

Type 2 Diabetes Report 2016

Tennessee

With a Special Focus on Patients With Cardiovascular Disease



SANOFI  REGENERON

in Partnership with

MBG 
members business group on health

HC21
HealthCare 21 Business Coalition

TENNESSEE TYPE 2 DIABETES REPORT 2016

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Introduction

Sanofi U.S. (Sanofi), together with HealthCare 21 Business Coalition (HC21) and the Memphis Business Group on Health, are pleased to present the inaugural edition of the *Tennessee Type 2 Diabetes Report*, an overview of demographic, financial, utilization, and pharmacotherapy measures for Type 2 diabetes patients in key local markets across the state of Tennessee. The report also examines cardiovascular (CV) disease as it relates to Type 2 diabetes, and provides discharge data for CV conditions commonly associated with diabetes. The report, intended to help providers and employers better identify opportunities to serve the needs of their patients, organizes Type 2 diabetes benchmarks into six local Tennessee markets and Tennessee as a whole. All data are drawn from the **Managed Care Digest Series®**.

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

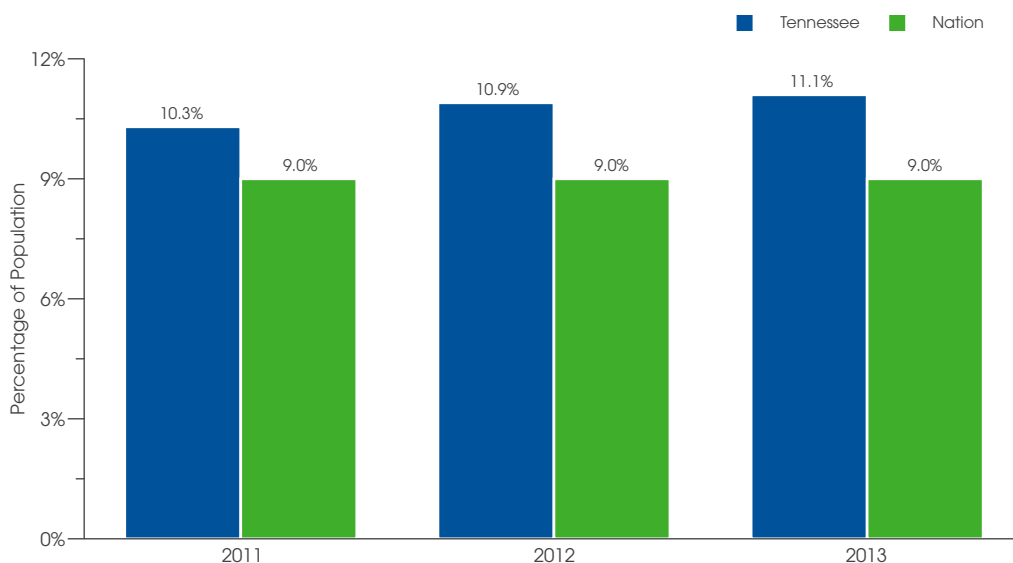
The *Tennessee Type 2 Diabetes Report* helps these organizations fulfill their mission of helping Tennessee employers play an active and

enthusiastic role in collaboration with health plans, providers, and purchasers; and of being a catalyst in promoting cost-effective delivery of quality health care to the benefit of the community.

This report features examples of the kinds of patient-level, disease-specific data on Type 2 diabetes that can be provided by these organizations using the **Managed Care Digest Series®** as a resource. Its focus on Tennessee locales allows for heightened scrutiny of community progress with Type 2 diabetes patient populations. Type 2 diabetes is a chronic condition that affects the way the body metabolizes glucose, making diabetes patients resistant to the effects of the hormone insulin or unable to produce enough insulin to maintain a normal glucose level.

The data (covering 2012 through 2014) were gathered by IMS Health, Parsippany, NJ, a leading provider of innovative health care data products and analytic services. The data provide employers with independent, third-party information against which they can benchmark their own data. Please see the back page for information on the data methodology.

PERCENTAGE OF POPULATION WITH DIABETES, 2011-2013



Data sources: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2016

TENNESSEE AND NATION

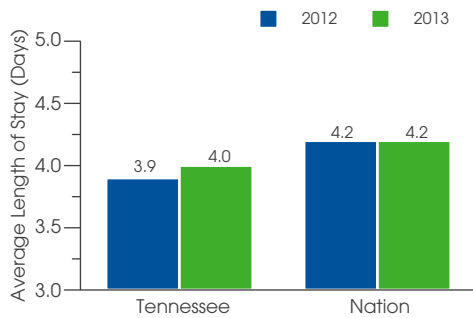
DEMOGRAPHICS: AGE AND GENDER, 2012-2014¹

AGE GROUP	Distribution of Type 2 Diabetes Patients					
	Tennessee			Nation		
	2012	2013	2014	2012	2013	2014
0-17	0.4%	0.4%	0.4%	0.4%	0.4%	0.5%
18-35	3.1	3.1	3.0	2.9	2.9	2.9
36-64	47.7	47.0	46.8	46.4	45.4	45.1
65-79	38.4	39.0	39.3	37.2	38.1	38.4
80+	10.5	10.6	10.6	13.1	13.2	13.2
GENDER	Tennessee		Nation			
Male	44.5%	44.9%	45.1%	46.6%	46.7%	46.8%
Female	55.5	55.1	54.9	53.4	53.3	53.2

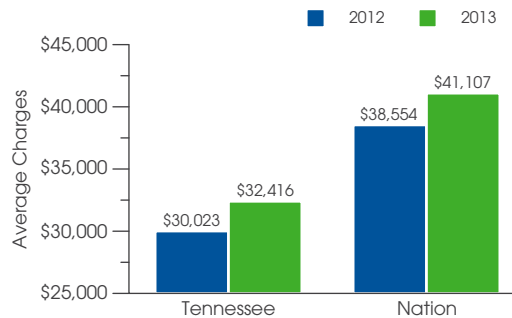
DEMOGRAPHICS: COMORBIDITIES AND COMPLICATIONS, 2013-2014^{2,3}

ACTUAL COMORBIDITIES	Percentage of Type 2 Diabetes Patients			
	Tennessee		Nation	
	2013	2014	2013	2014
Depression	9.7%	10.4%	9.0%	9.8%
Hyperlipidemia	62.7	64.0	63.3	63.1
Hypertension	82.6	83.5	79.8	79.6
Obesity	12.8	15.0	15.2	18.0
ACTUAL COMPLICATIONS	Tennessee		Nation	
Cardiovascular Disease	57.8%	57.5%	57.4%	56.2%
Hypoglycemia	8.2	8.2	7.9	8.8
Nephropathy	33.5	35.4	31.0	32.9
Neuropathy	34.3	36.0	32.7	34.3

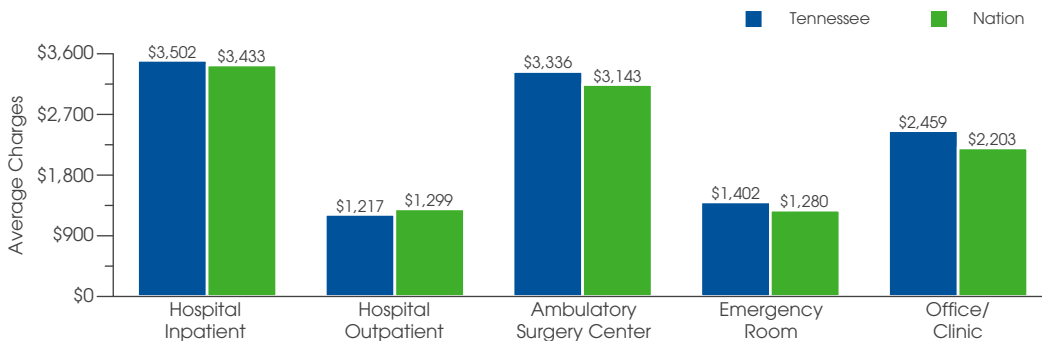
AVERAGE LENGTH OF STAY PER INPATIENT DIABETES MELLITUS CASE, 2012-2013⁴



CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2012-2013^{4,5}



PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, COMMERCIAL INSURANCE PAYERS, 2014^{6,7}



Data source: IMS Health © 2016

¹ On pages 3-9, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.

² 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, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

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

⁴ Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's *Hospital Procedure/Diagnosis* (HPD) database and are current as of end-of-year 2013.

⁵ 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.

⁶ Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.

⁷ Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

WORKING-AGE SHARE OF TN TYPE 2 DIABETES PATIENTS IS HIGH VERSUS NATION'S

In 2014, 49.8% of Type 2 diabetes patients in Tennessee were of working age (18-64), nearly two percentage points higher than the corresponding national share (48.0%). That year, Tennessee Type 2 diabetes patients were more apt than their counterparts across the country to also have depression, hyperlipidemia, hypertension, cardiovascular disease, nephropathy, or neuropathy.

CHARGES TOP NATION FOR TN TYPE 2 DIABETES PTS. WITH COMMERCIAL INSURANCE

In four of the five settings profiled (hospital outpatient excluded), annual professional charges per Type 2 diabetes patient with commercial insurance coverage were higher in Tennessee than they were nationally in 2014. For example, inpatient provider charges for such patients in Tennessee were \$3,502, versus \$3,433 across the U.S.

TENNESSEE AND NATION

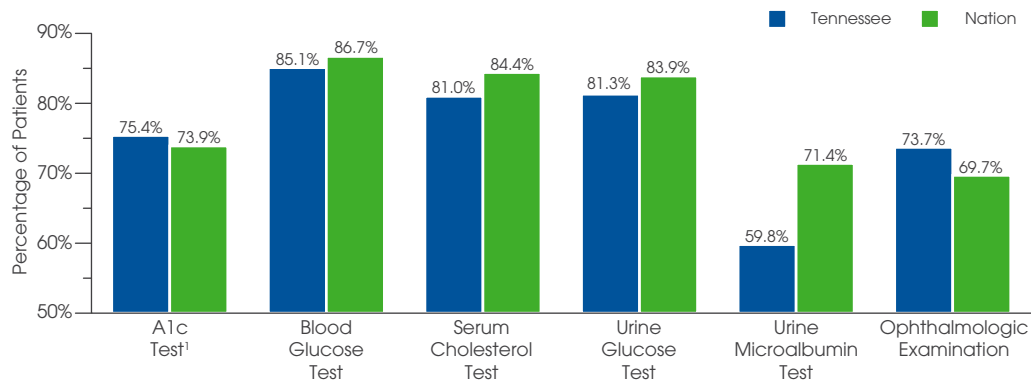
A1c TESTING AND EYE EXAM RATES EXCEED U.S. MARKS FOR TN TYPE 2 DIABETES PATIENTS

Type 2 diabetes patients across Tennessee were slightly more likely than their peers nationally to receive an A1c test (75.4% versus 73.9%) or ophthalmological exam (73.7% versus 69.7%) in 2014. Meanwhile, however, the portions of these Tennessee patients who received a blood glucose, serum cholesterol, urine glucose, or urine microalbumin test were below corresponding national shares.

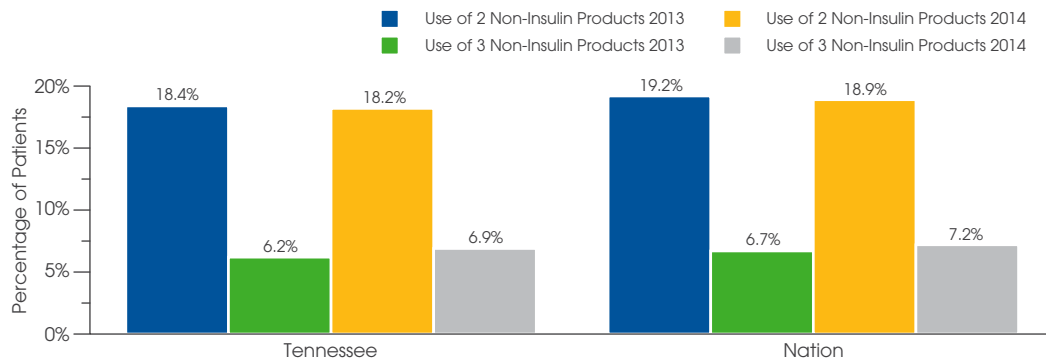
INSULIN PEN FILL RATES AMONG TN TYPE 2 DIABETES PATIENTS TRAIL NATION'S

Compared with national rates, smaller percentages of Tennessee Type 2 diabetes patients filled prescriptions for long-acting, rapid-acting, short-acting, or mixed insulin pens in 2014. However, the portions of Tennessee Type 2 diabetes patients who received these insulin vials were above those of the nation.

UTILIZATION: PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE, 2014



PHARMACOTHERAPY: PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING COMBINATION THERAPIES, 2013-2014



PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2014²

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Tennessee	35.4%	16.0%	12.2%	9.2%	8.7%	9.2%	10.3%	2.4%	3.6%
NATION	34.3%	18.3%	9.6%	10.6%	7.3%	10.6%	8.6%	2.5%	2.7%

AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2014^{2,3}

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Tennessee	\$3,046	\$2,012	\$1,978	\$1,830	\$2,005	\$1,830	\$1,944	\$2,682	\$1,891
NATION	\$3,151	\$2,044	\$2,060	\$1,864	\$2,064	\$1,864	\$2,023	\$2,762	\$1,852

PERCENTAGE OF AND AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING NON-INSULIN THERAPIES, 2014^{2,3}

	Any Non-Insulin Antidiabetic Product	Biguanides		Sulfonylureas		Insulin Sensitizing Agents		DPP-4 Inhibitors		SGLT-2 Inhibitors		
		% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	
Tennessee	84.9%	\$841	60.8%	\$114	31.4%	\$70	4.5%	\$291	10.9%	\$1,924	5.3%	\$1,170
NATION	85.1%	\$820	62.5%	\$109	32.5%	\$77	5.1%	\$294	12.4%	\$2,036	4.1%	\$1,304

Data source: IMS Health © 2016

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.

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 Insulin

Insulin replacement product with a long duration of action.

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.

Short-Acting Insulin

Insulin replacement product with a short onset of action and duration.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors

Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

Sulfonylureas

Stimulate the release of insulin in the pancreas.

