



**Greater Philadelphia
Business Coalition
On Health**

"Building Bridges to Better Healthcare"

GREATER PHILADELPHIA BUSINESS COALITION ON HEALTH

TYPE 2 DIABETES REPORT™ | 2017



▶ *Featuring Demographic, Utilization, Pharmacotherapy, and Disability Data*



► Introduction

Sanofi U.S. (Sanofi), in conjunction with the Greater Philadelphia Business Coalition on Health, is pleased to present the **Greater Philadelphia Business Coalition on Health Type 2 Diabetes Report™**, an overview of demographic, utilization, pharmacotherapy, and disability measures for Type 2 diabetes patients in key markets in the Greater Philadelphia area. The report also provides state and national benchmarks that can help providers and employers identify opportunities to better serve the needs of people with diabetes. All data are drawn from the Sanofi **Managed Care Digest Series®**. Throughout this report, the Philadelphia market includes the counties of Burlington, Camden, Gloucester, and Salem in New Jersey; and Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania.

The data in this report (current as of calendar year 2016) were gathered by QuintilesIMS, 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 QuintilesIMS 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

QuintilesIMS generated most of the data for this report out of health care professional (837p) and institutional (837i) insurance claims, representing nearly 9.7 million unique patients nationally in 2016 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.

QuintilesIMS 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 INTEGRITY

Data arriving into QuintilesIMS 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, QuintilesIMS 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 QuintilesIMS 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.

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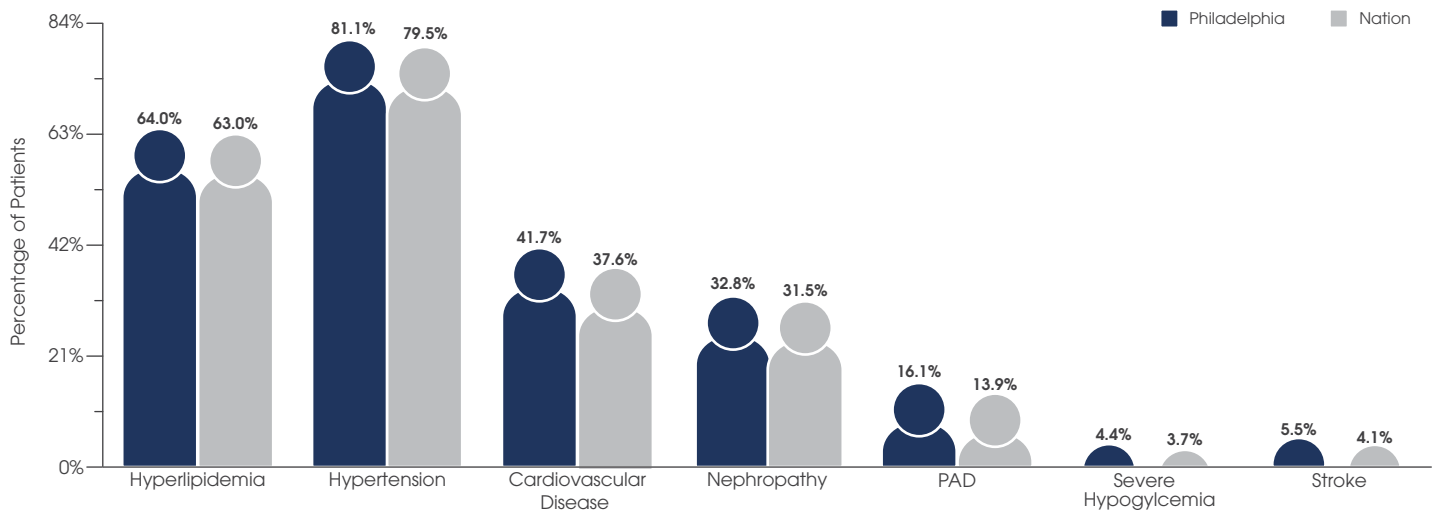
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 Forte Information Resources, LLC, Denver, CO
www.forteinformation.com

Data provided by
 QuintilesIMS, Durham, NC

Key findings for employers and other health care system stakeholders from the analysis of Type 2 diabetes patient medical, pharmacy, and disability claims as presented in this report include:

- People with Type 2 diabetes have high rates of hyperlipidemia and hypertension. Although the frequencies of comorbid obesity and depression appear to be lower compared with other conditions, these diagnoses often are not coded and captured in claims data.
- Nationally and locally, Type 2 diabetes is associated with cardiovascular disease, nephropathy, neuropathy, and retinopathy. Improved diabetes management could significantly reduce the risk of these serious comorbidities.
- The data show continued room for improvement in preventive care for people with diabetes. Nationally and locally, only three of four people with Type 2 diabetes had an A1c test in the past year, and roughly two of three people with Type 2 diabetes had an eye exam in 2016.
- People with diabetes mellitus in Greater Philadelphia had 142,136 hospital admissions in 2015—more than half of the total number of diabetes-related admissions in the entire Commonwealth of Pennsylvania. Improved management of diabetes has the potential to significantly improve health and lower costs of care.
- A wide variety of pharmaceutical therapies are available for the treatment of diabetes. Only 30% of all people with Type 2 diabetes who filled a prescription are treated with insulin.
- Analysis of pharmacy claims data shows that persistency (continuity of taking a particular prescribed drug) drops dramatically. Among Type 2 diabetes patients in Pennsylvania on various therapies, more than one-third were no longer on that medication after 12 months. Efforts should be made to determine if declines in persistency are associated with patient adherence (following recommendations), financial barriers to pharmacotherapy, changes in prescribed therapy to improve diabetes control, or other factors.
- Disability claims duration and cost are significant for people with diabetes. New Jersey’s average disability claims cost per case for people with diabetes are nearly 40% higher than Pennsylvania’s, and 50% higher than Delaware’s.

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH VARIOUS CO-OCCURRING CONDITIONS, 2016^{1,2}



Data source: QuintilesIMS © 2017

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

² Common co-occurring conditions include both complications and comorbidities. A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. A comorbidity is a condition a Type 2 diabetes patient may also have. Complications of Type 2 diabetes include, but are not limited to, cardiovascular disease, severe hypoglycemia, nephropathy, peripheral artery disease (PAD), and stroke. Comorbidities include hyperlipidemia, and other conditions.



PATIENT DEMOGRAPHICS

COMMERCIAL SHARE OF PHILADELPHIA TYPE 2 DIABETES PTS. IS THE HIGHEST

In 2016, just under 44% of Philadelphia patients with Type 2 diabetes had commercial coverage, the largest percentage, by payer type, in that market, but smaller than those of Delaware (43.9%), Pennsylvania (49.2%), or the nation (48.2%) that year. In Philadelphia, the Medicaid share of such patients exceeded the U.S. benchmark by more than five percentage points: 18.9% versus 13.3%.

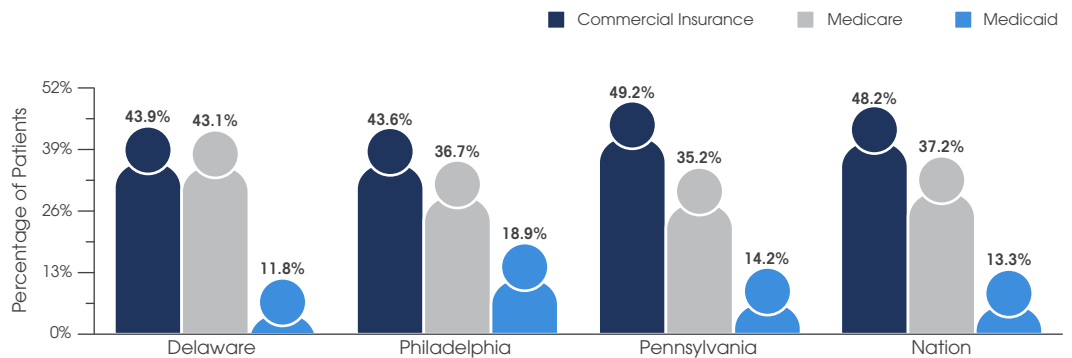
PHILADELPHIA TYPE 2 DIABETES PTS. HAVE HIGH COMPLICATION RATES

The shares of commercial Type 2 diabetes patients in Philadelphia diagnosed with a complication of AMI (3.6%) cardiovascular disease (41.7%), nephropathy (29.6), severe hypoglycemia (4.4%), or stroke (5.5%) all exceeded those of Pennsylvania and the nation in 2016.

