%	18.0%	24.9%
Northeast Region	7.8	12.7	17.5	24.1
NATION	**8.9%**	**12.2%**	**18.2%**	**22.8%**

Data source: IMS Health © 2016

PA PERSISTENCY RATES ARE HIGHEST FOR LONG-ACTING INSULIN, SGLT-2 INHIBITORS

In 2015, Pennsylvania Type 2 diabetes patients who filled prescriptions for long-acting insulin were more likely to remain persistent with their medication at month 12 than similar patients dispensed rapid-acting, short-acting or mixed insulin. Of non-insulin antidiabetic products, month-12 persistency was highest for such patients dispensed SGLT-2 inhibitors.

[1] A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, cardiovascular disease, hypoglycemia, nephropathy, neuropathy, and retinopathy.

[2] Figures reflect the percentages of and the visits and charges for Type 2 diabetes patients who visited an emergency department in the three-year period between 2013 and 2015. These include patients who filled multiple prescriptions.

[3] Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.

[4] Figures reflect the percentages of Type 2 diabetes patients who were readmitted to an inpatient facility in the three-year period between 2013 and 2015. These percentages include patients who filled multiple prescriptions. Readmissions are not necessarily due to Type 2 diabetes.

NOTE: "Persistency" measures whether patients maintain their prescribed therapy. It is calculated by identifying patients who filled a prescription for the reported drug class in the four months prior to the reported year, and then tracking prescription fills for those same patients in each of the months in the current reported year. If patients fill a prescription in a month, they are reported among the patients who have continued or restarted on therapy. Continued means that the patient has filled the drug group in each of the preceding months. Restarted means that the patient did not fill in one or more of the preceding months. Continuing and restarting patients are reported together. All patients tracked are "new-to-brand," meaning they have not filled a prescription for their cohort product during the six months prior to initiation of therapy on that product.

SECONDARY DIAGNOSES & PROCEDURES

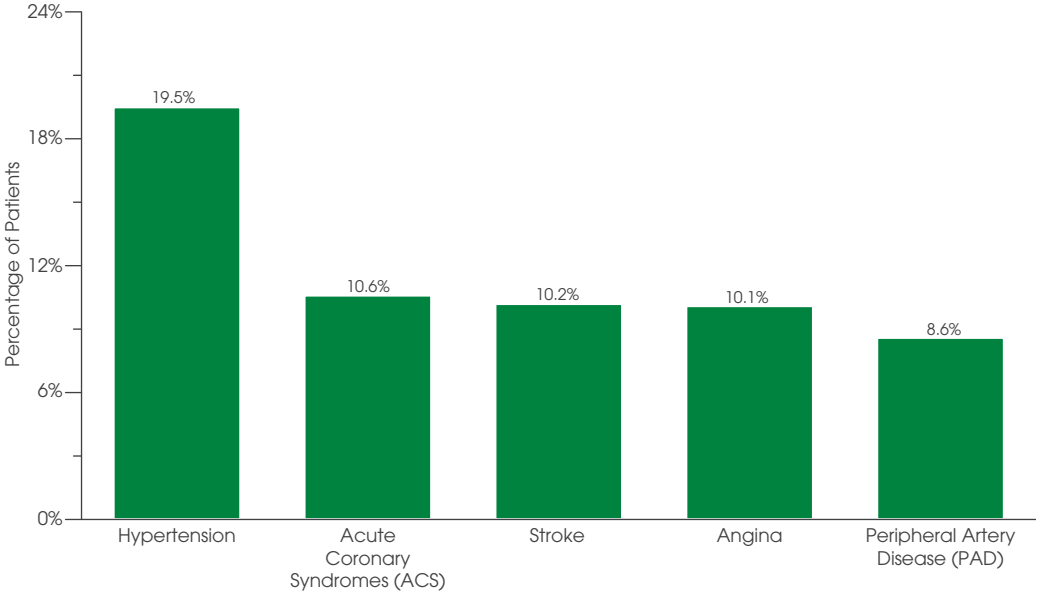
MORE THAN 10% OF PA ACS, STROKE INPATIENTS HAVE A SECONDARY DX OF DIABETES

More than 10% of Pennsylvania cardiovascular inpatients with a primary diagnosis of ACS (10.6%), stroke (10.2%), or angina (10.1%) also had a secondary diagnosis of diabetes mellitus in 2014. That year, the share of Pennsylvania hypertension inpatients with a secondary diagnosis of diabetes mellitus was even greater, at 19.5%.