TENNESSEE MSA COMPARISONS

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2013–2014

MARKET	Commercial ¹		Medicare		Medicaid	
	2013	2014	2013	2014	2013	2014
Chattanooga	49.4%	50.3%	43.8%	42.8%	6.8%	6.8%
Knoxville	50.7	51.3	40.7	39.7	8.6	8.9
Tri-Cities	51.9	50.5	38.5	39.6	9.7	9.8
Jackson	38.0	41.3	53.0	49.4	9.0	9.1
Memphis	49.4	44.0	41.4	45.2	9.1	10.8
Nashville	44.2	47.2	44.8	41.1	11.0	11.6
Tennessee	46.5	46.4	43.5	42.9	10.0	10.6
NATION	49.2%	48.9%	40.5%	39.7%	10.4%	11.5%

COMMERCIAL SHARES OF TYPE 2 DIABETES PATIENTS ARE ELEVATED IN THREE TN MARKETS

In Chattanooga (50.3%), Knoxville (51.3%), and Tri-Cities (50.5%) markets, the percentages of Type 2 diabetes patients with commercial coverage exceeded 48.9%—the corresponding national share—in 2014. Meanwhile, the Medicare-covered shares of Type 2 diabetes patients in Chattanooga, Jackson, Memphis, Nashville, and the state of Tennessee topped the nation’s (39.7%).

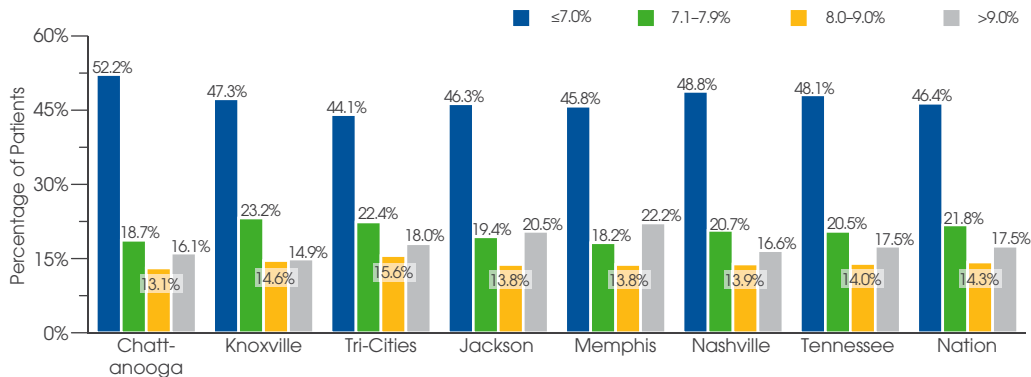
DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2013–2014²

MARKET	≤7.0%		7.1–7.9%		8.0–9.0%		>9.0%	
	2013	2014	2013	2014	2013	2014	2013	2014
Chattanooga	50.0%	53.5%	19.2%	18.2%	13.7%	12.3%	17.2%	16.0%
Knoxville	55.3	49.0	18.3	22.5	12.0	14.1	14.4	14.4
Tri-Cities	42.5	44.7	19.2	21.7	17.3	15.3	21.0	18.2
Jackson	48.7	50.9	20.0	18.9	13.4	13.0	17.9	17.2
Memphis	47.3	47.5	19.2	18.3	13.4	13.4	20.1	20.8
Nashville	47.9	49.4	20.1	19.9	14.0	13.7	18.1	17.1
Tennessee	48.9	49.5	19.5	19.8	13.7	13.6	17.9	17.0
NATION	49.5%	47.2%	20.8%	21.5%	13.4%	14.1%	16.3%	17.2%

MORE THAN ONE IN FIVE MEMPHIS TYPE 2 DIABETES PATIENTS HAVE A1c >9.0%

In 2014, nearly 21% of Memphis Type 2 diabetes patients had an A1c level greater than 9.0% on their most recent test, a slight increase from 20.1% the prior year, and well above the corresponding state and national shares in both years. This percentage also topped that of the nation in Tri-Cities (18.2%). From 2013 (17.9%) to 2014 (17.0%), the percentage of Type 2 diabetes patients across the state of Tennessee with an A1c level in this highest range dipped below the U.S. rate of 17.2% in 2014.

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE FOR COMMERCIAL PAYERS, 2014^{1,2}



Data source: IMS Health © 2016

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

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

NOTE: Throughout this report, the Tri-Cities market includes Johnson City, Kingsport, and Bristol.

TENNESSEE MSA COMPARISONS

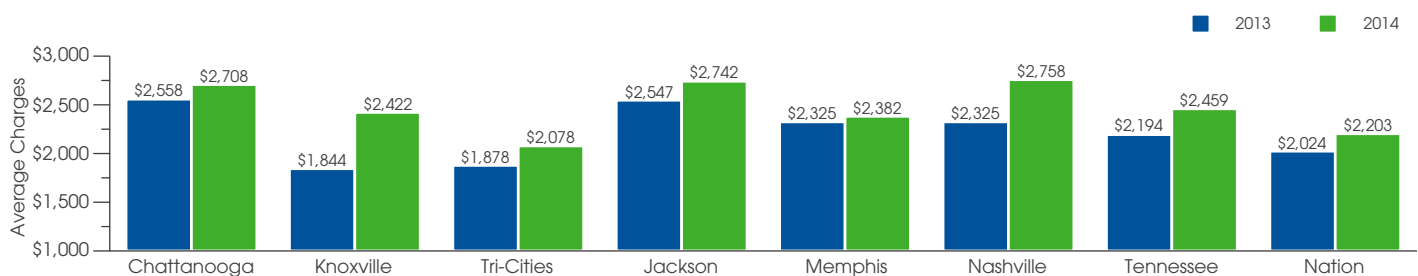
IP PROVIDER CHARGES FOR MEMPHIS TYPE 2 DIABETES PTS. EDGE ABOVE OTHER MKTS.

Despite a slight drop to \$4,002 in 2014 from \$4,081 in 2013, inpatient provider charges were highest, by profiled Tennessee market, in Memphis in 2014. These charges were higher than the U.S. average in six of seven profiled Tennessee markets in 2014.

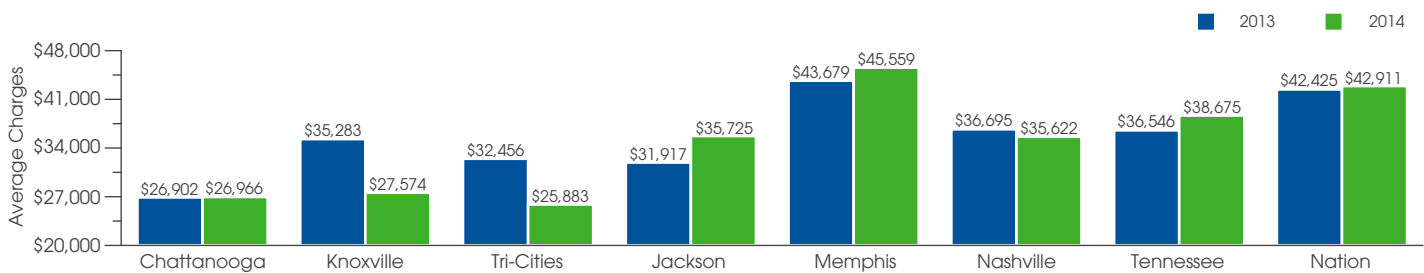
PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, 2013-2014¹

MARKET	Hospital Inpatient		Hospital Outpatient		Ambulatory Surgery Center		Emergency Room		Office/Clinic	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Chattanooga	\$3,556	\$3,918	\$1,476	\$1,684	\$3,832	\$3,771	\$1,268	\$1,596	\$2,558	\$2,708
Knoxville	2,901	3,691	1,165	1,496	3,174	3,293	1,465	1,824	1,844	2,422
Tri-Cities	3,241	3,462	1,021	1,316	2,471	2,588	917	1,012	1,878	2,078
Jackson	3,533	3,998	1,313	1,532	2,724	3,051	602	872	2,547	2,742
Memphis	4,081	4,002	1,014	1,030	3,139	3,638	969	1,116	2,325	2,382
Nashville	3,094	3,390	1,162	1,275	3,011	3,399	1,398	1,632	2,325	2,758
Tennessee	3,226	3,502	1,101	1,217	3,038	3,336	1,162	1,402	2,194	2,459
NATION	\$3,005	\$3,433	\$1,175	\$1,299	\$2,724	\$3,143	\$1,088	\$1,280	\$2,024	\$2,203

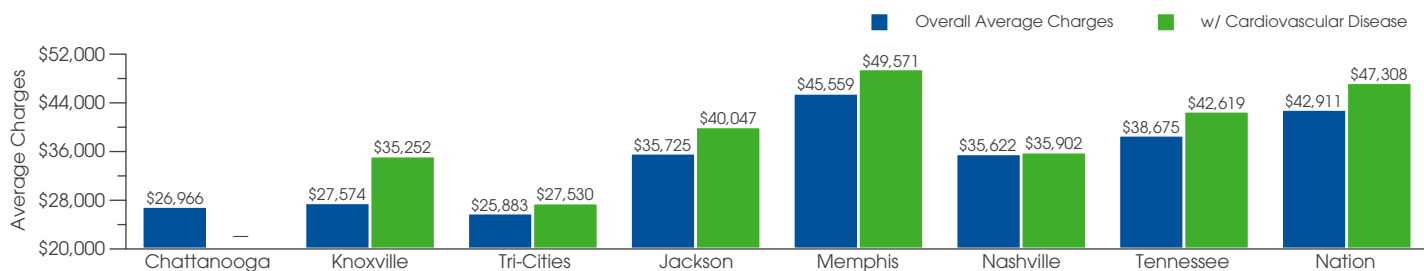
PROFESSIONAL OFFICE/CLINIC CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, 2013-2014¹



INPATIENT FACILITY CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, 2013-2014²



INPATIENT FACILITY CHARGES FOR TYPE 2 DIABETES PATIENTS, OVERALL VS. TYPE 2 DIABETES PATIENTS WITH CARDIOVASCULAR DISEASE, 2014^{2,3}



Data source: IMS Health © 2016

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

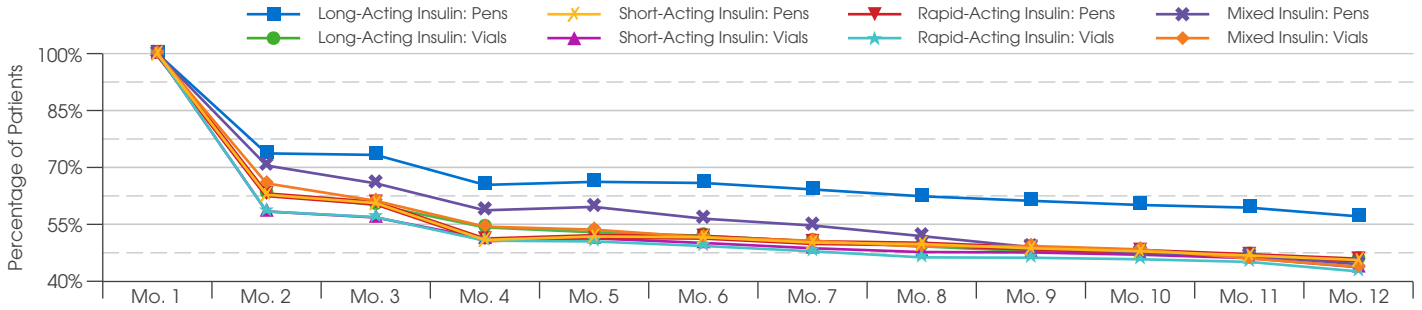
² Figures reflect the charges generated for Type 2 diabetes patients by the facilities that delivered care. Facility charge data include charges for all services rendered, including prevention and charges associated with the treatment of other diseases. The data also reflect the average amounts charged in Type 2 diabetes patient claims, not the amount paid.

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

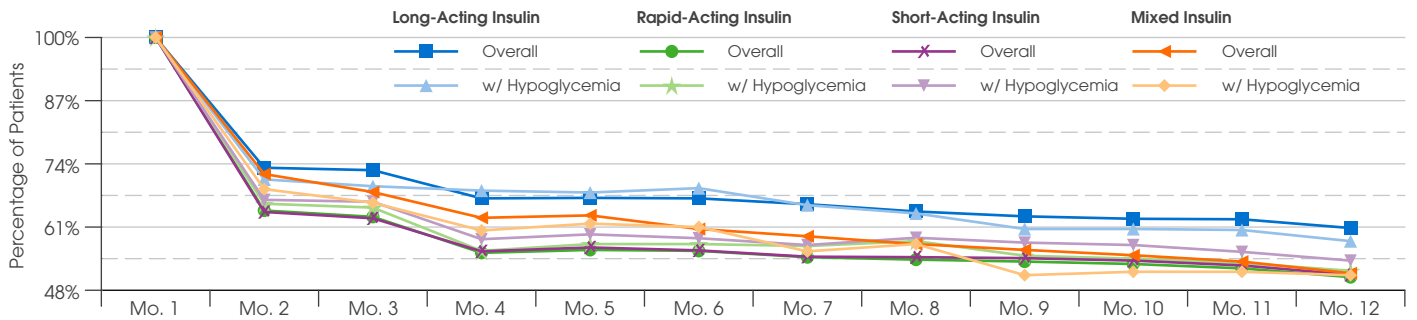
NOTE: Some facility charge data were unavailable for Chattanooga.

