

# Michigan

## Chronic Care Report

# 2009

Featuring Demographic, Utilization, Charges  
and Pharmacotherapy Data



## MANAGED CARE DIGEST SERIES<sup>®</sup>

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Alliance for Health  
www.afh.org

Greater Detroit Area  
Health Council  
www.gdahc.org  
www.SaveLivesSaveDollars.org

Michigan Association of  
Health Plans  
www.mahp.org

National Kidney Foundation  
of Michigan  
www.nkfm.org

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## Introduction

The Alliance for Health, Greater Detroit Area Health Council, Michigan Association of Health Plans and National Kidney Foundation of Michigan are pleased to present the **Michigan Chronic Care Report** for 2009, an overview of demographic, utilization, financial and pharmacotherapy measures for Type 2 diabetes and acute coronary syndromes (ACS) patients in key local markets across the state of Michigan. The report also provides state and national benchmarks that can help providers and employers identify better opportunities to serve the needs of their patients. All data are drawn from the sanofi-aventis **Managed Care Digest Series®**.

The **Michigan Chronic Care Report** for 2009 helps these organizations to fulfill their commitment to working with our partners in the community to promote and maintain a health care delivery system that provides quality, accountability and affordability for Michigan citizens.

This edition features a number of examples of the kinds of disease-specific data on Type 2 diabetes and ACS that can be provided by these organizations and the **Managed Care Digest Series®**. The sponsoring organizations chose Type 2 diabetes (high blood glucose levels caused by either a lack of insulin or the body's inability to use insulin efficiently) and ACS as the focuses of this resource, as the prevalence of these two chronic diseases has grown considerably in recent years.

The data in this report (covering 2006 through 2008) were gathered by SDI, Plymouth meeting, Pa., a leading health care information company. The data provide health care providers with independent, third-party information they can use to benchmark their own data on patient demographics, professional (provider) and facility (hospital) charges, service utilization and pharmacotherapy.

## Data Methodology

SDI generated data for this **Managed Care Digest Series®** database using health care professional and institutional insurance claims. Data for this Report represent millions of unique patients with a range of Type 2 diabetes and ACS diagnoses during calendar years 2006 through 2008. Data from physicians of all specialties and from all hospital types are included.

SDI also gathers data on prescription activity from the National Council for Prescription Drug Programs (NCPDP). These data account for some 8 billion prescription claims annually, or more than 50% 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, and come from a near census of more than 59,000 pharmacies in the U.S. Cash, mail-order, Medicaid and third-party transactions are tracked.

### DATA INTEGRITY

Patient-level, disease-specific data arriving into SDI 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, SDI 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 SDI 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.

# PATIENT DEMOGRAPHICS



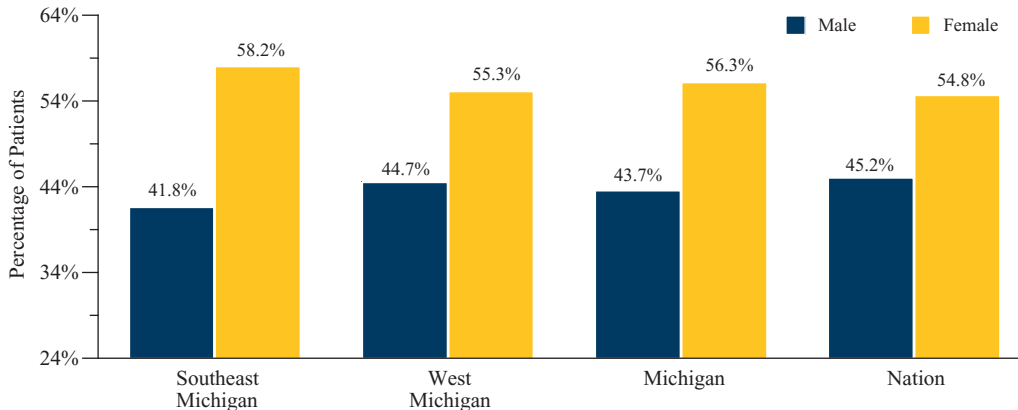
**PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY AGE<sup>1</sup>**

MARKET	0-17		18-35		36-64		65-79		80+	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan <sup>2</sup>	0.5%	0.5%	4.2%	4.0%	55.2%	54.4%	29.7%	30.3%	10.4%	10.9%
West Michigan <sup>3</sup>	0.5	0.5	4.3	4.1	54.0	52.2	30.9	31.9	10.3	11.3
Michigan	0.6	0.5	3.8	3.7	53.6	52.5	31.3	32.1	10.6	11.2
NATION	0.4%	0.4%	3.4%	3.2%	49.5%	48.4%	34.1%	34.7%	12.7%	13.4%

**PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY LOCATION OF DIAGNOSIS<sup>1</sup>**

MARKET	Location of Patient's Type 2 Diabetes Diagnosis							
	Primary Care <sup>4</sup>		Internal Medicine		Endocrinology		Cardiology	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan <sup>2</sup>	25.5%	23.7%	8.6%	8.0%	2.2%	1.8%	5.9%	5.3%
West Michigan <sup>3</sup>	29.6	23.7	4.5	3.4	0.0	—	12.9	4.5
Michigan	30.3	27.5	8.1	7.0	0.9	0.9	7.9	6.3
NATION	26.3%	23.2%	9.3%	8.9%	1.3%	1.3%	7.2%	6.6%

**PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY GENDER, 2008<sup>1</sup>**



**PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE<sup>5</sup>**

MARKET	≤7.0%		7.1-7.9%		8.0-9.0%		>9.0%	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan <sup>2</sup>	66.9%	67.2%	14.0%	14.4%	8.2%	7.7%	10.9%	10.8%
West Michigan <sup>3</sup>	66.9	67.2	14.0	13.9	8.4	8.2	10.8	10.8
Michigan	67.2	67.3	13.9	14.2	8.2	8.0	10.7	10.4
NATION	61.1%	61.4%	17.4%	17.2%	9.8%	9.9%	11.7%	11.5%

## MICHIGAN PATIENTS ARE MORE APT TO BE DIAGNOSED BY PCPS

Of patients with Type 2 diabetes in the state of Michigan in calendar year 2008, 27.5% were diagnosed by a primary care provider (general or family practitioner), notably higher than the national rate (23.2%). Conversely, Type 2 diabetes patients nationally were more likely than their Michigan counterparts to have been diagnosed by an internist (8.9% vs. 7.0%).

## LOW A1c PATIENT SHARES EDGE UP IN MICHIGAN MARKETS

The shares of Type 2 diabetes patients with A1c levels at or below 7.0% edged higher, between 2007 and 2008, regardless of Michigan market. For example, in the Southeast and West Michigan markets alike, the shares of Type 2 diabetes patients with A1c levels in this low range each rose fractionally, to 67.2% from 66.9% the year before.

<sup>1</sup> On all pages, the percentages are representative of the universe of Type 2 diabetes patients on whom claims data have been collected in a given year.

<sup>2</sup> Southeast Michigan refers to the Detroit MSA throughout this document.

<sup>3</sup> West Michigan refers to the Grand Rapids/Muskegon/Holland MSA throughout this document.

<sup>4</sup> "Primary care" consists of both general and family practitioners.

<sup>5</sup> The A1c test measures the amount of glucose present in the blood during the past 2-3 months.

Data source: SDI © 2009



# PATIENT DEMOGRAPHICS

## MICHIGAN PATIENTS IN SE ARE MORE APT TO HAVE CV DISEASE

Of the three Michigan markets profiled, Type 2 diabetes patients in Southeast Michigan were more likely than their counterparts in the other two markets also to have been diagnosed with cardiovascular (CV) disease in 2008, at 45.2%. However, a slightly higher 46.2% of Type 2 diabetes patients nationally were also diagnosed with CV disease.

## MANY COMPLICATION PATIENT SHARE IN MI TOPS NATIONAL RATE

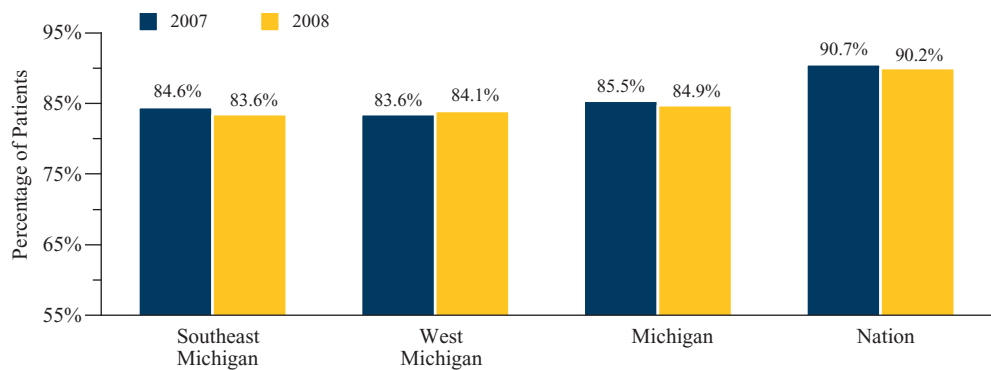
In 2008, the shares of patients with Type 2 diabetes who were also diagnosed with more than two complications from the disease were notably higher than their counterparts nationally (2.1%) in all three Michigan markets listed. For example, 4.2% of Southeast Michigan Type 2 diabetes patients were also diagnosed with more than two complications from the disease, twice the national average.

\* 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, coronary artery disease, hypoglycemia, nephropathy, neuropathy and retinopathy.