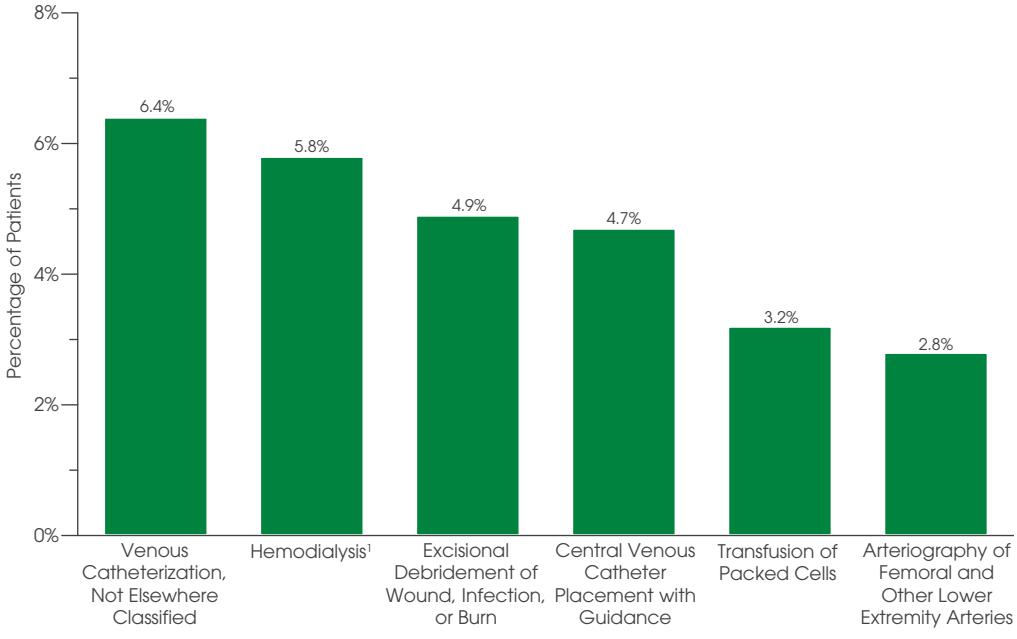
NEARLY 6% OF PENNSYLVANIA DIABETES MELLITUS INPATIENTS UNDERWENT HEMODIALYSIS

In 2014, 5.8% of Pennsylvania inpatients with a primary diagnosis of diabetes mellitus received hemodialysis. Of the other profiled common procedures for diabetes mellitus inpatients in Pennsylvania, 6.4% underwent venous catheterization not elsewhere classified, and 4.9% had excisional debridement of wound, infection, or burn.

PERCENTAGE OF INPATIENTS WITH A SECONDARY DIAGNOSIS OF DIABETES MELLITUS, BY FIVE PRIMARY CARDIOVASCULAR DIAGNOSES, PENNSYLVANIA, 2014



MOST COMMON PROCEDURES FOR PATIENTS WITH A PRIMARY DIAGNOSIS OF DIABETES MELLITUS, PENNSYLVANIA, 2014



Data source: IMS Health © 2016

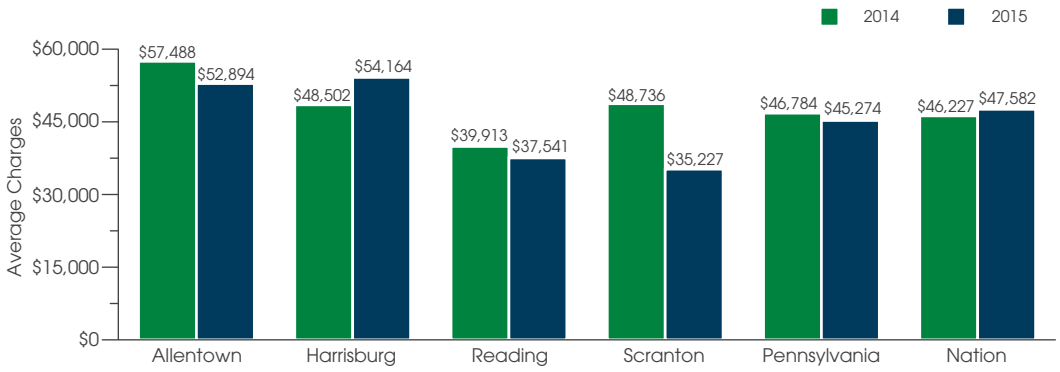
[1] Hemodialysis is a procedure for removing metabolic waste products or toxic substances from the bloodstream by dialysis.