TENNESSEE: PERSISTENCY

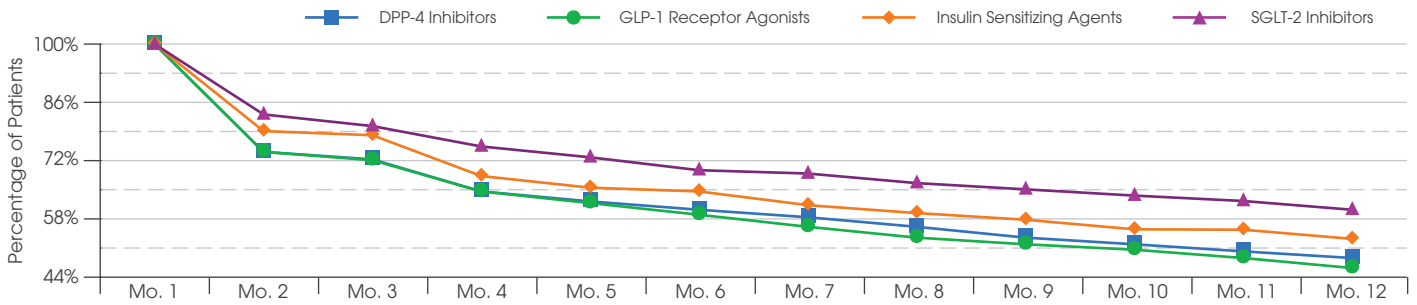
TYPE 2 DIABETES PATIENTS USING VARIOUS INSULIN PRODUCTS, TENNESSEE, 2014



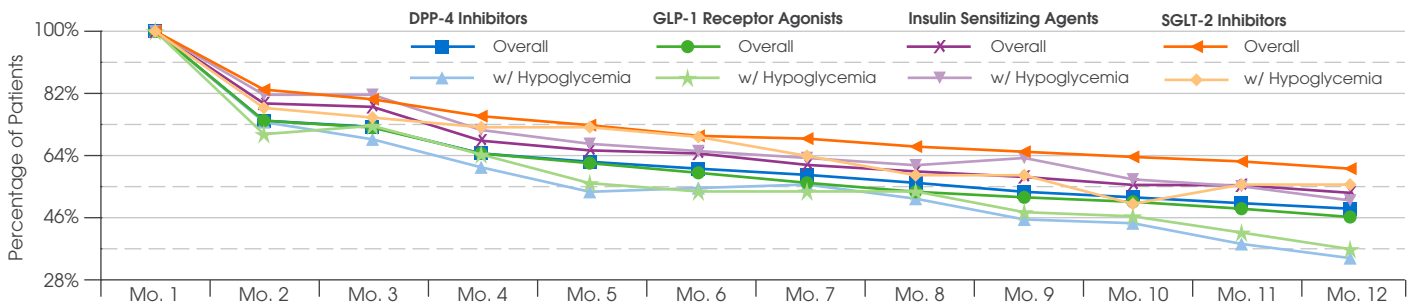
TYPE 2 DIABETES PATIENTS OVERALL VS. TYPE 2 DIABETES PATIENTS WITH HYPOGLYCEMIA, VARIOUS INSULIN THERAPIES, TENNESSEE, 2014¹



TYPE 2 DIABETES PATIENTS USING VARIOUS NON-INSULIN ANTIDIABETIC PRODUCTS, TENNESSEE, 2014



TYPE 2 DIABETES PATIENTS OVERALL VS. TYPE 2 DIABETES PATIENTS WITH HYPOGLYCEMIA, VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, TENNESSEE, 2014¹



Data source: IMS Health © 2016

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

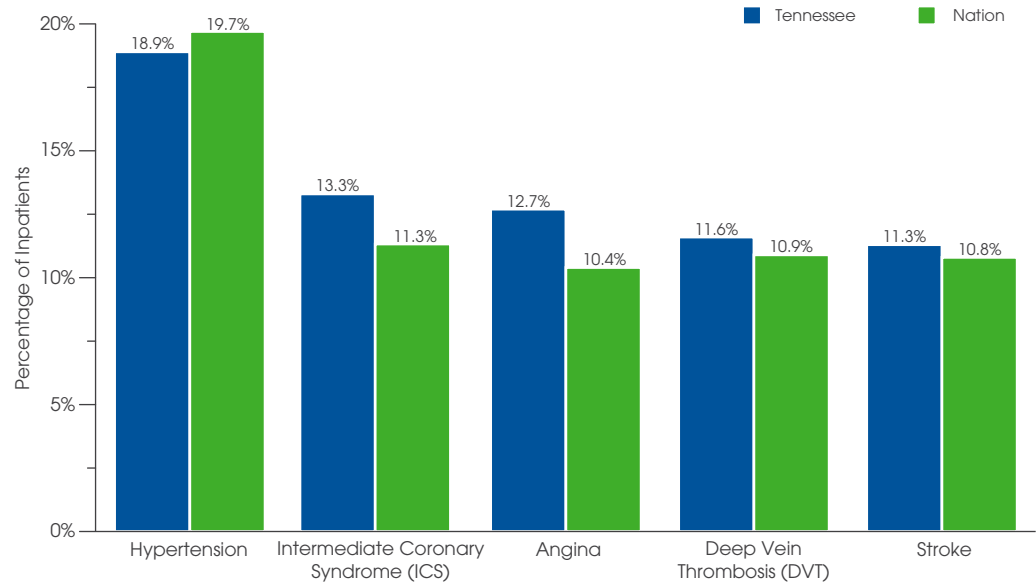
NOTE: "Persistence" measures whether patients maintain their prescribed therapy. It is calculated by identifying patients who filled a prescription for the reported drug class in the four months prior to the reported year, and then tracking prescription fills for those same patients in each of the months in the current reported year. If a patient fills 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 data track patients who are "New-to-Brand," meaning they have not filled a prescription for their cohort product during the six months prior to initiation of therapy on that product.

DIABETES AND CARDIOVASCULAR DISEASE

DIABETES AFFECTS LARGE SHARES OF CARDIOVASCULAR INPATIENTS IN TENNESSEE

Among Tennessee inpatients with any of five primary cardiovascular diagnoses, notable percentages had a secondary diagnosis of diabetes mellitus in 2013. For example, 18.9% of Tennessee inpatients with a primary diagnosis of hypertension also had diabetes mellitus that year, a slightly lower rate than that of the nation (19.7%). Among inpatients with a primary diagnosis of stroke in Tennessee, 11.3% also had a diagnosis of diabetes mellitus, fractionally above the corresponding national rate (10.8%).

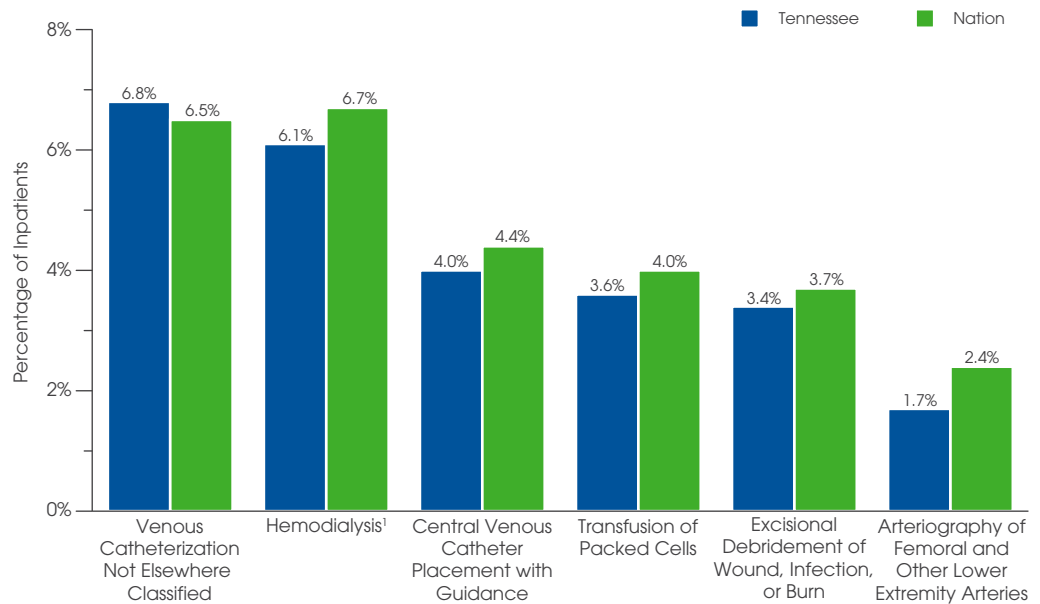
PERCENTAGE OF INPATIENTS WITH A SECONDARY DIAGNOSIS OF DIABETES MELLITUS, BY FIVE PRIMARY CARDIOVASCULAR DIAGNOSES, TENNESSEE, 2013



NEARLY 7% OF TN INPATIENTS WITH PRIMARY DIABETES DX UNDERGO VENOUS CATH.

Tennessee inpatients with a primary diagnosis of diabetes mellitus were most likely, by procedure, to receive a venous catheterization, not elsewhere classified, in 2013, at 6.8%. Just over 6% of these inpatients underwent hemodialysis in 2013, a lower share than that reported among these inpatients nationally (6.7%).

MOST COMMON PROCEDURES FOR INPATIENTS WITH A PRIMARY DIAGNOSIS OF DIABETES MELLITUS, TENNESSEE, 2013



Data source: IMS Health © 2016

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

NOTE: Secondary diagnoses and procedures data come from IMS Health's *Hospital Procedure/Diagnosis (HPD)* database and are current as of calendar year 2013.

DIABETES AND CARDIOVASCULAR DISEASE

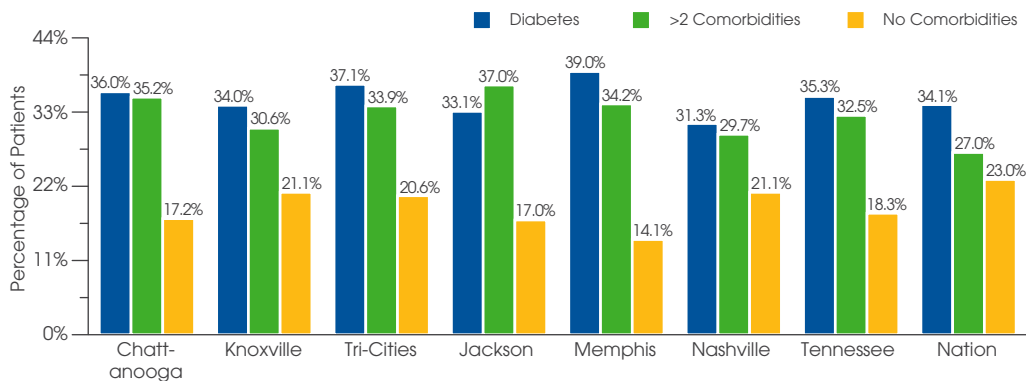
PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY TYPE OF COMPLICATION, 2014¹

MARKET	Cardiovascular Disease	Neuropathy	Nephropathy	Retinopathy	Hypoglycemia
Chattanooga	64.5%	34.9%	38.8%	9.3%	6.2%
Knoxville	56.3	38.9	35.7	13.7	6.5
Tri-Cities	51.8	39.5	34.9	22.0	8.9
Jackson	72.0	28.4	30.1	12.8	8.5
Memphis	59.8	31.0	36.3	14.9	8.6
Nashville	53.7	38.6	37.2	14.8	8.4
Tennessee	57.5	36.0	35.4	14.4	8.2
NATION	56.2%	34.3%	32.9%	18.2%	8.8%

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY TYPE OF COMORBIDITY, 2014²

MARKET	Hypertension	Hyperlipidemia	Congestive Heart Failure	Obesity	Dysmetabolic Syndrome
Chattanooga	86.2%	64.5%	14.3%	16.6%	1.3%
Knoxville	81.8	61.7	14.4	14.4	0.3
Tri-Cities	79.8	67.1	14.6	15.7	0.4
Jackson	87.0	65.4	19.0	14.3	0.7
Memphis	87.5	71.1	12.9	10.9	0.7
Nashville	79.7	55.9	13.3	20.3	0.9
Tennessee	83.5	64.0	13.5	15.0	0.7
NATION	79.6%	63.1%	12.4%	18.0%	0.7%

PERCENTAGE OF LIPID DISORDER PATIENTS, BY PATIENT TYPE, 2014³



DISTRIBUTION OF LIPID DISORDERS PATIENTS, BY NUMBER OF STATINS, 2014

MARKET	0	1	2	>2
Chattanooga	29.8%	59.5%	9.6%	1.1%
Knoxville	25.3	61.5	11.8	1.4
Tri-Cities	27.0	60.1	11.5	1.4
Jackson	18.9	67.7	11.9	1.6
Memphis	19.8	65.5	13.2	1.6
Nashville	25.2	61.7	11.8	1.3
Tennessee	24.3	62.6	11.8	1.4
NATION	27.8%	60.6%	10.5%	1.1%

Data source: IMS Health © 2016

RATES OF CV DISEASE ARE HIGH FOR TYPE 2 DIABETES PTS. IN CHATTANOOGA, JACKSON

The percentages of Type 2 diabetes patients in Chattanooga (64.5%) and Jackson (72.0%) with a complication of cardiovascular (CV) disease were notably higher than those statewide (57.5%) and across the nation (56.2%) in 2014. The rates of CV disease in Memphis (59.8%) and Knoxville (56.3%) also were higher than the national share.

DIABETIC SHARE OF LIPID DISORDER PATIENTS ECLIPSES NATION'S IN TN MARKETS

In Chattanooga (36.0%), the Tri-Cities (37.1%), Memphis (39.0%), and Tennessee (35.3%), the shares of lipid disorder patients who had a diagnosis of diabetes were higher than that of the nation (34.1%) in 2014. Moreover, in all of the profiled Tennessee markets, the shares of lipid disorder patients with more than two comorbidities were above the national average.

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

² 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 may include, but are not limited to, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

³ A comorbidity is a condition a lipid disorder patient may also have. Comorbidities were narrowed down to a subset of conditions that are typically present in patients with lipid disorders.

NOTE: Therapy percentages are representative of those patients with a diagnosis of interest in the most recent two years, who filled prescriptions within each drug category in the reporting year. Throughout this report, pharmacotherapy percentages do not include over-the-counter medications.

CARDIOVASCULAR DISEASE DISCHARGES

JACKSON HOSPITALS TREAT LARGE NUMBERS OF CV OUTPATIENT CASES

Of the profiled Tennessee markets, Jackson had the highest numbers of outpatient congestive heart failure, hyperlipidemia, hypertension, and stroke cases per hospital in 2013. For example, the average Jackson hospital discharged 27,314.5 outpatient hypertension cases in 2013, more than three times the national average of 8,805.3. The mean number of stroke outpatient cases in Jackson hospitals more than doubled the state average that year: 946.0 versus 379.4.

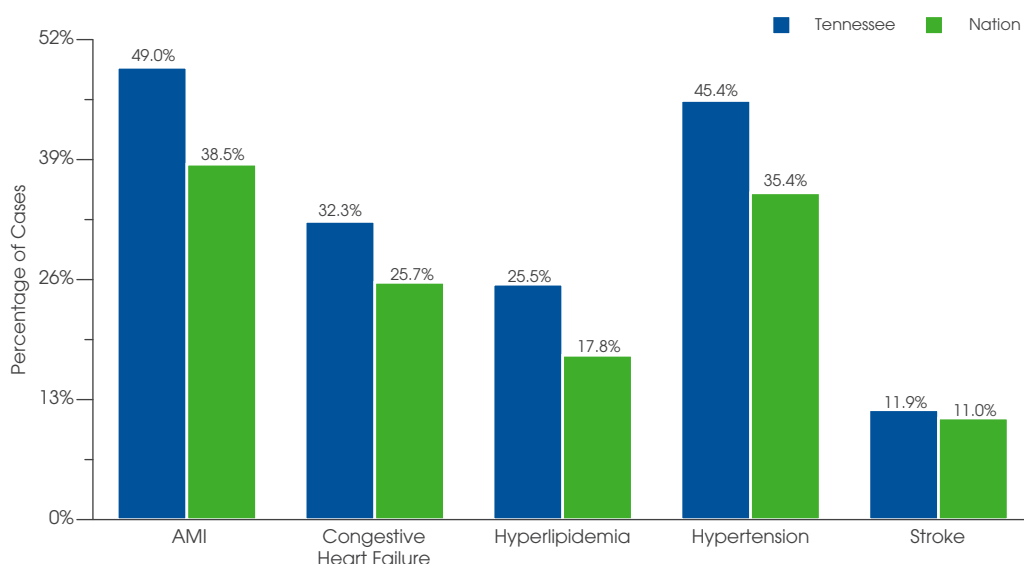
TN OUTPATIENT CV CASES ARE MORE APT TO BE IN EDs THAN SIMILAR CASES NATIONALLY

Compared with national rates, higher percentages of Tennessee outpatient acute myocardial infarction (AMI), heart failure, hyperlipidemia, hypertension, or stroke cases were in emergency rooms in 2013. For example, 49.0% of Tennessee outpatient AMI cases were in emergency departments (EDs) in 2013, versus 38.5% in hospitals nationally. The ED share of outpatient hypertension cases in Tennessee was 45.4% in 2013, 10 percentage points above the corresponding U.S. share of 35.4% that year.