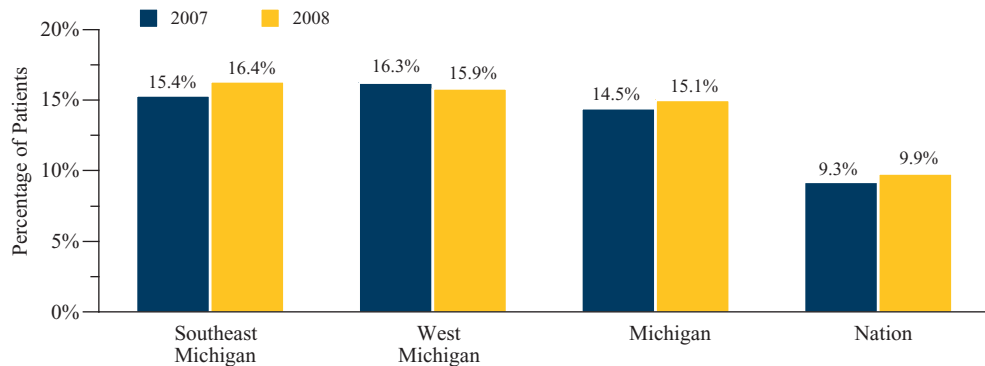
PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY NUMBER OF COMPLICATIONS\*

MARKET	0		1		2		>2	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	52.1%	51.0%	32.5%	32.6%	11.6%	12.2%	3.8%	4.2%
West Michigan	51.5	53.5	32.1	30.6	12.0	11.9	4.3	4.0
Michigan	53.0	52.4	32.5	32.5	11.0	11.4	3.5	3.7
NATION	62.5%	61.6%	28.2%	28.6%	7.3%	7.8%	2.0%	2.1%

PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH ONE COMPLICATION OR FEWER\*



PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH TWO OR MORE COMPLICATIONS\*



PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY TYPE OF COMPLICATION, 2008\*

MARKET	Cardiovascular Disease	Neuropathy	Nephropathy	Retinopathy	Hypoglycemia
SE Michigan	45.2%	20.5%	16.8%	13.6%	3.9%
West Michigan	41.8	23.3	18.6	12.6	3.8
Michigan	45.1	20.2	16.8	14.3	3.6
NATION	46.2%	20.1%	18.2%	11.5%	4.0%

Data source: SDI © 2009



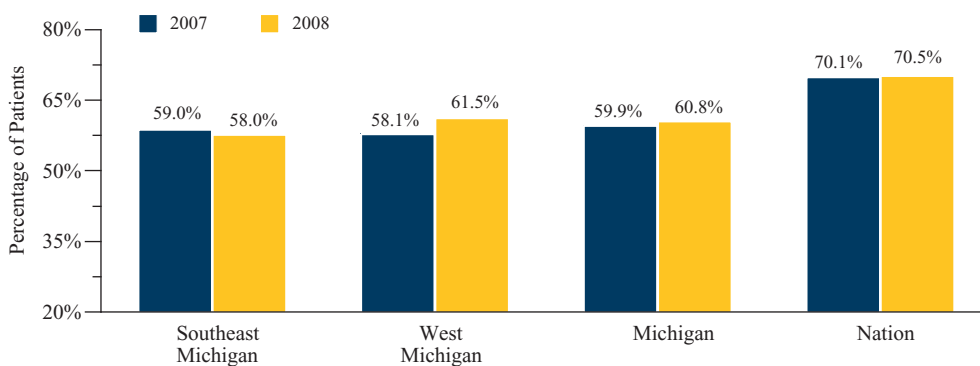
**PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY NUMBER OF COMORBIDITIES\***

MARKET	0		1		2		>2	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	35.1%	34.5%	23.9%	23.5%	30.4%	32.6%	10.6%	9.4%
West Michigan	33.7	37.4	24.4	24.1	31.3	30.6	10.7	7.9
Michigan	35.5	37.0	24.4	23.8	30.3	30.9	9.8	8.3
NATION	46.7%	47.6%	23.4%	22.9%	24.3%	24.8%	5.5%	4.7%

**COMORBIDITY-FREE W. MICHIGAN PATIENT SHARE INCREASES**

The share of patients in West Michigan with Type 2 diabetes and no diagnosed comorbidities rose significantly in 2008, to 37.4% from 33.7% in 2007. By comparison, the comorbidity-free Type 2 diabetes patient share in Southeast Michigan fell slightly, to 34.5% from 35.1% the previous year. However, both shares trailed the corresponding national average (47.6%) by a considerable margin.

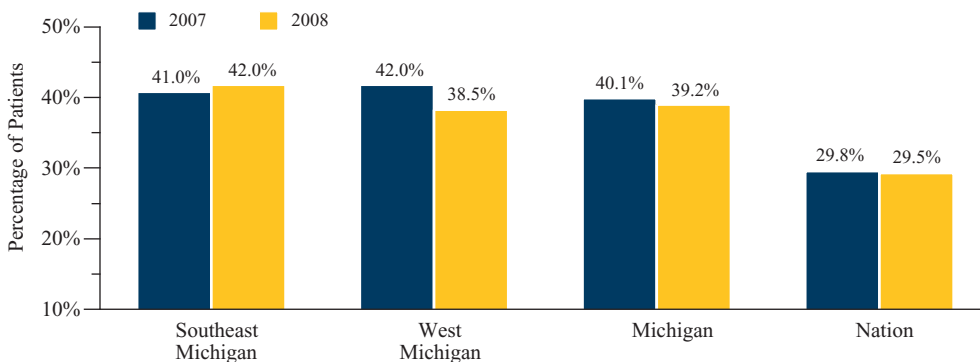
**PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH ONE COMORBIDITY OR FEWER\***



**SE MICHIGAN TYPE 2 DIABETES PATIENT OBESITY RATE IS HIGH**

In 2008, 6.4% of Southeast Michigan Type 2 diabetes patients were also diagnosed as being obese, moderately higher than the national average (4.8%). Type 2 diabetes patients in all three Michigan markets profiled were more likely also to be diagnosed as being obese than their counterparts nationally.

**PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH TWO OR MORE COMORBIDITIES\***



**PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY TYPE OF COMORBIDITY, 2008\***

MARKET	Hypertension	Hyperlipidemia	Congestive Heart Failure	Obesity	Dysmetabolic Syndrome
SE Michigan	47.2%	37.9%	7.8%	6.4%	0.7%
West Michigan	47.1	38.1	7.8	6.3	0.7
Michigan	47.3	38.3	7.8	6.0	0.7
NATION	48.0%	38.9%	7.7%	4.8%	0.6%

\* 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, coronary artery disease, dysmetabolic syndrome, hyperlipidemia, hypertension and obesity.

Data source: SDI © 2009



# HOSPITAL CHARGES

## SE MICHIGAN TYPE 2 DIABETES INPATIENT CHARGES DECLINE

Hospital inpatient charges per year for Type 2 diabetes patients in Southeast Michigan were \$51,175 in 2008, down slightly from \$53,271 in 2007, but still moderately higher than the statewide average (\$47,306) for this measure. By comparison, such charges for Type 2 diabetes patients in West Michigan were just \$31,374, although up from \$27,055 the previous year.

## ER CHARGES GROW NOTABLY FOR TYPE 2 PATIENTS IN MICHIGAN

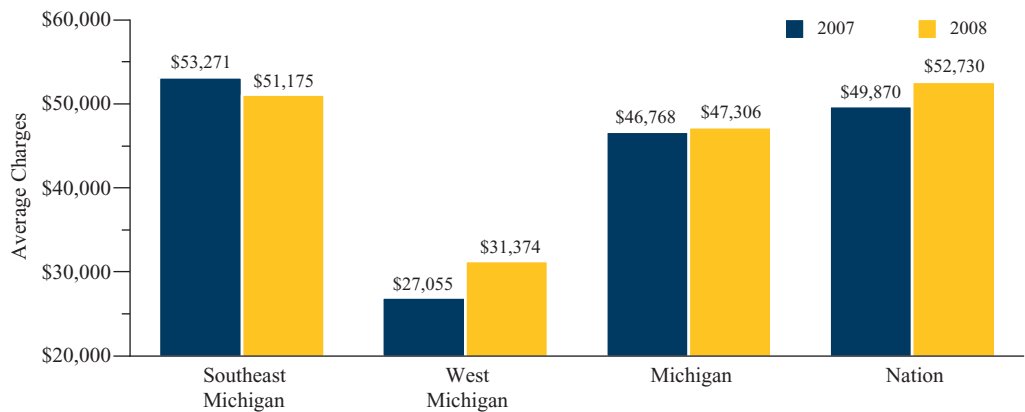
Between 2007 (\$2,116) and 2008 (\$2,338), average charges per year for care delivered to Type 2 diabetes patients at hospital emergency rooms (ER) in the state of Michigan rose substantially. Hospital ER charges per year likewise increased sharply for Type 2 diabetes patients nationally during this period, to \$1,854 from \$1,651 the prior year.

\* Data reflect the charges generated for Type 2 diabetes patients by the facilities that delivered care. The data also reflect the average amounts charged in Type 2 diabetes patient claims, not the amount the claims paid.