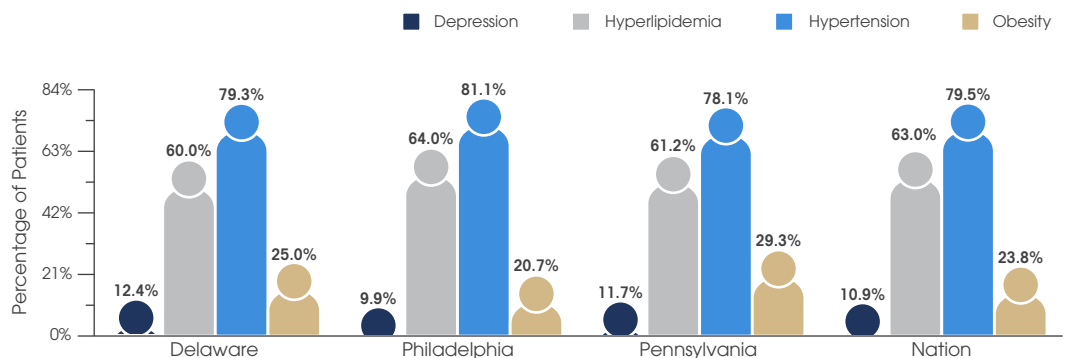
DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY AGE, 2014-2016

MARKET	0-17	18-35	36-64	65-79	80+
Delaware	1.4%	2.7%	45.9%	39.2%	10.8%
Philadelphia	1.8	3.3	45.0	36.5	13.5
Pennsylvania	1.9	2.8	42.3	38.7	14.3
NATION	1.4%	3.0%	44.7%	38.7%	12.2%

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2016



PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY ACTUAL COMORBIDITY, 2016¹



PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS, BY ACTUAL COMPLICATION, 2016²

MARKET	AMI	Cardiovascular Disease	Nephropathy	Neuropathy	PAD	Retinopathy	Severe Hypoglycemia	Stroke
Delaware	2.5%	34.7%	29.1%	32.6%	14.6%	13.4%	2.6%	4.5%
Philadelphia	3.6	41.7	32.8	32.1	16.1	14.7	4.4	5.5
Pennsylvania	3.0	39.1	29.6	34.5	16.2	17.5	3.6	4.7
NATION	2.7%	37.6%	31.5%	34.5%	13.9%	16.2%	3.7%	4.1%

Data source: QuintilesIMS © 2017

¹ 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, depression, hyperlipidemia, hypertension, and obesity.

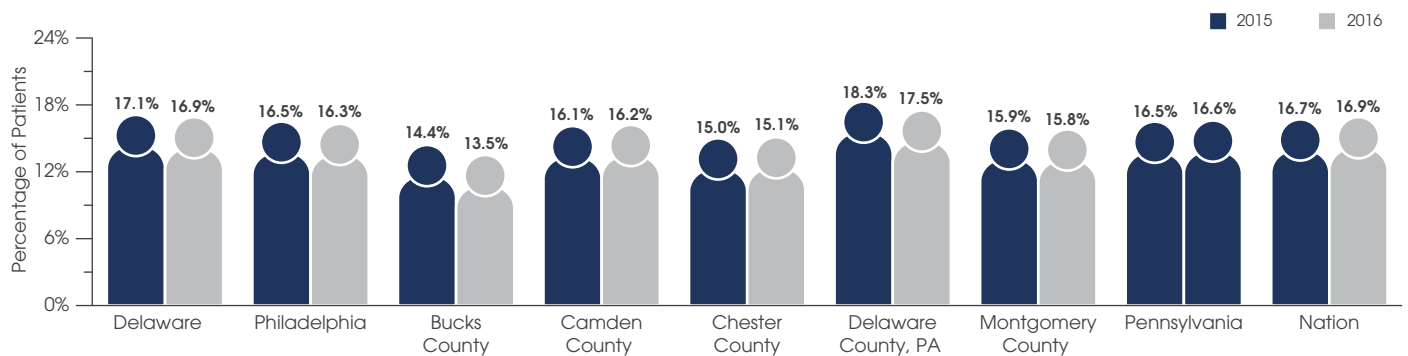
² A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, acute myocardial infarction (AMI), cardiovascular (CV) disease, severe hypoglycemia,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