NUMBER OF OUTPATIENT CASES PER HOSPITAL PER YEAR, 2013

	AMI	Congestive Heart Failure	Hyperlipidemia	Hypertension	Stroke
MARKET					
Chattanooga	13.0	1,230.1	3,453.0	9,746.6	441.6
Knoxville	24.6	1,181.5	4,065.1	8,823.8	464.0
Tri-Cities	16.0	980.7	2,996.2	6,855.1	583.7
Jackson	7.0	4,300.5	10,817.5	27,314.5	946.0
Memphis	13.8	1,003.7	2,715.4	7,627.0	534.4
Nashville	20.4	1,526.6	4,401.9	11,225.3	643.2
Tennessee	14.5	1,010.5	2,624.2	6,924.2	379.4
NATION	19.0	1,156.3	4,286.8	8,805.3	424.9

EMERGENCY DEPARTMENT PERCENTAGE OF OUTPATIENT CASES, 2013



NUMBER OF INPATIENT CASES PER HOSPITAL PER YEAR, 2013

	AMI	Congestive Heart Failure	Hyperlipidemia	Hypertension	Stroke
MARKET					
Chattanooga	70.1	807.8	977.8	2,267.2	321.4
Knoxville	77.0	1,227.6	1,638.1	2,800.3	310.5
Tri-Cities	81.9	1,387.9	1,374.7	2,570.2	283.9
Jackson	134.5	3,182.5	2,581.5	3,712.0	677.0
Memphis	104.9	1,478.3	1,721.9	2,824.4	322.2
Nashville	82.1	1,333.1	1,638.1	3,201.0	298.8
Tennessee	56.2	837.9	932.4	1,788.5	190.2
NATION	53.9	795.0	1,019.2	1,851.9	180.3

Data source: IMS Health © 2016

NOTE: Outpatient and inpatient discharge data on pages 10 and 11 come from IMS Health's Hospital Procedure/Diagnosis (HPD) database and are current as of end-of-year 2013. AMI is acute myocardial infarction.

CARDIOVASCULAR DISEASE DISCHARGES

AVERAGE LENGTH OF STAY PER INPATIENT CASE, 2013

	AMI	Congestive Heart Failure	Hypertension	Stroke
MARKET				
Chattanooga	3.8	4.7	2.3	3.6
Knoxville	4.1	5.1	2.1	3.8
Tri-Cities	3.1	4.5	1.6	3.3
Jackson	4.3	5.4	2.2	4.4
Memphis	4.5	5.4	2.4	5.1
Nashville	3.7	4.5	2.1	3.9
Tennessee	3.6	4.1	2.2	3.7
NATION	3.8	4.6	2.5	4.0

ALOS FOR CV CASES IN JACKSON AND MEMPHIS EXCEED STATE, NATION AVGS.

In both Jackson and Memphis, the average lengths of stay (ALOS) per inpatient (IP) case exceeded both the Tennessee and overall national averages for three of the four featured cardiovascular diagnoses in 2013 (hypertension excepted). For example, the ALOS per congestive heart failure inpatient case in both Jackson and Memphis (5.4 days) surpassed that of Tennessee (4.1) by 1.3 days, and that of the nation (4.6) by 0.8 days.

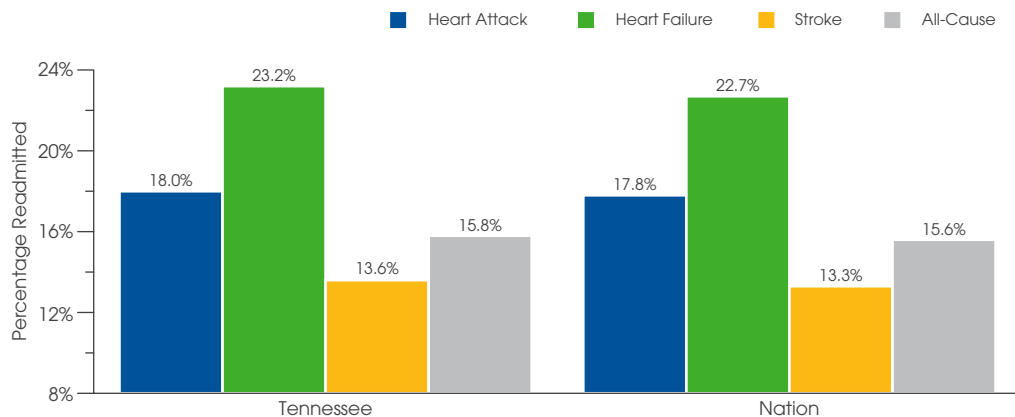
AVERAGE CHARGES PER INPATIENT CASE, 2013¹

	AMI	Congestive Heart Failure	Hyperlipidemia	Hypertension	Stroke
MARKET					
Chattanooga	\$69,532	\$34,941	—	\$21,430	\$35,193
Knoxville	67,868	31,989	\$29,289	17,277	30,206
Tri-Cities	82,788	33,353	—	15,669	36,827
Jackson	66,960	29,877	—	18,056	34,841
Memphis	100,092	44,003	41,972	26,569	48,326
Nashville	87,732	45,065	—	20,766	46,532
Tennessee	78,253	35,443	38,775	19,695	38,172
NATION	\$92,018	\$41,806	\$31,639	\$22,385	\$44,734

CHARGES PER CV IP CASE ARE HIGH IN MEMPHIS VERSUS STATE AND NATION

In 2013, average charges per inpatient case in Memphis were higher than both the corresponding statewide and national averages across all five of the featured cardiovascular diagnoses.

30-DAY HOSPITAL READMISSION RATES, 2013



CV 30-DAY READMISSION RATES IN TN HOSPITALS EDGE ABOVE THOSE OF THE NATION

Thirty-day hospital readmission rates for heart attack (18.0%), heart failure (23.2%), stroke (13.6%), and all causes (15.8%) were fractionally higher in Tennessee hospitals than at all hospitals nationwide in 2013.

Data source: IMS Health © 2016

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

NOTE: Outpatient and inpatient discharge data on pages 10 and 11 come from IMS Health's *Hospital Procedure/Diagnosis* (HPD) database and are current as of end-of-year 2013. AMI is acute myocardial infarction. Some charge data were unavailable for the selected markets.

EAST: CHATTANOOGA

**DEMOGRAPHICS:
AGE AND GENDER, 2012-2014¹**

AGE GROUP	Distribution of Type 2 Diabetes Patients			
	Chattanooga			Tennessee
	2012	2013	2014	2014
0-17	0.3%	0.3%	0.3%	0.4%
18-35	2.4	2.5	2.6	3.0
36-64	44.6	43.3	43.4	46.8
65-79	41.2	42.5	42.0	39.3
80+	11.5	11.4	11.7	10.6
GENDER				
Male	44.8%	45.4%	45.8%	45.1%
Female	55.2	54.6	54.2	54.9

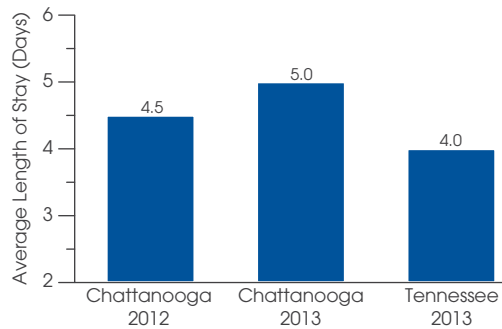
**DEMOGRAPHICS:
COMORBIDITIES AND COMPLICATIONS, 2013-2014^{2,3}**

ACTUAL COMORBIDITIES	Percentage of Type 2 Diabetes Patients			
	Chattanooga		Tennessee	
	2013	2014	2013	2014
Depression	7.5%	7.8%	9.7%	10.4%
Hyperlipidemia	65.6	64.5	62.7	64.0
Hypertension	85.3	86.2	82.6	83.5
Obesity	14.4	16.6	12.8	15.0
ACTUAL COMPLICATIONS				
Cardiovascular Disease	63.7%	64.5%	57.8%	57.5%
Hypoglycemia	5.6	6.2	8.2	8.2
Nephropathy	36.3	38.8	33.5	35.4
Neuropathy	33.4	34.9	34.3	36.0

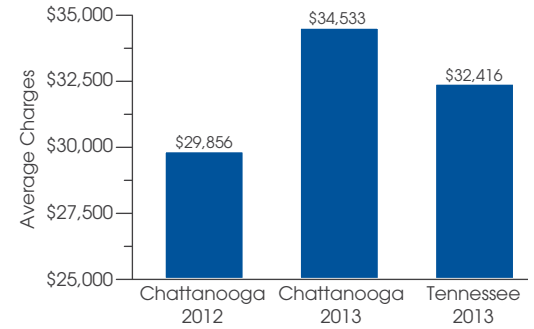
CHARGES CLIMB FOR CHATTANOOGA INPATIENT DIABETES MELLITUS CASES

From 2012 to 2013, average charges per inpatient (IP) diabetes mellitus case treated in Chattanooga hospitals grew 15.7%, to \$34,533 from \$29,856. Such charges averaged \$32,416 across Tennessee in 2013.

AVERAGE LENGTH OF STAY PER INPATIENT DIABETES MELLITUS CASE, 2012-2013⁴



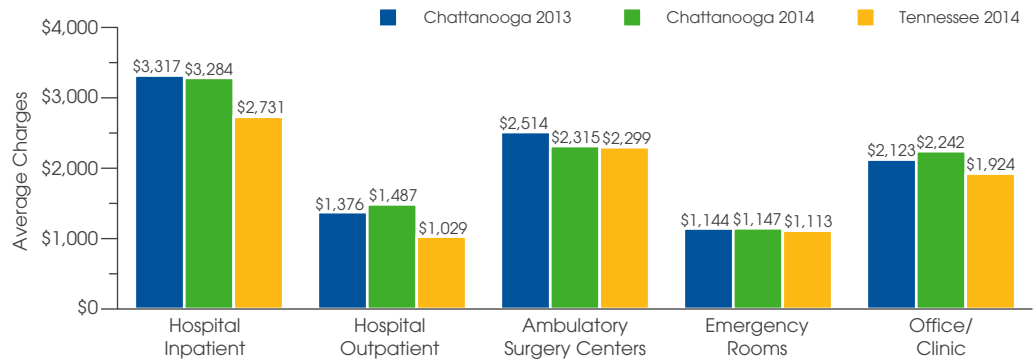
CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2012-2013^{4,5}



RATE OF CV DISEASE AMONG CHATTANOOGA TYPE 2 DIABETES PATIENTS RISES

The percentage of Chattanooga Type 2 diabetes patients with a complication of cardiovascular disease resulting from their diabetes grew to 64.5% in 2014 from 63.7% in 2013, and was notably higher than the Tennessee share of 57.5% in 2014.

PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, COMMERCIAL INSURANCE PAYERS, 2013-2014^{6,7}



Data source: IMS Health © 2016

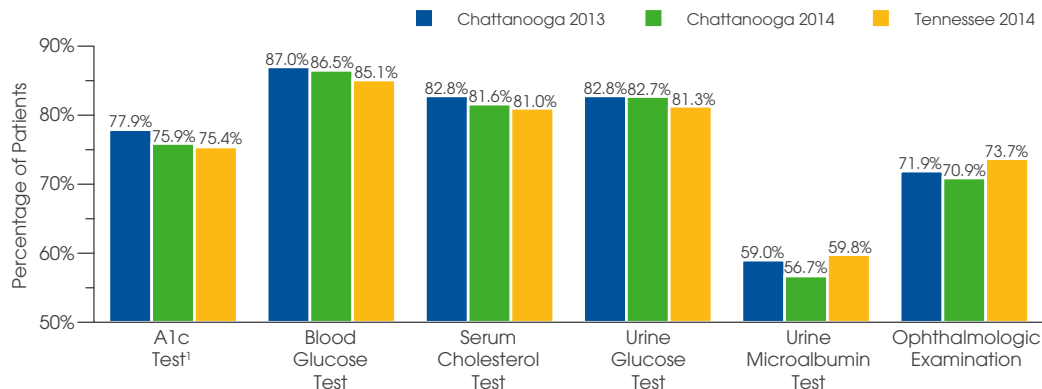
CHATTANOOGA TYPE 2 DIABETES PATIENTS ARE MORE APT TO HAVE HYPERLIPIDEMIA

Although the share of Chattanooga Type 2 diabetes patients with a comorbidity of hyperlipidemia fell to 64.5% in 2014 from 65.6% in 2013, it remained higher than that of Tennessee (64.0%) in 2014.