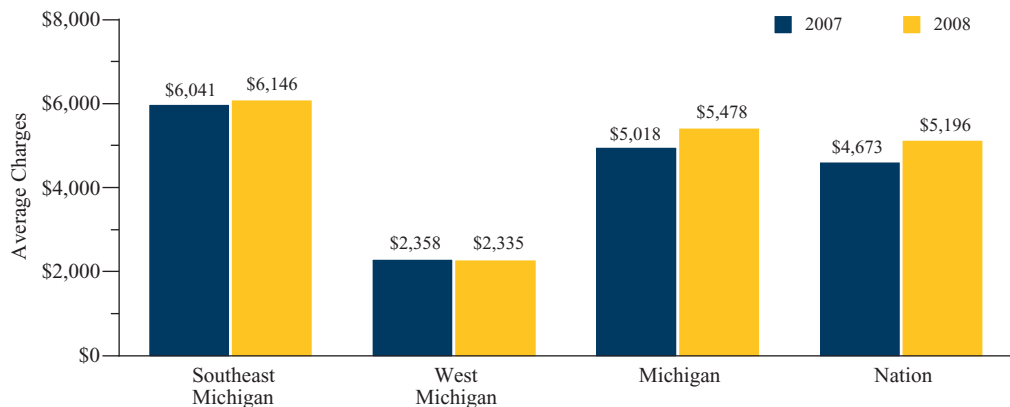
HOSPITAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS\*

MARKET	Emergency Room		Hospital Inpatient		Hospital Outpatient	
	2007	2008	2007	2008	2007	2008
SE Michigan	\$2,273	\$2,285	\$53,271	\$51,175	\$6,041	\$6,146
West Michigan	1,149	1,276	27,055	31,374	2,358	2,335
Michigan	2,116	2,338	46,768	47,306	5,018	5,478
NATION	\$1,651	\$1,854	\$49,870	\$52,730	\$4,673	\$5,196

HOSPITAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS\*



HOSPITAL OUTPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS\*



Data source: SDI © 2009



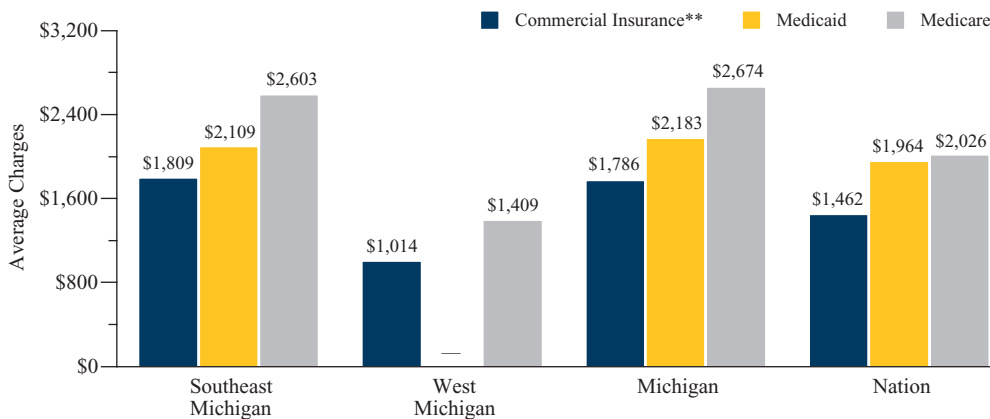
**HOSPITAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER\***

MARKET	Commercial Insurance**		Medicaid		Medicare	
	2007	2008	2007	2008	2007	2008
SE Michigan	\$39,183	\$40,367	\$46,261	\$49,785	\$58,429	\$52,746
West Michigan	23,518	25,078	—	—	25,542	25,249
Michigan	35,714	38,508	45,191	48,115	48,869	46,477
NATION	\$43,606	\$45,185	\$47,039	\$49,015	\$48,839	\$50,420

**HOSPITAL OUTPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER\***

MARKET	Commercial Insurance**		Medicaid		Medicare	
	2007	2008	2007	2008	2007	2008
SE Michigan	\$4,553	\$5,223	\$4,440	\$4,501	\$7,275	\$6,980
West Michigan	2,068	2,108	1,714	1,299	2,691	2,642
Michigan	3,843	4,750	4,229	4,327	5,927	5,991
NATION	\$4,030	\$4,440	\$4,317	\$4,711	\$5,103	\$5,804

**HOSPITAL EMERGENCY ROOM CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER, 2008\***



Data source: SDI © 2009

**HOSPITAL INPATIENT CHARGES ARE LOW IN STATE OF MICHIGAN**

Average hospital inpatient charges per year for Type 2 diabetes patients in the state of Michigan were lower than for such patients nationally, regardless of payer type. For example, Type 2 diabetes patients in Michigan with commercial insurance coverage generated average hospital inpatient charges of \$38,508 in 2008, notably lower than inpatient charges for Type 2 diabetes patients nationwide (\$45,185).

**OP CHARGES FALL FOR SE MICHIGAN MEDICARE PATIENTS**

In 2008, average hospital outpatient charges for Type 2 diabetes patients in Southeast Michigan dropped, to \$6,980 from \$7,275 in 2007. In spite of this decline, such charges remained substantially higher than the national average (\$5,804) for this measure. Statewide, average hospital outpatient charges for Type 2 diabetes patients with Medicare coverage held virtually steady, to \$5,991 from \$5,927 in 2007.

\* Figures reflect the charges generated for Type 2 diabetes patients by the facilities that delivered care. The data also reflect the average amounts charged in Type 2 diabetes patient claims, not the amount the claims paid.

\*\* Includes Blue Cross/Blue Shield, HMOs, PPOs, point-of-service plans and exclusive provider organizations.



# HOSPITAL CHARGES

## MICHIGAN TYPE 2 PATIENTS IN CONTROL SEE IP CHARGES DROP

Between 2007 (\$43,891) and 2008 (\$41,788), average hospital inpatient charges declined for Type 2 diabetes patients in the state of Michigan with A1c levels at or below 7.0%. Although average hospital inpatient charges increased notably for Type 2 diabetes patients in West Michigan with controlled A1c levels, to \$35,033 from \$26,048 the previous year, such charges were still lowest of the four markets profiled.

## OP CHARGES RISE FOR MICHIGAN PATIENTS WITH HIGH A1c TESTS

In 2008, average hospital outpatient charges per year for treatment of Type 2 diabetes patients in Michigan with A1c levels greater than 9.0% grew sharply, to \$5,128 from \$4,712 in 2007. In contrast, such charges fell notably for Michigan Type 2 diabetes patients with A1c levels in the 8.0% to 9.0% range, to \$4,569 from \$6,472 the previous year.

\* Data reflect the charges generated for Type 2 diabetes patients by the facilities that delivered care. The data also reflect the average amounts charged in Type 2 diabetes patient claims, not the amount the claims paid.

NOTE: The A1c test measures the amount of glucose present in the blood during the past 2–3 months.

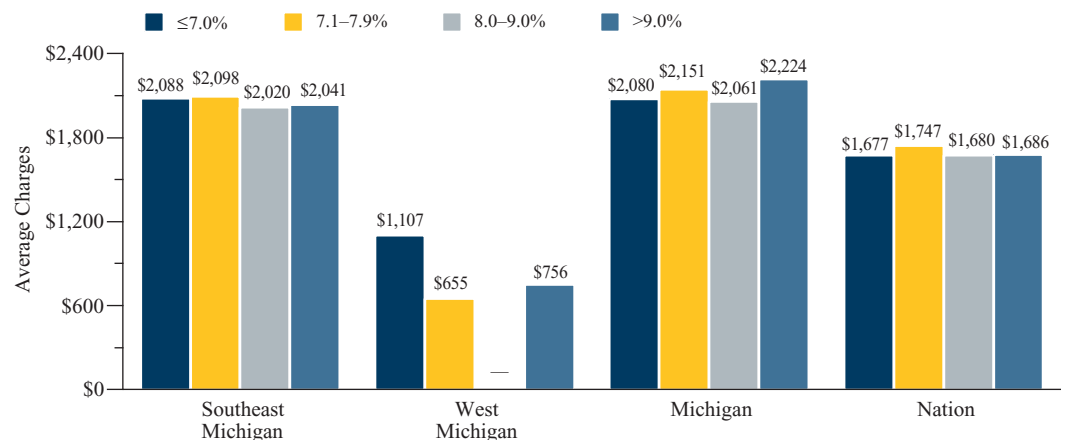
**HOSPITAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE\***

MARKET	≤7.0%		7.1–7.9%		8.0–9.0%		>9.0%	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	\$50,224	\$44,734	\$41,471	\$57,931	\$50,763	\$41,855	\$41,649	\$44,124
West Michigan	26,048	35,033	33,490	—	—	—	—	—
Michigan	43,891	41,788	38,296	51,187	55,533	42,774	39,158	40,596
NATION	\$47,165	\$49,457	\$46,894	\$52,734	\$47,453	\$50,098	\$45,477	\$45,832

**HOSPITAL OUTPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE\***

MARKET	≤7.0%		7.1–7.9%		8.0–9.0%		>9.0%	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	\$6,238	\$6,623	\$5,957	\$5,417	\$7,741	\$4,869	\$5,409	\$5,445
West Michigan	2,088	2,043	2,308	1,630	2,053	2,573	2,297	1,536
Michigan	5,339	5,935	4,862	4,841	6,472	4,569	4,712	5,128
NATION	\$4,462	\$4,987	\$4,463	\$5,063	\$4,568	\$4,898	\$4,262	\$4,634

