2019

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Employers for Healthcare Value Since 1980

TYPE 2 DIABETES REPORT™
LEHIGH VALLEY BUSINESS COALITION ON HEALTHCARE

7th Edition

With a Focus on How Cardiovascular
Conditions Can Impact Diabetes Care

INTRODUCTION

Sanofi U.S. (Sanofi), in conjunction with the Lehigh Valley Business Coalition on Healthcare (LVBCH), is pleased to present the seventh edition of the **LVBCH Type 2 Diabetes Report™** for 2019, an overview of key demographic, utilization, pharmacotherapy, and charge measures for Type 2 diabetes patients, as well as a focus on how cardiovascular conditions can impact diabetes care. The report also provides national benchmarks that can help providers and employers identify opportunities to better 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 2018) 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. Data in this report may have been restated from prior years to account for updates to methodology and patient samples.

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.

Through collective employer action and partnerships with providers/payers, LVBCH strives to improve the delivery, cost and quality of healthcare in our communities. 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.

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DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY AGE, 2016–2018

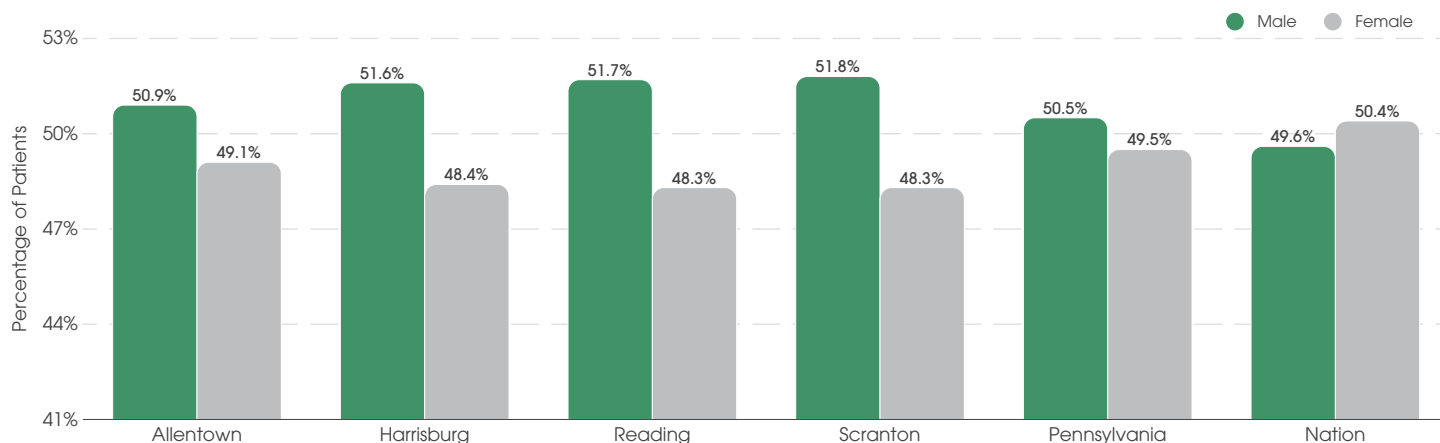|	0–17			18–35			36–64			65–79			80+		
MARKET	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Allentown	0.2%	0.3%	0.4%	1.8%	1.8%	2.2%	42.7%	41.7%	42.7%	38.4%	39.3%	38.5%	16.9%	16.9%	16.2%
Harrisburg	0.3	0.3	0.4	1.3	1.7	1.8	35.9	34.4	34.4	43.9	43.9	44.1	18.7	19.8	19.4
Reading	0.3	0.3	0.3	1.6	1.8	1.8	38.6	38.4	37.6	40.7	41.5	42.1	18.8	18.0	18.2
Scranton	0.4	0.5	0.4	1.5	1.6	1.7	34.8	34.3	34.0	43.5	43.7	44.0	19.8	20.0	19.9
Pennsylvania	**0.3**	**0.4**	**0.4**	**1.8**	**2.0**	**2.1**	**40.6**	**40.2**	**39.8**	**40.1**	**40.3**	**40.7**	**17.2**	**17.1**	**17.0**
NATION	**0.3%**	**0.4%**	**0.4%**	**2.0%**	**2.2%**	**2.3%**	**43.9%**	**43.3%**	**42.6%**	**39.4%**	**39.7%**	**40.3%**	**14.5%**	**14.4%**	**14.5%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY DIAGNOSING SPECIALIST, 2017–2018

	Primary Care[1]		Internal Medicine		Endocrinology		Cardiology	
MARKET	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	22.1%	22.5%	18.7%	17.8%	3.2%	2.9%	3.4%	3.3%
Harrisburg	31.8	28.3	16.5	16.5	1.8	2.0	2.2	2.2
Reading	38.6	38.4	24.7	24.4	2.0	2.1	3.5	3.3
Scranton	26.2	26.0	18.5	18.5	3.3	3.4	2.6	2.6
Pennsylvania	**32.5**	**32.2**	**20.1**	**19.7**	**4.3**	**4.3**	**4.5**	**4.3**
NATION	**28.4%**	**28.1%**	**22.5%**	**21.9%**	**3.6%**	**3.6%**	**4.1%**	**4.0%**

A1c LEVELS ARE HIGH VERSUS PA AND U.S. IN MANY LEHIGH VALLEY MARKETS

In Harrisburg (17.9%), Reading (15.6%), and Scranton (16.3%), the share of commercial Type 2 diabetes patients with an A1c level above 9.0% topped the corresponding Pennsylvania (13.8%) and U.S. (14.4%) benchmarks in 2018. Meanwhile, in these markets as well as Allentown, the rate of retinopathy among commercial Type 2 diabetes patients exceeded that of the nation (17.6%).

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY GENDER, 2018

● Male ● Female

Market	Male	Female
Allentown	50.9%	49.1%
Harrisburg	51.6%	48.4%
Reading	51.7%	48.3%
Scranton	51.8%	48.3%
Pennsylvania	50.5%	49.5%
Nation	49.6%	50.4%

Data source: IQVIA © 2019

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

NOTE: Throughout this report, the Allentown market includes Bethlehem and Easton, and parts of New Jersey; the Harrisburg market includes Carlisle; the Scranton market includes Wilkes-Barre and Hazleton. An n/a indicates that data were not available.

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2017–2018

MARKET	Commercial Insurance[1]		Medicare		Medicaid[2]	
	2017	2018	2017	2018	2017	2018
Allentown	42.5%	43.5%	42.3%	40.3%	15.3%	16.3%
Harrisburg	45.2	45.5	46.3	45.6	8.5	8.9
Reading	41.9	42.0	47.4	47.7	10.8	10.3
Scranton	44.3	44.8	48.5	48.8	7.2	6.4
Pennsylvania	**41.2**	**41.5**	**43.6**	**43.1**	**15.2**	**15.4**
NATION	**42.0%**	**42.5%**	**43.4%**	**43.0%**	**14.6%**	**14.5%**

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH VARIOUS COMPLICATIONS, OVERALL VS. LONG-ACTING BASAL CATEGORY 1 AND CATEGORY 2, 2017–2018[3]

	Cardiovascular Disease						Stroke					
	Overall		Cat. 1		Cat. 2		Overall		Cat. 1		Cat. 2	
MARKET	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	36.0%	35.8%	32.5%	35.9%	30.4%	33.3%	4.5%	4.0%	3.6%	5.3%	n/a	n/a
Harrisburg	33.7	33.0	25.9	23.2	n/a	n/a	4.3	4.0	3.0	n/a	n/a	n/a
Reading	44.7	44.0	45.5	41.0	33.5	36.7	5.0	4.9	5.3	4.5	n/a	n/a
Scranton	42.7	40.9	39.5	37.7	36.3	35.0	3.6	3.7	3.4	3.8	2.5%	2.5%
Pennsylvania	**39.3**	**38.4**	**35.5**	**34.2**	**32.3**	**30.4**	**4.4**	**4.5**	**4.1**	**4.3**	**2.9**	**2.7**
NATION	**37.6%**	**37.5%**	**33.6%**	**32.8%**	**30.8%**	**30.3%**	**4.1%**	**4.2%**	**3.9%**	**4.0%**	**2.7%**	**2.8%**

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH VARIOUS COMPLICATIONS, OVERALL VS. LONG-ACTING BASAL CATEGORY 1 AND CATEGORY 2, 2017–2018[3]

	Chronic Kidney Disease						Hypoglycemia					
	Overall		Cat. 1		Cat. 2		Overall		Cat. 1		Cat. 2	
MARKET	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	15.1%	16.0%	17.6%	18.4%	12.7%	14.7%	3.3%	3.1%	5.6%	5.1%	n/a	n/a
Harrisburg	20.1	21.7	22.9	23.7	11.1	25.0	2.7	2.5	n/a	3.5	n/a	n/a
Reading	15.6	16.4	21.0	22.3	13.7	15.8	2.6	2.9	3.5	5.3	n/a	n/a
Scranton	16.0	16.1	19.6	19.8	18.6	16.1	2.3	2.5	4.7	4.0	5.8%	4.5%
Pennsylvania	**18.5**	**18.9**	**19.0**	**18.8**	**16.3**	**16.3**	**2.9**	**3.1**	**4.7**	**4.8**	**4.6**	**4.2**
NATION	**19.6%**	**20.1%**	**19.2%**	**19.1%**	**17.0%**	**17.3%**	**3.0%**	**3.2%**	**4.8%**	**5.1%**	**4.5%**	**4.8%**

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY ACTUAL COMORBIDITY, 2017–2018[4]

MARKET	Depression		Hyperlipidemia		Hypertension		Obesity	
	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	13.4%	15.2%	66.6%	65.6%	78.9%	79.9%	28.3%	38.6%
Harrisburg	12.4	13.7	61.3	57.6	79.6	80.8	35.3	34.1
Reading	12.7	13.2	77.3	76.6	81.7	81.5	28.5	29.6
Scranton	11.3	12.0	62.6	61.5	79.6	78.8	35.5	38.4
Pennsylvania	**11.6**	**12.3**	**67.9**	**66.4**	**78.9**	**78.7**	**32.8**	**35.6**
NATION	**10.8%**	**11.3%**	**68.0%**	**67.7%**	**80.8%**	**80.8%**	**26.8%**	**28.5%**

Data source: IQVIA © 2019

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

2 Medicaid includes fee-for-service and managed care.

3 A complication is defined as a patient condition caused by diabetes. Complications of diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD), cardiovascular disease, congestive heart failure, hypoglycemia, myocardial infarction (MI), nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, and stroke. ASCVD includes patients with acute coronary syndromes, MI, stroke, and other cardiovascular diseases.