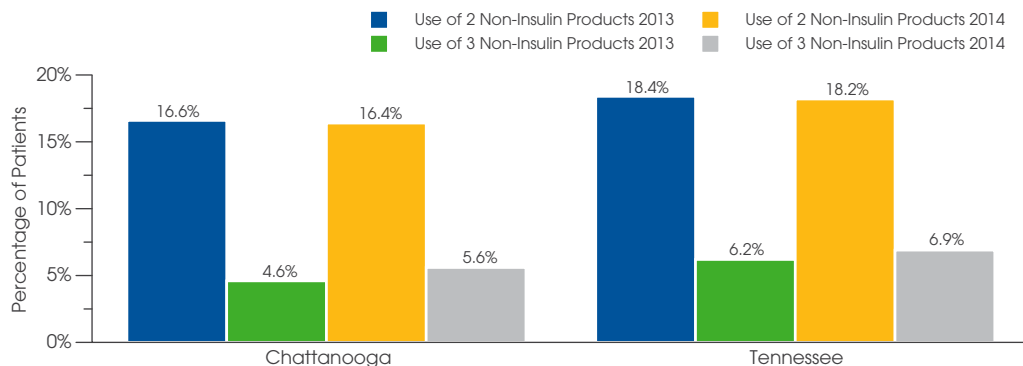
¹ On pages 12-13, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.
² A comorbidity is a condition a Type 2 diabetes patient may also have, which is not directly related to the diabetes. Comorbidities were narrowed 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, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.
³ A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, cardiovascular disease, hypoglycemia, nephropathy, neuropathy, and retinopathy.
⁴ Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's Hospital Procedure/Diagnosis (HPD) database and are current as of end-of-year 2013.
⁵ 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.
⁶ Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.
⁷ Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

EAST: CHATTANOOGA

UTILIZATION: PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE, 2013-2014



PHARMACOTHERAPY: PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS NON-INSULINS THERAPIES, 2013-2014



PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014²

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Chattanooga 2013	37.8%	17.5%	13.9%	10.5%	10.6%	10.5%	12.5%	1.7%	2.5%
Chattanooga 2014	36.4	17.7	12.9	10.3	9.9	10.3	11.9	1.5	2.1
Tennessee 2014	35.4%	16.0%	12.2%	9.2%	8.7%	9.2%	10.3%	2.4%	3.6%

AVERAGE PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014^{2,3}

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Chattanooga 2013	\$2,334	\$1,463	\$1,386	\$1,505	\$1,544	\$1,505	\$1,473	\$2,241	\$1,632
Chattanooga 2014	2,997	1,894	1,908	2,013	1,930	2,013	1,817	2,501	1,826
Tennessee 2014	\$3,046	\$2,012	\$1,978	\$1,830	\$2,005	\$1,830	\$1,944	\$2,682	\$1,891

PERCENTAGE OF AND AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING NON-INSULIN THERAPIES, 2013-2014^{2,3}

	Any Non-Insulin Anti-diabetic Product	Biguanides		Sulfonylureas		Insulin Sensitizing Agents		DPP-4 Inhibitors		SGLT-2 Inhibitors	
		% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs
Chattanooga 2013	\$645	58.3%	\$99	29.3%	\$81	3.7%	\$773	9.5%	\$1,620	0.4%	\$694
Chattanooga 2014	746	60.0	87	27.3	66	3.5	282	9.8	1,923	3.7	1,082
Tennessee 2014	\$841	60.8%	\$114	31.4%	\$70	4.5%	\$291	10.9%	\$1,924	5.3%	\$1,170

CHATTANOOGA TYPE 2 DIABETES PTS. ARE MORE LIKELY TO RECEIVE TESTING SERVICES

The percentages of Chattanooga Type 2 diabetes patients who had an A1c (75.9%), blood glucose (86.5%), serum cholesterol (81.6%), or urine glucose (82.7%) test in 2014 were higher than the corresponding shares for Type 2 diabetes patients across Tennessee.

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 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 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.

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.

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 Insulin

Insulin replacement product with a long duration of action.

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.

Short-Acting Insulin

Insulin replacement product with a short onset of action and duration.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors

Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

Sulfonylureas

Stimulate the release of insulin in the pancreas.

Data source: IMS Health © 2016

EAST: KNOXVILLE

DEMOGRAPHICS: AGE AND GENDER, 2012-2014¹

AGE GROUP	Distribution of Type 2 Diabetes Patients			
	2012	2013	2014	2014
0-17	0.3%	0.3%	0.3%	0.4%
18-35	2.7	2.5	2.5	3.0
36-64	43.6	41.9	42.1	46.8
65-79	41.5	43.1	43.1	39.3
80+	11.9	12.3	12.1	10.6
GENDER	2012	2013	2014	2014
Male	46.7%	46.6%	47.2%	45.1%
Female	53.3	53.4	52.8	54.9

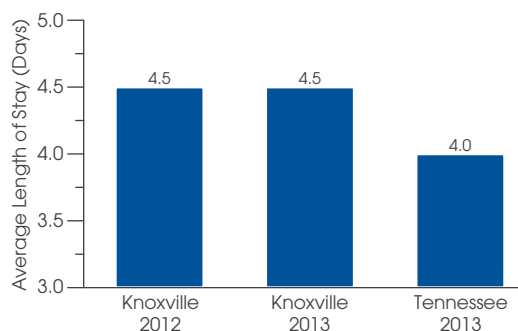
DEMOGRAPHICS: COMORBIDITIES AND COMPLICATIONS, 2013-2014^{2,3}

	Percentage of Type 2 Diabetes Patients			
	Knoxville		Tennessee	
	2013	2014	2013	2014
ACTUAL COMORBIDITIES				
Depression	13.5%	14.9%	9.7%	10.4%
Hyperlipidemia	60.1	61.7	62.7	64.0
Hypertension	78.8	81.8	82.6	83.5
Obesity	12.3	14.4	12.8	15.0
ACTUAL COMPLICATIONS				
Cardiovascular Disease	57.9%	56.3%	57.8%	57.5%
Hypoglycemia	6.1	6.5	8.2	8.2
Nephropathy	34.5	35.7	33.5	35.4
Neuropathy	33.5	38.9	34.3	36.0

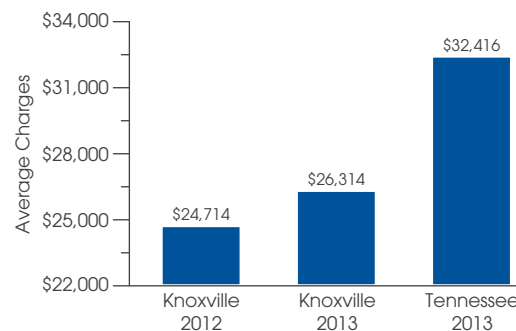
COMORBIDITY RATES GROW AMONG TYPE 2 DIABETES PATIENTS IN KNOXVILLE

From 2013 to 2014, the percentages of Type 2 diabetes patients in Knoxville who had any of the four profiled comorbidities increased. Concurrently, the percentages of such patients in Knoxville who were diagnosed with a complication of hypoglycemia, nephropathy, or neuropathy as a result of their diabetes also rose.

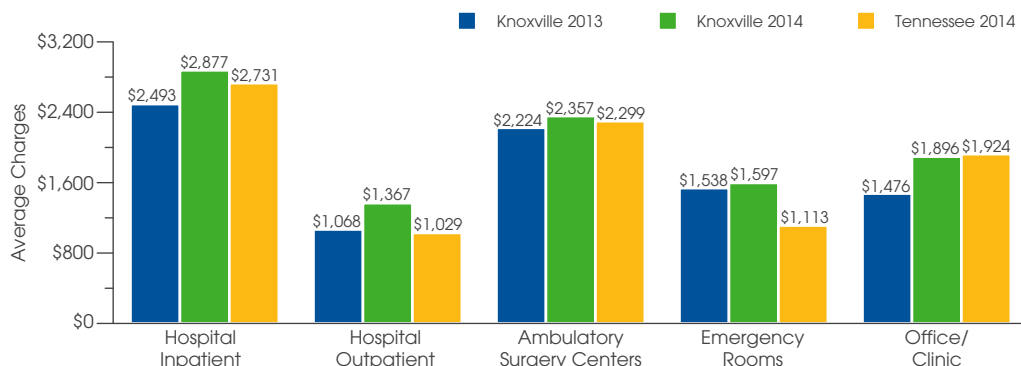
AVERAGE LENGTH OF STAY PER INPATIENT DIABETES MELLITUS CASE, 2012-2013⁴



CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2012-2013^{4,5}



PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, COMMERCIAL INSURANCE PAYERS, 2013-2014^{6,7}



Data source: IMS Health © 2016

PROVIDER CHARGES RISE FOR KNOXVILLE TYPE 2 DIABETES PTS. WITH COMMERCIAL INS.

Across all five of the profiled settings, professional charges for Knoxville Type 2 diabetes patients with commercial insurance rose from 2013 to 2014. In both the hospital outpatient and office/clinic settings, such charges expanded by at least 28.0%, accounting for the two largest such increases that year. In 2014, provider charges for these Knoxville patients exceeded the overall Tennessee averages in four of the five settings (office/clinic excepted).

¹ On pages 14-15, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.

² 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, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

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

⁴ Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's *Hospital Procedure/Diagnosis (HPD)* database and are current as of end-of-year 2013.

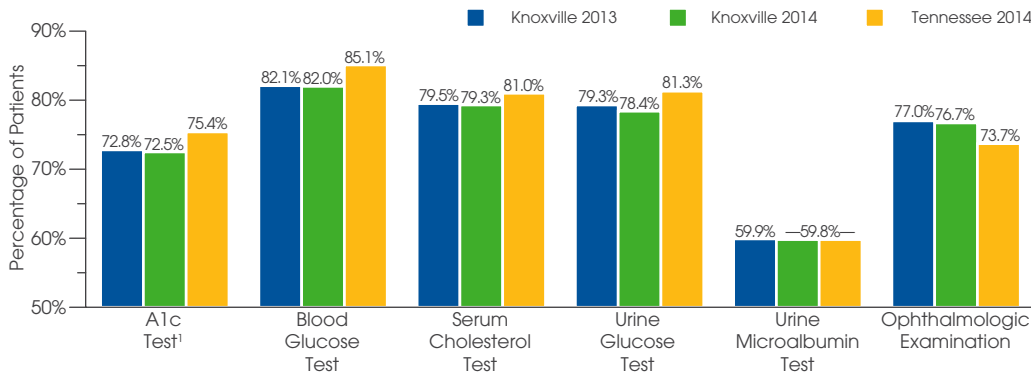
⁵ Charge data are per-case averages for inpatients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the hospital for the entire episode of care, and may include accommodation, pharmacy, laboratory, radiology, and other charges not billed by the physician. Data do not necessarily indicate final amounts paid.

⁶ Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.

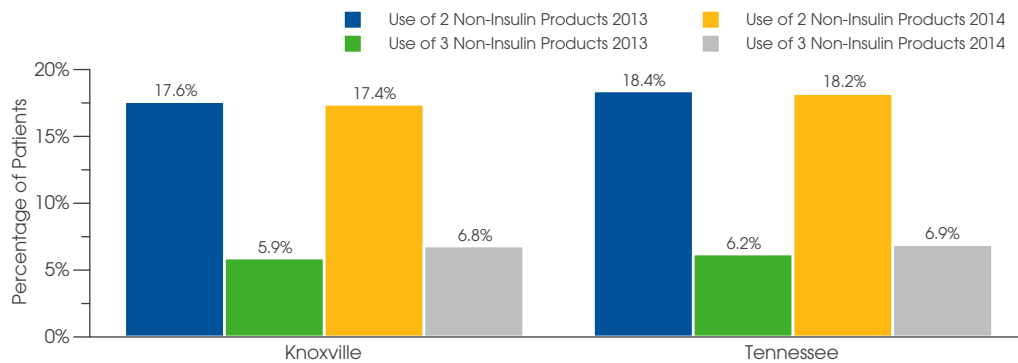
⁷ Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

EAST: KNOXVILLE

UTILIZATION: PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE, 2013-2014



PHARMACOTHERAPY: PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS NON-INSULIN THERAPIES, 2013-2014



PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014²

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Knoxville 2013	37.4%	16.0%	13.5%	10.8%	9.5%	10.8%	11.5%	2.5%	3.0%
Knoxville 2014	37.5	17.3	13.0	11.2	9.6	11.2	11.4	2.3	2.7
Tennessee 2014	35.4%	16.0%	12.2%	9.2%	8.7%	9.2%	10.3%	2.4%	3.6%

AVERAGE PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014^{2,3}

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Knoxville 2013	\$2,583	\$1,676	\$1,694	\$1,389	\$1,691	\$1,389	\$1,602	\$2,479	\$1,884
Knoxville 2014	3,307	2,187	2,293	1,777	2,050	1,777	1,958	2,970	2,139
Tennessee 2014	\$3,046	\$2,012	\$1,978	\$1,830	\$2,005	\$1,830	\$1,944	\$2,682	\$1,891

PERCENTAGE OF AND AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING NON-INSULIN THERAPIES, 2013-2014^{2,3}

	Any Non-Insulin Anti-diabetic Product	Biguanides		Sulfonylureas		Insulin Sensitizing Agents		DPP-4 Inhibitors		SGLT-2 Inhibitors	
		% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs
Knoxville 2013	\$697	59.9%	\$131	33.1%	\$81	4.7%	\$631	10.9%	\$1,700	0.8%	\$662
Knoxville 2014	826	61.8	127	31.3	70	4.5	271	11.0	1,928	4.4	1,231
Tennessee 2014	\$841	60.8%	\$114	31.4%	\$70	4.5%	\$291	10.9%	\$1,924	5.3%	\$1,170

KNOXVILLE TYPE 2 DIABETES PTS. HAVE LOWER TESTING RATES THAN PTS. ACROSS TN

In 2014, Type 2 diabetes patients in Knoxville were less likely than their counterparts across the state of Tennessee to receive an A1c test (72.5% versus 75.4%), blood glucose test (82.0% versus 85.1%), serum cholesterol test (79.3% versus 81.0%), or urine glucose test (78.4% versus 81.3%).

- 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 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 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.

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.

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 Insulin

Insulin replacement product with a long duration of action.

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.

Short-Acting Insulin

Insulin replacement product with a short onset of action and duration.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors

Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

Sulfonylureas

Stimulate the release of insulin in the pancreas.

Data source: IMS Health © 2016

EAST: TRI-CITIES

**DEMOGRAPHICS:
AGE AND GENDER, 2012-2014¹**

AGE GROUP	Distribution of Type 2 Diabetes Patients			
	Tri-Cities			Tennessee
	2012	2013	2014	2014
0-17	0.4%	0.4%	0.4%	0.4%
18-35	2.7	2.7	2.5	3.0
36-64	43.4	44.0	43.5	46.8
65-79	41.8	41.6	41.8	39.3
80+	11.7	11.4	11.8	10.6
GENDER				
Male	44.3%	45.0%	45.7%	45.1%
Female	55.8	55.0	54.3	54.9

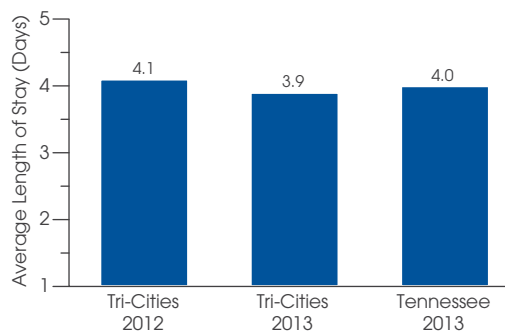
**DEMOGRAPHICS:
COMORBIDITIES AND COMPLICATIONS, 2013-2014^{2,3}**

ACTUAL COMORBIDITIES	Percentage of Type 2 Diabetes Patients			
	Tri-Cities		Tennessee	
	2013	2014	2013	2014
Depression	11.4%	13.9%	9.7%	10.4%
Hyperlipidemia	65.3	67.1	62.7	64.0
Hypertension	77.1	79.8	82.6	83.5
Obesity	12.1	15.7	12.8	15.0
ACTUAL COMPLICATIONS				
Cardiovascular Disease	51.0%	51.8%	57.8%	57.5%
Hypoglycemia	8.0	8.9	8.2	8.2
Nephropathy	30.0	34.9	33.5	35.4
Neuropathy	38.0	39.5	34.3	36.0

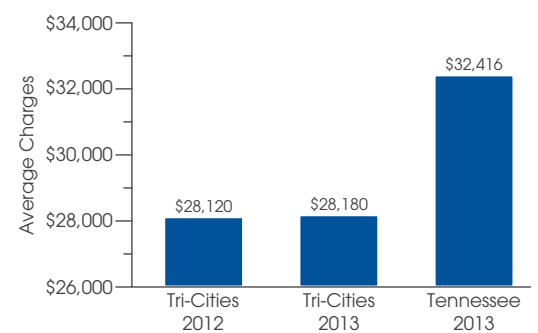
TRI-CITIES TYPE 2 DIABETES PTS. HAVE HIGHER RATES OF COMMON COMORBIDITIES

The percentages of Tri-Cities Type 2 diabetes patients with a comorbidity of depression (13.9%), hyperlipidemia (67.1%), or obesity (15.7%) in 2014 were all higher than the corresponding shares of their counterparts across Tennessee.