NOTE: Secondary diagnoses and procedures data come from IMS Health's *Hospital Procedure/Diagnosis* (HPD) database and are current as of calendar year 2014.

INPATIENT FACILITY CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS WITH A COMPLICATION OF CARDIOVASCULAR DISEASE, 2014–2015[1,2]

MARKET	2014	2015
Allentown	$57,488	$52,894
Harrisburg	48,502	54,164
Reading	39,913	37,541
Scranton	48,736	35,227
Pennsylvania	46,784	45,274
NATION	**$46,227**	**$47,582**

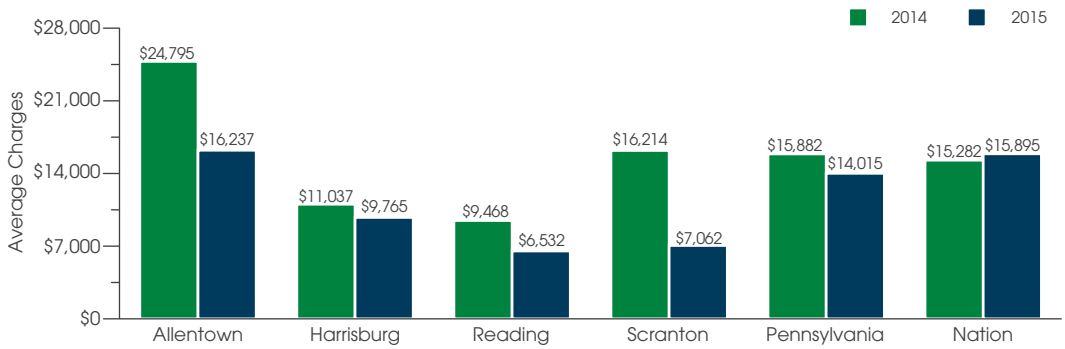
INPATIENT FACILITY CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS WITH A COMPLICATION OF CARDIOVASCULAR DISEASE, 2014–2015[1,2]



OUTPATIENT FACILITY CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS WITH A COMPLICATION OF CARDIOVASCULAR DISEASE, 2014–2015[1,2]

MARKET	2014	2015
Allentown	$24,795	$16,237
Harrisburg	11,037	9,765
Reading	9,468	6,532
Scranton	16,214	7,062
Pennsylvania	15,882	14,015
NATION	**$15,282**	**$15,895**

OUTPATIENT FACILITY CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS WITH A COMPLICATION OF CARDIOVASCULAR DISEASE, 2014–2015[1,2]



Data source: IMS Health © 2016

TYPE 2 DIABETES PTS. WITH CV DISEASE IN SOME PA MARKETS HAVE HIGH IP CHARGES

In 2015, Type 2 diabetes patients in Allentown and Harrisburg with a complication of cardiovascular disease resulting from their diabetes recorded higher average annual inpatient (IP) facility charges ($52,894 and $54,164, respectively) than did their counterparts across Pennsylvania ($45,274). Further, such charges in Allentown and Harrisburg were notably higher than those of similar patients in Reading and Scranton, and surpassed the national mean ($47,582).

CV DISEASE INFLUENCES OP CHARGES FOR ALLENTOWN TYPE 2 DIABETES PATIENTS

Allentown Type 2 diabetes patients who had a complication of cardiovascular disease had higher outpatient (OP) facility charges ($16,237) than their peers in Harrisburg ($9,765), Reading ($6,532), Scranton ($7,062), and across Pennsylvania ($14,015) in 2015.

[1] Data reflect the charges generated for Type 2 diabetes patients by the facilities that delivered care. The data also reflect the average amounts charged, not the amounts paid.

[2] A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, cardiovascular disease, hypoglycemia, nephropathy, neuropathy, peripheral artery disease (PAD), and retinopathy.

PA TYPE 2 DIABETES PTS. WITH CV DISEASE ARE LESS APT TO FILL ANY INSULIN PRODUCTS

In all profiled Pennsylvania markets, the percentages of Type 2 diabetes patients who were diagnosed with a complication of cardiovascular disease and filled a prescription for any insulin products were lower than those of their counterparts who were dispensed any non-insulin antidiabetic product. For example, across Pennsylvania, the shares of such patients were 42.5% and 79.6%, respectively.

