



Pittsburgh
Business Group
ON HEALTH

Pittsburgh Business Group on Health

TYPE 2 DIABETES REPORT | 2018

Featuring Demographic, Utilization, Charge, and Pharmacotherapy Data
With a Focus on Commercial Insurance Coverage



11th Edition

PBGH TYPE 2 DIABETES REPORT

INTRODUCTION

Sanofi U.S. (Sanofi) and the Pittsburgh Business Group on Health (PBGH) are pleased to present the 11th edition of the *Type 2 Diabetes Report* for 2018, an overview of key demographic, utilization, charge, pharmacotherapy, and health outcome measures for Type 2 diabetes patients in Pittsburgh and western Pennsylvania (Erie and Johnstown), as well as parts of Ohio (Youngstown) and West Virginia (Wheeling). The report also provides supplemental data on patients with cardiovascular conditions as well as IQVIA's state and national benchmarks, which help providers and employers better identify opportunities to serve the needs of their patients. All data are drawn from the Sanofi **Managed Care Digest Series®**.

NOTE: Throughout this report, commercial coverage includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

Most of the data in this report (current as of calendar year 2017) were gathered by IQVIA, Durham, NC, 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 IQVIA 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.

PBGH EMPLOYER MEMBERS

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Carnegie Mellon University	Electronics for Imaging	Matthews International Corporation	Spang & Company	
Carpenter Technology Corporation	Ellwood Group, Inc.	Michael Baker International	The Board of Pensions of the Presbyterian Church (USA)	
City of Pittsburgh	EQT Corporation	Microbac Laboratories Inc.	The Hillman Company	

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PATIENT DEMOGRAPHICS

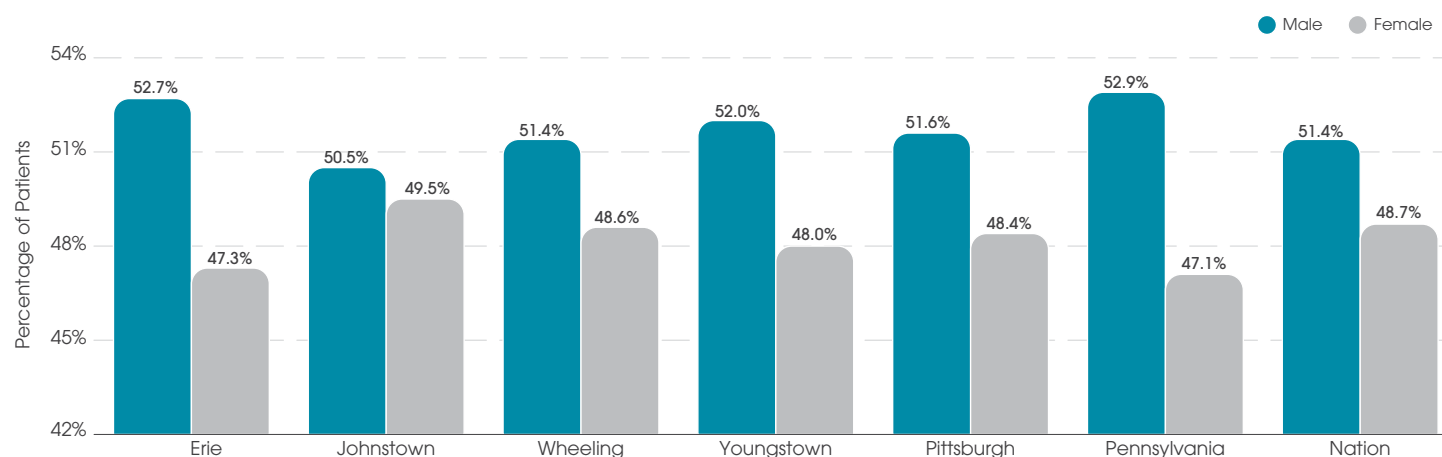
DISTRIBUTION OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY AGE, 2016-2017

MARKET	0-17		18-35		36-64		65-79		80+	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Erie	0.4%	0.5%	2.4%	2.7%	39.9%	42.3%	40.6%	39.8%	16.6%	14.7%
Johnstown	n/a	0.2	1.5	1.4	32.0	35.1	42.2	42.1	24.2	21.2
Wheeling	0.2	n/a	1.5	1.8	34.8	38.2	46.0	45.0	17.5	14.9
Youngstown	0.2	0.2	1.8	2.0	38.0	41.6	41.4	40.1	18.6	16.1
Pittsburgh	0.2	0.2	1.8	1.8	36.8	38.6	41.9	41.5	19.3	18.0
Pennsylvania	0.6	0.5	2.7	2.6	41.6	43.5	38.4	37.8	16.7	15.6
NATION	0.4%	0.4%	2.6%	2.7%	46.7%	48.7%	38.0%	36.8%	12.4%	11.4%

AGE 36-64 SHARE OF TYPE 2 DIABETES PATIENTS RISES ACROSS PENNSYLVANIA

From 2016 to 2017, the share of commercially insured Type 2 diabetes patients between the ages of 36 and 64 edged up, but remained below that of the nation. Correspondingly, the 65-and-over portion of these patients in Pennsylvania declined, but still exceeded the U.S. benchmark in 2017.

DISTRIBUTION OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY GENDER, 2017



PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY DIAGNOSING SPECIALIST, 2016-2017

MARKET	Cardiology		Endocrinology		Internal Medicine		Primary Care ¹	
	2016	2017	2016	2017	2016	2017	2016	2017
Erie	8.9%	8.6%	8.0%	7.4%	12.1%	11.4%	31.0%	30.7%
Johnstown	6.5	5.8	1.1	1.2	18.4	16.5	38.3	40.7
Wheeling	7.2	6.5	2.1	2.2	17.0	16.7	41.3	40.1
Youngstown	1.9	1.7	2.6	2.3	23.3	22.9	24.2	25.0
Pittsburgh	5.2	5.0	5.7	5.4	22.1	22.0	30.5	30.4
Pennsylvania	4.5	4.4	5.0	4.8	20.3	20.3	31.3	31.2
NATION	4.0%	3.9%	4.2%	4.0%	23.0%	22.4%	29.6%	29.4%

Data source: IQVIA © 2018

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

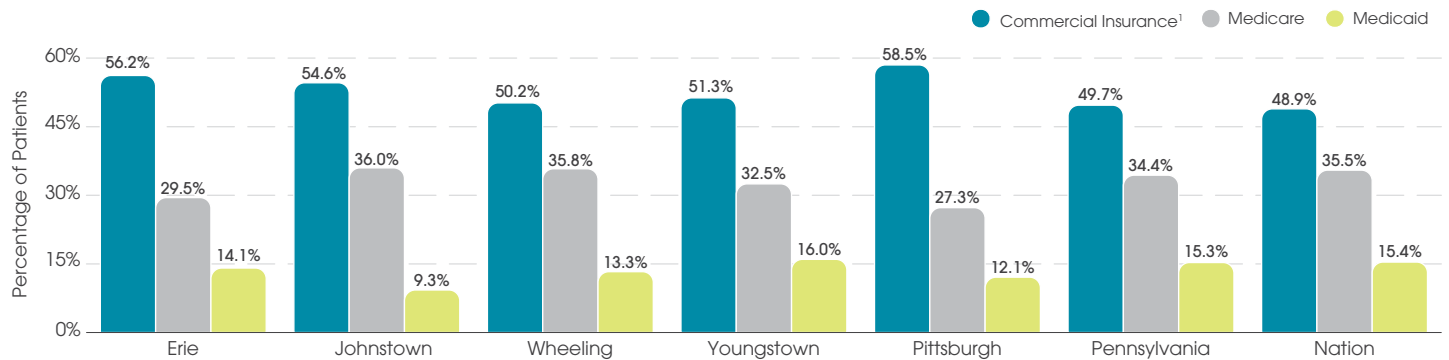
NOTE: Throughout this report, the Youngstown, OH, market includes Warren and Boardman, and parts of Pennsylvania; the Wheeling, WV, market includes parts of Ohio. An n/a indicates that data were not available.