AVERAGE LENGTH OF STAY PER INPATIENT DIABETES MELLITUS CASE, 2012-2013⁴



CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2012-2013^{4,5}



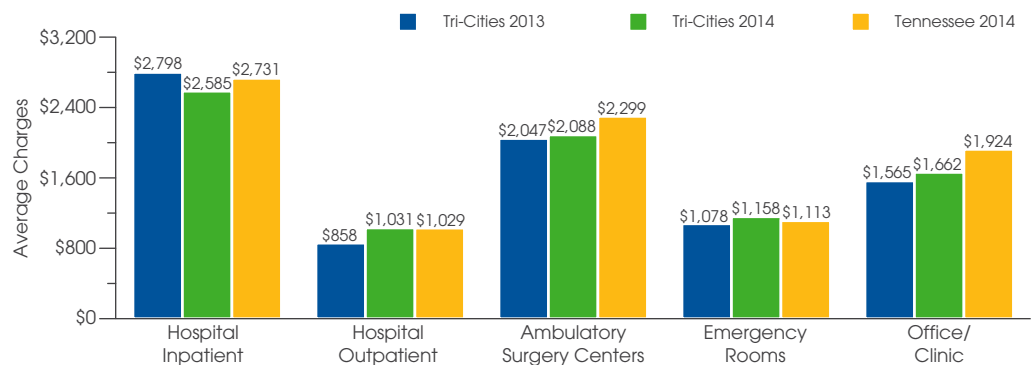
ALOS FALLS FOR TRI-CITIES DIABETES MELLITUS CASES

From 2012 (4.1 days) to 2013 (3.9), the average length of stay (ALOS) per inpatient diabetes mellitus case dipped. In Tennessee, ALOS for such cases was 4.0 days in 2013.

INPATIENT CHARGES RISE SLIGHTLY FOR TRI-CITIES DIABETES MELLITUS CASES

The average charges per Tri-Cities inpatient diabetes mellitus case grew just 0.2% from 2012 (\$28,120) to 2013 (\$28,180), and remained well below the Tennessee average (\$32,416) in 2013.

PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, COMMERCIAL INSURANCE PAYERS, 2013-2014^{6,7}



Data source: IMS Health © 2016

¹ On pages 16-17, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.

² 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, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

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

⁴ Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's *Hospital Procedure/Diagnosis* (HPD) database and are current as of end-of-year 2013.

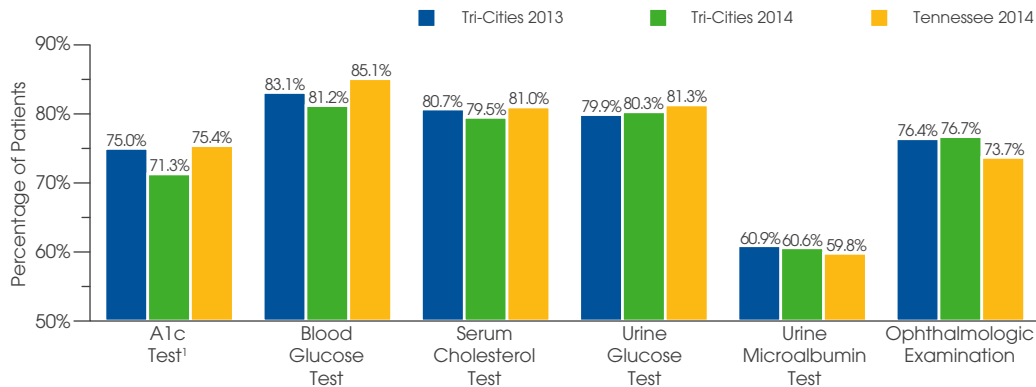
⁵ Charge data are per-case averages for inpatients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the hospital for the entire episode of care, and may include accommodation, pharmacy, laboratory, radiology, and other charges not billed by the physician. Data do not necessarily indicate final amounts paid.

⁶ Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.

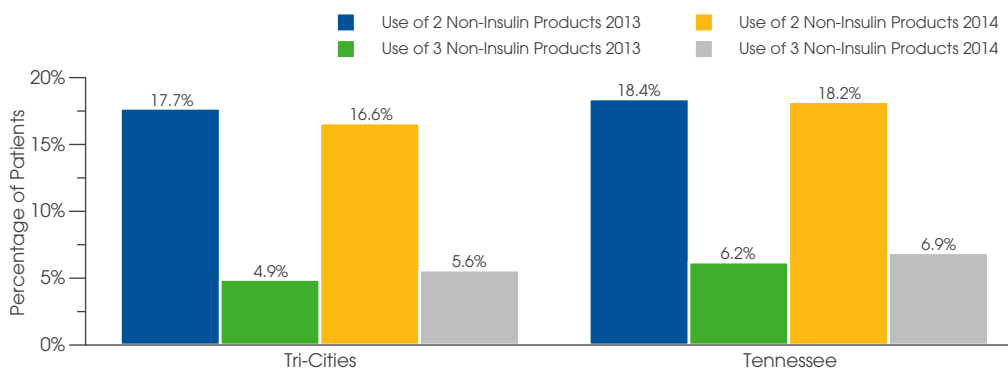
⁷ Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

EAST: TRI-CITIES

UTILIZATION: PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE, 2013-2014



PHARMACOTHERAPY: PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS NON-INSULIN THERAPIES, 2013-2014



PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014²

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Tri-Cities 2013	37.0%	16.7%	13.2%	9.4%	9.4%	9.4%	11.7%	2.0%	2.4%
Tri-Cities 2014	36.9	16.9	13.0	9.4	9.4	9.4	11.5	2.1	2.5
Tennessee 2014	35.4%	16.0%	12.2%	9.2%	8.7%	9.2%	10.3%	2.4%	3.6%

AVERAGE PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014^{2,3}

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Tri-Cities 2013	\$2,694	\$1,715	\$1,766	\$1,527	\$1,885	\$1,527	\$1,885	\$2,577	\$2,032
Tri-Cities 2014	3,371	2,177	2,359	1,868	2,182	1,868	2,250	2,856	2,373
Tennessee 2014	\$3,046	\$2,012	\$1,978	\$1,830	\$2,005	\$1,830	\$1,944	\$2,682	\$1,891

PERCENTAGE OF AND AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING NON-INSULIN THERAPIES, 2013-2014^{2,3}

	Any Non-Insulin Anti-diabetic Product	Biguanides		Sulfonylureas		Insulin Sensitizing Agents		DPP-4 Inhibitors		SGLT-2 Inhibitors	
		% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs
Tri-Cities 2013	\$657	63.7%	\$105	30.6%	\$94	4.9%	\$686	8.5%	\$1,605	0.5%	\$685
Tri-Cities 2014	711	64.8	99	29.4	77	4.5	301	8.4	1,924	3.7	1,103
Tennessee 2014	\$841	60.8%	\$114	31.4%	\$70	4.5%	\$291	10.9%	\$1,924	5.3%	\$1,170

A1c TESTING RATE AMONG TRI-CITIES TYPE 2 DIABETES PATIENTS DECLINES

From 2013 (75.0%) to 2014 (71.3%), the percentage of Tri-Cities Type 2 diabetes patients who received an A1c test decreased. Furthermore, such Tri-Cities patients were less likely than their counterparts across the state of Tennessee (75.4%) to receive an A1c test in 2014.

- 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 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 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.

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.

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 Insulin

Insulin replacement product with a long duration of action.

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.

Short-Acting Insulin

Insulin replacement product with a short onset of action and duration.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors

Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

Sulfonylureas

Stimulate the release of insulin in the pancreas.

Data source: IMS Health © 2016

WEST: JACKSON

**DEMOGRAPHICS:
AGE AND GENDER, 2012–2014¹**

AGE GROUP	Distribution of Type 2 Diabetes Patients			
	Jackson			Tennessee
	2012	2013	2014	2014
0–17	0.3%	0.2%	0.3%	0.4%
18–35	2.7	2.8	2.8	3.0
36–64	44.9	44.0	45.3	46.8
65–79	39.8	40.0	40.2	39.3
80+	12.3	13.0	11.5	10.6
GENDER				
Male	44.9%	45.2%	46.9%	45.1%
Female	55.1	54.8	53.1	54.9

**DEMOGRAPHICS:
COMORBIDITIES AND COMPLICATIONS, 2013–2014^{2,3}**

ACTUAL COMORBIDITIES	Percentage of Type 2 Diabetes Patients			
	Jackson		Tennessee	
	2013	2014	2013	2014
Depression	7.0%	8.1%	9.7%	10.4%
Hyperlipidemia	66.2	65.4	62.7	64.0
Hypertension	87.0	87.0	82.6	83.5
Obesity	12.2	14.3	12.8	15.0
ACTUAL COMPLICATIONS				
Cardiovascular Disease	76.2%	72.0%	57.8%	57.5%
Hypoglycemia	8.0	8.5	8.2	8.2
Nephropathy	26.6	30.1	33.5	35.4
Neuropathy	25.1	28.4	34.3	36.0

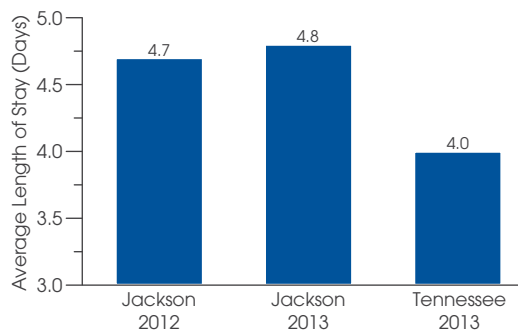
CV RATE AMONG JACKSON TYPE 2 DIABETES PATIENTS EXCEEDS THAT OF TENNESSEE

In both 2013 (76.2%) and 2014 (72.0%), the share of Jackson Type 2 diabetes patients who had cardiovascular disease as a complication of their diabetes surpassed that of Tennessee (57.8% and 57.5%, respectively). Similarly, the percentages of Jackson Type 2 diabetes patients diagnosed with a comorbidity of hyperlipidemia or hypertension also exceeded those of Tennessee in both 2013 and 2014.

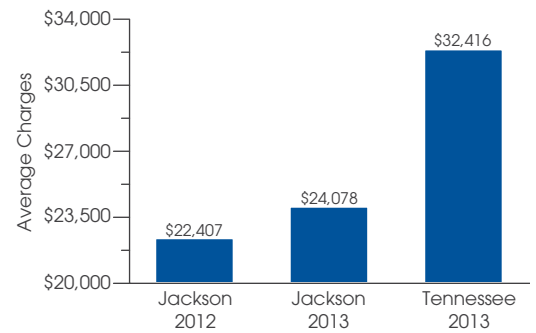
INPATIENT PROVIDER CHARGES INCREASE FOR TYPE 2 DIABETES PTS. IN JACKSON, TOP TN AVG.

Inpatient professional charges for Jackson Type 2 diabetes patients covered by commercial insurance increased 24.9% from 2013 (\$2,529) to 2014 (\$3,158) and were 15.6% higher in 2014 than those for such patients across Tennessee. Hospital outpatient charges for these patients in Jackson (\$1,312) also surpassed the state mean in 2014 (\$1,029).

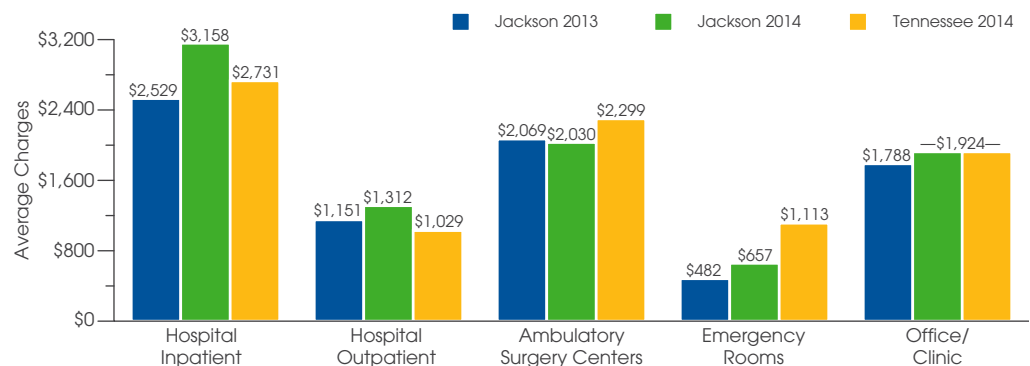
AVERAGE LENGTH OF STAY PER INPATIENT DIABETES MELLITUS CASE, 2012–2013⁴



CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2012–2013^{4,5}



PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, COMMERCIAL INSURANCE PAYERS, 2013–2014^{6,7}



Data source: IMS Health © 2016

¹ On pages 18–19, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.

² 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, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

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

⁴ Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's *Hospital Procedure/Diagnosis (HPD)* database and are current as of end-of-year 2013.

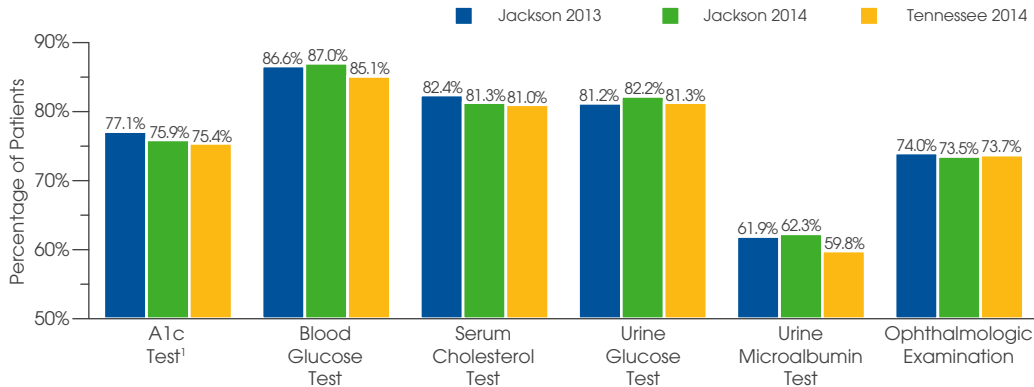
⁵ Charge data are per-case averages for inpatients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the hospital for the entire episode of care, and may include accommodation, pharmacy, laboratory, radiology, and other charges not billed by the physician. Data do not necessarily indicate final amounts paid.