IP CHARGES FOR TYPE 2 DIABETES PTS. WITH CV DXs ARE HIGH IN SELECT MARKETS

In 2015, inpatient (IP) facility charges for Type 2 diabetes patients with a co-occurring diagnosis of hyperlipidemia in Allentown ($42,978) and Reading ($42,235) surpassed those of Pennsylvania ($40,992), as did such charges in Allentown and Harrisburg for heart failure and hypertension.

[1] Figures reflect the charges generated by the facilities that delivered care. The data also reflect the amounts charged, not the amounts paid.

[2] A co-occurring condition is a diagnosis a Type 2 diabetes patient may also have, which may or may not be directly related to the diabetes. Such conditions were narrowed down to a subset of conditions which are typically present in patients with Type 2 diabetes. Co-occurring conditions of Type 2 diabetes include, but are not limited to, congestive heart failure, depression, hyperlipidemia, hypertension, obesity, hypoglycemia, and peripheral artery disease (PAD).

[3] A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, cardiovascular disease, hypoglycemia, nephropathy, neuropathy, peripheral artery disease (PAD), and retinopathy.

[4] Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.

NOTE: Some data were unavailable for the selected markets.

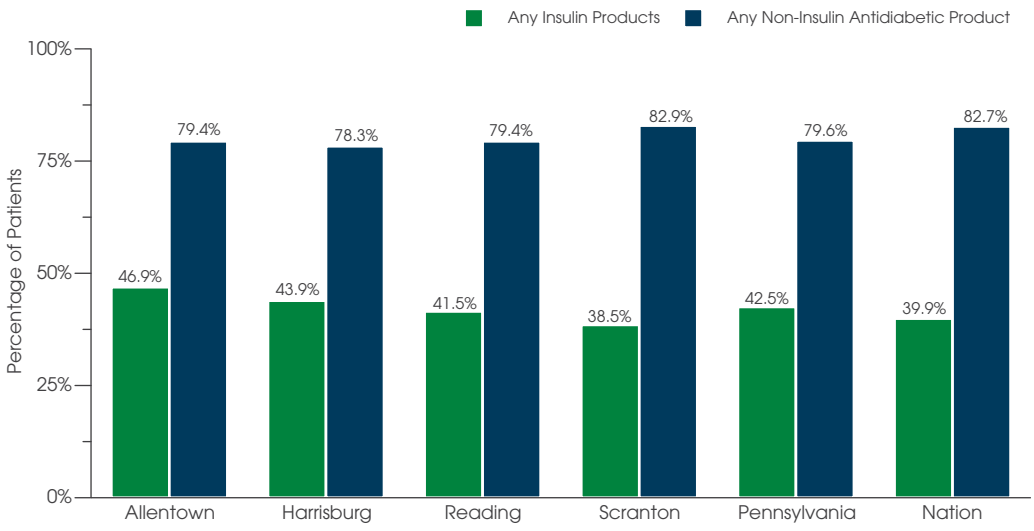
INPATIENT FACILITY CHARGES FOR TYPE 2 DIABETES PATIENTS WITH VARIOUS CO-OCCURRING CONDITIONS, 2015[1,2]

MARKET	Hypertension	Hyperlipidemia	Heart Failure	AMI	PAD
Allentown	$47,151	$42,978	$57,292	$53,021	$46,302
Harrisburg	45,525	—	54,552	—	—
Reading	35,003	42,235	—	—	—
Scranton	35,540	36,248	32,498	32,958	35,978
Pennsylvania	42,641	40,992	51,636	52,154	47,190
NATION	**$45,225**	**$43,269**	**$52,773**	**$53,961**	**$50,363**

OUTPATIENT FACILITY CHARGES FOR TYPE 2 DIABETES PATIENTS WITH VARIOUS CO-OCCURRING CONDITIONS, 2015[1,2]

MARKET	Hypertension	Hyperlipidemia	Heart Failure	AMI	PAD
Allentown	$13,582	$13,217	$15,851	$22,292	$15,420
Harrisburg	7,399	7,320	6,924	—	15,043
Reading	7,568	5,468	10,911	—	7,298
Scranton	6,150	6,095	6,778	13,411	6,574
Pennsylvania	11,522	10,287	15,775	19,998	13,445
NATION	**$13,115**	**$11,894**	**$17,116**	**$18,423**	**$16,998**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH A COMPLICATION OF CARDIOVASCULAR DISEASE, BY THERAPY, 2015[3,4]