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

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.

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PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS SERVICES, 2016–2018

|	A1c Test[1]			Blood Glucose Test			Ophthalmologic Exam			Serum Cholesterol Test			Urine Microalbumin Test		
MARKET	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Allentown	87.0%	84.9%	86.1%	90.8%	88.5%	88.1%	51.7%	52.8%	51.7%	79.9%	75.8%	74.8%	49.0%	47.1%	45.8%
Harrisburg	85.1	86.9	87.1	89.3	89.6	89.6	56.8	59.8	58.1	77.0	76.7	77.1	48.8	49.9	49.8
Reading	88.6	90.1	91.5	88.5	87.9	88.1	73.2	77.8	77.6	74.8	74.9	74.2	44.7	44.9	44.3
Scranton	84.0	84.8	86.6	88.2	89.1	88.5	58.5	59.7	59.5	75.8	74.2	74.8	44.9	46.3	44.7
Pennsylvania	85.7	86.6	87.2	89.3	89.2	89.2	50.5	51.2	51.0	76.9	76.3	76.2	47.2	48.3	48.0
NATION	89.2%	90.0%	90.3%	92.3%	92.8%	92.9%	41.8%	42.0%	41.4%	81.0%	81.2%	80.7%	49.5%	50.8%	50.4%

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH AN A1c LEVEL >9.0%, 2016–2018[1]
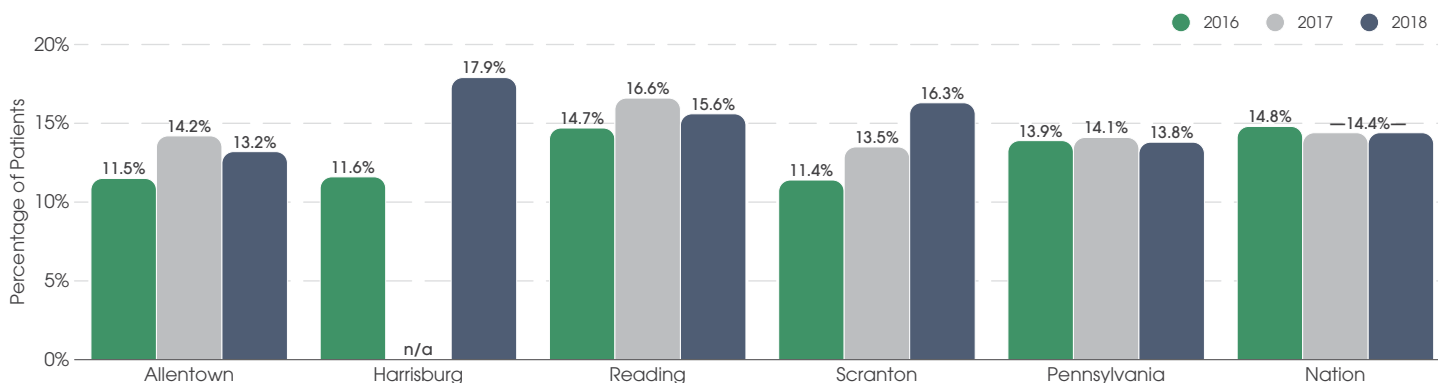
PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING LONG-ACTING BASAL CATEGORY 1 VS. CATEGORY 2 WITH AN A1c LEVEL ≤7.0% OR >9.0%, 2016 AND 2018[1]

	≤7.0%[2]						>9.0%[3]					
	Category 1			Category 2			Category 1			Category 2		
MARKET	2016	2018	% Point Change	2016	2018	% Point Change	2016	2018	% Point Change	2016	2018	% Point Change
Pennsylvania	20.5%	24.4%	4.0	14.6%	21.9%	7.3	31.1%	31.5%	0.4	37.7%	30.1%	−7.5
NATION	20.1%	23.1%	3.0	14.5%	21.2%	6.7	36.1%	35.5%	−0.6	42.1%	34.9%	−7.3

EMERGENCY DEPARTMENT PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE AND PAYER, 2018[1,4]
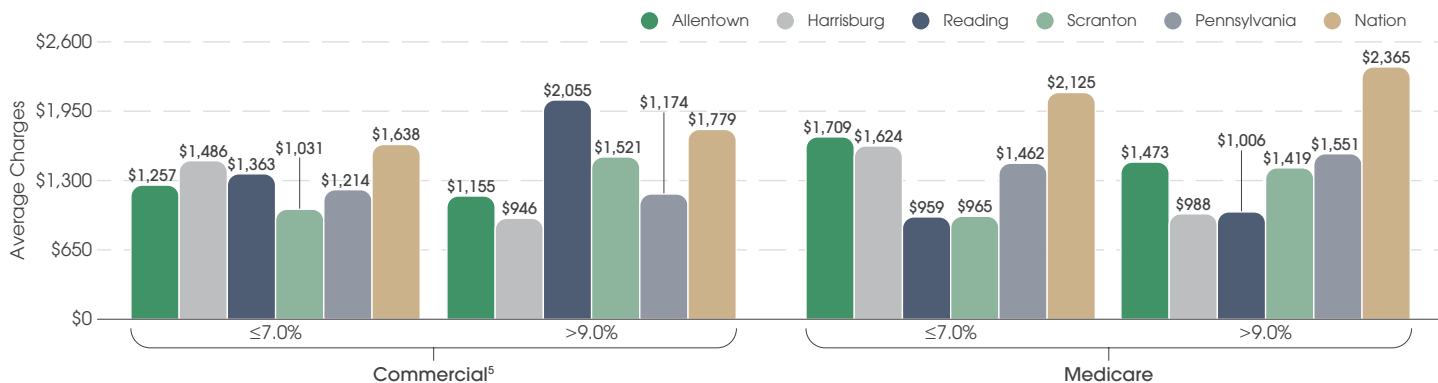
Data source: IQVIA © 2019

[1] The A1c test measures how much glucose has been in the blood during the past 2–3 months. Figures reflect the percentage of diabetes patients who have had at least one A1c test in a given year.
[2] Positive percent change in this group indicates an improvement, from 2016 to 2018, in the percentage of patients with A1c levels at or below 7.0%.
[3] Negative percent change in this group indicates an improvement, from 2016 to 2018, in the percentage of patients with A1c levels above 9.0%.
[4] Professional charges are those generated by the providers delivering care to patients with diabetes in various settings.
[5] 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. Some data were unavailable for the selected markets.

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS INSULIN AND COMBINATION THERAPIES, 2017–2018[1]

MARKET	Any Insulin Products		Long-Acting Basal Category 1		Long-Acting Basal Category 2		Fixed Ratio (Long-Acting Insulin/ GLP-1 RA)		Free Ratio (Variable Long-Acting Insulin + GLP-1 RA)		Rapid-Acting Insulin	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	30.7%	31.2%	19.0%	18.9%	5.8%	7.0%	0.5%	0.8%	4.4%	5.4%	12.9%	12.5%
Harrisburg	32.2	33.1	20.2	18.9	5.4	6.2	0.6	0.4	5.0	5.7	14.8	15.0
Reading	25.8	27.1	16.1	16.8	5.6	6.2	0.2	0.4	3.0	4.1	12.0	12.0
Scranton	27.2	26.9	16.5	15.1	6.4	7.1	0.3	0.6	4.9	5.8	12.6	12.4
Pennsylvania	**28.6**	**29.5**	**17.5**	**17.1**	**5.9**	**6.9**	**0.4**	**0.8**	**4.4**	**5.7**	**13.0**	**13.4**
NATION	**27.7%**	**27.5%**	**17.8%**	**16.9%**	**5.5%**	**6.3%**	**0.4%**	**0.8%**	**4.4%**	**5.5%**	**11.2%**	**11.4%**

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH AN A1c LEVEL >9.0% RECEIVING VARIOUS INSULIN AND COMBINATION THERAPIES, 2017–2018[1,2]