**HOSPITAL EMERGENCY ROOM CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2008\***



Data source: SDI © 2009

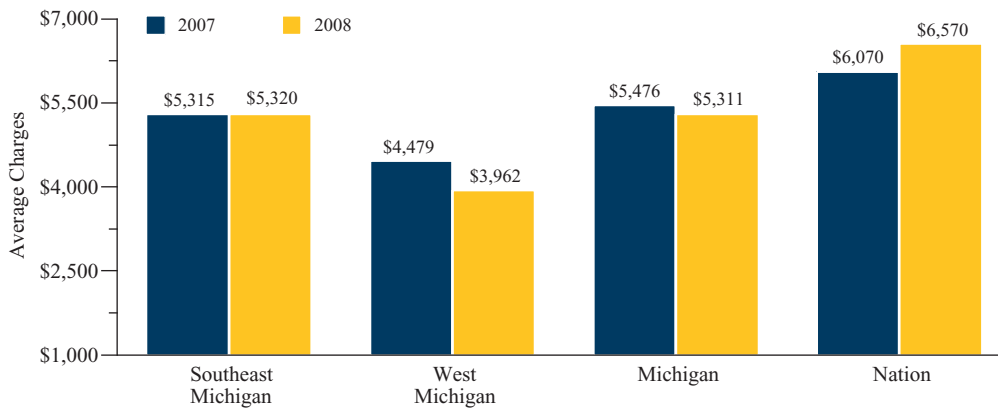
# PROFESSIONAL CHARGES



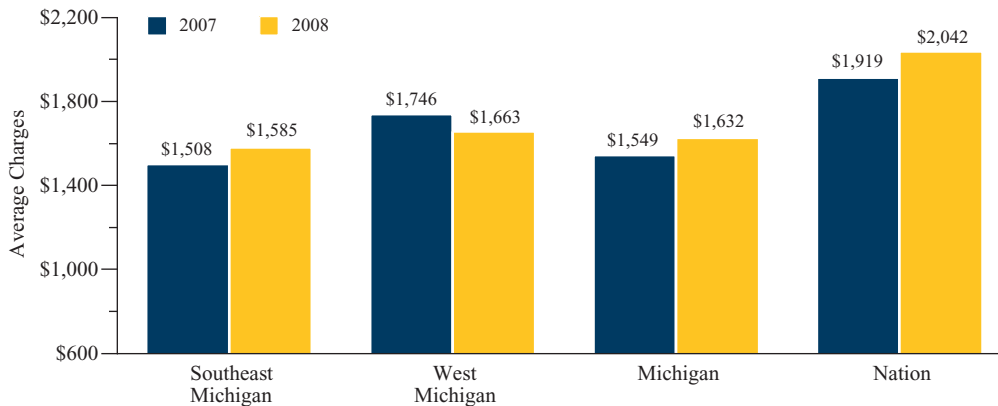
## PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS\*

MARKET	Ambulatory Surgery Center		Emergency Room		Hospital Inpatient		Hospital Outpatient		Office/Clinic	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	\$1,848	\$2,077	\$316	\$368	\$5,315	\$5,320	\$1,508	\$1,585	\$1,380	\$1,750
West Michigan	3,586	3,478	225	316	4,479	3,962	1,746	1,663	893	941
Michigan	2,665	2,706	351	388	5,476	5,311	1,549	1,632	1,252	1,520
NATION	\$3,055	\$3,077	\$647	\$722	\$6,070	\$6,570	\$1,919	\$2,042	\$2,818	\$3,399

## PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS\*



## PROFESSIONAL OUTPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS\*



### INPATIENT PROVIDER CHARGES FALL FOR MICHIGAN PATIENTS

Average annual professional charges for services rendered to Michigan Type 2 diabetes patients in a hospital inpatient setting dropped in 2008, to \$5,311 from \$5,476 in 2007. In contrast, average annual professional inpatient charges grew sharply for Type 2 diabetes patients nationwide during this period, to \$6,570 from \$6,070 the year before.

### ASC PROFESSIONAL CHARGES ARE HIGH IN WEST MICHIGAN

Although professional charges for care delivered at ambulatory surgery centers (ASC) fell slightly for Type 2 diabetes patients in West Michigan in 2008, to \$3,478 from \$3,586 in 2007, such charges were still highest, by market, by a substantial margin. By comparison, ASC professional charges were comparatively low for Type 2 diabetes patients in Southeast Michigan, at \$2,077, up moderately from \$1,848 the previous year.

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

Data source: SDI © 2009



# PROFESSIONAL CHARGES

## MICHIGAN INPATIENT PROVIDER CHARGES LAG NATIONAL RATE

Average annual professional inpatient charges for Type 2 diabetes patients in the state of Michigan trailed the national averages, regardless of payer type or Michigan market. For example, such charges for Type 2 diabetes patients in West Michigan with Medicare coverage were \$3,783 per year, notably lower than the national average (\$6,326) in 2008.

## PROFESSIONAL OFFICE CHARGES ARE LOW IN STATE OF MICHIGAN

In 2008, average professional office/clinic charges for care delivered to Type 2 diabetes patients in the state of Michigan were significantly lower than such charges nationally, regardless of payer type. For instance, average professional office charges for Type 2 diabetes patients in the state of Michigan with commercial insurance coverage were \$1,168 in 2008, less than half the national average of \$2,740.

\* Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.  
 \*\* Includes Blue Cross/Blue Shield, HMOs, PPOs, point-of-service plans and exclusive provider organizations.

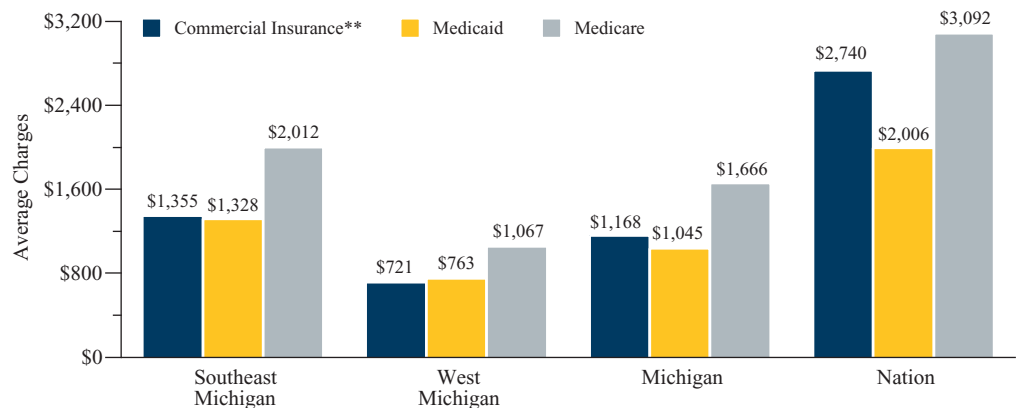
PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER\*

MARKET	Commercial Insurance**		Medicaid		Medicare	
	2007	2008	2007	2008	2007	2008
SE Michigan	\$4,311	\$4,355	\$4,039	\$4,668	\$5,248	\$5,226
West Michigan	3,991	3,571	4,040	4,116	4,146	3,783
Michigan	4,402	4,278	4,626	5,000	5,353	5,178
NATION	\$4,916	\$5,211	\$4,963	\$5,224	\$5,823	\$6,326

PROFESSIONAL OUTPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER\*

MARKET	Commercial Insurance**		Medicaid		Medicare	
	2007	2008	2007	2008	2007	2008
SE Michigan	\$1,617	\$1,696	\$1,023	\$1,426	\$1,324	\$1,373
West Michigan	1,764	1,698	2,621	1,908	1,501	1,494
Michigan	1,531	1,608	1,426	1,432	1,401	1,501
NATION	\$1,797	\$1,934	\$1,388	\$1,421	\$1,676	\$1,720

PROFESSIONAL OFFICE/CLINIC CHARGES FOR TYPE 2 DIABETES PATIENTS, BY PAYER, 2008\*



Data source: SDI © 2009



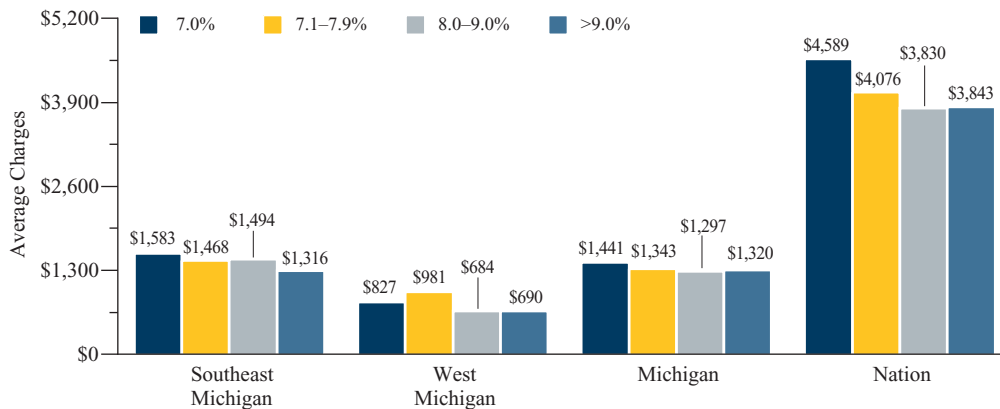
**PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE\***

MARKET	≤7.0%		7.1–7.9%		8.0–9.0%		>9.0%	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	\$4,739	\$5,116	\$4,676	\$5,743	\$6,111	\$4,533	\$5,411	\$4,648
West Michigan	4,491	4,385	4,619	3,974	5,870	2,570	3,738	4,495
Michigan	5,199	5,188	5,186	5,206	5,779	4,549	5,059	5,001
NATION	\$6,680	\$7,150	\$6,198	\$6,797	\$6,268	\$6,356	\$5,734	\$6,024

**PROFESSIONAL OUTPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE\***

MARKET	≤7.0%		7.1–7.9%		8.0–9.0%		>9.0%	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	\$1,402	\$1,608	\$1,526	\$1,344	\$1,535	\$1,724	\$1,325	\$1,321
West Michigan	1,850	1,691	1,548	1,471	1,578	2,944	1,479	2,153
Michigan	1,534	1,652	1,574	1,494	1,494	1,882	1,473	1,565
NATION	\$2,302	\$2,477	\$2,205	\$2,292	\$2,178	\$2,350	\$2,088	\$2,251

**PROFESSIONAL OFFICE/CLINIC CHARGES FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2008\***



Data source: SDI © 2009

**IP CHARGES ARE LOW FOR TYPE 2 PATIENTS ACROSS MICHIGAN**

In 2008, average hospital inpatient charges for care delivered to Type 2 diabetes patients in Michigan trailed the national averages in all four A1c level range categories profiled. For example, Type 2 diabetes patients in the state of Michigan with A1c test results at or below 7.0% generated average hospital inpatient charges of \$5,188 in 2008, highest by local Michigan market, but still considerably lower than the national average (\$7,150).