PATIENT DEMOGRAPHICS

PERCENTAGES OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2016-2017

MARKET	Commercial Insurance ¹		Medicare		Medicaid	
	2016	2017	2016	2017	2016	2017
Erie	55.1%	56.2%	31.9%	29.5%	12.7%	14.1%
Johnstown	54.8	54.6	36.5	36.0	8.6	9.3
Wheeling	51.8	50.2	36.4	35.8	11.7	13.3
Youngstown	51.2	51.3	33.3	32.5	15.1	16.0
Pittsburgh	58.3	58.5	27.2	27.3	12.3	12.1
Pennsylvania	50.4	49.7	34.2	34.4	14.8	15.3
NATION	50.0%	48.9%	35.7%	35.5%	14.2%	15.4%

PERCENTAGES OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2017



DISTRIBUTION OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY NUMBER OF COMPLICATIONS, 2016-2017²

MARKET	0		1		2		>2	
	2016	2017	2016	2017	2016	2017	2016	2017
Erie	33.7%	32.4%	25.0%	25.9%	16.9%	16.6%	24.4%	25.1%
Johnstown	29.1	27.3	20.8	21.4	18.0	16.4	32.1	34.8
Wheeling	34.1	34.6	21.6	21.8	15.7	14.2	28.6	29.4
Youngstown	34.7	35.1	27.0	26.8	15.1	15.5	23.3	22.6
Pittsburgh	34.8	34.2	25.5	25.5	15.0	14.9	24.7	25.4
Pennsylvania	38.0	37.0	24.6	25.0	14.4	14.5	23.0	23.5
NATION	39.6%	38.9%	25.1%	25.3%	14.0%	14.0%	21.4%	21.8%

DISTRIBUTION OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY NUMBER OF COMORBIDITIES, 2016-2017³

MARKET	0		1		2		>2	
	2016	2017	2016	2017	2016	2017	2016	2017
Erie	32.9%	31.1%	24.2%	23.8%	27.7%	29.1%	15.2%	16.1%
Johnstown	18.4	17.8	23.3	22.6	40.2	38.6	18.2	21.0
Wheeling	14.8	16.7	23.4	22.0	41.7	39.5	20.1	21.7
Youngstown	27.4	26.6	28.7	29.9	32.3	31.9	11.6	11.6
Pittsburgh	27.8	28.1	22.6	22.6	30.1	29.0	19.5	20.3
Pennsylvania	26.2	26.7	23.6	23.5	33.6	32.1	16.6	17.7
NATION	22.1%	22.8%	25.8%	25.9%	36.8%	35.5%	15.3%	15.8%

Data source: IQVIA © 2018

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, atherosclerotic cardiovascular disease (ASCVD; includes patients with ACS, MI, stroke, and other cardiovascular conditions), cardiovascular (CV) disease, nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, severe hypoglycemia, and stroke.

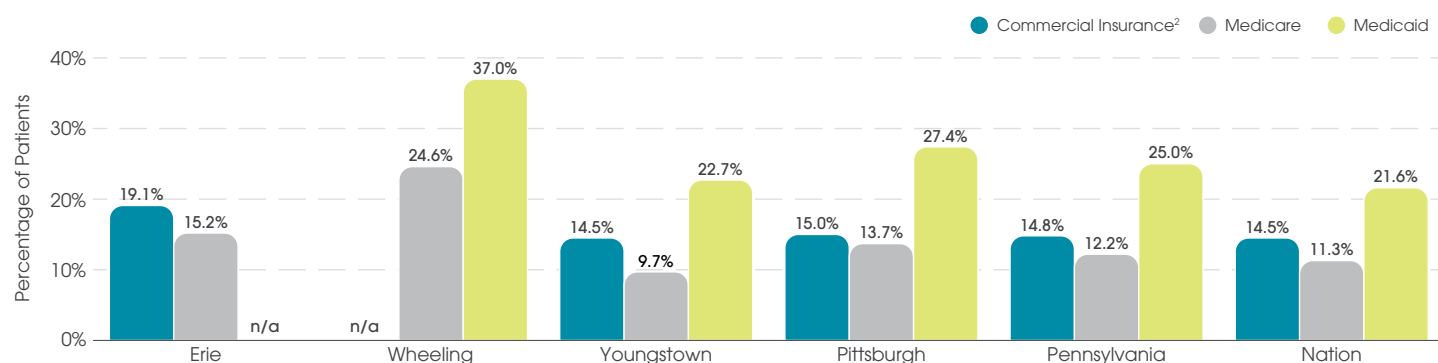
³ A comorbidity is a condition a Type 2 diabetes patient may also have, which is not directly related to the diabetes. Comorbidities were narrowed down to a subset of conditions which are typically present in patients with Type 2 diabetes. Comorbidities of Type 2 diabetes include, but are not limited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

A1c LEVELS

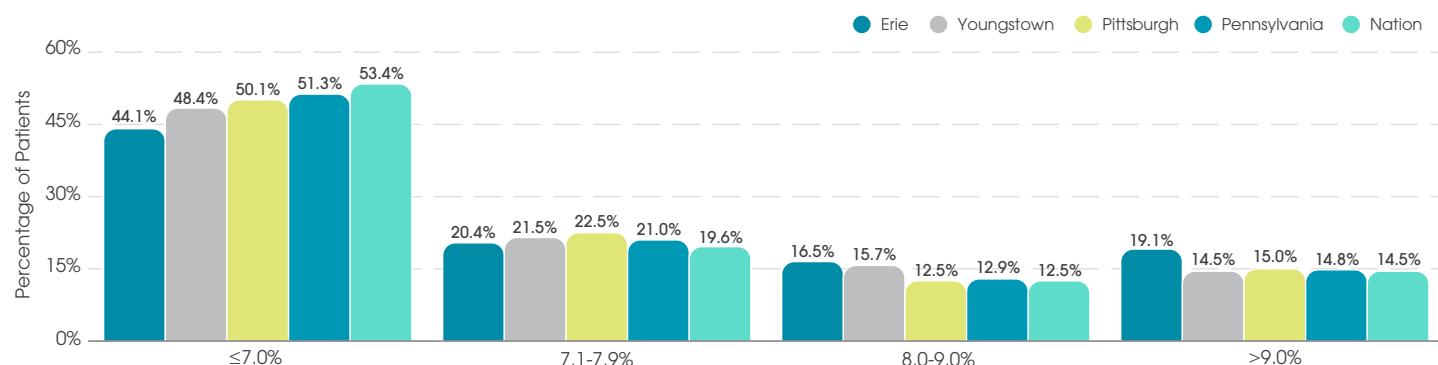
DISTRIBUTION OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2017¹

MARKET	≤7.0%			7.1–7.9%			8.0–9.0%			>9.0%		
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
Erie	48.5%	54.1%	44.1%	19.2%	22.2%	20.4%	18.5%	14.8%	16.5%	13.9%	8.9%	19.1%
Wheeling	45.6	45.5	n/a	25.6	20.5	n/a	13.3	13.6	n/a	15.6	20.5	n/a
Youngstown	53.4	49.2	48.4	20.6	22.0	21.5	13.6	12.5	15.7	12.4	16.3	14.5
Pittsburgh	50.9	47.4	50.1	20.5	21.5	22.5	14.7	13.9	12.5	14.0	17.1	15.0
Pennsylvania	47.6	48.4	51.3	23.1	22.8	21.0	14.0	13.8	12.9	15.3	15.1	14.8
NATION	51.0%	50.0%	53.4%	20.8%	21.2%	19.6%	13.0%	13.4%	12.5%	15.3%	15.4%	14.5%

PERCENTAGES OF TYPE 2 DIABETES PATIENTS WITH A1c >9.0%, BY PAYER, 2017¹



DISTRIBUTION OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2017¹



TOP-PERFORMING STATE: PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2017¹

	≤7.0%	>9.0%
TOP-PERFORMING STATE ³	58.7%	11.7%

Data source: IQVIA © 2018

¹ The A1c test measures how much glucose has been 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 HMCs, 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.

NOTE: Some data were unavailable for Johnstown and Wheeling. An n/a indicates that data were not available.