⁶ Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.

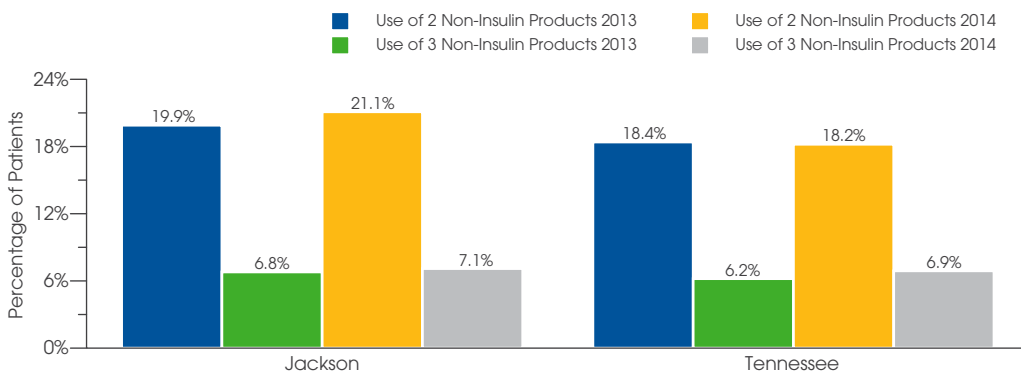
⁷ Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

WEST: JACKSON

UTILIZATION: PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE, 2013-2014



PHARMACOTHERAPY: PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS NON-INSULIN THERAPIES, 2013-2014



PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014²

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Jackson 2013	34.1%	12.1%	13.6%	5.3%	9.1%	5.3%	11.8%	2.0%	4.2%
Jackson 2014	32.9	13.2	12.4	5.3	9.0	5.3	11.5	2.3	3.5
Tennessee 2014	35.4%	16.0%	12.2%	9.2%	8.7%	9.2%	10.3%	2.4%	3.6%

AVERAGE PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014^{2,3}

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Jackson 2013	\$2,084	\$1,595	\$1,330	\$1,291	\$1,640	\$1,291	\$1,448	\$1,779	\$1,224
Jackson 2014	2,859	2,059	2,050	1,768	2,045	1,768	1,788	2,132	1,652
Tennessee 2014	\$3,046	\$2,012	\$1,978	\$1,830	\$2,005	\$1,830	\$1,944	\$2,682	\$1,891

PERCENTAGE OF AND AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING NON-INSULIN THERAPIES, 2013-2014^{2,3}

	Any Non-Insulin Anti-diabetic Product	Biguanides		Sulfonylureas		Insulin Sensitizing Agents		DPP-4 Inhibitors		SGLT-2 Inhibitors	
		% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs
Jackson 2013	\$735	58.8%	\$116	37.3%	\$85	4.9%	\$708	12.6%	\$1,615	1.4%	\$691
Jackson 2014	829	60.2	99	36.2	76	4.6	300	12.4	1,927	5.1	1,030
Tennessee 2014	\$841	60.8%	\$114	31.4%	\$70	4.5%	\$291	10.9%	\$1,924	5.3%	\$1,170

A1c, OTHER TESTING RATES DECREASE FOR JACKSON TYPE 2 DIABETES PATIENTS

The percentage of Jackson Type 2 diabetes patients who had at least one A1c test shrank to 75.9% in 2014 from 77.1% in 2013, yet remained above the 2014 Tennessee rate (75.4%). Serum cholesterol testing and ophthalmologic examination rates also declined from 2013 to 2014 for these patients in Jackson.

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 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 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.

Biguanides

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Long-Acting Insulin

Insulin replacement product with a long duration of action.

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.

Short-Acting Insulin

Insulin replacement product with a short onset of action and duration.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors

Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

Sulfonylureas

Stimulate the release of insulin in the pancreas.

WEST: MEMPHIS

**DEMOGRAPHICS:
AGE AND GENDER, 2012–2014¹**

AGE GROUP	Distribution of Type 2 Diabetes Patients			
	Memphis			Tennessee
	2012	2013	2014	2014
0–17	0.5%	0.5%	0.5%	0.4%
18–35	3.7	3.7	3.4	3.0
36–64	52.9	52.3	49.4	46.8
65–79	34.0	34.8	37.2	39.3
80+	8.9	8.7	9.6	10.6
GENDER	Memphis			Tennessee
Male	43.0%	43.4%	42.8%	45.1%
Female	57.0	56.6	57.2	54.9

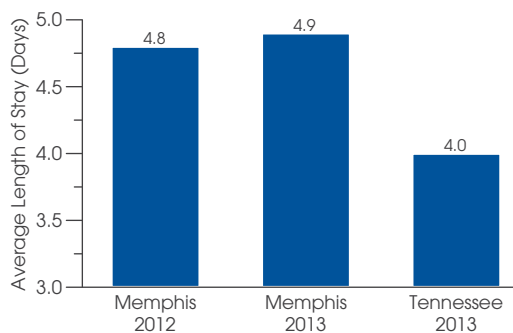
**DEMOGRAPHICS:
COMORBIDITIES AND COMPLICATIONS, 2013–2014^{2,3}**

ACTUAL COMORBIDITIES	Percentage of Type 2 Diabetes Patients			
	Memphis		Tennessee	
	2013	2014	2013	2014
Depression	6.6%	6.9%	9.7%	10.4%
Hyperlipidemia	67.9	71.1	62.7	64.0
Hypertension	86.9	87.5	82.6	83.5
Obesity	10.2	10.9	12.8	15.0
ACTUAL COMPLICATIONS	Memphis		Tennessee	
Cardiovascular Disease	61.3%	59.8%	57.8%	57.5%
Hypoglycemia	10.2	8.6	8.2	8.2
Nephropathy	34.7	36.3	33.5	35.4
Neuropathy	29.0	31.0	34.3	36.0

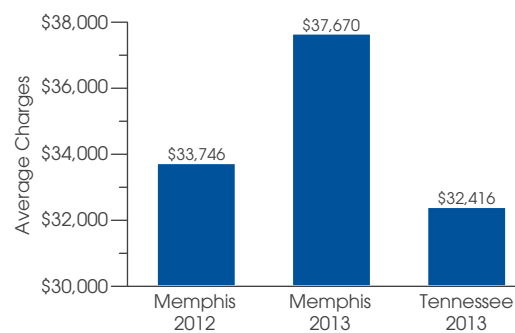
MEMPHIS TYPE 2 DIABETES PTS. HAVE HIGHER RATES OF SOME COMORBIDITIES THAN TN PTS.

Type 2 diabetes patients in Memphis were more likely to have a diagnosis of hyperlipidemia (71.1%) or hypertension (87.5%) than their Tennessee counterparts (64.0% and 83.5%, respectively) in 2014.

AVERAGE LENGTH OF STAY PER INPATIENT DIABETES MELLITUS CASE, 2012–2013⁴



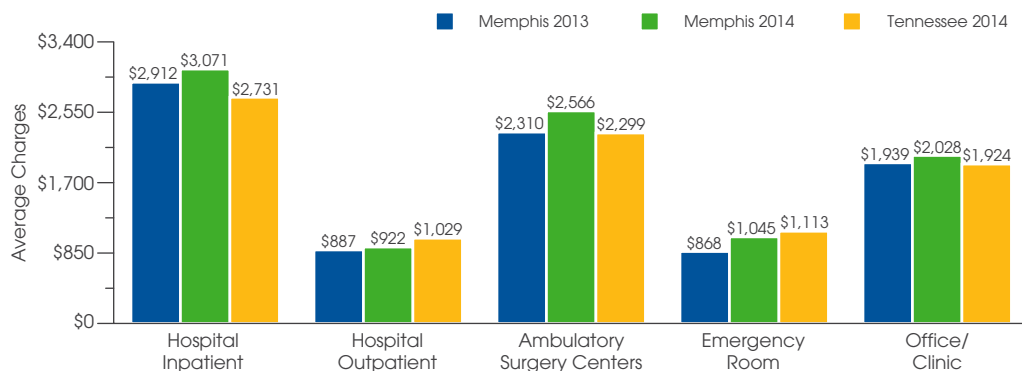
CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2012–2013^{4,5}



ALOS RISES FOR MEMPHIS DIABETES MELLITUS CASES, TOPS THAT OF TENNESSEE

From 2012 (4.8 days) to 2013 (4.9), the average length of stay (ALOS) per inpatient diabetes mellitus case in Memphis increased fractionally. ALOS in Memphis in 2013 surpassed that of Tennessee (4.0) by close to a day. Average total charges per inpatient diabetes mellitus case in Memphis climbed 11.6%, to \$37,670 in 2013 from \$33,746 in 2012. The 2013 charges surpassed those of Tennessee (\$32,416) by 16.2%.

PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, COMMERCIAL INSURANCE PAYERS, 2013–2014^{6,7}



Data source: IMS Health © 2016

¹ On pages 20–21, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.

² 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, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

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⁴ Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health’s Hospital Procedure/Diagnosis (HPD) database and are current as of end-of-year 2013.

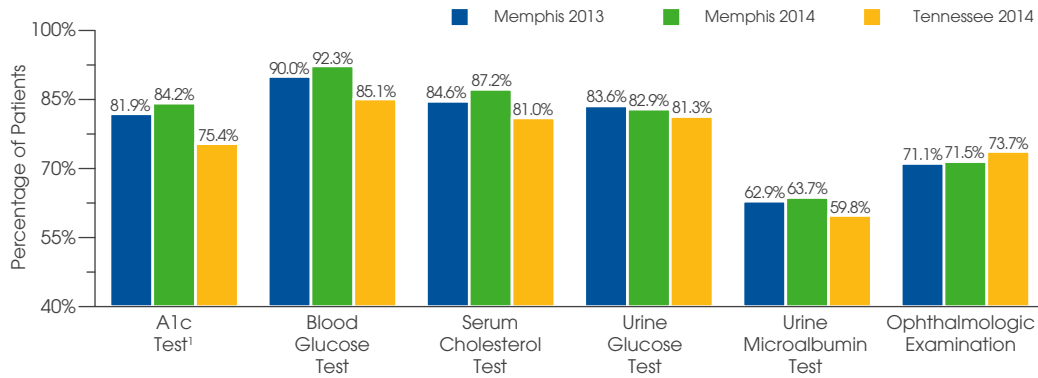
⁵ Charge data are per-case averages for inpatients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the hospital for the entire episode of care, and may include accommodation, pharmacy, laboratory, radiology, and other charges not billed by the physician. Data do not necessarily indicate final amounts paid.

⁶ Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.

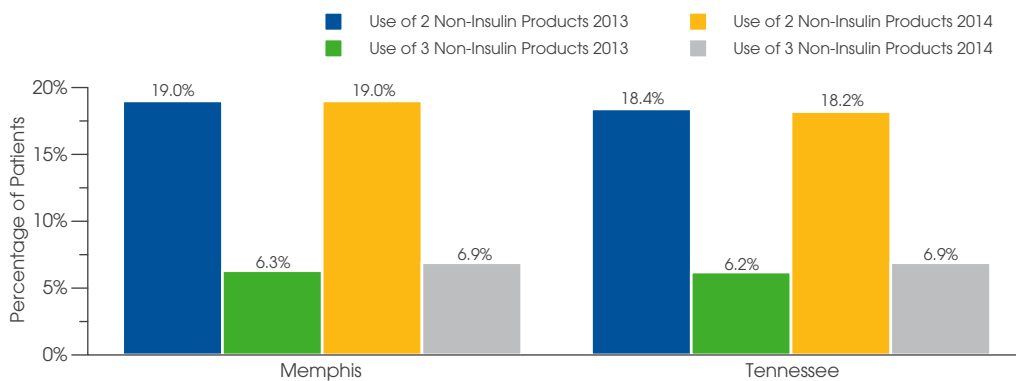
⁷ Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

WEST: MEMPHIS

UTILIZATION: PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE, 2013-2014



PHARMACOTHERAPY: PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS NON-INSULIN THERAPIES, 2013-2014



PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014²

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Memphis 2013	35.0%	14.0%	11.8%	7.4%	7.6%	7.4%	9.5%	3.4%	6.2%
Memphis 2014	34.2	14.9	11.0	7.4	7.2	7.4	8.5	3.1	5.7
Tennessee 2014	35.4%	16.0%	12.2%	9.2%	8.7%	9.2%	10.3%	2.4%	3.6%

AVERAGE PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014^{2,3}

	Any Insulin Products	Long-Acting Insulin		Rapid-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Memphis 2013	\$2,168	\$1,482	\$1,233	\$1,354	\$1,524	\$1,354	\$1,378	\$2,060	\$1,550
Memphis 2014	2,702	1,884	1,694	1,639	1,858	1,639	1,707	2,522	1,848
Tennessee 2014	\$3,046	\$2,012	\$1,978	\$1,830	\$2,005	\$1,830	\$1,944	\$2,682	\$1,891

PERCENTAGE OF AND AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING NON-INSULIN THERAPIES, 2013-2014^{2,3}

	Any Non-Insulin Anti-diabetic Product	Biguanides		Sulfonylureas		Insulin Sensitizing Agents		DPP-4 Inhibitors		SGLT-2 Inhibitors	
		% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs
Memphis 2013	\$772	55.9%	\$127	34.0%	\$80	4.2%	\$676	13.0%	\$1,590	1.7%	\$659
Memphis 2014	896	57.3	124	33.1	69	3.8	257	12.4	1,895	6.9	1,195
Tennessee 2014	\$841	60.8%	\$114	31.4%	\$70	4.5%	\$291	10.9%	\$1,924	5.3%	\$1,170

PERCENTAGE OF MEMPHIS TYPE 2 DIABETES PTS. ON ANY INSULIN PRODUCTS SHRINKS

The share of Memphis Type 2 diabetes patients dispensed any insulin products declined from 2013 (35.0%) to 2014 (34.2%). The 2014 share was lower than that of Tennessee (35.4%). Average payments for such Memphis patients prescribed any insulin products in 2014 (\$2,702) fell below those of Tennessee (\$3,046).

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 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 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.

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.

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 Insulin

Insulin replacement product with a long duration of action.

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.

Short-Acting Insulin

Insulin replacement product with a short onset of action and duration.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors

Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

Sulfonylureas

Stimulate the release of insulin in the pancreas.