**OP CHARGES GROW FOR WEST MICHIGAN HIGH A1c PATIENTS**

Patients diagnosed with Type 2 diabetes in West Michigan who received A1c test results greater than 9.0% in their most recent exam generated average professional hospital outpatient charges of \$2,153 in 2008, up sharply from \$1,479 in 2007. In spite of this significant growth, such charges still trailed the national average (\$2,251) for this measure.

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

NOTE: The A1c test measures the amount of glucose present in the blood during the past 2–3 months.



# USE OF SERVICES

## LARGER SHARE OF SE MICHIGAN PATIENTS RECEIVES A1c TESTS

The percentage of Type 2 diabetes patients in the Southeast Michigan area who received at least one A1c test in 2008 increased fractionally, to 76.6% from 76.0% in 2007, the highest share among the three Michigan markets profiled, and nearly three percentage points higher than the national average (73.8%). By comparison, the share of Type 2 diabetes patients in West Michigan who received at least one A1c test fell during this period, to 76.3% in 2008 from 76.4% the year before.

## MEDICARE PATIENT SHARE RECEIVING EYE EXAMS IS LOW

In 2008, 72.4% of Type 2 diabetes patients in West Michigan with Medicare coverage received at least one ophthalmologic exam, the lowest percentage among the four markets listed. By comparison, a more notable 75.0% of Type 2 diabetes patients in Southeast Michigan who were covered by Medicare received an eye test in 2008.

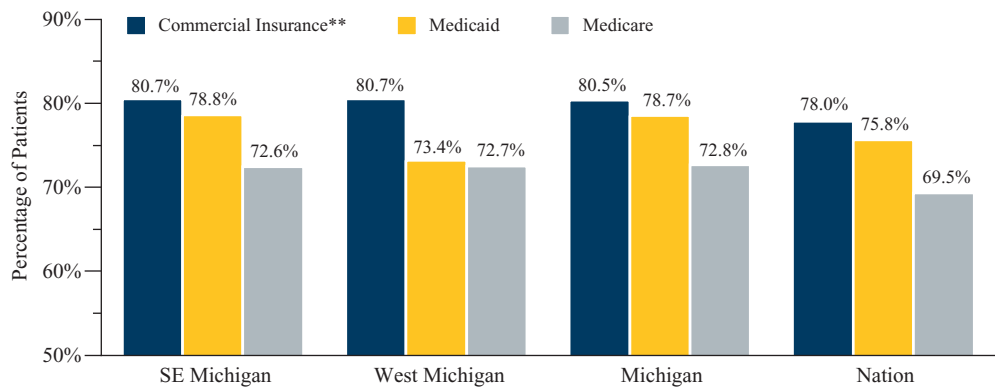
\* The A1c test measures the amount of glucose present in the blood during the past 2–3 months. Figures reflect the percentage of Type 2 diabetes patients who have had at least one A1c test in a given year.

\*\* Includes Blue Cross/Blue Shield, HMOs, PPOs, point-of-service plans and exclusive provider organizations.

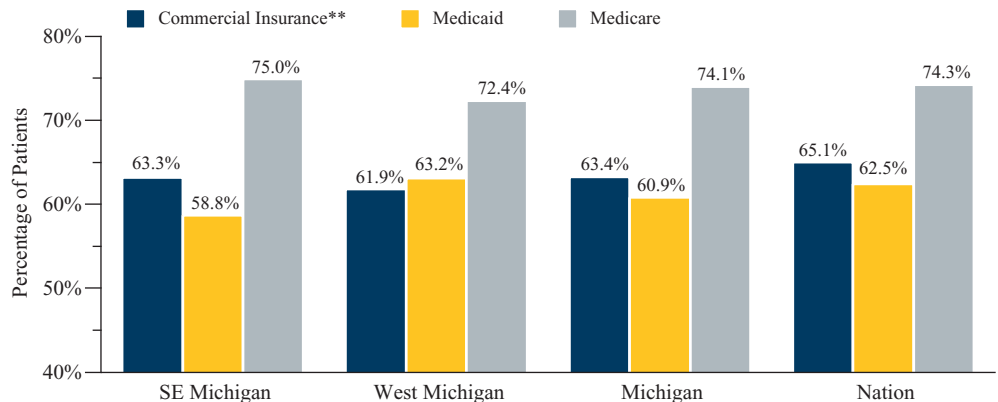
PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY SERVICE

MARKET	A1c Test*		Blood Glucose Test		Serum Cholesterol Test		Ophthalmologic Exam		Urine Microalbumin Test	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	76.0%	76.6%	85.5%	85.6%	83.8%	83.9%	69.3%	69.2%	74.6%	74.6%
West Michigan	76.4	76.3	85.9	85.8	83.0	83.8	67.9	67.5	75.3	75.1
Michigan	76.2	76.3	85.8	85.7	83.8	83.9	69.3	69.2	75.1	75.0
NATION	73.8%	73.8%	86.6%	86.7%	83.8%	83.9%	69.2%	69.4%	71.1%	71.1%

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING A1c TESTS, BY PAYER TYPE, 2008\*



PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING OPHTHALMOLOGIC EXAMS, BY PAYER TYPE, 2008



Data source: SDI © 2009



## PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING INSULIN THERAPIES

AMARKET	Any Insulin Product		Intermediate-Acting Insulin		Long-Acting Insulin		Short-Acting Insulin		Mixed Insulin	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	35.0%	35.5%	3.8%	3.0%	17.5%	19.9%	13.2%	14.6%	12.1%	10.8%
West Michigan	36.3	37.4	3.8	3.3	21.6	23.6	16.0	16.6	8.3	7.3
Michigan	35.7	36.1	3.8	3.1	19.0	21.1	14.2	15.2	10.3	9.3
NATION	35.6%	36.4%	4.7%	4.0%	19.1%	21.2%	15.2%	16.1%	8.9%	8.5%

## PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING NON-INSULIN ANTIDIABETIC THERAPIES

MARKET	Any Non-Insulin Antidiabetic Product		Biguanides		Sulfonylureas		Insulin Sensitizing Agents	
	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	81.7%	81.6%	51.3%	54.2%	37.8%	37.2%	19.2%	13.4%
West Michigan	80.2	79.7	48.2	51.9	35.5	34.7	24.6	19.5
Michigan	82.0	81.6	51.7	54.3	37.5	36.8	21.4	15.4
NATION	84.8%	84.5%	52.5%	54.2%	39.5%	39.0%	26.0%	19.4%

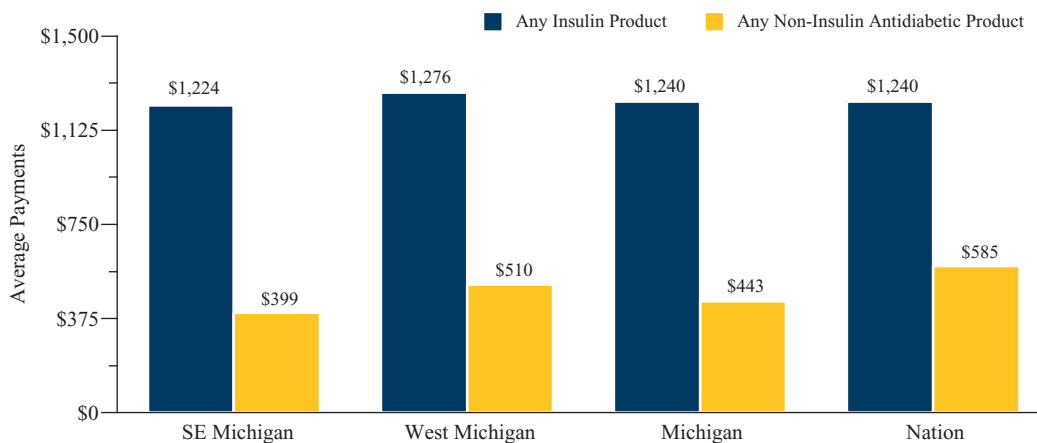
## MICHIGAN PATIENT SHARES USING INSULIN PRODUCTS RISE

In 2008, the shares of Type 2 diabetes patients using any insulin product increased in all three Michigan markets profiled. For example, 37.4% of patients diagnosed with Type 2 diabetes in West Michigan used any insulin product, up from 36.3% the previous year. Similarly, the share of Type 2 diabetes patients in the state of Michigan who used any insulin product rose to 36.1% from 35.7% in 2007.

## WEST MICHIGAN PATIENTS HAVE HIGH INSULIN PAYMENTS

Average annual payments per Type 2 diabetes patient in West Michigan using any insulin product were \$1,276 in 2008, slightly higher than the statewide average of \$1,240. By comparison, average payments per West Michigan Type 2 diabetes patient per year using any non-insulin antidiabetic product were \$510 in 2008, considerably higher than the statewide mark (\$443), but still well below the national average (\$585).

## AVERAGE PAYMENTS PER TYPE 2 DIABETES PATIENT PER YEAR, BY TYPE OF THERAPY, 2008\*



Data source: SDI © 2009

### Biguanides

Improve insulin sensitivity; reduce the production of glucose by the liver, decrease intestinal absorption of glucose and increase the peripheral uptake and use of circulating glucose.

### Insulin Sensitizing Agents

Improve 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.

### Sulfonylureas

Stimulate the release of insulin in the pancreas.

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



# PHARMACOTHERAPY

## NON-INSULIN COMBO USE FALLS SHARPLY IN SE MICHIGAN

The percentage of Type 2 diabetes patients in Southeast Michigan using any three non-insulin antidiabetic products fell notably in 2008, to 7.5% from 9.0% in 2007, well below the national average (8.3%). By comparison, the share of Type 2 diabetes patients in West Michigan using any three non-insulin antidiabetic products fell fractionally over this time, to 7.0% from 7.3% in 2007.