HOSPITAL DISCHARGE DATA

NUMBERS OF OUTPATIENT DIABETES MELLITUS CASES PER HOSPITAL PER YEAR, MEDICARE VS. NON-MEDICARE, 2016^{1,2}

MARKET	Medicare	Non-Medicare
Erie	1,869.3	3,213.0
Johnstown	4,562.5	8,477.5
Wheeling	3,405.8	5,836.8
Youngstown	3,497.1	6,270.1
Pittsburgh	2,909.6	7,223.5
Pennsylvania	4,547.2	7,595.2
NATION	3,590.6	5,669.2

NUMBERS OF INPATIENT DIABETES MELLITUS CASES PER HOSPITAL PER YEAR, BY PAYER, 2016¹

MARKET	Commercial Insurance ³	Medicare	Medicaid Fee-for-Service
Erie	890.9	1,117.0	48.2
Johnstown	741.6	856.4	8.2
Wheeling	305.3	405.4	4.8
Youngstown	642.0	768.0	20.1
Pittsburgh	810.9	799.5	14.7
Pennsylvania	677.9	926.5	22.3
NATION	538.6	769.0	31.5

AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2016¹

MARKET	Average Length of Stay	Average Charges ⁴
Erie	3.7	\$27,720
Johnstown	4.7	\$16,330
Wheeling	5.0	\$18,646
Youngstown	4.4	\$34,033
Pittsburgh	4.3	\$26,743
Pennsylvania	4.3	\$38,213
NATION	4.3	\$30,778

Data source: IQVIA © 2018

¹ Data in 2016 vary from previous years due to (a) the mandatory implementation of ICD-10 coding beginning October 1, 2015, which resulted in additional diagnoses being captured in the 2016 data for some of the disease states shown; and (b) beginning in 2016, outpatient measures also include treatment delivered in locations that are not contiguous with a hospital or located on a hospital campus. Unless otherwise specified, data include cases for primary and secondary diagnoses.

² Non-Medicare includes commercial, Medicaid, and other non-Medicare payers. In 2016, non-Medicare also includes some commercial Medicare Advantage plans.

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

⁴ 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: Inpatient and outpatient case counts, average length of stay, and hospital inpatient charge data come from IQVIA's Hospital Procedure/Diagnosis (HPD) database. Hospital data are based on all short-term, acute-care hospitals and are effective as of 2016. Psychiatric, rehabilitation, armed forces, and long-term acute-care hospitals are excluded.

PROFESSIONAL CHARGES

PROFESSIONAL CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS, BY SETTING, 2016–2017¹

MARKET	Ambulatory Surgery		Emergency Department		Hospital Inpatient		Hospital Outpatient		Office/Clinic	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Erie	\$2,284	\$2,602	\$1,030	\$1,081	\$2,951	\$2,667	\$1,094	\$1,091	\$1,544	\$1,314
Johnstown	1,803	1,841	n/a	868	2,615	2,505	1,167	1,046	1,640	1,495
Wheeling	n/a	3,620	1,240	1,152	2,989	2,769	1,179	1,153	1,513	1,371
Youngstown	2,169	2,215	1,233	1,294	2,693	2,343	1,145	1,057	1,299	1,294
Pittsburgh	2,101	2,170	867	903	2,939	2,937	1,091	1,032	1,630	1,688
Pennsylvania	2,205	2,222	1,056	1,171	3,213	3,188	1,174	1,181	1,620	1,611
NATION	\$2,599	\$2,658	\$1,549	\$1,646	\$3,512	\$3,549	\$1,420	\$1,456	\$2,100	\$2,084

IP CHARGES ARE LOWER FOR PATIENTS FILLING CAT. 2 VS. CAT. 1 INSULIN

In 2017, annual professional inpatient (IP) charges for commercial Type 2 diabetes patients receiving a category 2 long-acting basal insulin were lower than such patients receiving a category 1 basal insulin across all profiled Pennsylvania markets—the largest difference was recorded in Erie (\$1,179).

PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER, 2016–2017¹

MARKET	Commercial Insurance ²		Medicare		Medicaid	
	2016	2017	2016	2017	2016	2017
Erie	\$2,951	\$2,667	\$2,333	\$2,569	\$3,388	\$2,172
Johnstown	2,615	2,505	2,519	2,487	2,823	3,427
Wheeling	2,989	2,769	2,312	3,066	3,705	3,502
Youngstown	2,693	2,343	1,939	1,841	2,755	2,887
Pittsburgh	2,939	2,937	2,812	2,829	2,965	3,052
Pennsylvania	3,213	3,188	3,111	3,218	4,121	4,262
NATION	\$3,512	\$3,549	\$3,112	\$3,219	\$3,830	\$3,837

PROFESSIONAL CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING LONG-ACTING BASAL CATEGORY 1 VS. CATEGORY 2, BY SETTING, 2017¹

MARKET	Ambulatory Surgery		Emergency Department		Hospital Inpatient		Hospital Outpatient		Office/Clinic	
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2
Erie	\$2,646	\$2,183	\$1,514	\$1,333	\$3,238	\$2,059	\$1,088	\$994	\$1,345	\$1,330
Johnstown	2,049	3,462	797	993	2,818	2,814	1,257	1,061	1,361	1,592
Wheeling	n/a	2,618	1,236	915	2,819	2,331	1,006	1,071	1,578	1,572
Youngstown	2,094	1,717	1,626	1,207	2,691	1,868	1,026	1,036	1,425	1,545
Pittsburgh	2,373	1,900	1,103	899	3,207	2,280	1,089	1,000	1,843	1,931
Pennsylvania	2,370	2,204	1,419	1,194	3,390	2,650	1,238	1,168	1,763	1,948
NATION	\$2,785	\$2,679	\$1,956	\$1,783	\$4,046	\$3,312	\$1,578	\$1,490	\$2,286	\$2,440

Data source: IQVIA © 2018

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.

NOTE: "Category 1" refers to long-acting basal insulins approved through 2014 and follow-on long-acting insulins approved after 2014. "Category 2" refers to non-follow-on long-acting basal insulins approved in or after 2015. An n/a indicates that data were not available.

PHARMACOTHERAPY

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS INSULIN THERAPIES, BY PAYER, 2017¹

MARKET	Any Insulin Products			Long-Acting Basal Category 1			Long-Acting Basal Category 2			Rapid-Acting Insulin			Mixed Insulin			GLP-1 + Long-Acting Insulin (Fixed Ratio)		
	Comm. Ins. ²	Medicare	Medicaid	Comm. Ins. ²	Medicare	Medicaid	Comm. Ins. ²	Medicare	Medicaid	Comm. Ins. ²	Medicare	Medicaid	Comm. Ins. ²	Medicare	Medicaid	Comm. Ins. ²	Medicare	Medicaid
Erie	42.0%	41.5%	44.2%	25.5%	29.0%	34.4%	8.1%	6.3%	4.5%	24.8%	22.1%	27.7%	2.1%	4.8%	n/a	n/a	n/a	n/a
Johnstown	37.2	36.2	59.5	21.9	24.8	38.8	7.8	6.0	16.4	23.1	20.3	38.8	1.4	1.8	n/a	n/a	n/a	n/a
Wheeling	37.8	42.4	52.8	23.7	31.5	34.0	9.1	6.4	12.0	17.3	22.2	37.5	n/a	3.0	2.6	n/a	n/a	n/a
Youngstown	33.8	38.6	50.0	19.5	26.3	35.8	5.3	4.8	9.6	17.1	18.5	30.2	2.3	5.0	3.5%	n/a	n/a	n/a
Pittsburgh	41.6	39.5	56.1	24.7	26.6	33.9	8.8	6.1	13.7	23.7	19.4	34.2	3.2	4.9	5.5	0.3%	0.1%	n/a
Pennsylvania	37.1	38.9	51.6	21.5	26.6	37.6	6.7	5.0	5.3	20.5	19.2	30.5	2.8	5.2	7.3	0.3	0.1	0.1%
NATION	34.4%	37.7%	49.8%	20.4%	26.0%	37.7%	5.8%	4.5%	3.7%	17.4%	16.8%	28.2%	2.3%	4.7%	5.1%	0.4%	0.1%	0.1%

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS INSULIN THERAPIES, PENS VS. VIALS, 2017¹

MARKET	Long-Acting Basal Category 1		Long-Acting Basal Category 2	Rapid-Acting Insulin		Mixed Insulin		GLP-1 + Long-Acting Insulin (Fixed Ratio)
	Pens	Vials	Pens	Pens	Vials	Pens	Vials	Pens
Erie	21.9%	4.5%	8.1%	16.9%	9.3%	1.7%	n/a	n/a
Johnstown	18.5	4.3	7.8	14.7	9.5	1.0	n/a	n/a
Wheeling	21.4	3.1	9.1	13.3	4.9	n/a	n/a	n/a
Youngstown	15.5	4.8	5.3	10.1	8.0	1.4	0.9%	n/a
Pittsburgh	21.6	4.1	8.8	17.2	7.6	2.4	0.9	0.3%
Pennsylvania	18.3	3.9	6.7	14.1	7.4	1.9	0.9	0.3
NATION	16.4%	5.0%	5.8%	10.9%	7.5%	1.4%	1.0%	0.4%

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS NON-INSULIN ANTIDIABETIC AND COMBINATION THERAPIES, 2017¹

MARKET	Any Non-Insulin Antidiabetic Product	Biguanides	DPP-4 Inhibitors	GLP-1 Receptor Agonists	GLP-1+ Long-Acting Insulin (Free Ratio)	Insulin Sensitizing Agents	SGLT-2 Inhibitors
Erie	81.1%	54.8%	13.8%	14.8%	5.9%	2.0%	13.3%
Johnstown	83.4	58.4	12.7	11.5	4.1	1.8	14.8
Wheeling	86.1	59.8	13.5	12.4	4.4	3.4	13.1
Youngstown	83.6	57.4	10.8	10.5	2.9	3.5	14.7
Pittsburgh	81.6	57.5	11.8	12.3	4.5	2.2	11.9
Pennsylvania	83.5	57.7	12.0	10.7	3.5	3.2	12.5
NATION	85.5%	60.6%	11.0%	11.2%	3.6%	5.1%	12.2%

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.