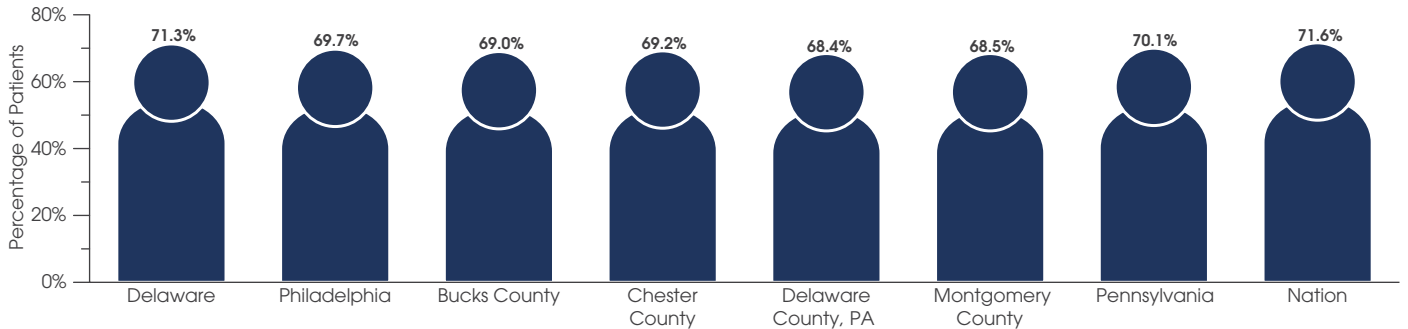
PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS SERVICES, 2014-2016

MARKET	A1c Test ¹			Blood Glucose Test			Ophthalmologic Exam			Serum Cholesterol Test			Urine Glucose Test		
	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016
Delaware	83.5%	84.8%	84.7%	92.3%	92.8%	92.2%	71.3%	71.1%	71.9%	91.7%	91.3%	91.4%	93.6%	93.5%	93.4%
Philadelphia	76.6	76.1	75.8	86.6	86.4	86.0	66.7	66.0	65.6	85.1	84.8	84.6	85.7	85.8	85.5
Bucks County	77.1	76.1	75.9	86.3	86.0	85.7	66.8	67.5	66.3	85.0	85.3	84.9	84.4	85.2	84.6
Camden County	69.5	68.2	66.8	87.1	85.8	85.2	70.2	69.5	69.1	85.2	83.9	83.2	87.8	87.6	87.0
Chester County	78.4	76.3	75.2	85.7	85.0	85.0	67.2	66.2	64.7	84.9	84.4	83.2	84.4	83.5	84.0
Delaware County, PA	77.3	76.8	75.7	86.2	85.7	85.5	64.9	61.6	62.0	85.2	85.1	84.6	84.9	85.0	84.5
Montgomery County	77.9	78.1	78.2	87.0	87.5	86.8	68.5	66.5	65.6	85.5	85.8	85.8	85.5	85.7	85.5
Pennsylvania	79.2	79.4	79.3	87.6	87.5	87.2	67.4	67.1	66.8	86.5	86.3	86.2	85.8	85.7	85.7
NATION	77.0%	77.0%	76.9%	86.8%	86.7%	86.6%	66.9%	66.9%	66.6%	84.5%	84.4%	84.4%	83.0%	82.9%	82.8%

PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH AN A1c LEVEL >9.0%, 2015-2016¹



PERCENTAGE OF COMMERCIAL TYPE 2 DIABETES PATIENTS WITH LDL-C >70 mg/dL, 2016²



PHILADELPHIA TYPE 2 DIABETES PTS. ARE LESS APT TO RECEIVE AN A1c TEST

In 2016, the A1c testing rate for commercially insured Type 2 diabetes patients in Philadelphia (75.8%) fell below those of Pennsylvania (79.3%) and the nation (76.9%). It also fell from its 2014 mark.

NUMBER OF PROVIDER ENCOUNTERS PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY SPECIALTY, 2016

MARKET	Endocrinology	Internal Medicine	Primary Care ³
Delaware	2.3	3.9	3.7
Philadelphia	2.8	5.2	3.8
Bucks County	2.5	5.6	3.9
Camden County	2.3	5.0	3.5
Chester County	3.0	4.4	4.2
Delaware County, PA	3.8	5.6	3.8
Montgomery County	2.8	5.0	3.8
Pennsylvania	2.8	5.2	4.3
NATION	2.9	5.2	4.1

Data source: QuintilesIMS © 2017

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. An A1c level greater than 9.0% may indicate poor control of blood glucose.