## WESTERN MICHIGAN NON-INSULIN COMBO PAYMENTS INCREASE

Average annual payments per Type 2 diabetes patient in West Michigan using any two non-insulin antidiabetic products rose, to \$646 in 2008 from \$588 the year before. By comparison, such payments decreased moderately (to \$456 from \$480 in 2007) for Type 2 diabetes patients in Southeast Michigan during the same time. Average annual payments for any two non-insulin antidiabetic products were below the national average (\$662) in all three local Michigan markets profiled in 2008.

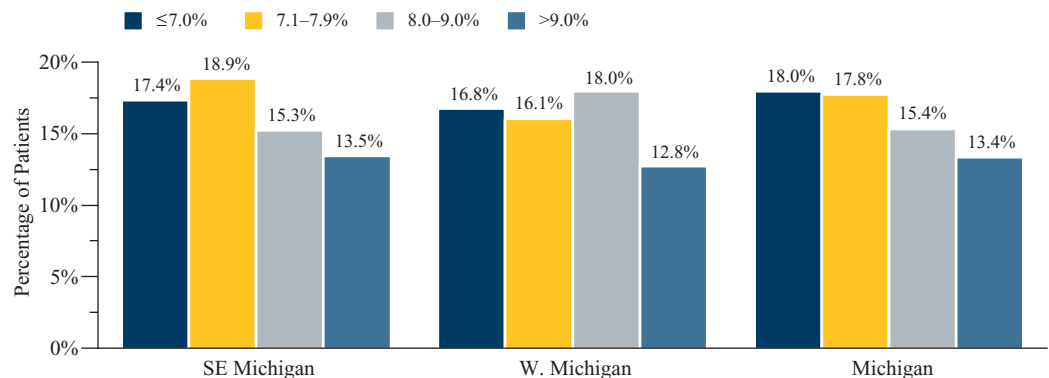
PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING VARIOUS THERAPIES

MARKET	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 Insulin, 1 Non-Insulin	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	32.1%	32.7%	19.3%	19.1%	6.6%	6.7%	5.7%	6.2%	9.0%	7.5%	8.2%	8.1%	7.0%	8.0%
W. Michigan	34.5	33.7	18.8	18.3	6.3	6.7	7.1	7.8	7.3	7.0	7.1	7.5	6.5	7.1
Michigan	32.7	33.3	19.1	18.8	6.6	6.7	6.0	6.6	8.5	7.3	8.0	8.0	7.2	7.8
NATION	33.6%	34.4%	20.0%	19.6%	5.9%	6.2%	6.0%	6.4%	9.7%	8.3%	7.7%	7.6%	6.7%	7.2%

AVERAGE ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT USING VARIOUS THERAPIES\*

MARKET	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 Insulin, 1 Non-Insulin	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
SE Michigan	\$161	\$156	\$480	\$456	\$887	\$950	\$1,317	\$1,593	\$1,048	\$1,156	\$1,102	\$1,221	\$1,372	\$1,627
W. Michigan	216	227	588	646	976	1,184	1,340	1,740	1,168	1,309	1,321	1,458	1,654	1,916
Michigan	187	182	532	527	920	1,036	1,318	1,626	1,113	1,234	1,233	1,327	1,496	1,722
NATION	\$223	\$237	\$637	\$662	\$967	\$1,112	\$1,320	\$1,624	\$1,364	\$1,558	\$1,588	\$1,759	\$1,879	\$2,183

PERCENTAGE OF TYPE 2 DIABETES PATIENTS USING ANY 2 NON-INSULIN ANTIDIABETIC THERAPIES, BY A1c LEVEL RANGE, 2008



Data source: SDI © 2009

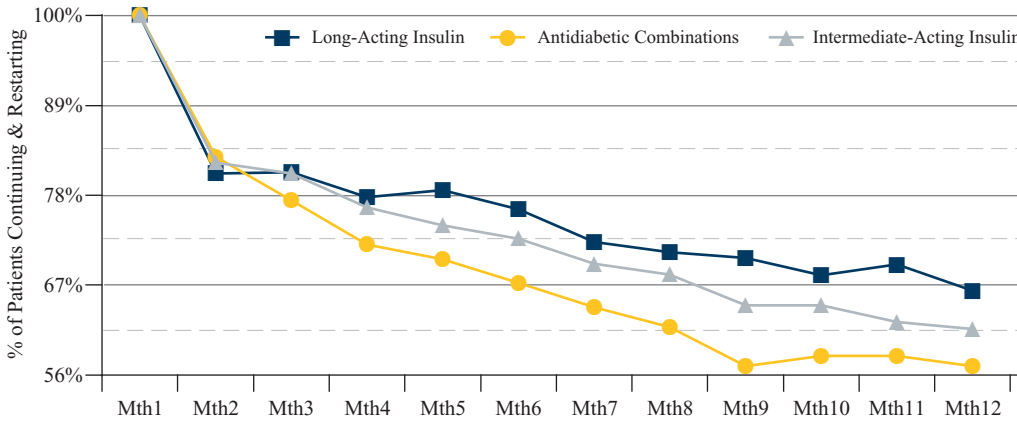
\* Figures reflect the per-patient yearly costs for Type 2 diabetes patients receiving a particular type of therapy.

NOTE: A1c tests measure the amount of glucose present in the blood during the past 2-3 months.

# PERSISTENCY



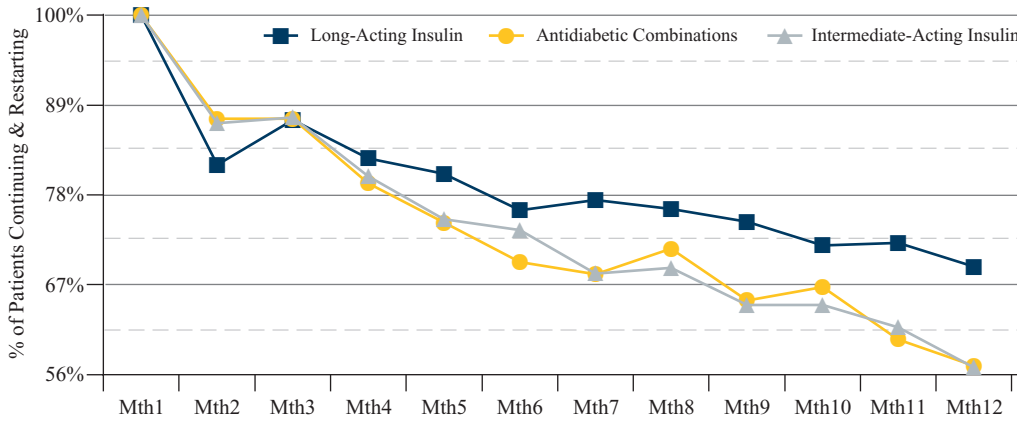
**PERSISTENCY: SOUTHEAST MICHIGAN, 2008**



## LONG-ACTING INSULIN PERSISTENCY DROPS OFF AT MONTH 2

Just 79.5% of Type 2 diabetes patients in the state of Michigan who were prescribed long-acting insulin remained persistent at the second month of treatment. By the sixth month, less than three-quarters (74.7%) of these patients either continued or restarted their long-acting insulin prescription.

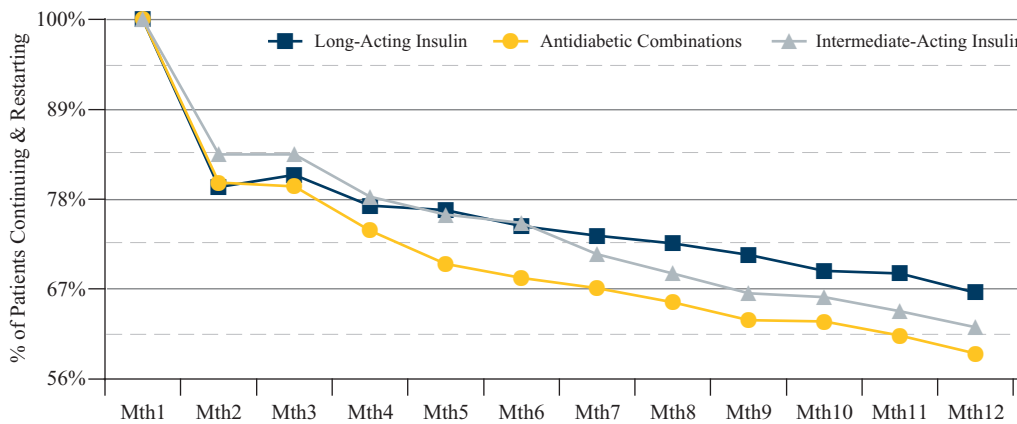
**PERSISTENCY: WEST MICHIGAN, 2008**



## LONG-ACTING INSULIN PERSISTENCY RATE IS HIGH IN W. MICHIGAN

The share of Type 2 diabetes patients in West Michigan who maintained their prescribed therapy for long-acting insulin was 69.2%, at month 12, highest among the four markets profiled. By comparison, 66.6% of patients diagnosed with Type 2 diabetes in the state of Michigan maintained their prescribed long-acting insulin therapy at month 12.

**PERSISTENCY: MICHIGAN, 2008**



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. Restart means that the patient did not fill in one or more of the preceding months. Continuing and restart patients are reported together.

Data source: SDI © 2009

### Antidiabetic Combinations

Fixed-dose combinations of non-insulin diabetic medications utilizing different mechanisms of action; used when adequate blood sugar control cannot be obtained with a single agent.



# ACS: PATIENT DEMOGRAPHICS

## LARGE SHARE OF SE MICHIGAN PATIENTS IS 45 TO 64 YEARS OLD

The percentage of patients diagnosed with acute coronary syndromes (ACS) in Southeast Michigan who were between 45 and 64 years of age was 41.3% in calendar year 2007, the highest mark among the four markets profiled.

By comparison, patients diagnosed with ACS in West Michigan were least likely, by market, to fall into this age category, at 37.7%.