NOTE: "Category 1" refers to long-acting basal insulins approved through 2014 and follow-on long-acting insulins approved after 2014. "Category 2" refers to non-follow-on long-acting basal insulins approved in or after 2015. An n/a indicates that data were not available.

Biguanides: Decrease the production of glucose by the liver, decrease intestinal absorption of glucose, and increase the peripheral uptake and use of circulating glucose.

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: 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. "GLP-1 + long-acting insulin (fixed ratio)" refers to the two therapies combined in a single product. "GLP-1 + long-acting insulin (free ratio)" refers to the two therapies taken separately and concurrently.

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.

Long-Acting Basal Category 1/Category 2: Insulin replacement product with a long duration of action.

"Category 1" refers to long-acting basal insulins approved through 2014 and follow-on long-acting insulins approved after 2014. "Category 2" refers to non-follow-on long-acting basal insulins approved in or after 2015.

Rapid-Acting Insulin: Insulin replacement product with a rapid onset and shorter duration of action than short-acting insulin.

Mixed Insulin: Insulin replacement product combining a short-acting and an intermediate-acting insulin product.

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

Data source: IQVIA © 2018

PHARMACOTHERAPY

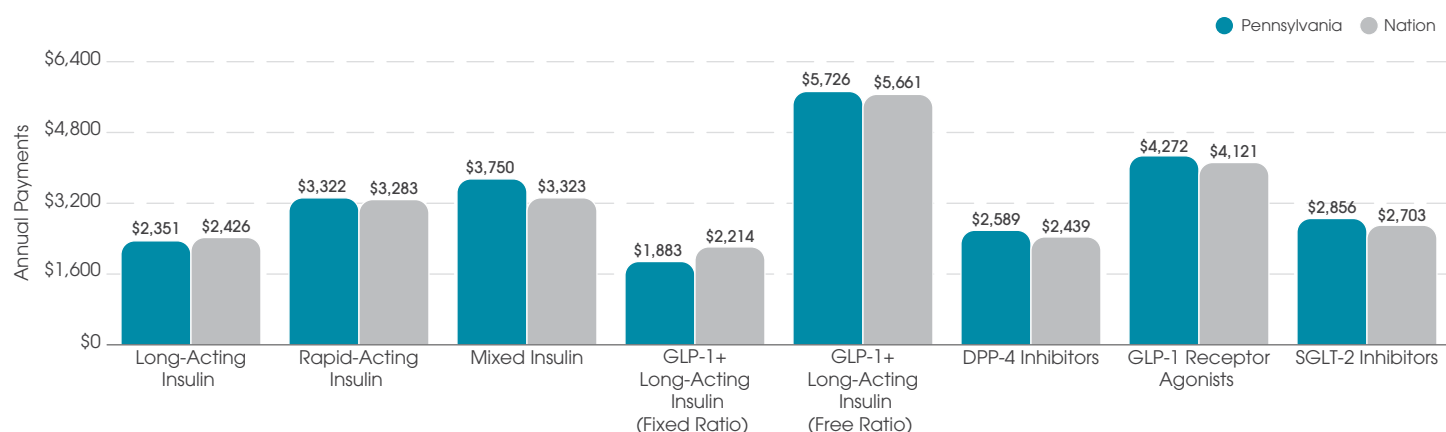
**ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT
FOR VARIOUS INSULIN THERAPIES, BY PAYER, 2017^{1,2}**

	Any Insulin Products			Long-Acting Insulin			Rapid-Acting Insulin			Mixed Insulin			GLP-1 + Long-Acting Insulin (Fixed Ratio)		
MARKET	Comm. Ins. ³	Medicare	Medicaid	Comm. Ins. ³	Medicare	Medicaid	Comm. Ins. ³	Medicare	Medicaid	Comm. Ins. ³	Medicare	Medicaid	Comm. Ins. ³	Medicare	Medicaid
Erie	\$6,428	\$5,462	\$4,624	\$2,782	\$2,641	\$1,961	\$3,689	\$2,941	\$2,779	\$3,334	\$3,958	\$3,431	\$2,311	n/a	n/a
Johnstown	5,397	4,788	4,086	2,326	2,345	2,109	3,468	2,415	2,661	2,607	4,280	2,347	1,043	n/a	n/a
Wheeling	5,235	5,423	5,600	2,731	2,922	2,743	3,051	2,654	3,182	3,035	4,378	2,561	3,626	n/a	n/a
Youngstown	4,765	4,721	5,521	2,204	2,709	2,573	3,214	2,573	2,986	4,266	3,223	4,080	2,476	\$1,572	n/a
Pittsburgh	5,428	5,016	4,427	2,419	2,551	2,155	3,275	2,799	2,944	4,497	4,194	3,163	1,918	1,657	n/a
Pennsylvania	5,181	5,123	4,878	2,351	2,550	2,132	3,322	2,931	3,177	3,750	3,986	3,241	1,883	1,974	\$1,614
NATION	\$5,091	\$4,787	\$4,684	\$2,426	\$2,547	\$2,237	\$3,283	\$2,754	\$2,937	\$3,323	\$3,369	\$2,960	\$2,214	\$1,792	\$1,598

**ANNUAL PAYMENTS PER COMMERCIAL TYPE 2 DIABETES PATIENT
FOR VARIOUS NON-INSULIN ANTIDIABETIC AND COMBINATION THERAPIES, 2017^{1,2}**

MARKET	Any Non-Insulin Antidiabetic Product	Biguanides	DPP-4 Inhibitors	GLP-1 Receptor Agonists	GLP-1+ Long-Acting Insulin (Free Ratio)	Insulin Sensitizing Agents	SGLT-2 Inhibitors
Erie	\$3,586	\$167	\$2,490	\$5,020	\$6,793	\$480	\$2,722
Johnstown	2,663	69	2,777	3,804	5,700	98	2,854
Wheeling	2,811	96	2,416	4,004	5,976	113	2,604
Youngstown	2,298	73	2,341	3,922	5,445	94	2,654
Pittsburgh	2,897	71	2,624	4,482	5,888	81	2,914
Pennsylvania	2,623	108	2,589	4,272	5,726	132	2,856
NATION	\$2,467	\$106	\$2,439	\$4,121	\$5,661	\$86	\$2,703

**ANNUAL PAYMENTS PER COMMERCIAL TYPE 2 DIABETES PATIENT FOR VARIOUS INSULIN
AND NON-INSULIN ANTIDIABETIC THERAPIES, 2017^{1,2}**



Data source: IQVIA © 2018

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 Figures reflect the per-patient yearly payments for Type 2 diabetes patients receiving a particular type of therapy. These are the actual amounts paid by the insurer and patient for such prescriptions. Costs mainly include copayments, but can also include tax, deductibles, and cost differentials where applicable.