² LDL-C is low-density lipoprotein cholesterol.

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

NOTE: Throughout this report, n/a indicates that data were not available. Some data were unavailable for Camden County.



UTILIZATION

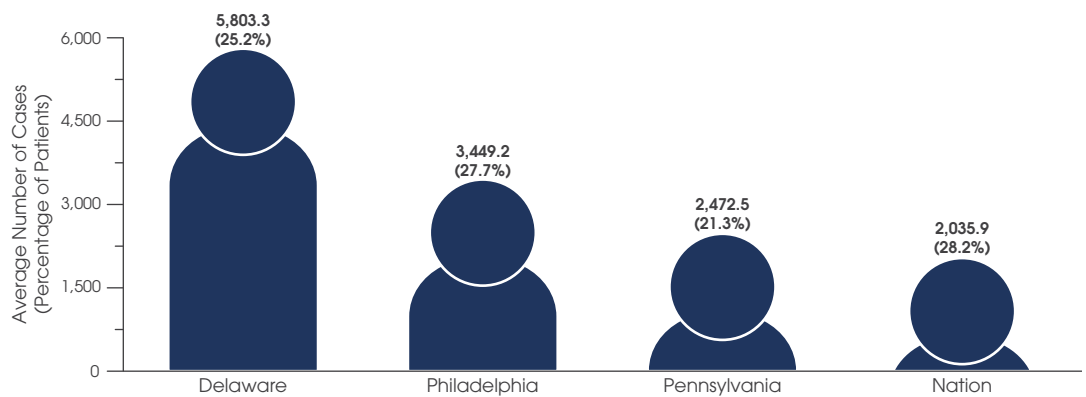
ONE IN THREE PA OUTPATIENT DIABETES CASES ARE IN PHILADELPHIA

In 2015, Philadelphia hospitals treated nearly 610,000 diabetes mellitus outpatient cases, just over a third of the total number of such outpatient cases across the Commonwealth that year. Of those, 27.7% were treated in emergency departments, a portion that exceeded the corresponding Pennsylvania share by more than six percentage points. Collectively, Philadelphia hospitals treated more than half (50.3%) of all Pennsylvania diabetes mellitus inpatient cases in 2015.

AVERAGE AND TOTAL NUMBER OF INPATIENT AND OUTPATIENT DIABETES MELLITUS CASES PER ACUTE-CARE HOSPITAL, 2015

MARKET	Inpatient Cases		Outpatient Cases	
	Average	Total	Average	Total
Delaware	3,429.7	24,008	23,041.6	161,291
Philadelphia	2,450.6	142,136	10,513.3	609,772
Pennsylvania	1,671.3	282,444	10,700.0	1,776,198
NATION	1,272.8	6,208,771	6,865.5	33,283,977

AVERAGE NUMBER AND PERCENTAGE OF EMERGENCY DEPARTMENT DIABETES MELLITUS CASES PER ACUTE-CARE HOSPITAL, 2015



EMERGENCY DEPARTMENT (ED) UTILIZATION FOR PATIENTS DIAGNOSED WITH TYPE 2 DIABETES, BY TYPE OF THERAPY, 2014-2016^{1,2}

MARKET	Any Insulin Products		Three Non-Insulin Antidiabetic Products	
	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	13.4%	2.1	19.8%	2.6
New Jersey	15.3	2.3	18.7	1.9
Northeast Region	18.5	2.2	25.3	2.6
NATION	20.9%	2.1	25.7%	2.6

READMISSION RATES FOR PATIENTS DIAGNOSED WITH TYPE 2 DIABETES, BY TYPE OF THERAPY, 2014-2016^{1,3}

MARKET	Three-Day Readmissions		30-Day Readmissions	
	Any Insulin Products	Three Non-Insulin Antidiabetic Products	Any Insulin Products	Three Non-Insulin Antidiabetic Products
Pennsylvania	8.4%	13.9%	18.7%	22.0%
Northeast Region	7.1	11.7	16.9	22.0
NATION	8.7%	11.9%	18.1%	22.4%

Data source: QuintilesIMS © 2017

¹ Figures reflect the percentages of and the visits for Type 2 diabetes patients who visited an emergency department in the three-year period between 2014 and 2016. These include patients who filled multiple prescriptions. Data shown are for all payers.