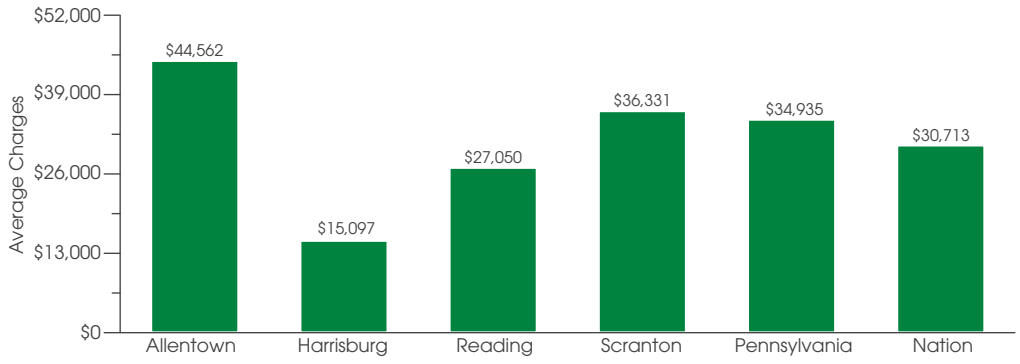


Data source: IMS Health © 2016

AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER INPATIENT ACUTE CORONARY SYNDROMES CASE, 2014

MARKET	Average Length of Stay	Average Charges[1]
Allentown	1.9	$44,562
Harrisburg	1.5	15,097
Reading	2.1	27,050
Scranton	1.8	36,331
Pennsylvania	2.2	34,935
NATION	**2.1**	**$30,713**

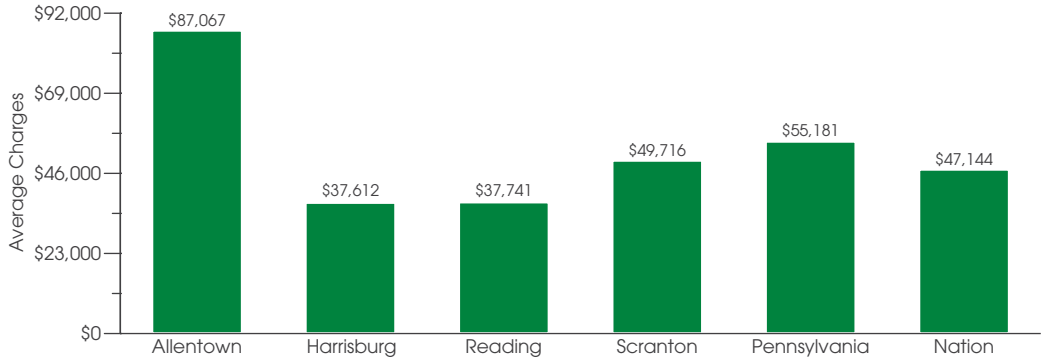
CHARGES PER INPATIENT ACUTE CORONARY SYNDROMES CASE, 2014[1]



AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER INPATIENT STROKE CASE, 2014

MARKET	Average Length of Stay	Average Charges[1]
Allentown	4.0	$87,067
Harrisburg	3.9	37,612
Reading	3.6	37,741
Scranton	5.6	49,716
Pennsylvania	4.0	55,181
NATION	**4.0**	**$47,144**

CHARGES PER INPATIENT STROKE CASE, 2014[1]



Data source: IMS Health © 2016

ALOS AND CHARGES ARE HIGHER IN PA FOR IP ACS CASES VERSUS NATION

In 2014, average length of stay (ALOS) and average inpatient (IP) charges per ACS case in Pennsylvania (2.2 days and $34,935, respectively) both exceeded the corresponding national averages (2.1 days and $30,713). Of local Pennsylvania markets profiled, such charges were highest in Allentown ($44,562) and Scranton ($36,331), even though ALOS for ACS inpatient cases were lower than the national mean in both markets.

CHARGES PER PENNSYLVANIA INPATIENT STROKE CASE SURPASS THOSE OF U.S.

Average charges per inpatient stroke case in Pennsylvania ($55,181) topped those of the nation ($47,144) in 2014. Such charges in Allentown ($87,067) notably surpassed those of the other profiled Pennsylvania markets, as well as the national benchmark—even though average length of stay (4.0 days) for such stroke cases was the same as the nation's. In Scranton ($49,716), these charges were lower than the Pennsylvania mean, but ALOS (5.6 days) was higher than that of any other profiled market.