## MICHIGAN PATIENT SHARE DIAGNOSED BY CARDIOLOGY IS HIGH

Of patients identified as having ACS in the state of Michigan in 2007, 23.2% were diagnosed by a cardiologist, nearly five percentage points higher than the national average (17.5%). An even more notable 31.0% of ACS patients in West Michigan were diagnosed by a cardiologist, the highest share of the four markets listed by a wide margin.

\* Includes Blue Cross/Blue Shield, HMOs, PPOs, point-of-service plans and exclusive provider organizations.

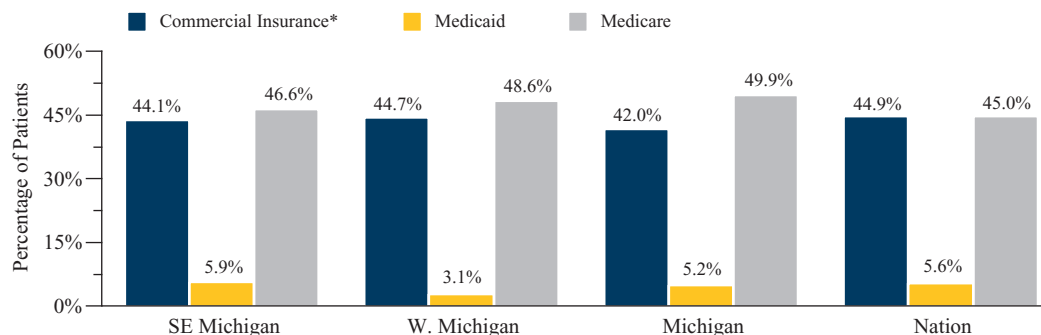
\*\* "Primary care" consists of both general and family practitioners.

NOTE: All demographics percentages are representative of the universe of ACS patients on whom claims data have been collected in a given year.

PERCENTAGE OF ACS PATIENTS, BY AGE, 2007

MARKET	0-44	45-54	55-64	65-74	75+
SE Michigan	5.0%	16.1%	25.2%	24.7%	29.0%
W. Michigan	4.3	14.1	23.6	24.9	33.1
Michigan	4.4	14.7	23.9	26.1	30.9
NATION	4.0%	14.6%	24.4%	26.1%	30.9%

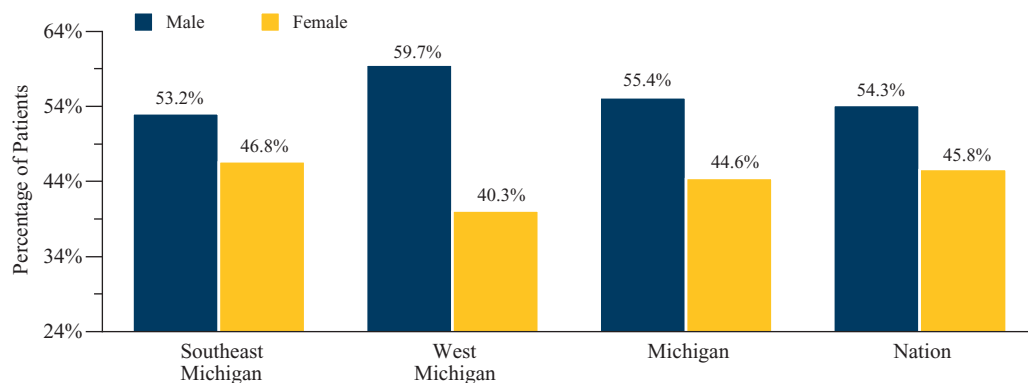
PERCENTAGE OF ACS PATIENTS, BY PAYER TYPE, 2007



PERCENTAGE OF ACS PATIENTS, BY LOCATION OF DIAGNOSIS, 2007

MARKET	Primary Care**	Cardiology	Internal Medicine	Emergency Room	Ophthalmology	Other Specialty
SE Michigan	24.3%	20.5%	9.9%	1.0%	4.8%	39.5%
W. Michigan	20.4	31.0	8.4	0.7	5.4	34.0
Michigan	25.2	23.2	9.4	1.0	4.3	37.0
NATION	24.0%	17.5%	9.3%	2.3%	4.9%	41.9%

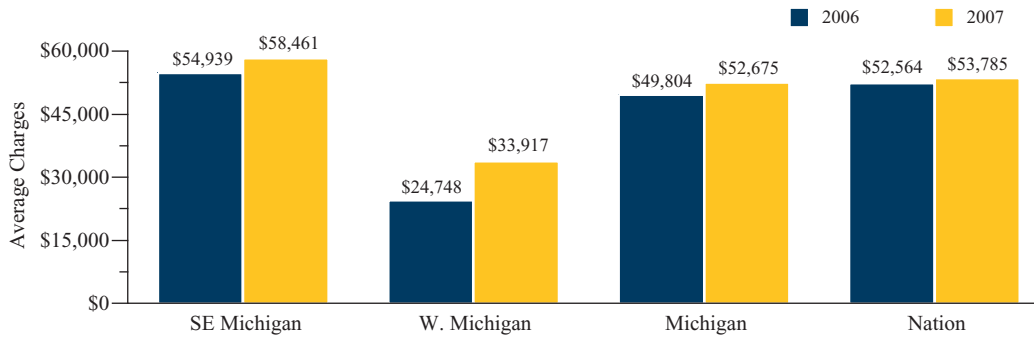
PERCENTAGE OF ACS PATIENTS, BY GENDER, 2007



Data source: SDI © 2009



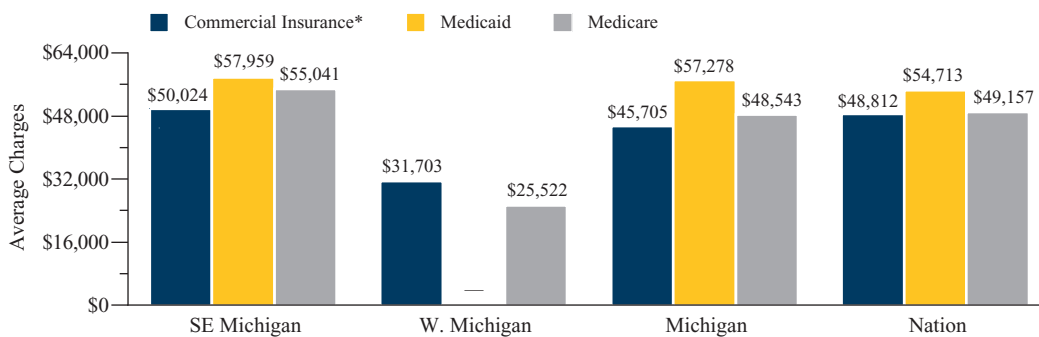
## HOSPITAL INPATIENT CHARGES PER YEAR FOR ACS PATIENTS



## HOSPITAL INPATIENT CHARGES RISE FOR PATIENTS IN MICHIGAN

Average annual facility charges for care delivered to patients diagnosed with ACS in the state of Michigan rose moderately in 2007, to \$52,675 from \$49,804 in 2006. Such charges likewise increased for ACS patients nationally, to \$53,785 from \$52,564 the year before. Although average annual hospital inpatient charges grew substantially for ACS patients in West Michigan (to \$33,917 in 2007 from \$24,748 in 2006), such charges were lowest, by market, by a notable margin.

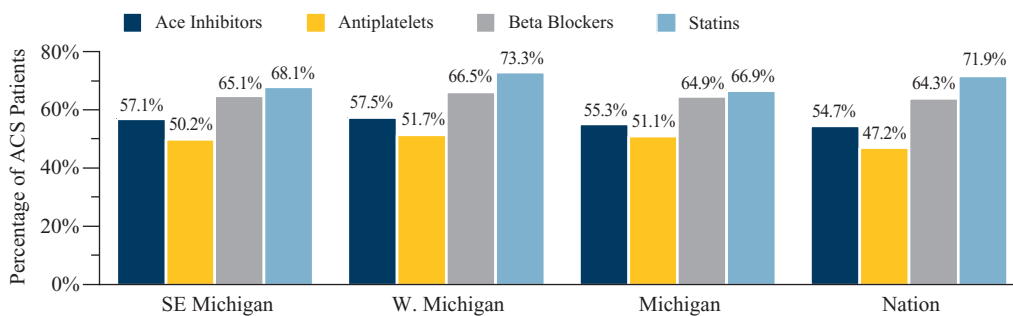
## HOSPITAL INPATIENT CHARGES PER YEAR FOR ACS PATIENTS, BY PAYER TYPE, 2007



## MOST WEST MICHIGAN ACS PATIENTS USE RXs FROM 3+ CLASSES

In 2007, more than six of every 10 (61.9%) patients diagnosed with ACS in West Michigan filled prescriptions across at least three product classes. By comparison, 55.9% of patients diagnosed with ACS nationally filled prescriptions from at least three separate product classes during the course of calendar year 2007.

## PERCENTAGE OF ACS PATIENTS USING VARIOUS THERAPIES, 2007\*\*



## PERCENTAGE OF ACS PATIENTS USING COMBINATION THERAPY, 2007

MARKET	Use of Any 2 Product Classes	Use of 3 or More Product Classes
SE Michigan	22.7%	58.1%
W. Michigan	21.9	61.9
Michigan	22.8	58.2
NATION	24.0%	55.9%

\* Includes Blue Cross/Blue Shield, HMOs, PPOs, point-of-service plans and exclusive provider organizations.

\*\* 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.