MARKET	Any Insulin Products		Long-Acting Basal Category 1		Long-Acting Basal Category 2		Fixed Ratio (Long-Acting Insulin/ GLP-1 RA)		Free Ratio (Variable Long-Acting Insulin + GLP-1 RA)		Rapid-Acting Insulin	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	50.0%	48.1%	29.5%	31.9%	13.7%	15.6%	n/a	n/a	11.6%	10.0%	23.3%	17.5%
Scranton	55.3	50.7	33.5	28.8	16.1	16.0	n/a	n/a	10.8	12.8	27.0	23.4
Pennsylvania	**53.5**	**53.3**	**33.6**	**31.6**	**12.8**	**13.7**	**0.6%**	**1.4%**	**7.5**	**9.1**	**24.8**	**24.6**
NATION	**51.5%**	**50.7%**	**33.3%**	**31.7%**	**11.9%**	**12.5%**	**1.2%**	**1.9%**	**8.2%**	**10.1%**	**20.5%**	**20.2%**

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, 2017–2018[1]

MARKET	Any Non-Insulin Antidiabetic Product		Biguanides		DPP-4 Inhibitors		GLP-1 RAs		Insulin Sensitizing Agents		SGLT-2 Inhibitors	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	91.7%	91.0%	62.2%	62.6%	15.0%	14.8%	11.0%	13.2%	3.4%	3.3%	16.5%	16.9%
Harrisburg	90.2	90.7	64.4	65.6	14.8	14.2	12.1	14.6	6.3	6.2	15.0	14.3
Reading	92.9	92.7	65.8	66.8	15.0	13.4	9.0	11.4	3.5	3.3	17.7	18.5
Scranton	92.5	92.4	67.7	68.2	16.8	15.6	13.2	15.4	6.5	5.9	13.7	15.3
Pennsylvania	**91.8**	**91.5**	**66.9**	**67.1**	**14.9**	**14.0**	**12.1**	**14.7**	**5.0**	**4.8**	**14.1**	**15.2**
NATION	**92.9%**	**92.9%**	**69.3%**	**69.5%**	**13.0%**	**12.5%**	**12.4%**	**14.5%**	**6.3%**	**6.6%**	**13.7%**	**14.3%**

Data source: IQVIA © 2019

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 (RAs): 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. "Fixed ratio (long-acting insulin/GLP-1 RA)" refers to the two therapies combined in a single product. "Free ratio (variable long-acting insulin + GLP-1 RA)" 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.

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

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

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

[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] The A1c test measures how much glucose has been in the blood during the past 2–3 months. Figures reflect the percentage of diabetes patients who have had at least one A1c test in a given year.
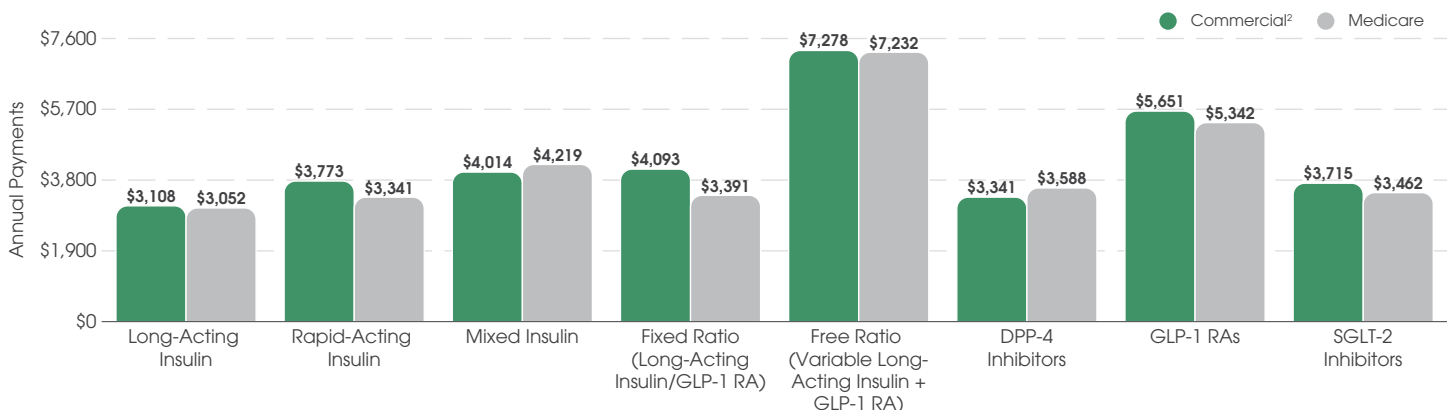NOTE: Some data were unavailable for Harrisburg and Reading.

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PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS COMBINATION THERAPIES, 2017–2018

| | 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-Insulin | | Use of 3 Products: 2 Insulin, 1 Non-Insulin | |
MARKET	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	37.5%	37.2%	20.4%	20.0%	6.2%	6.6%	4.5%	5.2%	11.0%	11.3%	8.1%	7.9%	7.4%	6.6%
Harrisburg	35.3	34.5	21.5	20.8	6.0	6.0	5.5	5.3	10.6	10.9	7.2	8.3	8.1	8.5
Reading	39.9	39.8	23.6	23.0	5.4	6.0	4.1	4.7	10.4	9.9	6.0	6.1	6.8	6.9
Scranton	38.4	38.8	22.2	21.8	5.1	5.4	4.7	4.8	11.4	11.8	7.4	7.0	6.9	6.5
Pennsylvania	37.7	37.4	22.4	22.0	5.5	5.7	5.0	5.4	10.8	10.7	7.1	7.1	7.2	7.3
NATION	38.7%	38.8%	22.5%	22.6%	5.8%	5.8%	4.2%	4.3%	10.7%	10.6%	7.4%	7.2%	6.8%	6.6%

ANNUAL PAYMENTS PER COMMERCIAL TYPE 2 DIABETES PATIENT RECEIVING VARIOUS COMBINATION THERAPIES, 2017–2018[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-Insulin | | Use of 3 Products: 2 Insulin, 1 Non-Insulin | |
MARKET	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	$914	$1,000	$2,697	$2,995	$4,371	$5,552	$5,668	$6,287	$5,005	$5,536	$6,667	$7,354	$8,514	$9,208
Harrisburg	727	895	2,207	2,575	5,426	5,054	6,867	6,559	4,257	4,713	6,490	6,795	9,527	9,166
Reading	898	1,049	2,771	3,297	4,281	4,834	5,326	6,054	5,297	6,011	6,697	7,378	7,728	9,171
Scranton	1,006	1,067	2,864	3,239	5,816	6,502	7,150	7,543	5,455	5,689	7,881	8,265	10,191	10,809
Pennsylvania	847	1,000	2,493	2,881	4,906	5,679	6,448	6,828	4,900	5,459	6,764	7,376	8,806	9,435
NATION	$827	$955	$2,300	$2,599	$4,768	$5,224	$6,445	$6,848	$4,616	$5,106	$6,422	$7,035	$8,614	$9,311

ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT RECEIVING VARIOUS INSULIN AND NON-INSULIN ANTIDIABETIC THERAPIES, BY PAYER, PENNSYLVANIA, 2018[1]

Legend: ● Commercial[2] ● Medicare

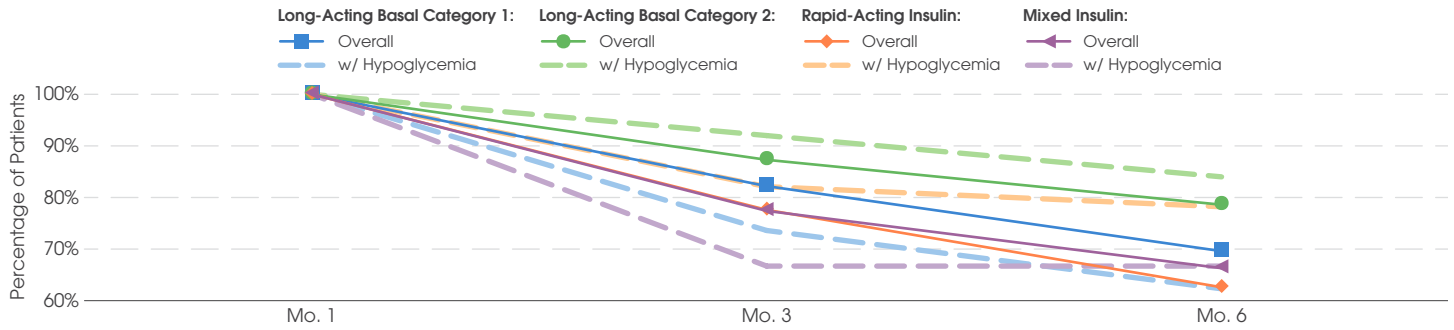| Therapy	Commercial	Medicare
Long-Acting Insulin	$3,108	$3,052
Rapid-Acting Insulin	$3,773	$3,341
Mixed Insulin	$4,014	$4,219
Fixed Ratio (Long-Acting Insulin/GLP-1 RA)	$4,093	$3,391
Free Ratio (Variable Long-Acting Insulin + GLP-1 RA)	$7,278	$7,232
DPP-4 Inhibitors	$3,341	$3,588
GLP-1 RAs	$5,651	$5,342
SGLT-2 Inhibitors	$3,715	$3,462