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

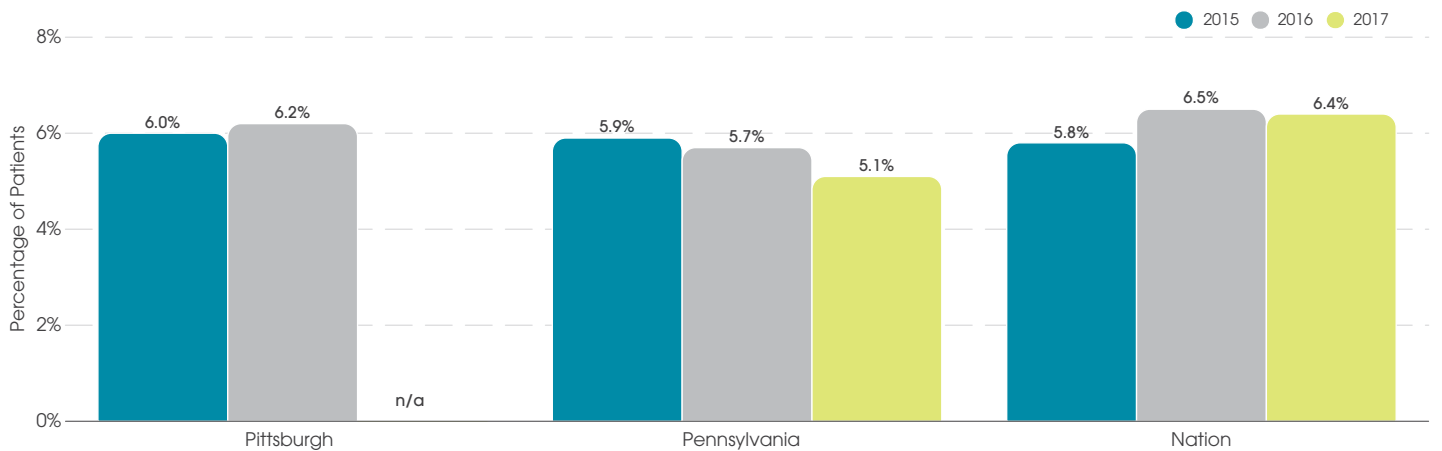
NOTE: An n/a indicates that data were not available.

PHARMACOTHERAPY

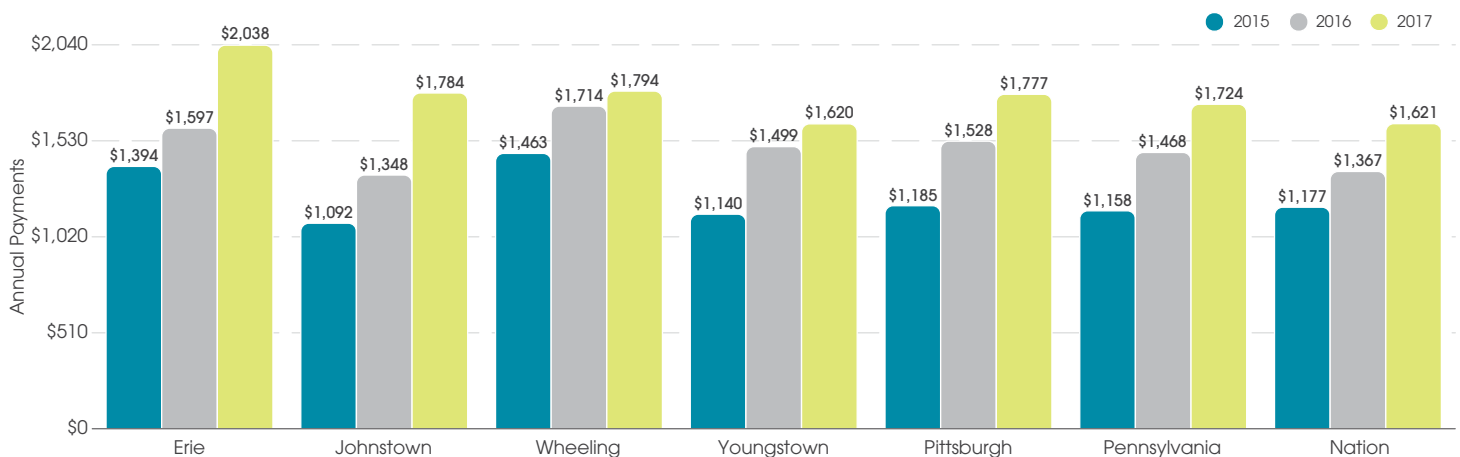
PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING THREE ORAL ANTIDIABETIC PRODUCTS, 2015-2017

MARKET	2015	2016	2017
Erie	6.0%	5.7%	6.0%
Johnstown	6.3	5.9	4.6
Wheeling	4.6	4.0	5.0
Youngstown	6.7	5.7	5.6
Pittsburgh	6.7	6.3	6.0
Pennsylvania	6.3	6.1	5.7
NATION	6.2%	6.4%	6.5%

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH AN A1c >9.0% RECEIVING THREE ORAL ANTIDIABETIC PRODUCTS, 2015-2017¹