WEST: NASHVILLE

**DEMOGRAPHICS:
AGE AND GENDER, 2012-2014¹**

AGE GROUP	Distribution of Type 2 Diabetes Patients			
	Nashville			Tennessee
	2012	2013	2014	2014
0-17	0.3%	0.3%	0.4%	0.4%
18-35	2.9	2.9	3.0	3.0
36-64	48.4	47.8	49.4	46.8
65-79	38.5	38.8	37.7	39.3
80+	10.0	10.3	9.5	10.6
GENDER				
Male	44.6%	45.1%	45.8%	45.1%
Female	55.4	54.9	54.2	54.9

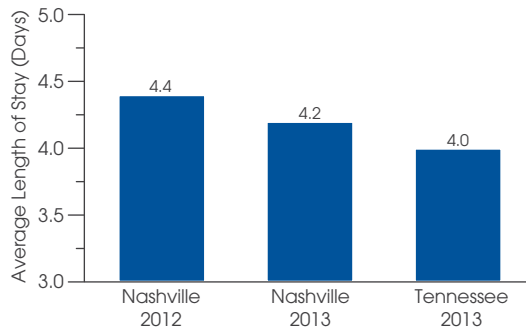
**DEMOGRAPHICS:
COMORBIDITIES AND COMPLICATIONS, 2013-2014^{2,3}**

ACTUAL COMORBIDITIES	Percentage of Type 2 Diabetes Patients			
	Nashville		Tennessee	
	2013	2014	2013	2014
Depression	11.6%	12.8%	9.7%	10.4%
Hyperlipidemia	57.0	55.9	62.7	64.0
Hypertension	79.7	79.7	82.6	83.5
Obesity	16.2	20.3	12.8	15.0
ACTUAL COMPLICATIONS				
Cardiovascular Disease	53.2%	53.7%	57.8%	57.5%
Hypoglycemia	8.2	8.4	8.2	8.2
Nephropathy	36.6	37.2	33.5	35.4
Neuropathy	37.9	38.6	34.3	36.0

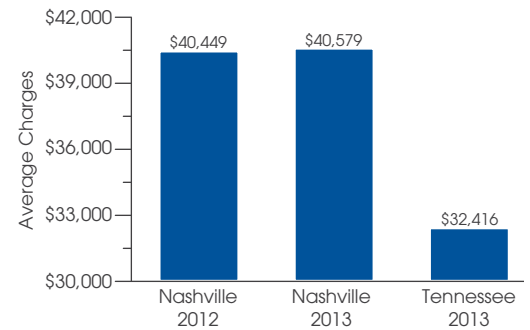
OBESITY RATES CLIMB FOR NASHVILLE TYPE 2 DIABETES PATIENTS FROM 2013 TO 2014

The percentage of Nashville Type 2 diabetes patients with a diagnosis of obesity climbed to 20.3% in 2014 from 16.2% in 2013. In both years, the Nashville shares of such patients surpassed those of Tennessee (12.8% in 2013 and 15.0% in 2014).

AVERAGE LENGTH OF STAY PER INPATIENT DIABETES MELLITUS CASE, 2012-2013⁴



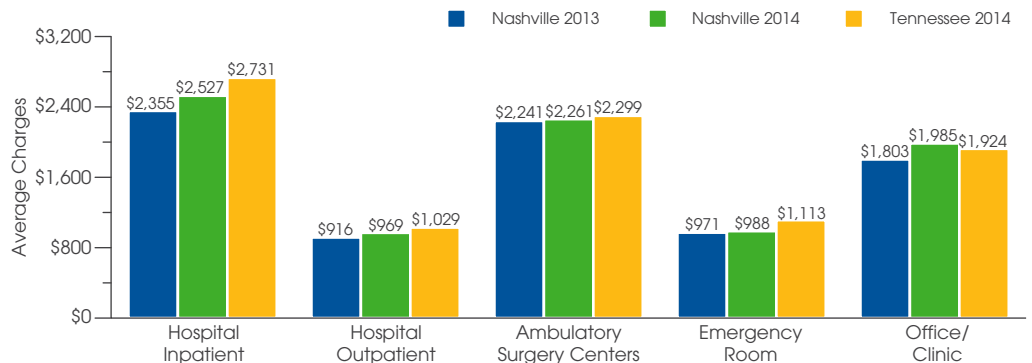
CHARGES PER INPATIENT DIABETES MELLITUS CASE, 2012-2013^{4,5}



IP CHARGES RISE FOR NASHVILLE DIABETES CASES DESPITE DECLINE IN ALOS

Although the average length of stay (ALOS) per inpatient (IP) diabetes mellitus case in Nashville contracted to 4.2 days in 2013 from 4.4 days in 2012, average charges per IP case increased to \$40,579 in 2013 from \$40,449 in 2012.

PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, COMMERCIAL INSURANCE PAYERS, 2013-2014^{6,7}



Data source: IMS Health © 2016

IP PROFESSIONAL CHARGES GROW FOR NASHVILLE TYPE 2 DIABETES PATIENTS IN 2014

IP professional charges for Nashville Type 2 diabetes patients with commercial insurance increased 7.3%, to \$2,527 in 2014 from \$2,355 in 2013. Professional charges for these patients increased in 2014 for every profiled setting.

¹ On pages 22-23, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.

² 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, congestive heart failure, dysmetabolic syndrome, hyperlipidemia, hypertension, and obesity.

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

⁴ Average length of stay (ALOS) and hospital inpatient charge data come from IMS Health's *Hospital Procedure/Diagnosis* (HPD) database and are current as of end-of-year 2013.

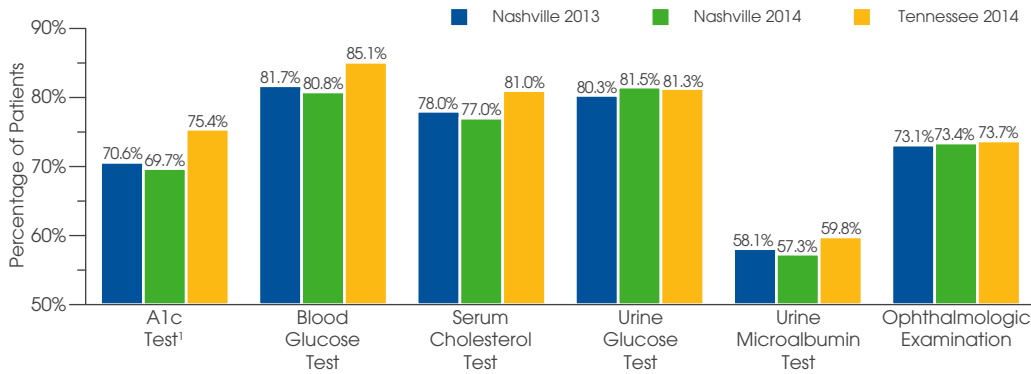
⁵ Charge data are per-case averages for inpatients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the hospital for the entire episode of care, and may include accommodation, pharmacy, laboratory, radiology, and other charges not billed by the physician. Data do not necessarily indicate final amounts paid.

⁶ Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.

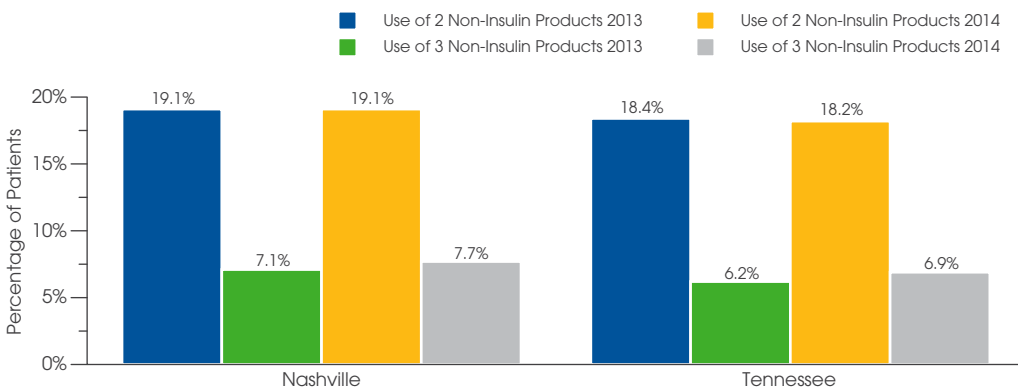
⁷ Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.

WEST: NASHVILLE

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PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014²

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		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Nashville 2013	34.3%	15.2%	12.3%	9.8%	8.7%	9.8%	10.5%	2.4%	3.0%
Nashville 2014	34.1	15.9	12.0	9.8	8.8	9.8	10.4	2.1	2.6
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AVERAGE PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES, 2013-2014^{2,3}

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		Pens	Vials	Pens	Vials	Pens	Vials	Pens	Vials
Nashville 2013	\$2,575	\$1,567	\$1,520	\$1,598	\$1,781	\$1,598	\$1,774	\$2,315	\$1,663
Nashville 2014	3,174	1,994	1,983	1,960	2,082	1,960	2,088	2,779	1,862
Tennessee 2014	\$3,046	\$2,012	\$1,978	\$1,830	\$2,005	\$1,830	\$1,944	\$2,682	\$1,891

PERCENTAGE OF AND AVERAGE ANNUAL PAYMENTS FOR TYPE 2 DIABETES PATIENTS USING NON-INSULIN THERAPIES, 2013-2014^{2,3}

	Any Non-Insulin Anti-diabetic Product	Biguanides		Sulfonylureas		Insulin Sensitizing Agents		DPP-4 Inhibitors		SGLT-2 Inhibitors	
		% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs	% of Patients	Avg. Costs
Nashville 2013	\$728	62.4%	\$121	33.6%	\$84	5.9%	\$660	10.6%	\$1,653	0.7%	\$665
Nashville 2014	856	62.9	111	31.5	70	5.7	315	10.4	1,940	5.3	1,160
Tennessee 2014	\$841	60.8%	\$114	31.4%	\$70	4.5%	\$291	10.9%	\$1,924	5.3%	\$1,170

FIVE OF SIX TESTING RATES FOR NASHVILLE TYPE 2 DIABETES PTS. LAG TN AVGS.

In 2014, the shares of Type 2 diabetes patients in Nashville who received an A1c, blood glucose, serum cholesterol, urine microalbumin test, or an ophthalmologic examination fell below the Tennessee averages. For instance, 69.7% of such patients in Nashville had an A1c test in 2014, compared with 75.4% in Tennessee.

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 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 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.

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Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors

Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

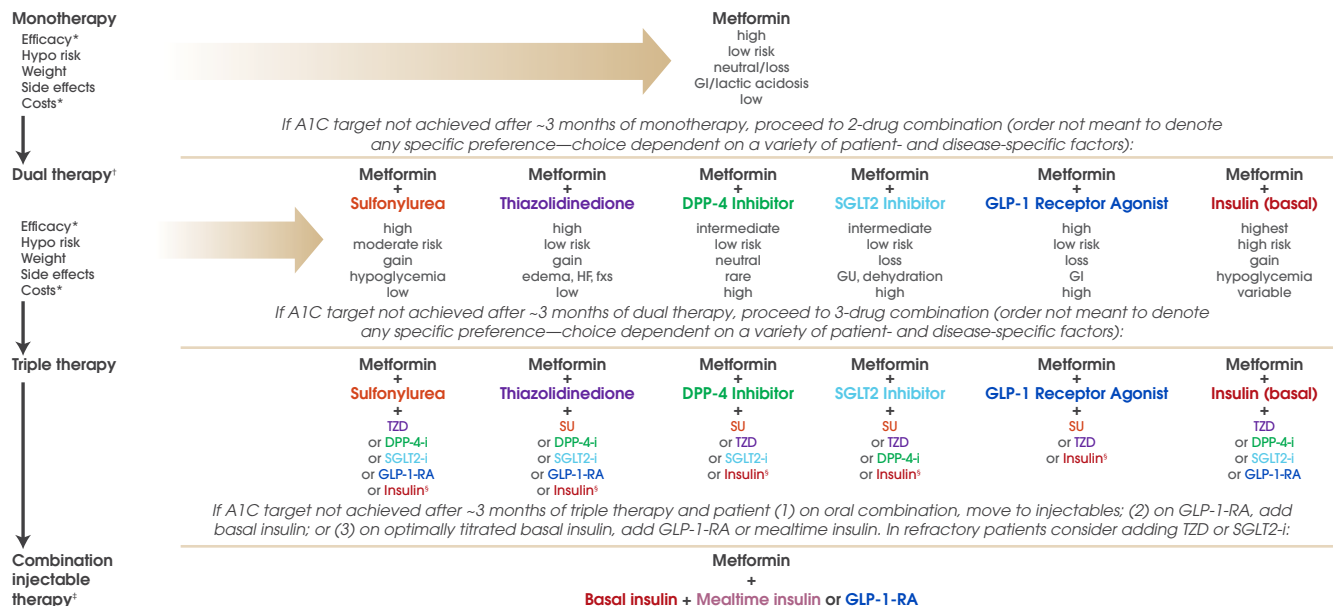
Sulfonylureas

Stimulate the release of insulin in the pancreas.

Data source: IMS Health © 2016

Adapted From the 2015 ADA/EASD Position Statement

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



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

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

Methodology

IMS Health generated most of the data for this **Managed Care Digest Series[®]** report using health care professional and institutional insurance claims. Data for this report represent more than 8 million unique Type 2 diabetes patients in 2014 with a diagnoses in the 250.00–250.92 range.

Inpatient case counts, average length of stay, inpatient charge data, co-occurring diagnosis and procedure data, and 30-day hospital readmission rates come from IMS Health's *Hospital Procedure/Diagnosis* (HPD) Database. This database contains an extensive set of hospital inpatient and outpatient discharge records, including actual diagnoses and procedures for about 75% of discharges nationwide (including 100% of Medicare-reimbursed discharges).

IMS Health also gathers data on prescription activity from the National Council for Prescription Drug Programs (NCPDP). These data represent some 2 billion prescription claims annually, or more than 70% of the prescription universe. These data represent

the sampling of prescription activity from a variety of sources, including retail chains, mass merchandisers, and pharmacy benefit managers. Cash, mail-order, Medicaid, and third-party transactions are tracked.

Patient-level, disease-specific data arriving into IMS Health are put through a rigorous process to ensure that data elements match to valid references, such as product codes, ICD-9 (diagnosis) and CPT-4 (procedure) codes, and provider and facility data. Claims undergo a careful de-duplication process to ensure that when multiple, voided, or adjusted claims are assigned to a patient encounter, they are applied to the database, but only for a single, unique patient. Through its patient encryption methods, IMS Health creates a unique, random numerical identifier for every patient, and then strips away all patient-specific health information that is protected under HIPAA. The identifier allows IMS Health to track disease-specific diagnosis and procedure activity across many settings where care is provided.