[1] Charge data are per-case averages for inpatients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the hospital for the entire episode of care, and may include accommodation, pharmacy, laboratory, radiology, and other charges not billed by the physician. Data do not necessarily indicate final amounts paid.

NOTE: Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's *Hospital Procedure/Diagnosis* (HPD) database and are current as of end-of-year 2014.

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Adapted From the 2015 ADA/EASD Position Statement

Healthy eating, weight control, increased physical activity, and diabetes education

Monotherapy

Efficacy*
Hypo risk
Weight
Side effects
Costs*

Metformin
high
low risk
neutral/loss
GI/lactic acidosis
low

If A1C target not achieved after ~3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference—choice dependent on a variety of patient- and disease-specific factors):

Dual therapy†

Efficacy*
Hypo risk
Weight
Side effects
Costs*

Metformin + Sulfonylurea	Metformin + Thiazolidinedione	Metformin + DPP-4 Inhibitor	Metformin + SGLT2 Inhibitor	Metformin + GLP-1 Receptor Agonist	Metformin + Insulin (basal)
high	high	intermediate	intermediate	high	highest
moderate risk	low risk	low risk	low risk	low risk	high risk
gain	gain	neutral	loss	loss	gain
hypoglycemia	edema, HF, fxs	rare	GU, dehydration	GI	hypoglycemia
low	low	high	high	high	variable

If A1C target not achieved after ~3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference—choice dependent on a variety of patient- and disease-specific factors):

Triple therapy

Metformin + Sulfonylurea +	Metformin + Thiazolidinedione +	Metformin + DPP-4 Inhibitor +	Metformin + SGLT2 Inhibitor +	Metformin + GLP-1 Receptor Agonist +	Metformin + Insulin (basal) +
TZD	SU	SU	SU	SU	TZD
or DPP-4-i	or DPP-4-i	or TZD	or TZD	or TZD	or DPP-4-i
or SGLT2-i	or SGLT2-i	or SGLT2-i	or DPP-4-i	or Insulin§	or SGLT2-i
or GLP-1-RA	or GLP-1-RA	or Insulin§	or Insulin§		or GLP-1-RA
or Insulin§	or Insulin§				

If A1C target not achieved after ~3 months of triple therapy and patient (1) on oral combination, move to injectables; (2) on GLP-1-RA, add basal insulin; or (3) on optimally titrated basal insulin, add GLP-1-RA or mealtime insulin. In refractory patients consider adding TZD or SGLT2-i:

Combination injectable therapy‡

Metformin + Basal insulin + Mealtime insulin or GLP-1-RA

Antihyperglycemic therapy in Type 2 diabetes: general recommendations (see Reference). The order in the chart was determined by historical availability and the route of administration, with injectibles to the right; it is not meant to denote any specific preference. Potential sequences of antihyperglycemic therapy for patients with Type 2 diabetes are displayed, with the usual transition moving vertically from top to bottom (although horizontal movement within therapy stages is also possible, depending on the circumstances). DPP-4-i, DPP-4 inhibitor; fxs, fractures; GI, gastrointestinal; GLP-1-RA, GLP-1 receptor agonist; GU, genitourinary; HF, heart failure; Hypo, hypoglycemia; SGLT2-i, SGLT2 inhibitor; SU, sulfonylurea; TZD, thiazolidinedione. *See Reference for description of efficacy categorization. † Consider starting at this stage when A1C is ≥9%. ‡ Consider starting at this stage when blood glucose is ≥300–350 mg/dL (16.7–19.4 mmol/L) and/or A1C is ≥10–12%, especially if symptomatic or catabolic features are present, in which case basal insulin + mealtime insulin is the preferred initial regimen. § Usually a basal insulin (NPH, glargine, detemir, degludec). Adapted with permission from Inzucchi et al. (see Reference).

Reference: Inzucchi, S. E., et al. (2015). Management of Hyperglycemia in Type 2 Diabetes, 2015: A Patient-Centered Approach: Update to a Position Statement of the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetes Care. Retrieved from http://care.diabetesjournals.org/content/38/1/140.full.pdf+html

LVBCH TYPE 2 DIABETES REPORT 2016

The Lehigh Valley Business Coalition on Healthcare (LVBCH), in conjunction with Sanofi, is pleased to bring you the **LVBCH Type 2 Diabetes Report.**

The report features key national, state and local patient-level, Type 2 diabetes (and cardiovascular) data from the Sanofi **Managed Care Digest Series®**.

- Demographics
- Hospital and Professional Charges
- Persistency
- Utilization
- Pharmacotherapy

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