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 Figures reflect the percentages of Type 2 diabetes patients who were readmitted to an inpatient facility in the three-year period between 2014 and 2016. These percentages include patients who filled multiple prescriptions. Readmissions are not necessarily due to Type 2 diabetes. Data shown are for all payers.

NOTE: Inpatient, outpatient, and emergency department case counts data come from QuintilesIMS' Hospital Procedure/Diagnosis (HPD) database and are current as of calendar year 2015. Some data were unavailable for Delaware and New Jersey. Data shown are for all payers.

PHARMACOTHERAPY



PERCENTAGE OF AND PAYMENTS FOR COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS INSULIN THERAPIES, 2016¹

MARKET	Any Insulin Products		Long-Acting Insulin: Gen 1		Long-Acting Insulin: Gen 2		Rapid-Acting Insulin		Mixed Insulin	
	%	\$	%	\$	%	\$	%	\$	%	\$
Delaware	31.1%	\$3,457	21.1%	\$1,997	4.1%	\$1,938	16.5%	\$2,750	2.3%	\$2,818
Philadelphia	28.1	3,822	19.0	2,223	2.5	1,983	14.6	3,131	3.3	3,452
Pennsylvania	31.9	4,102	21.7	2,346	3.8	2,137	17.7	3,133	3.1	3,767
NATION	30.0%	\$4,045	20.6%	\$2,483	4.0%	\$2,301	15.4%	\$3,144	2.4%	\$3,319

INSULIN FILL RATES ARE LOW FOR PHILADELPHIA TYPE 2 DIABETES PATIENTS

Philadelphia Type 2 diabetes patients with commercial coverage who filled a prescription in 2016 were less likely than similar patients nationally to fill prescriptions for any insulin product. Additionally, the portions of such patients who received various non-insulin therapies—such as a biguanide, GLP-1 receptor agonist, or SGLT-2 inhibitor also fell shy of the corresponding national percentages.

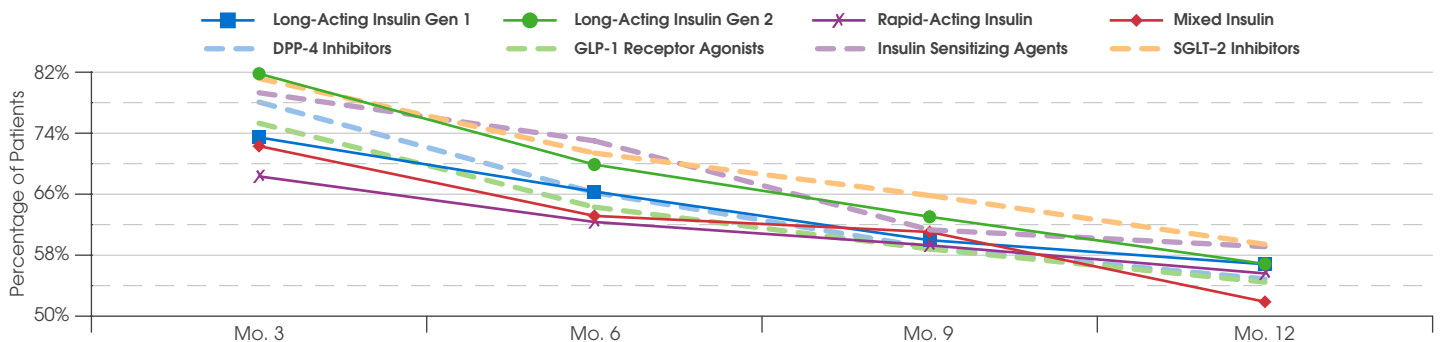
PERCENTAGE OF AND PAYMENTS FOR COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS NON-INSULIN ANTI-DIABETIC THERAPIES, 2015-2016

MARKET	Biguanides		DPP-4 Inhibitors		GLP-1 Receptor Agonists		GLP-1 + Long-Acting Insulin		Insulin Sensitizing Agents (TZDs)		SGLT-2 Inhibitors	
	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$
Delaware	59.7%	\$188	12.3%	\$2,444	9.5%	\$3,782	2.6%	\$2,664	3.1%	\$85	13.4%	\$2,821
Philadelphia	61.2	165	12.5	2,503	8.1	3,717	2.3	2,588	4.5	147	10.8	2,628
Pennsylvania	60.6	134	12.4	2,528	8.9	3,871	2.7	2,654	3.5	140	11.3	2,709
NATION	64.0%	\$136	11.1%	\$2,410	10.1%	\$3,755	3.1%	\$2,659	5.0%	\$108	11.7%	\$2,552