Data source: IQVIA © 2019

[1] Figures reflect the per-patient yearly payments for 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.
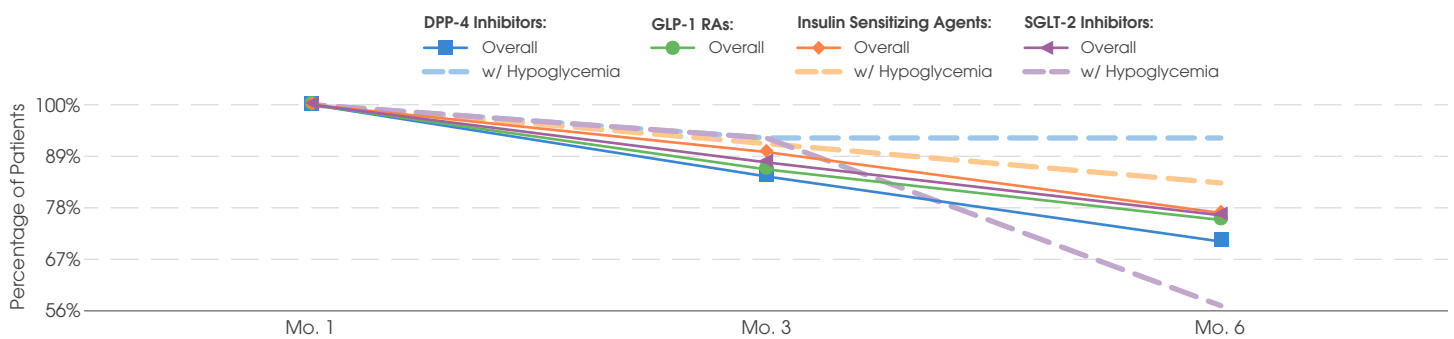[2] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
NOTE: "Fixed ratio (long-acting insulin/GLP-1 RA)" refers to the two therapies combined in a single product. "Free ratio (variable long-acting insulin + GLP-1 RA)" refers to the two therapies taken separately and concurrently.
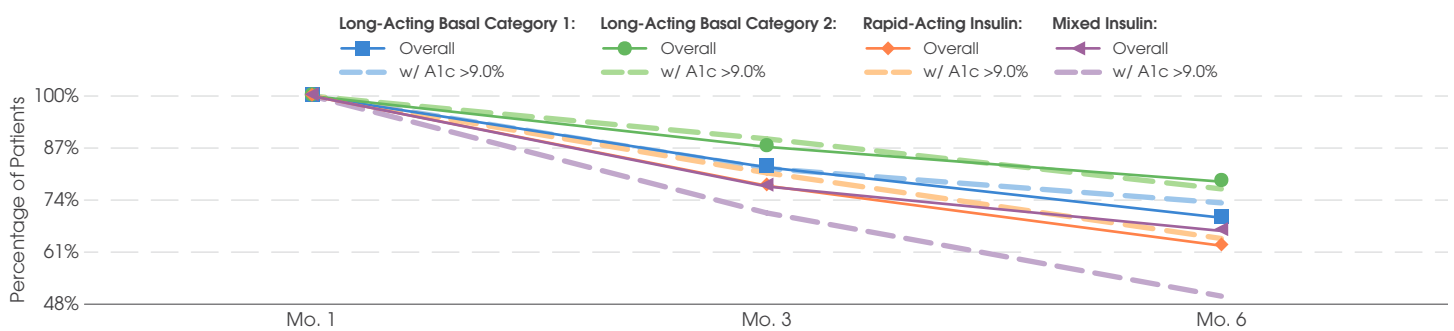
PERSISTENCY: COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH HYPOGLYCEMIA, VARIOUS INSULIN THERAPIES, PENNSYLVANIA, 2018[1]
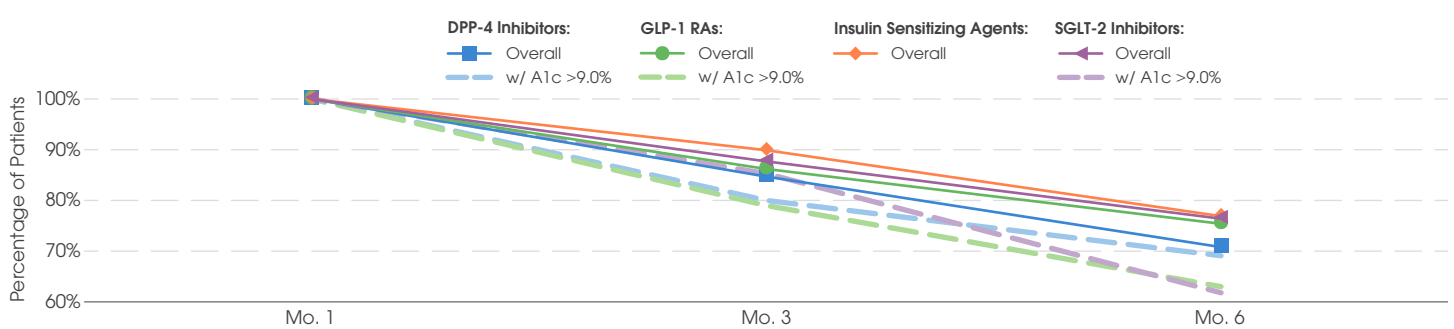
Long-Acting Basal Category 1:
- Overall
- w/ Hypoglycemia

Long-Acting Basal Category 2:
- Overall
- w/ Hypoglycemia

Rapid-Acting Insulin:
- Overall
- w/ Hypoglycemia

Mixed Insulin:
- Overall
- w/ Hypoglycemia

PERSISTENCY: COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH HYPOGLYCEMIA, VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, PENNSYLVANIA, 2018[1]

DPP-4 Inhibitors:
- Overall
- w/ Hypoglycemia

GLP-1 RAs:
- Overall

Insulin Sensitizing Agents:
- Overall
- w/ Hypoglycemia

SGLT-2 Inhibitors:
- Overall
- w/ Hypoglycemia

PERSISTENCY: COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH AN A1c LEVEL >9.0%, VARIOUS INSULIN THERAPIES, PENNSYLVANIA, 2018[2]

Long-Acting Basal Category 1:
- Overall
- w/ A1c >9.0%

Long-Acting Basal Category 2:
- Overall
- w/ A1c >9.0%

Rapid-Acting Insulin:
- Overall
- w/ A1c >9.0%

Mixed Insulin:
- Overall
- w/ A1c >9.0%

PERSISTENCY: COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH AN A1c LEVEL >9.0%, VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, PENNSYLVANIA, 2018[2]

DPP-4 Inhibitors:
- Overall
- w/ A1c >9.0%

GLP-1 RAs:
- Overall
- w/ A1c >9.0%

Insulin Sensitizing Agents:
- Overall

SGLT-2 Inhibitors:
- Overall
- w/ A1c >9.0%

Data source: IQVIA © 2019

[1] A complication is defined as a patient condition caused by diabetes. Complications of diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD), cardiovascular disease, congestive heart failure, hypoglycemia, myocardial infarction (MI), nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, and stroke. ASCVD includes patients with acute coronary syndromes, MI, stroke, and other cardiovascular diseases.

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

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 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. Persistency 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 & CARDIOVASCULAR DISEASE

PERCENTAGE OF ALL-PAYER INPATIENT CASES WITH A SECONDARY DIAGNOSIS OF TYPE 2 DIABETES, BY FOUR PRIMARY CARDIOVASCULAR DIAGNOSES, 2017[1]
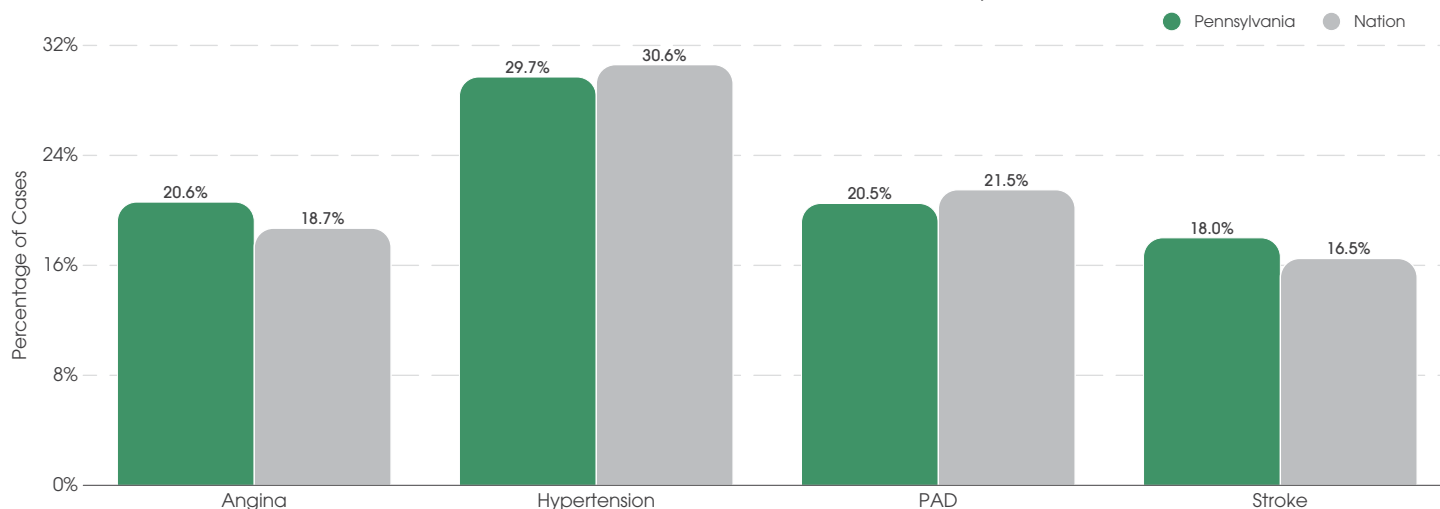
INPATIENT FACILITY CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH CARDIOVASCULAR DISEASE, BY PAYER, 2018[2,3]