Data source: SDI © 2009



# ACS: PERSISTENCY

## PERSISTENCY

### MICHIGAN PATIENTS ARE LESS APT TO MAINTAIN THERAPY

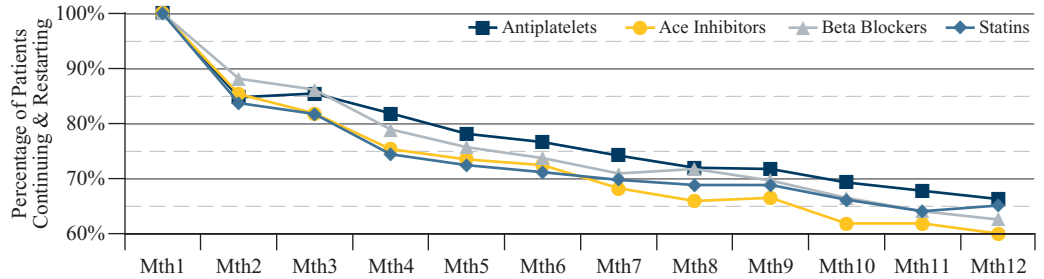
Regardless of therapeutic class profiled, Michigan patients who were diagnosed with ACS were less likely than such patients nationally, at month 12, to have maintained their prescribed course of therapy. For example, 70.3% of ACS patients nationwide who were prescribed a statin were persistent at month 12, compared with just 64.6% of Michigan ACS patients.

### MICHIGAN PATIENTS ON BETA BLOCKERS ARE MOST PERSISTENT

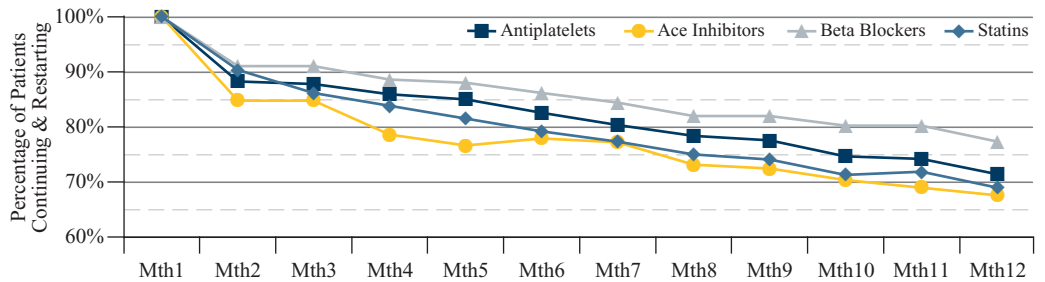
Of the four therapeutic classes listed, Michigan ACS patients were most likely, in every month tracked, to have maintained their prescribed therapy for beta blockers. At month 6, for instance, 77.1% of Michigan ACS patients on beta blockers were persistent, moderately higher than the percentages of such patients prescribed antiplatelets (74.9%), statins (72.7%) and ace inhibitors (72.4%).

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. Restart means that the patient did not fill in one or more of the preceding months. Continuing and restart patients are reported together.

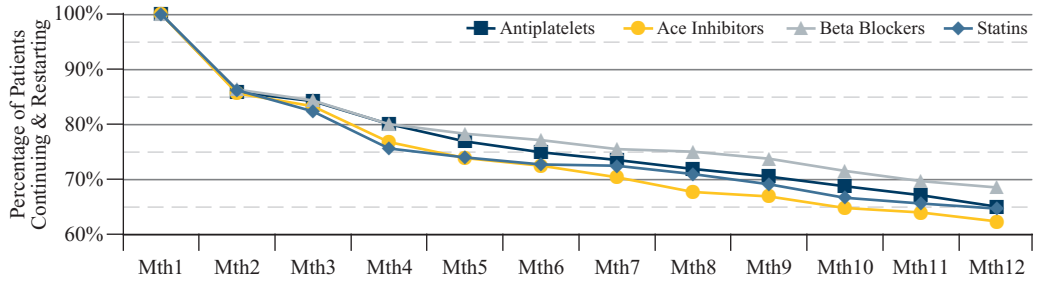
PERSISTENCY: SE MICHIGAN, 2007



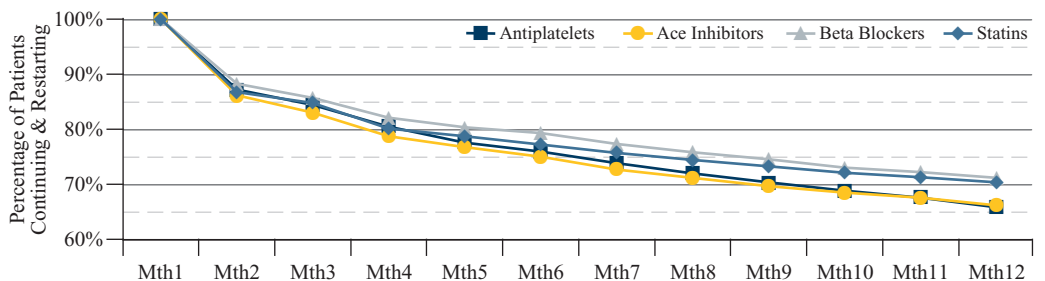
PERSISTENCY: W. MICHIGAN, 2007



PERSISTENCY: MICHIGAN, 2007



PERSISTENCY: NATION, 2007



Data source: SDI © 2009

**Antiplatelets:** Drugs that inhibit platelets from aggregating to form a plug. They are used to prevent clotting and alter the natural course of atherosclerosis.

**ACE Inhibitors:** A group of antihypertensive drugs (such as captopril) that relaxes arteries and promotes renal excretion of salt and water by inhibiting the activity of angiotensin-converting enzyme.

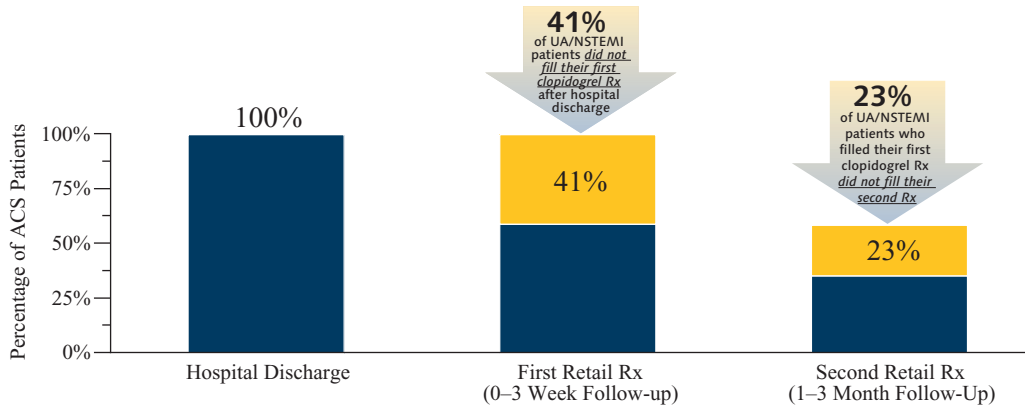
**Beta Blockers:** Medicines that affect the body's response to certain nerve impulses. This, in turn, decreases the force and rate of the heart's contractions, which lowers blood pressure and reduces the heart's demand for oxygen.

**Statins:** A class of drugs commonly used to lower LDL cholesterol levels.

Definition source: Encarta® Online Encyclopedia © 2009



### ACS PATIENT NONADHERENCE AFTER HOSPITAL DISCHARGE



### NONADHERENCE IN FIRST 3 WEEKS POSES A LARGE PROBLEM

Upon being discharged from the hospital, a notable 41% of ACS patients nationwide failed to fill their first antiplatelet (clopidogrel) prescription within three weeks. In the subsequent 1 to 3 months, another 23% of ACS patients nationwide who filled their first antiplatelet prescription did not fill their second one.

## 2009 ADA/EASD RECOMMENDATIONS FOR TIMELY INSULIN USE

### Consensus Statement: Strategies for the Management of Type 2 Diabetes Mellitus

<b>STEP 1</b>	<b>At diagnosis: Lifestyle + Metformin</b>	<b>Reinforce lifestyle interventions at every visit and check A1c every 3 months until A1c is &lt;7% and then at least every 6 months.</b>	
<b>STEP 2</b>	<b>Tier 1: Well-validated core therapies</b>	<b>Lifestyle + Metformin + Basal Insulin</b> <b>Lifestyle + Metformin + Sulfonylurea</b>	
	<b>Tier 2: Less well-validated therapies</b>	<b>Lifestyle + Metformin + Pioglitazone</b> <b>Lifestyle + Metformin + GLP-1 agonist</b>	<b>Lifestyle + Metformin + Pioglitazone + Sulfonylurea</b> <b>Lifestyle + Metformin + Basal Insulin</b>
<b>STEP 3</b>	<b>Lifestyle + Metformin + Intensive Insulin</b>		

The 2009 American Diabetes Association (ADA)/European Association for the Study of Diabetes (EASD) consensus statement recommends timely use of insulin, as one approach, for patients who are not at their A1c goal. The ADA and EASD also recommend, as one approach, earlier addition of insulin in patients who do not meet glycemic goals after lifestyle intervention and metformin for 2 to 3 months.<sup>1</sup> To access the ADA's website for the latest ADA/EASD consensus statement and information on diabetes management, visit [www.diabetes.org](http://www.diabetes.org).

<sup>1</sup> Nathan DM, Buse JB, Ferrannini E, et al. Medical management of hyperglycemia in type 2 diabetes: a consensus algorithm for the initiation and adjustment of therapy. *Diabetes Care*. 2009;32(1): 193-203.



## MICHIGAN CHRONIC CARE REPORT 2009

The Michigan Association of Health Plans (MAHP), in conjunction with sanofi-aventis U.S. LLC, is pleased to bring you the **Michigan Chronic Care Report**.

This report features key national, state and local patient-level, Type 2 diabetes and ACS data from the sanofi-aventis **Managed Care Digest Series**®.

- Demographics
- Hospital and Professional Charges
- Use of Services
- Pharmacotherapy
- Persistency

We look forward to providing you with another **Michigan Chronic Care Report** in 2010.