PERCENTAGE OF AND PAYMENTS FOR COMMERCIAL TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS THERAPIES, 2016

MARKET	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	
	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$
Delaware	37.8%	\$641	20.3%	\$1,939	4.1%	\$2,726	6.2%	\$4,326	9.4%	\$4,323	6.8%	\$5,086	6.8%	\$6,329
Philadelphia	39.0	497	20.8	1,528	4.6	3,171	5.5	4,929	10.7	3,859	5.9	5,083	5.8	6,495
Pennsylvania	36.4	485	20.0	1,634	4.7	3,307	6.5	5,040	10.1	3,889	6.3	5,115	7.0	6,751
NATION	38.2%	\$449	20.2%	\$1,611	4.6%	\$3,347	5.2%	\$5,034	10.3%	\$3,849	6.6%	\$5,357	6.5%	\$6,930

PERSISTENCY: COMMERCIAL TYPE 2 DIABETES PATIENTS OVERALL, VARIOUS THERAPIES, PENNSYLVANIA, 2016



Data source: QuintilesIMS © 2017

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. Cost mainly include tax, deductibles, and cost differentials where applicable.

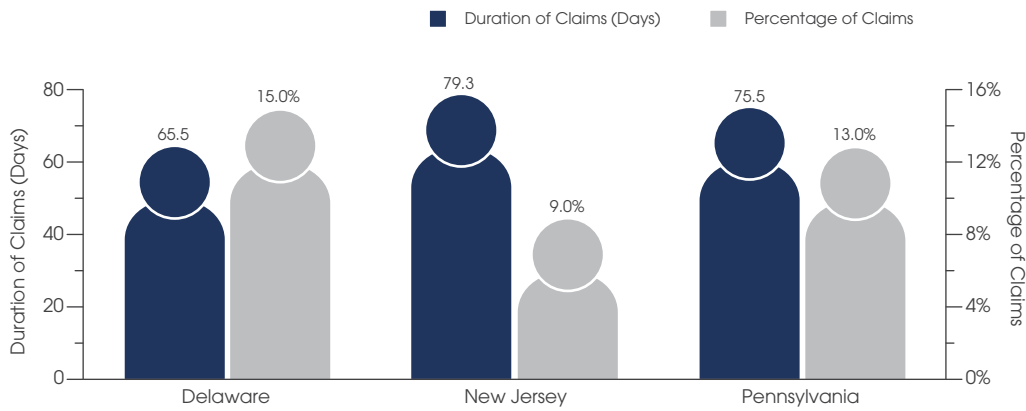
Biguanides Decrease the production of glucose by the liver, decrease intestinal absorption of glucose, and increase the peripheral uptake and use of circulating glucose.

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. Some data were unavailable for Pennsylvania. Throughout this report, "Gen 1" refers to long-acting basal insulins approved through 2014, as well as long-acting insulin follow-on biologics/biosimilar medications approved after 2014. "Gen 2" refers to non-follow-on biologics/biosimilar longer-acting basal insulins approved in 2015 or after.



DISABILITY CLAIMS

AVERAGE DURATION (DAYS) OF SHORT-TERM DIABETES DISABILITY CLAIMS AND PERCENTAGE OF CLAIMS REACHING MAXIMUM BENEFIT DURATION, 2011-2015¹