MARKET	Commercial[4]		Medicare	
	Overall	w/ Cardiovascular Disease	Overall	w/ Cardiovascular Disease
Allentown	$46,552	$49,184	$41,568	$42,496
Harrisburg	70,249	104,975	56,651	64,382
Reading	54,203	71,641	63,608	69,696
Scranton	72,111	72,111	52,295	39,725
Pennsylvania	61,401	70,725	59,358	62,919
NATION	$49,034	$54,103	$53,515	$57,620

MEDICARE CHARGES AND REIMBURSEMENT PER INPATIENT CASE, PENNSYLVANIA, 2017
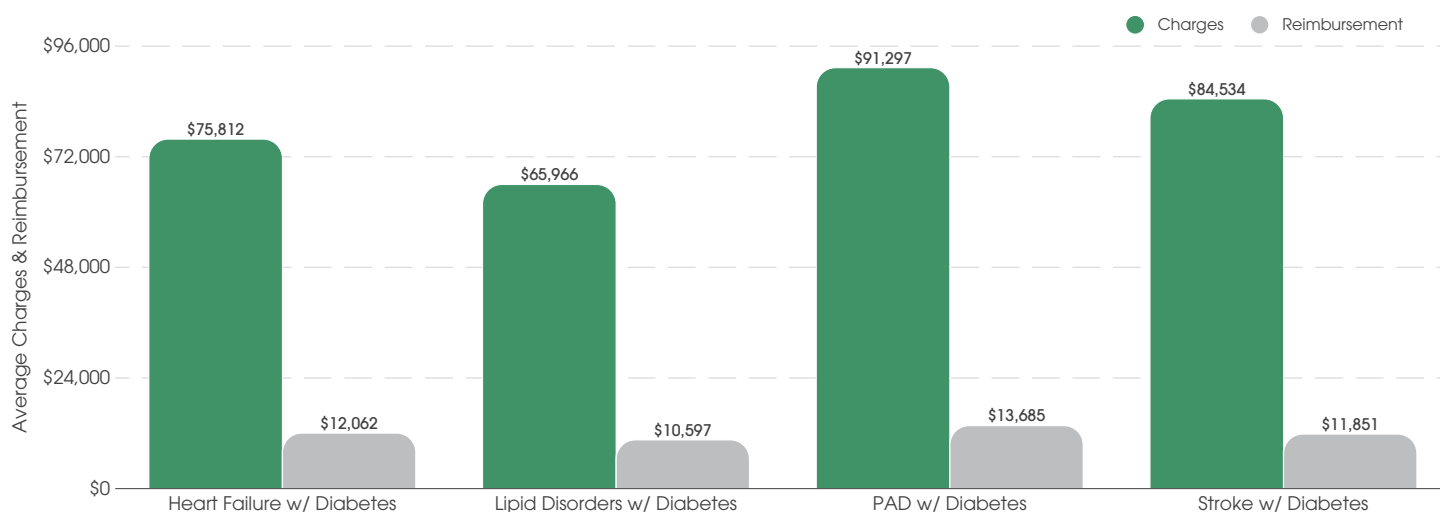
Data source: IQVIA © 2019

1 Data include cases of Type 2 diabetes with no complications or Type 2 diabetes with diabetic chronic kidney disease.
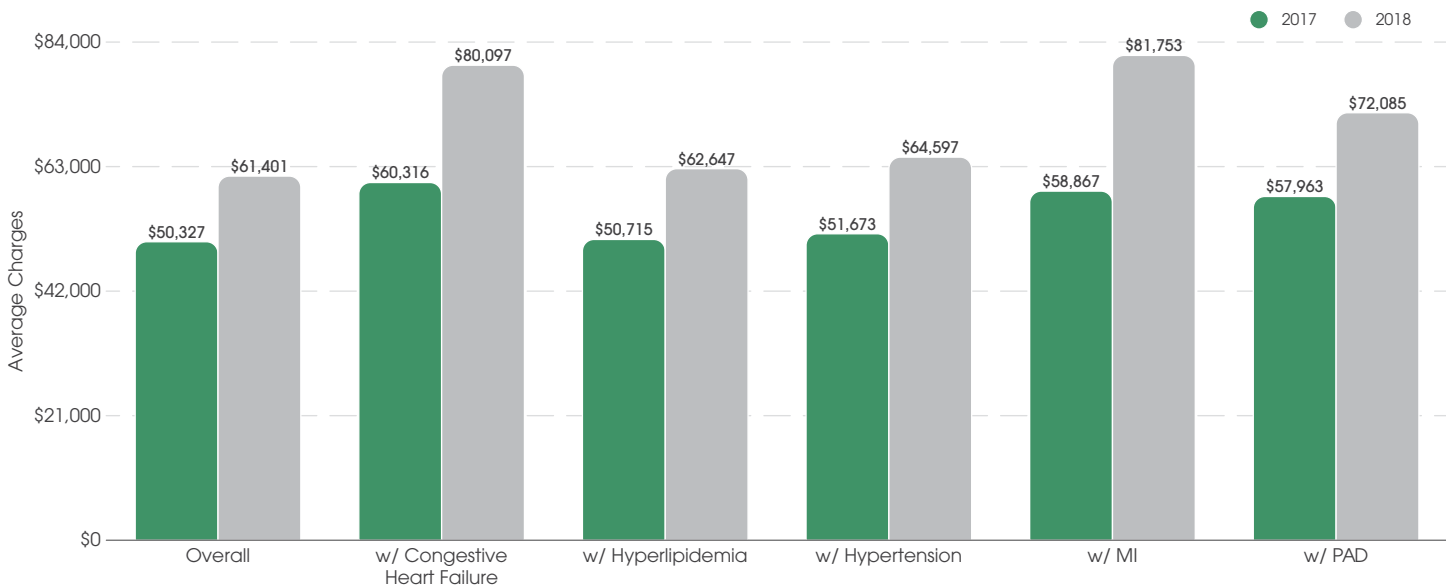2 Data reflect the charges generated for diabetes patients by the facilities that delivered care. The data also reflect the average amounts charged, not the amounts paid.
3 A complication is defined as a patient condition caused by diabetes. Complications of diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD), cardiovascular disease, congestive heart failure, hypoglycemia, myocardial infarction (MI), nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, and stroke. ASCVD includes patients with acute coronary syndromes, MI, stroke, and other cardiovascular diseases.
4 Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
NOTE: Throughout this report, unless otherwise specified, hospital case data include primary and secondary diagnoses. Secondary diagnoses and charges and reimbursement 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 2017. Psychiatric, rehabilitation, armed forces, and long-term acute-care hospitals are excluded.

INPATIENT FACILITY CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH COMMON CO-OCCURRING CONDITIONS, PENNSYLVANIA, 2017–2018[1,2]

Bar chart legend: ● 2017 ● 2018

Y-axis: Average Charges

Category	2017	2018
Overall	$50,327	$61,401
w/ Congestive Heart Failure	$60,316	$80,097
w/ Hyperlipidemia	$50,715	$62,647
w/ Hypertension	$51,673	$64,597
w/ MI	$58,867	$81,753
w/ PAD	$57,963	$72,085

OUTPATIENT FACILITY CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH COMMON CO-OCCURRING CONDITIONS, 2018[1,2]

MARKET	Overall	w/ Congestive Heart Failure	w/ Hyperlipidemia	w/ Hypertension	w/ MI	w/ PAD
Pennsylvania	$23,510	$43,298	$24,756	$26,217	$50,595	$35,285
NATION	**$12,730**	**$20,535**	**$12,865**	**$13,814**	**$22,226**	**$19,050**

INPATIENT PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH CARDIOVASCULAR DISEASE, BY PAYER, 2018[3,4]

MARKET	Commercial[5]		Medicare	
	Overall	w/ Cardiovascular Disease	Overall	w/ Cardiovascular Disease
Allentown	$4,074	$4,816	$3,555	$4,250
Harrisburg	3,191	3,995	4,184	5,332
Reading	5,111	6,029	5,948	6,834
Scranton	4,398	5,413	2,261	2,641
Pennsylvania	**3,570**	**4,259**	**3,792**	**4,508**
NATION	**$4,173**	**$5,040**	**$4,410**	**$5,237**

Data source: IQVIA © 2019

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.
2 A co-occurring condition is a condition a patient with diabetes may also have, which may or may not be directly related to the diabetes. Co-occurring conditions were narrowed down to a subset of conditions, including, but not limited to, atherosclerotic cardiovascular disease (ASCVD; includes patients with acute coronary syndromes, myocardial infarction (MI), stroke, and other cardiovascular conditions), chronic kidney disease (CKD), gastrointestinal (GI) symptoms, congestive heart failure, hypoglycemia, obesity, peripheral artery disease (PAD), and stroke.
3 Professional charges are those generated by the providers delivering care to patients with diabetes in various settings.
4 A complication is defined as a patient condition caused by diabetes. Complications of diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD), cardiovascular disease, congestive heart failure, hypoglycemia, myocardial infarction (MI), nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, and stroke. ASCVD includes patients with acute coronary syndromes, MI, stroke, and other cardiovascular diseases.
5 Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
NOTE: Some data were unavailable for the selected markets.