ANNUAL PAYMENTS PER COMMERCIAL TYPE 2 DIABETES PATIENT RECEIVING THREE NON-INSULIN ANTIDIABETIC PRODUCTS, 2015-2017

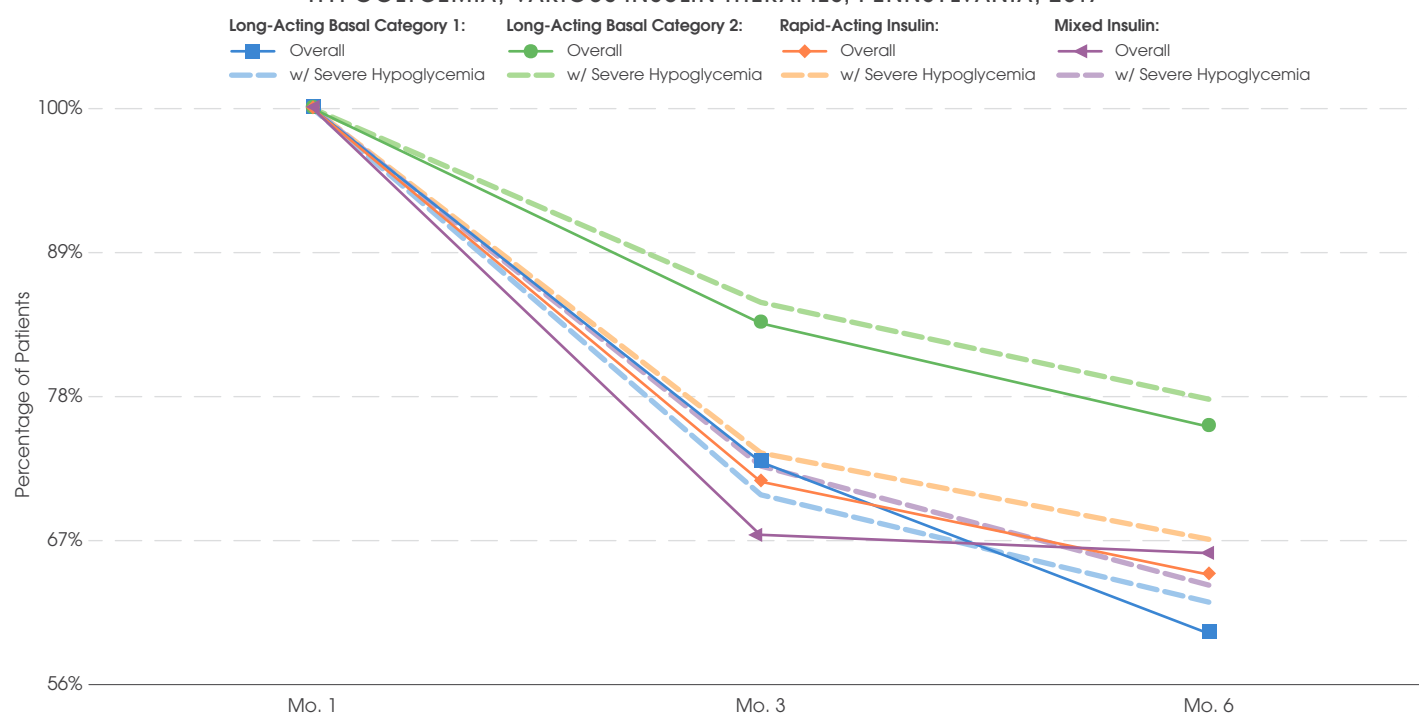


Data source: IQVIA © 2018

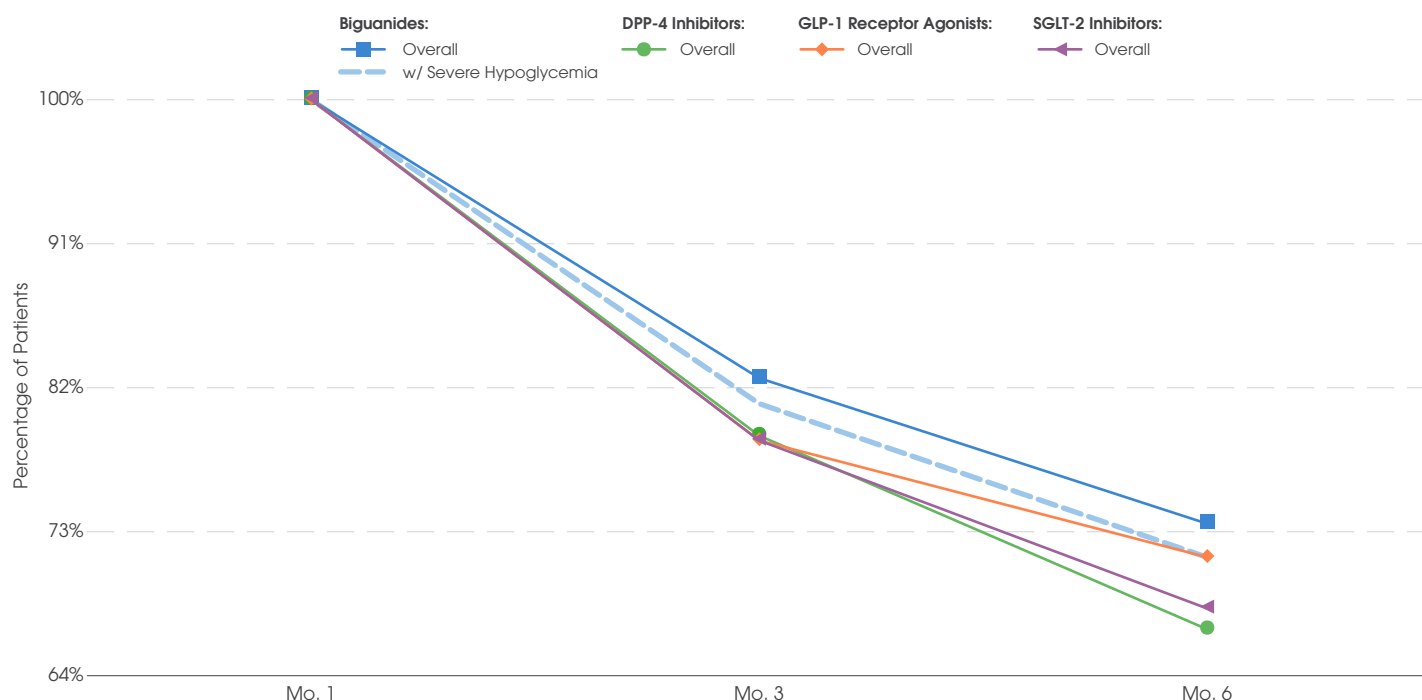
¹ The A1c test measures how much glucose has been in the blood during the past 2-3 months. Figures reflect the percentage of Type 2 diabetes patients who have had at least one A1c test in a given year.
NOTE: An n/a indicates that data were not available. Some data were unavailable for the selected markets.

PERSISTENCY

PERSISTENCY: COMMERCIAL TYPE 2 DIABETES PATIENTS OVERALL VS. COMMERCIAL TYPE 2 DIABETES PATIENTS WITH SEVERE HYPOGLYCEMIA, VARIOUS INSULIN THERAPIES, PENNSYLVANIA, 2017¹



PERSISTENCY: COMMERCIAL TYPE 2 DIABETES PATIENTS OVERALL VS. COMMERCIAL TYPE 2 DIABETES PATIENTS WITH SEVERE HYPOGLYCEMIA, VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, PENNSYLVANIA, 2017¹



Data source: IQVIA © 2018

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, atherosclerotic cardiovascular disease (ASCVD; includes patients with ACS, MI, stroke, and other cardiovascular conditions), cardiovascular (CV) disease, nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, severe hypoglycemia, and stroke.

NOTE: "Persistence" measures whether patients maintain their prescribed therapy. It is calculated by identifying patients who filled a prescription for the reported drug class in the six 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. Persistence is tracked for patients who are new to therapy (those who have not filled the therapy in question in the six months prior to their first fill of the study period). "Category 1" refers to long-acting basal insulins approved through 2014 and follow-on long-acting insulins approved after 2014. "Category 2" refers to non-follow-on long-acting basal insulins approved in or after 2015. Some data were unavailable for Pennsylvania.

DIABETES AND CO-OCCURRING CONDITIONS

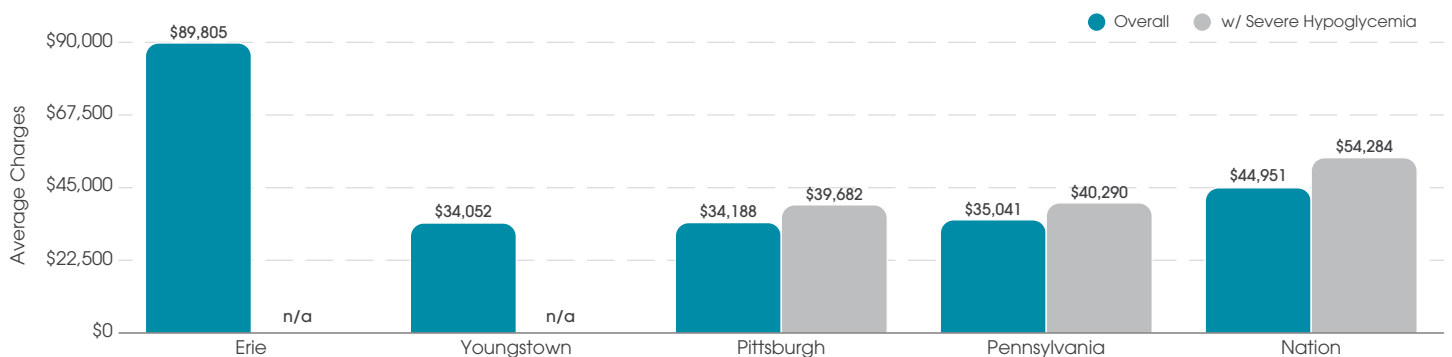
PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY CO-OCCURRING CONDITION, 2017¹

MARKET	Depression	Hyper-lipidemia	Hypertension	Nephropathy	Neuropathy	Obesity	Retinopathy	Severe Hypoglycemia
Erie	11.0%	61.2%	75.3%	25.2%	39.0%	35.9%	19.9%	4.4%
Johnstown	11.5	67.4	80.6	37.4	34.8	31.3	n/a	3.4
Wheeling	11.2	65.8	84.6	24.3	36.9	31.7	n/a	4.3
Youngstown	10.9	56.2	81.5	26.7	36.9	19.5	21.7	2.8
Pittsburgh	10.3	60.6	78.1	30.7	40.7	42.2	20.1	3.0
Pennsylvania	10.7	64.5	79.0	30.5	36.0	32.6	19.1	3.6
NATION	10.2%	65.8%	80.7%	32.9%	36.2%	25.5%	17.7%	3.7%

INPATIENT PROFESSIONAL CHARGES PER COMMERCIAL TYPE 2 DIABETES PATIENT PER YEAR, OVERALL VS. WITH VARIOUS CO-OCCURRING CONDITIONS, 2017^{1,2}

MARKET	Overall	Depression	Hyper-lipidemia	Hypertension	Nephropathy	Neuropathy	Obesity	Retinopathy	Severe Hypo-glycemia
Erie	\$2,667	\$3,143	\$2,739	\$2,913	\$3,565	\$3,156	\$3,035	\$2,989	\$3,401
Johnstown	2,505	2,771	2,257	2,672	3,039	3,002	2,496	2,802	3,472
Wheeling	2,769	2,672	2,907	3,104	4,025	3,433	3,059	1,977	5,736
Youngstown	2,343	2,719	2,442	2,627	3,113	2,882	2,625	2,167	4,074
Pittsburgh	2,937	3,769	3,232	3,353	4,084	3,495	3,273	2,975	5,049
Pennsylvania	3,188	4,135	3,483	3,557	4,315	3,865	3,459	3,332	4,994
NATION	\$3,549	\$4,411	\$3,775	\$3,856	\$4,744	\$4,435	\$3,898	\$3,977	\$5,502

INPATIENT FACILITY CHARGES PER COMMERCIAL TYPE 2 DIABETES PATIENT PER YEAR, OVERALL VS. WITH SEVERE HYPOGLYCEMIA, 2017^{1,3}



PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH VARIOUS CO-OCCURRING CONDITIONS, LONG-ACTING BASAL CATEGORY 1 VS. CATEGORY 2, 2017¹

MARKET	Depression		Hyper-lipidemia		Hypertension		Nephropathy		Neuropathy		Obesity		Retinopathy		Severe Hypoglycemia	
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2
Erie	12.6%	19.7%	59.9%	59.1%	65.3%	62.1%	20.4%	24.0%	50.4%	52.0%	47.3%	37.9%	25.4%	30.7%	4.6%	n/a
Johnstown	13.6	14.1	56.4	71.8	75.0	70.6	31.7	40.5	48.2	41.7	39.6	30.6	17.4	n/a	n/a	n/a
Wheeling	7.4	n/a	64.9	62.1	83.1	72.4	24.1	23.9	48.2	41.3	37.8	41.4	16.1	n/a	8.9	n/a
Youngstown	10.4	14.4	63.6	67.6	73.6	79.1	27.1	19.7	39.5	44.7	21.9	19.4	29.0	29.6	4.0	n/a
Pittsburgh	14.2	11.7	54.2	60.5	71.1	70.6	29.7	28.4	51.6	52.9	46.2	50.7	24.2	21.9	4.9	5.9%
Pennsylvania	13.1	12.4	58.3	62.6	73.9	71.8	30.3	28.7	44.9	48.1	37.8	42.8	24.3	22.6	6.0	5.9
NATION	11.2%	10.5%	62.5%	68.2%	78.2%	77.0%	33.8%	30.2%	40.4%	41.4%	27.7%	31.0%	23.2%	23.4%	6.4%	6.4%

Data source: IQVIA © 2018

¹ A co-occurring condition is a condition a Type 2 diabetes patient may also have, which may or may not be directly related to Type 2 diabetes. Co-occurring conditions were narrowed down to a subset of conditions, including, but not limited to, atherosclerotic cardiovascular disease (ASCVD); includes patients with ACS, MI, stroke, and other cardiovascular conditions), cardiovascular (CV) disease, congestive heart failure, depression, hyperlipidemia, hypertension, nephropathy, neuropathy, obesity, peripheral artery disease (PAD), retinopathy, severe hypoglycemia, and stroke.

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

³ Figures reflect the charges generated by the facilities that delivered care. The data also reflect the amounts charged, not the amounts paid.

NOTE: An n/a indicates that data were not available. Some data were unavailable for Johnstown and Wheeling.

DIABETES AND CARDIOVASCULAR DISEASE

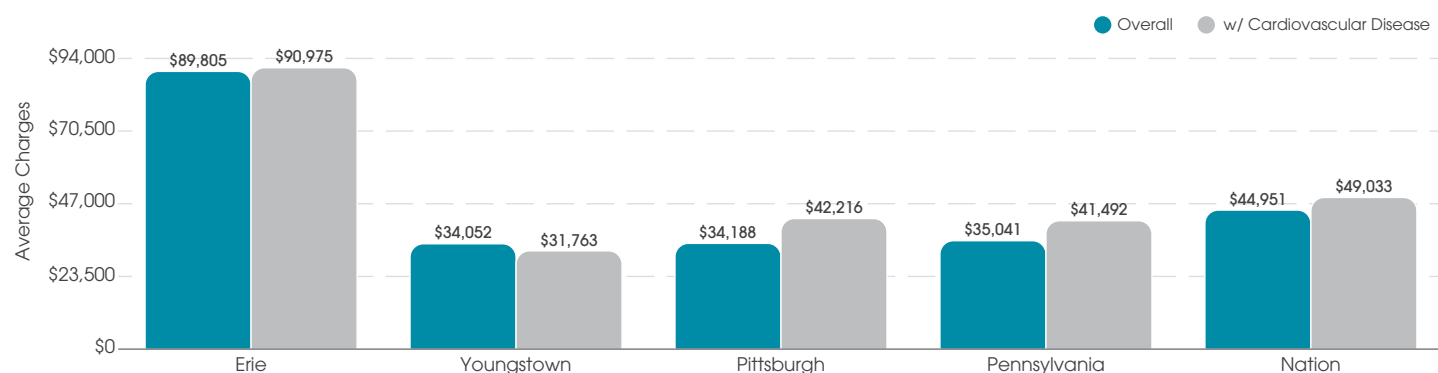
PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY CO-OCCURRING CONDITION, 2017¹

MARKET	ASCVD	Cardiovascular Disease	Congestive Heart Failure	MI	PAD	Stroke
Erie	42.9%	39.2%	15.2%	2.7%	15.9%	3.3%
Johnstown	55.4	49.9	14.1	3.5	23.5	4.7
Wheeling	51.1	50.5	16.7	3.8	19.2	4.7
Youngstown	39.3	37.4	12.1	2.1	15.1	4.0
Pittsburgh	41.9	37.7	13.4	2.8	17.8	4.6
Pennsylvania	41.6	37.8	12.4	2.8	17.2	4.5
NATION	37.8%	36.9%	11.7%	2.5%	15.4%	4.0%

INPATIENT PROFESSIONAL CHARGES PER COMMERCIAL TYPE 2 DIABETES PATIENT PER YEAR, OVERALL VS. WITH VARIOUS CO-OCCURRING CONDITIONS, 2017^{1,2}

MARKET	Overall	ASCVD	Cardiovascular Disease	Congestive Heart Failure	MI	PAD	Stroke
Erie	\$2,667	\$3,207	\$3,147	\$3,706	\$4,392	\$3,565	\$3,470
Johnstown	2,505	2,784	2,910	3,505	3,785	2,960	2,505
Wheeling	2,769	3,098	3,207	4,562	4,344	3,505	4,574
Youngstown	2,343	2,659	2,769	3,360	3,254	2,982	2,735
Pittsburgh	2,937	3,648	3,772	4,573	5,709	4,110	4,377
Pennsylvania	3,188	3,870	4,028	4,798	5,529	4,339	4,826
NATION	\$3,549	\$4,322	\$4,444	\$5,378	\$5,982	\$4,992	\$5,105

INPATIENT FACILITY CHARGES PER COMMERCIAL TYPE 2 DIABETES PATIENT PER YEAR, OVERALL VS. WITH CARDIOVASCULAR DISEASE, 2017^{1,3}



PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH VARIOUS CO-OCCURRING CONDITIONS, LONG-ACTING BASAL CATEGORY 1 VS. CATEGORY 2, 2017¹

MARKET	ASCVD		Cardiovascular Disease		Congestive Heart Failure		MI		PAD		Stroke	
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2
Erie	28.8%	25.3%	30.4%	21.3%	15.4%	n/a	n/a	n/a	8.8%	n/a	n/a	n/a
Johnstown	43.1	n/a	40.4	38.1	6.9	n/a	n/a	n/a	18.4	n/a	4.6%	n/a
Wheeling	48.2	39.1	43.8	39.1	15.2	n/a	n/a	n/a	19.6	n/a	8.9	n/a
Youngstown	33.2	30.3	34.0	24.2	8.5	n/a	n/a	n/a	11.2	12.1%	4.0	n/a
Pittsburgh	32.4	28.9	29.0	27.2	10.2	6.8%	2.9%	2.1%	14.8	11.0	4.7	3.5%
Pennsylvania	32.5	30.1	30.1	28.5	10.5	7.5	3.2	2.3	13.3	11.8	4.6	3.0
NATION	30.7%	27.2%	30.9%	27.9%	10.3%	7.0%	3.0%	2.0%	11.1%	9.4%	4.0%	2.6%

Data source: IQVIA © 2018

¹ A co-occurring condition is a condition a Type 2 diabetes patient may also have, which may or may not be directly related to Type 2 diabetes. Co-occurring conditions were narrowed down to a subset of conditions, including, but not limited to, atherosclerotic cardiovascular disease (ASCVD); includes patients with ACS, MI, stroke, and other cardiovascular conditions), cardiovascular (CV) disease, congestive heart failure, depression, hyperlipidemia, hypertension, nephropathy, neuropathy, obesity, peripheral artery disease (PAD), retinopathy, severe hypoglycemia, and stroke.

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

³ Figures reflect the charges generated by the facilities that delivered care. The data also reflect the amounts charged, not the amounts paid.

NOTE: MI is myocardial infarction. An n/a indicates that data were not available. Some data were unavailable for Johnstown and Wheeling.