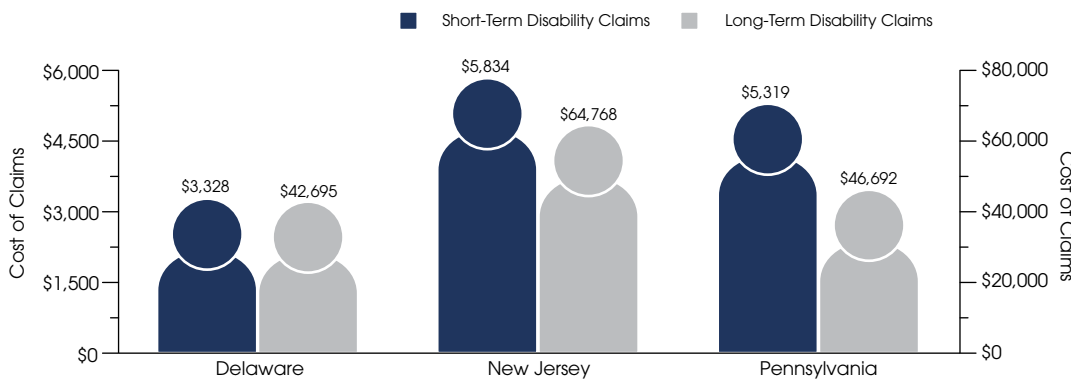
PA SHORT-TERM DISABILITY CLAIMS FOR DIABETES CLOSE IN NEARLY 76 DAYS

From 2011 to 2015, the average short-term disability claim in Pennsylvania for diabetes took 75.5 days to close. Such claims in New Jersey took even longer, at 79.3 days.

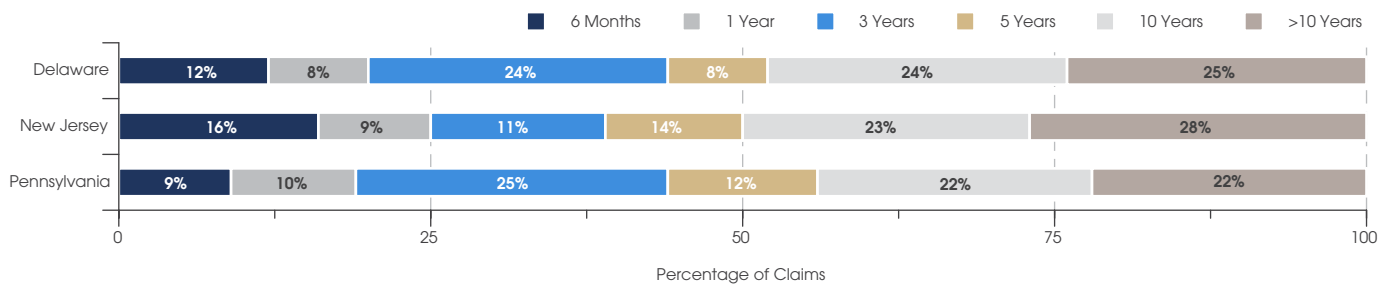
NJ SHORT-, LONG-TERM DIABETES DISABILITY CLAIM COSTS ARE HIGH VS. DE, PA

On average, short- and long-term disability claims for diabetes in New Jersey (\$5,834, and \$64,768) cost more than the corresponding claims in Pennsylvania (\$5,319 and \$46,692, respectively) and Delaware (\$3,328 and \$42,695) from 2011 to 2015.

AVERAGE COSTS OF SHORT- AND LONG-TERM DIABETES DISABILITY CLAIMS, 2011-2015¹



DISTRIBUTION OF LONG-TERM DIABETES DISABILITY CLAIMS, BY TIME TO CLOSE, 2011-2015



DATA DESCRIPTION

Data source: Integrated Benefits Institute © 2017

All analyses on this page were conducted using disability claims data from Integrated Benefits Institute's (IBI's) Lost Productivity benchmarking data. Each year, 14 major U.S. disability insurers and absence management firms provide IBI with more than 3 million short-term disability (STD), long-term disability (LTD), Worker's Compensation (WC), and federal Family and Medical Leave Act (FMLA) claims from more than 45,000 employer disability policies.

This analysis used STD and LTD claims that were on suppliers' books of business in calendar years 2011 through 2015. The database contains: 1,243 Delaware employers' STD policies and 1,241 Delaware employers' LTD policies; 4,252 New Jersey employers' STD policies and 4,480 New Jersey employers' LTD policies; and 5,663 Pennsylvania employers' STD policies and 7,132 Pennsylvania employers' LTD policies.

The data contain claims for which payments were ceased by the end of calendar year 2015 (i.e., closed claims) and claims for which payments continued to be paid at the end of 2015 (i.e., open claims). These claims include information on costs and durations of disability, as well as claim and claimant characteristics such as industry, plan design, the primary diagnosis (International Classification of Diseases, 9th Revision (ICD-9) or 10th Revision (ICD-10)), date of birth and sex. Within this data set, an STD claim is considered closed when an employee returns to work or when the claim reaches its maximum duration of benefits (whether or not an employee returned to work), whichever comes sooner; LTD claims can remain open until an employee reaches social security retirement age, receives a lump sum payout from a policy carrier, or returns to work.

¹ Closed claims only.