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AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER ALL-PAYER PRIMARY INPATIENT ACUTE CORONARY SYNDROMES CASE, 2016–2017

	Average Length of Stay		Average Charges[1]	
MARKET	2016	2017	2016	2017
Allentown	2.8	4.2	$89,694	$132,294
Harrisburg	4.0	5.2	67,077	82,284
Reading	3.4	4.3	73,189	76,364
Scranton	3.3	4.8	68,941	78,559
Pennsylvania	**3.1**	**4.6**	**65,497**	**91,546**
NATION	**2.9**	**4.7**	**$57,665**	**$88,080**

30-DAY ALL-PAYER HOSPITAL READMISSION RATES FOR ACUTE CORONARY SYNDROMES OR STROKE, 2017
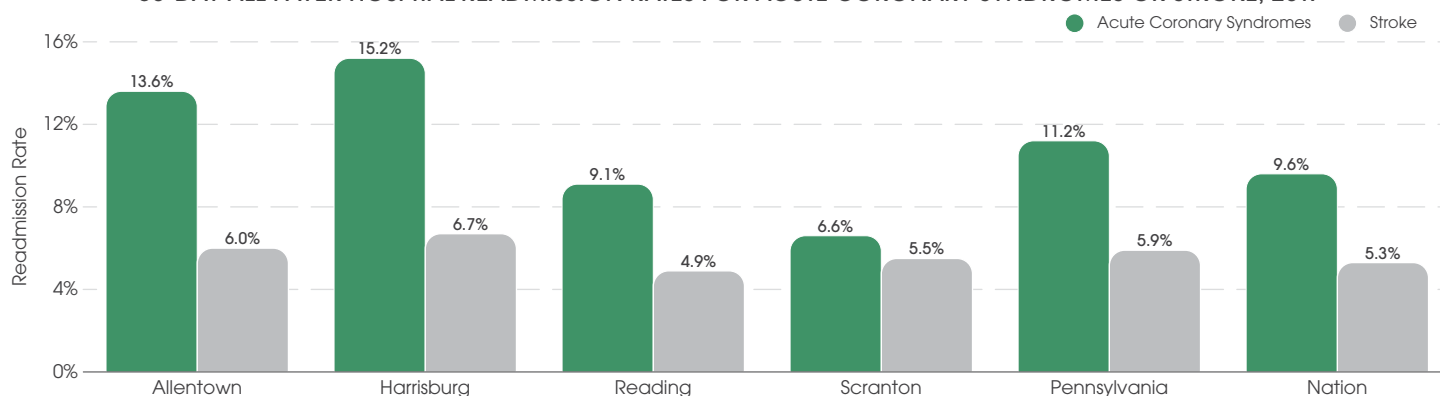
AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER ALL-PAYER PRIMARY INPATIENT STROKE CASE, 2016–2017

	Average Length of Stay		Average Charges[1]	
MARKET	2016	2017	2016	2017
Allentown	3.7	4.4	$74,723	$97,175
Harrisburg	4.1	4.0	42,385	40,494
Reading	3.8	3.7	44,678	51,296
Scranton	3.5	3.4	52,911	39,218
Pennsylvania	**3.5**	**3.7**	**41,699**	**60,734**
NATION	**3.8**	**3.7**	**$34,554**	**$55,082**

EMERGENCY DEPARTMENT PROFESSIONAL CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH STROKE, 2017–2018[2,3]

	Overall		w/ Stroke	
MARKET	2017	2018	2017	2018
Allentown	$1,074	$1,038	$1,328	$1,521
Harrisburg	1,391	1,259	1,821	1,787
Reading	1,252	1,320	1,669	1,974
Scranton	1,384	1,284	1,513	1,279
Pennsylvania	**1,142**	**1,228**	**1,427**	**1,620**
NATION	**$1,494**	**$1,640**	**$2,036**	**$2,298**

Data source: IQVIA © 2019

[1] Charge data are per-case averages for patients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the acute-care 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.

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

[3] A complication is defined as a patient condition caused by diabetes. Complications of diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD), cardiovascular disease, congestive heart failure, hypoglycemia, myocardial infarction (MI), nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, and stroke. ASCVD includes patients with acute coronary syndromes, MI, stroke, and other cardiovascular diseases.

NOTE: Average length of stay and 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 2017. Psychiatric, rehabilitation, armed forces, and long-term acute-care hospitals are excluded. Data for acute coronary syndromes and stroke in 2017 vary from previous years due to changes in the ICD-10 codes.

NUMBER OF ALL-PAYER INPATIENT AND OUTPATIENT DIABETES MELLITUS CASES PER HOSPITAL PER YEAR, 2016–2017

	Inpatient		Outpatient	
MARKET	2016	2017	2016	2017
Allentown	2,074.7	2,248.3	11,250.9	10,904.8
Harrisburg	3,691.5	3,886.0	28,884.5	30,906.8
Reading	2,564.0	2,638.0	21,499.7	23,101.0
Scranton	2,157.0	2,103.6	18,902.7	20,161.3
Pennsylvania	1,681.1	1,723.0	12,142.4	12,273.6
NATION	1,358.2	1,428.8	9,259.8	9,294.2

NUMBER OF INPATIENT AND OUTPATIENT DIABETES MELLITUS CASES PER HOSPITAL PER YEAR, BY PAYER, 2017

	Inpatient			Outpatient	
MARKET	Commercial Insurance[1]	Medicare	Medicaid[2]	Medicare	Non-Medicare[3]
Allentown	522.3	1,401.4	256.8	4,782.6	6,122.2
Harrisburg	1,249.8	1,987.0	518.0	10,146.5	20,760.3
Reading	663.7	1,527.0	396.3	9,067.7	14,033.3
Scranton	447.7	1,339.9	265.4	8,847.1	11,314.1
Pennsylvania	484.0	928.1	260.7	4,559.2	7,714.5
NATION	328.2	771.5	236.0	3,575.9	5,718.4

AVERAGE LENGTH OF STAY (DAYS) AND CHARGES PER ALL-PAYER PRIMARY INPATIENT DIABETES MELLITUS CASE, 2016–2017

	Average Length of Stay		Average Charges[4]	
MARKET	2016	2017	2016	2017
Allentown	4.5	7.7	$57,554	$64,427
Harrisburg	4.3	6.7	42,016	n/a
Reading	6.0	7.7	44,455	37,109
Scranton	4.4	7.0	44,396	n/a
Pennsylvania	4.3	6.6	38,213	42,049
NATION	4.3	6.6	$30,778	$37,768

EMERGENCY DEPARTMENT PERCENTAGE OF ALL-PAYER OUTPATIENT DIABETES MELLITUS CASES, 2016–2017
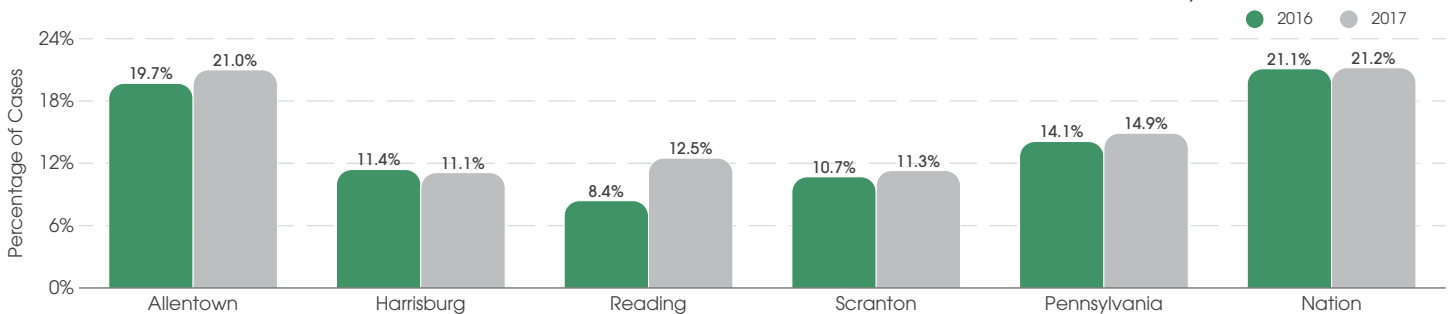
Data source: IQVIA © 2019

1 Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
2 Medicaid includes fee-for-service and managed care.
3 Non-Medicare includes commercial insurance, Medicaid, and all other non-Medicare payers. Non-Medicare may also include some commercial Medicare Advantage plans.
4 Charge data are per-case averages for patients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the acute-care 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: Case counts, average length of stay, and 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 2017. Psychiatric, rehabilitation, armed forces, and long-term acute-care hospitals are excluded.

PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER, 2017–2018[1]

MARKET	Commercial Insurance[2]		Medicare		Medicaid[3]	
	2017	2018	2017	2018	2017	2018
Allentown	$3,494	$4,074	$3,040	$3,555	$3,234	$4,128
Harrisburg	3,678	3,191	3,116	4,184	3,051	4,450
Reading	4,096	5,111	5,890	5,948	5,495	5,472
Scranton	3,266	4,398	2,603	2,261	3,346	2,904
Pennsylvania	**3,249**	**3,570**	**3,783**	**3,792**	**4,308**	**4,679**
NATION	**$3,684**	**$4,173**	**$4,036**	**$4,410**	**$4,164**	**$4,696**

PROFESSIONAL CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS, BY SETTING, 2017–2018[1]

MARKET	Ambulatory Surgery		Emergency Department		Inpatient		Outpatient		Office/ Clinic	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	$2,422	$2,518	$1,074	$1,038	$3,494	$4,074	$1,385	$1,503	$1,634	$1,831
Harrisburg	1,946	1,722	1,391	1,259	3,678	3,191	1,652	1,445	1,462	1,566
Reading	2,048	2,294	1,252	1,320	4,096	5,111	1,214	1,301	1,831	1,956
Scranton	2,651	2,769	1,384	1,284	3,266	4,398	1,293	1,371	1,762	1,971
Pennsylvania	**2,231**	**2,325**	**1,142**	**1,228**	**3,249**	**3,570**	**1,270**	**1,352**	**1,564**	**1,733**
NATION	**$2,829**	**$2,934**	**$1,494**	**$1,640**	**$3,684**	**$4,173**	**$1,563**	**$1,642**	**$2,031**	**$2,291**

PROFESSIONAL INPATIENT CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH HYPOGLYCEMIA, 2017–2018[1,4]

MARKET	Overall		w/ Hypoglycemia	
	2017	2018	2017	2018
Allentown	$3,494	$4,074	$5,933	$6,301
Harrisburg	3,678	3,191	4,749	3,503
Reading	4,096	5,111	5,859	8,478
Scranton	3,266	4,398	3,324	5,488
Pennsylvania	**3,249**	**3,570**	**4,178**	**5,049**
NATION	**$3,684**	**$4,173**	**$4,992**	**$5,936**

PROFESSIONAL INPATIENT CHARGES PER YEAR FOR COMMERCIAL TYPE 2 DIABETES PATIENTS, BY ACTUAL COMPLICATION, 2017–2018[1,4]

MARKET	Cardiovascular Disease		Nephropathy		Neuropathy		PAD		Retinopathy	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Allentown	$4,102	$4,816	$4,230	$4,818	$3,957	n/a	$4,301	$5,526	$3,409	$4,155
Harrisburg	4,615	3,995	4,465	3,724	4,437	$3,564	4,340	3,659	4,330	3,142
Reading	4,733	6,029	5,049	6,468	4,852	6,523	4,949	6,430	4,288	5,279
Scranton	3,716	5,413	4,200	5,482	3,820	5,472	4,302	5,620	3,481	3,526
Pennsylvania	**3,757**	**4,259**	**3,918**	**4,385**	**3,718**	**4,079**	**3,986**	**4,584**	**3,488**	**3,572**
NATION	**$4,352**	**$5,040**	**$4,523**	**$5,223**	**$4,314**	**$4,971**	**$4,711**	**$5,510**	**$3,944**	**$4,443**

Data source: IQVIA © 2019

[1] Professional charges are those generated by the providers delivering care to patients with diabetes in various settings.
[2] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
[3] Medicaid includes fee-for-service and managed care.
[4] A complication is defined as a patient condition caused by diabetes. Complications of diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD), cardiovascular disease, congestive heart failure, hypoglycemia, myocardial infarction (MI), nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, and stroke. ASCVD includes patients with acute coronary syndromes, MI, stroke, and other cardiovascular diseases.

MARKET	Long-Acting Basal Category 1			Long-Acting Basal Category 2			Fixed Ratio (Long-Acting Insulin/GLP-1 RA)			Free Ratio (Variable Long-Acting Insulin + GLP-1 RA)			Rapid-Acting Insulin		
	Comm. Ins.[2]	Medi-care	Medi-caid[3]	Comm. Ins.[2]	Medi-care	Medi-caid[3]	Comm. Ins.[2]	Medi-care	Medi-caid[3]	Comm. Ins.[2]	Medi-care	Medi-caid[3]	Comm. Ins.[2]	Medi-care	Medi-caid[3]
Allentown	$2,593	$2,783	$2,128	$3,454	$3,167	$3,292	$4,245	$3,228	$3,120	$6,964	$7,237	$5,244	$3,604	$3,396	$3,197
Harrisburg	2,806	3,131	2,223	3,708	3,818	2,711	4,118	4,562	n/a	7,417	8,272	5,907	3,520	3,311	3,199
Reading	2,554	2,662	1,758	3,261	3,395	2,664	5,064	2,969	n/a	7,320	6,777	4,827	3,645	3,481	2,819
Scranton	3,152	2,878	2,401	3,773	3,630	2,441	4,047	3,760	5,383	8,436	8,503	5,703	4,188	3,562	4,043
Pennsylvania	2,746	2,791	2,197	3,515	3,374	2,698	4,093	3,391	3,726	7,278	7,232	5,824	3,773	3,341	3,387
NATION	$2,730	$2,828	$2,363	$3,483	$3,191	$3,191	$3,731	$2,887	$3,064	$6,850	$7,152	$5,439	$3,550	$3,092	$3,001

AVERAGE ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT RECEIVING VARIOUS INSULIN AND COMBINATION THERAPIES, BY PAYER, 2018[1]

AVERAGE ANNUAL PAYMENTS PER COMMERCIAL TYPE 2 DIABETES PATIENT RECEIVING VARIOUS INSULIN AND COMBINATION THERAPIES, 2018[1]

MARKET	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Fixed Ratio (Long-Acting Insulin/GLP-1 RA)	Free Ratio (Variable Long-Acting Insulin + GLP-1 RA)	Rapid-Acting Insulin
Allentown	$2,593	$3,454	$4,245	$6,964	$3,604
Harrisburg	2,806	3,708	4,118	7,417	3,520
Reading	2,554	3,261	5,064	7,320	3,645
Scranton	3,152	3,773	4,047	8,436	4,188
Pennsylvania	2,746	3,515	4,093	7,278	3,773
NATION	$2,730	$3,483	$3,731	$6,850	$3,550

AVERAGE ANNUAL PAYMENTS PER COMMERCIAL TYPE 2 DIABETES PATIENT RECEIVING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, 2018[1,4]

MARKET	Any Non-Insulin Antidiabetic Product	DPP-4 Inhibitors	GLP-1 RAs	Insulin Sensitizing Agents	SGLT-2 Inhibitors
Allentown	$3,638	$3,147	$5,544	$211	$3,579
Harrisburg	3,498	3,243	5,523	159	3,716
Reading	3,499	3,383	5,566	247	3,879
Scranton	3,858	3,483	6,110	259	3,809
Pennsylvania	3,576	3,341	5,651	222	3,715
NATION	$3,297	$3,261	$5,384	$285	$3,650

Data source: IQVIA © 2019

1 Figures reflect the per-patient yearly payments for 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.

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

3 Medicaid includes fee-for-service and managed care.

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: "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. "Fixed ratio (long-acting insulin/GLP-1 RA)" refers to the two therapies combined in a single product. "Free ratio (variable long-acting insulin + GLP-1 RA)" refers to the two therapies taken separately and concurrently.

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COMMON PROCEDURES FOR ALL-PAYER CASES TREATING A PRIMARY DIAGNOSIS OF DIABETES MELLITUS, PENNSYLVANIA, 2017
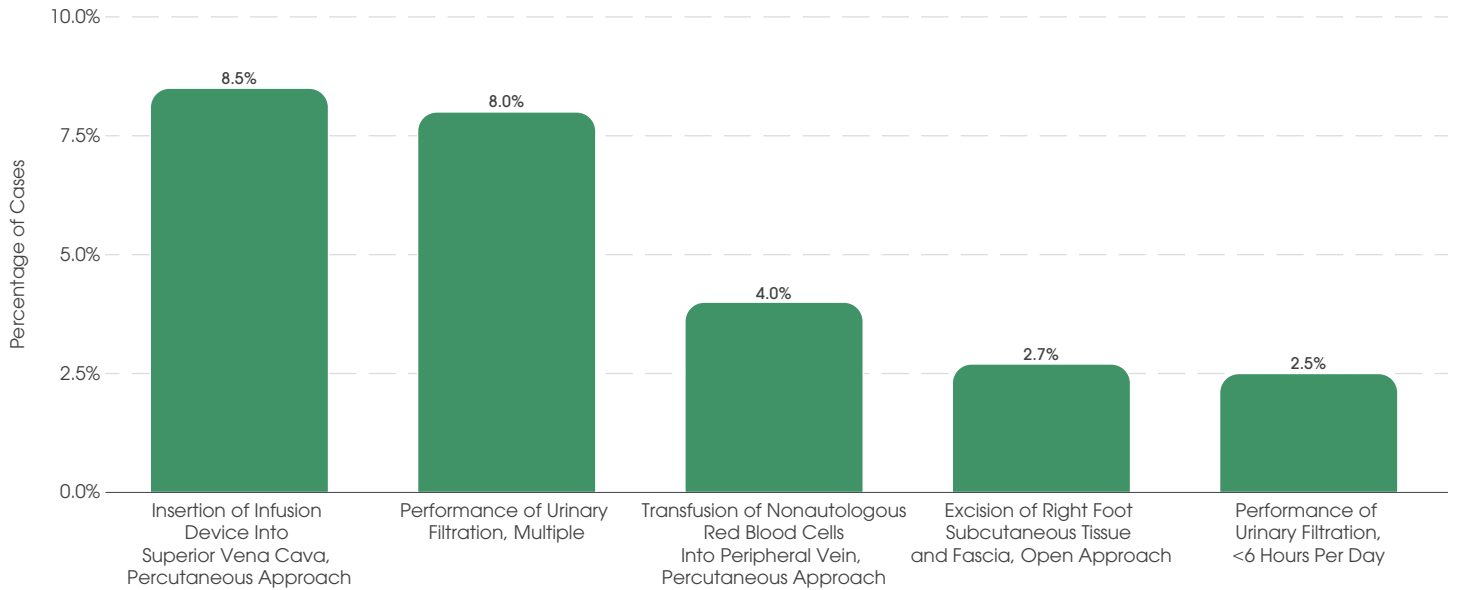
READMISSION RATES FOR ALL-PAYER PATIENTS DIAGNOSED WITH TYPE 2 DIABETES, BY TYPE OF THERAPY, 2016–2018[1]