ACS/STROKE

NUMBERS OF OUTPATIENT ACUTE CORONARY SYNDROMES AND STROKE CASES PER HOSPITAL, BY PAYER, 2016^{1,2}

MARKET	Acute Coronary Syndromes Cases		Stroke Cases	
	Medicare	Non-Medicare	Medicare	Non-Medicare
Erie	443.3	574.0	453.8	579.3
Johnstown	208.5	281.5	342.0	482.5
Wheeling	418.5	469.5	290.2	353.0
Youngstown	365.5	482.2	395.3	512.9
Pittsburgh	286.7	497.5	241.3	431.6
Pennsylvania	437.8	526.8	469.7	573.0
NATION	434.0	479.4	308.0	343.1

NUMBERS OF INPATIENT ACUTE CORONARY SYNDROMES AND STROKE CASES PER HOSPITAL, BY PAYER, 2016¹

MARKET	Acute Coronary Syndromes Cases			Stroke Cases		
	Comm. Ins. ³	Medicare	Medicaid	Comm. Ins. ³	Medicare	Medicaid
Erie	290.8	406.5	29.2	105.6	172.7	12.1
Johnstown	135.0	192.5	n/a	76.3	107.4	1.5
Wheeling	96.5	139.4	5.3	30.0	49.2	2.0
Youngstown	188.9	243.5	11.9	75.5	112.0	3.4
Pittsburgh	236.4	262.3	5.9	89.2	104.1	3.1
Pennsylvania	194.4	288.4	6.8	81.2	134.4	3.7
NATION	156.3	236.7	9.4	65.0	111.5	3.8

AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER INPATIENT ACUTE CORONARY SYNDROMES CASE, 2015–2016¹

MARKET	Average Length of Stay		Average Charges ⁴	
	2015	2016	2015	2016
Erie	2.1	3.1	\$31,655	\$78,588
Johnstown	2.0	3.8	17,111	49,521
Wheeling	2.6	2.6	20,644	n/a
Youngstown	2.3	3.5	26,156	78,137
Pittsburgh	2.5	3.3	35,049	55,463
Pennsylvania	2.0	3.1	34,834	65,497
NATION	2.1	2.9	\$31,282	\$57,665

AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER INPATIENT STROKE CASE, 2015–2016¹

MARKET	Average Length of Stay		Average Charges ⁴	
	2015	2016	2015	2016
Erie	3.2	3.1	\$56,041	\$44,824
Johnstown	3.7	3.9	21,870	21,345
Wheeling	3.8	3.8	20,225	19,759
Youngstown	4.1	3.2	41,497	38,380
Pittsburgh	4.0	3.3	57,408	32,653
Pennsylvania	3.8	3.5	57,110	41,699
NATION	4.1	3.8	\$48,875	\$34,554

Data source: IQVIA © 2018

¹ Data in 2016 vary from previous years due to (a) the mandatory implementation of ICD-10 coding beginning October 1, 2015, which resulted in additional diagnoses being captured in the 2016 data for some of the disease states shown; and (b) beginning in 2016, outpatient measures also include treatment delivered in locations that are not contiguous with a hospital or located on a hospital campus. Unless otherwise specified, data include cases for primary and secondary diagnoses.

² Non-Medicare includes commercial, Medicaid, and other non-Medicare payers. In 2016, non-Medicare also includes some commercial Medicare Advantage plans.

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

⁴ 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: Inpatient and outpatient case counts, average length of stay, and hospital inpatient charge data come from IQVIA's Hospital Procedure/Diagnosis (HPD) database. Hospital data are based on all short-term, acute-care hospitals and are effective as of 2016. Psychiatric, rehabilitation, armed forces, and long-term acute-care hospitals are excluded. An n/a indicates that data were not available.

KEY FINDINGS

- From 2016 to 2017, the share of commercially insured Type 2 diabetes patients in Pennsylvania between the ages of 65 and 79 or over the age of 80 decreased, but still remained higher than the national percentages in 2017.
- In Pittsburgh, growing proportions of commercial Type 2 diabetes patients had more than two complications (to 25.4% in 2017 from 24.7% in 2016) or comorbidities (to 20.3% from 19.5%), exceeding those of the nation by notable margins both years.
- A lower percentage of commercial Type 2 diabetes patients in Pittsburgh had an A1c of 7.0% or lower than patients in either Pennsylvania or across the nation in 2017. Correspondingly, a greater share of Pittsburgh patients had an A1c over 9.0%.
- In Pennsylvania, annual payments per commercially insured Type 2 diabetes patients were lowest, among the profiled therapies, for those who received fixed-ratio combinations of GLP-1 receptor agonists and long-acting insulins in 2017.

ADA GUIDELINES

2018 ADA Guidelines for Adults With Type 2 Diabetes

⇒ At diagnosis, initiate lifestyle management, set A1c target, and initiate pharmacologic therapy based on A1c:

- A1c is less than 9%, consider Monotherapy.
- A1c is greater than or equal to 9%, consider Dual Therapy.
- A1c is greater than or equal to 10%, blood glucose is greater than or equal to 300 mg/dL, or patient is markedly symptomatic, consider Combination Injectable Therapy.

MONOTHERAPY

Initiate metformin therapy if no contraindications

Lifestyle Management + Metformin

A1c at target after 3 months of Monotherapy?

Yes: Monitor A1c every 3–6 months

No: Assess medication-taking behavior, consider Dual Therapy

DUAL THERAPY

Atherosclerotic cardiovascular disease (ASCVD)?

Yes: Add agent proven to reduce major adverse cardiovascular events and/or cardiovascular mortality*

No: Add second agent after consideration of drug-specific effects and patient factors

Lifestyle Management + Metformin + Additional Agent

A1c at target after 3 months of Dual Therapy?

Yes: Monitor A1c every 3–6 months

No: Assess medication-taking behavior, consider Triple Therapy

TRIPLE THERAPY

Add third agent based on drug-specific effects and patient factors*

Lifestyle Management + Metformin + Two Additional Agents

A1c at target after 3 months of Triple Therapy?

Yes: Monitor A1c every 3–6 months

No: Assess medication-taking behavior, consider Combination Injectable Therapy

COMBINATION INJECTABLE THERAPY

* If patient does not tolerate or has contraindications to metformin, consider agents from another class.

* Glucagon-like peptide-1 (GLP-1) receptor agonists and dipeptidyl peptidase 4 (DPP-4) inhibitors should not be prescribed in combination. If a patient with ASCVD is not yet on an agent with evidence of cardiovascular risk reduction, consider adding.

NOTE: A1c is glycated hemoglobin.

Source: American Diabetes Association Standards of Care 2018;41:S73–S85

METHODOLOGY

IQVIA generated the Type 2 diabetes data for this report out of health care professional (837p) and institutional (837i) insurance claims, representing nearly 11.7 million unique patients nationally in 2017 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.

IQVIA 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. Data arriving into IQVIA 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. Substate markets represent core-based statistical areas (CBSAs).

Proprietary lab data derive from one of the largest independent commercial lab companies in the U.S. Patient information is de-identified, matched, and linked with other patient data assets (e.g., medical claims data). The most common attributes used are the de-identified patient ID, observation date, diagnosis, test name, test code, and test result.

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, IQVIA 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 IQVIA 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.

Case count, per-case average length of stay, inpatient charge, and discharge destination data come from IQVIA's Hospital Procedure/Diagnosis (HPD) database. This database features an extensive set of inpatient and outpatient discharge records (including diagnoses and procedures data) integrated with hospital claims data. In 2016, the HPD data set comprises nearly 88,000 ICD-10 procedure codes and more than 69,000 diagnosis codes (compared with just under 4,000 procedure codes and roughly 14,000 diagnosis codes under the ICD-9 classification system used in previous years). The inpatient and outpatient data provided in this backgrounder include analyses of 351 ICD-10 diagnosis codes (compared with 93 ICD-9 codes in prior years) aggregated into 13 common disease states. In 2016, the HPD data set also incorporates about 85% of all hospital claims nationwide (including 100% of Medicare-reimbursed inpatient and outpatient discharges), representing more than 1.9 million unique health care providers and 1.5 billion medical claims per year. To account for non-Medicare hospital discharge information, HPD uses either Medicare procedure counts paired with additional hospital-level information or non-Medicare medical claims data linked to individual facilities via physician affiliations. Beginning in 2016, outpatient measures also include treatment delivered in locations that are not contiguous with a hospital or located on a hospital campus.

Sanofi U.S., 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 U.S. is that the information in this report be completely independent and objective.

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