	Three-Day Readmissions			30-Day Readmissions		
MARKET	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Three Non-Insulin Antidiabetic Products	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Three Non-Insulin Antidiabetic Products
NATION	6.9%	5.5%	13.6%	19.0%	17.3%	29.3%

30-DAY READMISSION RATES FOR ALL-PAYER PATIENTS WITH SELECT CARDIOVASCULAR CONDITIONS, 2017
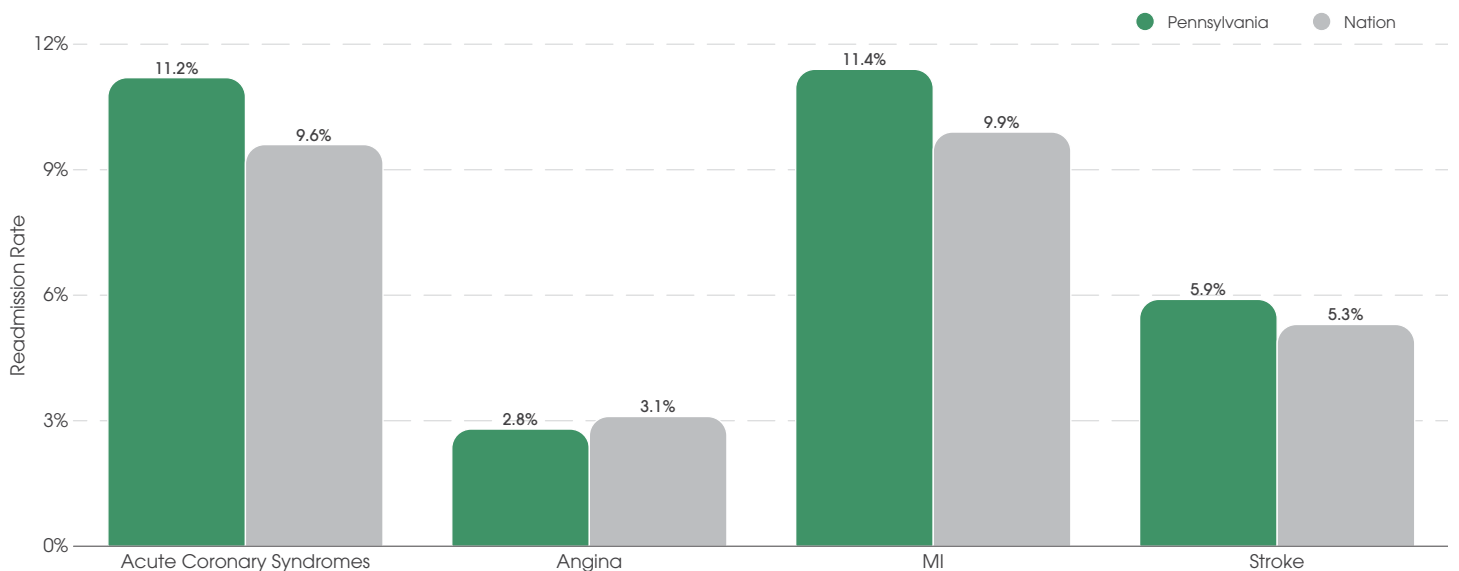
Data source: IQVIA © 2019

[1] Figures reflect the percentages of Type 2 diabetes patients who were readmitted to an inpatient facility in the three-year period between 2016 and 2018. These percentages include patients who filled multiple prescriptions. Readmissions are not necessarily due to Type 2 diabetes. Readmissions data are available down to the national level only.

NOTE: Procedure 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 2017. Psychiatric, rehabilitation, armed forces, and long-term acute-care hospitals are excluded. "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.

METHODOLOGY

IQVIA's *Hospital Procedure & Diagnosis* (HPD) database features an extensive set of inpatient and outpatient medical claims. The HPD data set comprises nearly 88,000 ICD-10 procedure codes and more than 69,000 diagnosis codes. The HPD data set includes nearly 2 billion professional and institutional medical claims representing coverage of more than 1.9 million unique health care providers. Consequently, HPD has visibility into more than 80% of all inpatient hospital claims nationwide and 100% of Medicare-reimbursed hospital inpatient and outpatient discharges. To account for non-Medicare hospital discharge information, HPD leverages non-Medicare medical claims data linked to individual facilities via physician affiliations and projects this data based on a combination of non-Medicare coverage metrics and hospital-level profiling information. All additional metrics (e.g., payer distribution, age, and gender distribution) are generated solely based off observations from the underlying medical claims used for data projection.

IQVIA generated data for this report out of health care professional (837p) and institutional (837i) insurance claims, representing roughly 12 million unique patients nationally in 2018 with a diagnosis of Type 2 diabetes (E08, E09, E11, and E13). Data from physicians of all specialties are included. Substate markets represent core-based statistical areas (CBSAs).

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-10 (diagnosis) and CPT-4 (procedure) codes, and provider and facility data.

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.

Pharmacologic Approaches to Type 2 Diabetes Treatment: Intensifying to Injectable Therapies
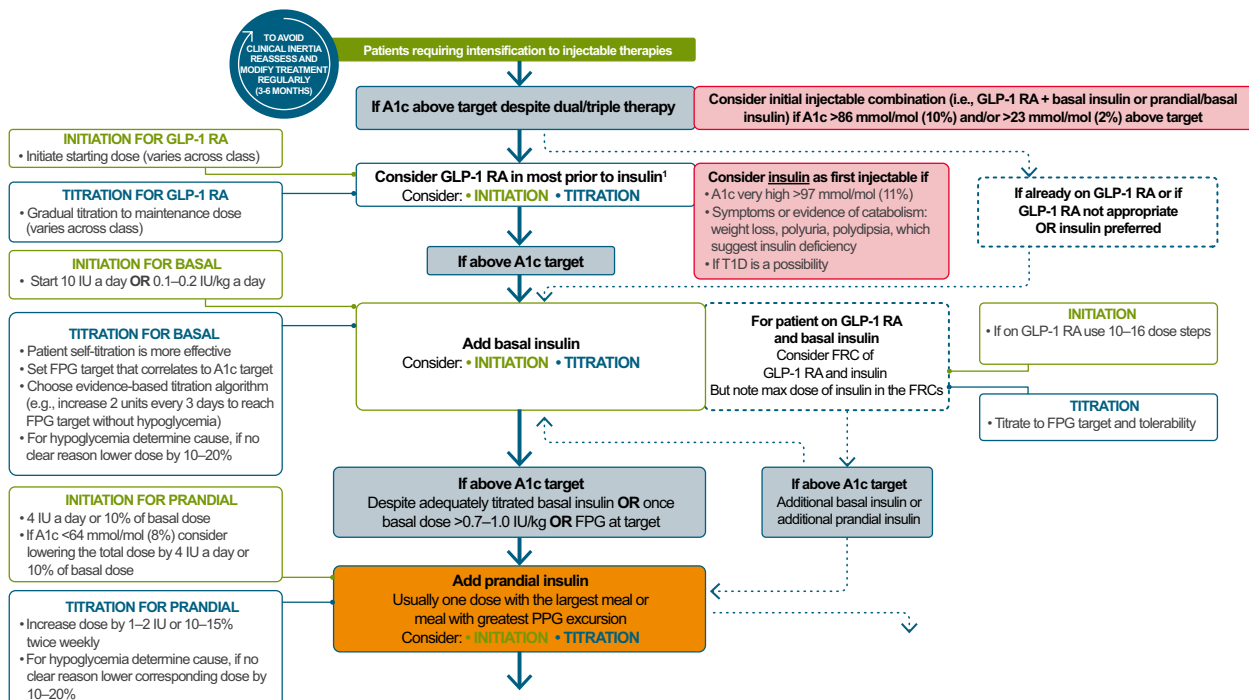
[1] When selecting GLP-1 RA, consider: patient preference, A1c lowering, weight-lowering effect, or frequency of injection. If CVD, consider GLP-1 RA with proven CVD benefit.
NOTE: CVD: cardiovascular disease; FPG: fasting plasma glucose; FRC: fixed-ratio combination; GLP-1 RA: glucagon-like peptide-1 receptor agonist; PPG: postprandial glucose; T1D: Type 1 diabetes.
Source: American Diabetes Association. *Diabetes Care* 2019;42(Suppl 1):S90–S102. (Adapted from the ADA-EASD Consensus Report: Davies M.J., et al. *Diabetologia* 2018;61(12):2461–2498.)