Health Check
ANALYZING TRENDS IN WEST MICHIGAN
2015

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GRAND VALLEY
STATE UNIVERSITY

Health Check
Analyzing Trends in West Michigan 2015

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Dear Colleagues,

We are pleased to publish and distribute the sixth edition of "Health Check: Analyzing Trends in West Michigan" for 2015. This year, in addition to updated information presented in the 2014 report, we include the results of a survey regarding the impact of the Affordable Care Act on physician practices and a section focused on women's health. This publication is intended to inform health care policy and community decisions about the types of health care professionals, services, and delivery systems that could best serve our community. Our region continues to commit substantial resources for health care delivery and health science research development. These resources and the strong collaborations and partnerships among health care organizations, research institutes, and universities have resulted in world-class health care in our region.

Health Check 2015 identifies significant health-related trends and issues facing Kent, Ottawa, Muskegon, and Allegan (KOMA) counties. One such trend is an increase in the number of individuals in the 45–64 and the over 65 age groups and a drop in the number of individuals in the 20–34 age group. Currently, persons over age 65 outnumber those in the prime working ages of 35–44. If this trend continues, our community is likely to face an increasing number of chronic health problems, an increase in health care utilization, and a limited labor pool.

Embracing healthy lifestyles and moving to population health management are critical strategies for minimizing our individual and community health risk factor profiles and health care costs. This report highlights the continuing risk factors of heavy and binge drinking, obesity, and inadequate exercise persisting in our region. These trends, coupled with increases in hospital expenses in KOMA, if continued, will have substantial impact on health care expenditures in our region.

An important component in addressing these challenges is the development of a population health approach to health care services that builds upon the strengths of our health care organizations, businesses, governmental agencies, foundations, and educational institutions. A comprehensive approach would focus on team-based care incorporating integrated care delivery networks of health providers, public health, and community resources providing services to patients across the lifespan, with the goals of promoting healthy lifestyles, assisting individuals to age in their preferred environments, and delivering cost-effective quality care. By emphasizing healthy lifestyles, especially focusing on health promotion, healthy food choices, and physical activity, we can improve the quality of life for individuals, families, and our communities as well as conserving valuable health care resources.

Sincerely,

Jean Nagelkerk
Vice Provost for Health

Acknowledgments

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Executive Summary

The West Michigan health sector continues to experience significant changes. It continues to be a vital and growing part of the West Michigan economy. However, the sector also continues to face challenges from pressures to reduce health care costs and the implementation of the Affordable Care Act (ACA).

Health Check provides an ongoing trend analysis of three major issues: Knowledge Foundations, Health Care Trends, and Economic Analysis.

Our focus is primarily on a four-county area: Kent, Ottawa, Muskegon, and Allegan (KOMA). However, when discussing the pool of graduates and potential employment, the analysis expands to Barry, Berrien, Calhoun, Cass, Clare, Clinton, Eaton, Gratiot, Ionia, Isabella, Kalamazoo, Lake, Manistee, Mason, Mecosta, Missaukee, Montcalm, Muskegon, Newaygo, Oceana, Van Buren, and Wexford counties. The Affordable Care Act Physician Survey covers KOMA and Eaton, Kalamazoo, and Ingham counties.

Knowledge Foundations

Graduation and Jobs: Our analysis indicates that regional educational programs are graduating students at a rate that will meet projected job demand in most occupations. The Bureau of Labor (BLS) Statistics adjusted for West Michigan shows shortfalls of RNs between the number graduating and the schools surveyed. Although the BLS analysis also shows surpluses in family practitioners and physician assistants, the increases in wages for these professions suggest there are also shortfalls in West Michigan. Both BLS projections and wage change data show a surplus of graduates becoming LPNs, nursing aides, and home health aides. Two issues that may impact projections are 1) whether many skilled workers leave West Michigan and 2) how new regulatory changes impact the delivery of health services.

Medical Patents: Applications for patents and the awarding of patents are reasonable measures of knowledge creation. There has been a distinct increase in patent activity since the 1990s, and new players in the field have been identified. Average annual patents per decade assigned in the area have steadily increased from 6.2 patents on average from 1990 to 1999, to 10.3 patents from 2000 to 2009, and to 14.6 patents from 2010 to September 2014. However, these patents are coming from fewer firms with only six firms showing intellectual property activity over the last year. The value of corporate patents generally stays with the organization not the inventor, so these patents have potential to draw wealth into West Michigan.

Health Care Trends

Demographics: There are several disturbing health care trends. First, in KOMA and the United States, there are larger numbers of people between the ages of 45 and 64 than there are between the ages of 20 and 34. Therefore, over the next 20 years, there will be fewer workers to replace retiring workers. Also, in KOMA, Detroit, and the United States, there are now more people over age 65 than in the prime working ages of 35–44. In addition, workers are growing older which will create burdens on employer-sponsored health care. One strategy is to incentivize our young workers and graduates to stay in Michigan as well as to attract additional skilled workers to the state.

Health Care Overview: The latest data from the Michigan Behavioral Risk Factor show that a large number of people in West Michigan are still making unhealthy lifestyle choices:

- 33 percent report being obese (body mass index greater than 30)
- 23 percent report no leisure time physical activity
- 20 percent report that they smoke
- 19 percent report that they binge drink
- 30 percent report no routine checkup in the last year

All of these activities result in people being less healthy with 17 percent of the population reporting poor or fair health. This directly leads to increased health care spending in the region with diseases related to behavioral choices trending higher. Diabetes is an example of this with 9 percent of the population reporting they have diabetes.

Women's Health: Because women often are the primary caregivers for children or elderly parents, the cost of treating women's health issues are magnified beyond the cost of treating individual women. Of the top 10 reasons for death, women are far more likely than men to die of Alzheimer's or stroke. Additionally, improving women's health decreases the probability of negative outcomes associated with childbirth. For example, if improved maternal health reduced low birth weight babies by 20 percent, West Michigan would save up to $13.4 million annually.

Economic Analysis

Benchmarking Medical Services: Grand Rapids residents are less likely to be admitted to the hospital relative to residents in a number of comparison communities, and their hospital stays, on average, tend to be shorter. However, total hospital expenses and total hospital expenses per bed have grown much faster between 2003 and 2012 in Grand Rapids than in the comparison communities (108 percent and 78 percent respectively with the average comparison city expenses growing 68 percent and 65 percent respectively). Additionally, expenses per admission grew faster than all comparison cities except Portland, Oregon. From 2003 to 2012, per-enrollee Medicare Fee-for-Service (FFS) expenditures in Grand Rapids increased by 32.4 percent, three times faster than the average comparison city. Yet with these increasing costs, the quality markers such as hospital discharges for ambulatory-sensitive conditions show that, among the comparison cities, only Portland performs better. It is important to note that costs have been rising but not average length of stay or the rate of hospital admissions, so there is little evidence that the increased costs are the result of changes in population health or increased service intensity. However, like most hospital referral areas, Grand Rapids has seen an increase in market concentration (less potential competition). At this point, using an economic measure of market concentration called the Herfindahl-Hirschman Index, the Grand Rapids Hospital Referral Region has 1.6 times the market concentration of the Detroit region, making it more susceptible to increasing costs.

Affordable Care Act: A survey of how general practitioners are reacting to the Affordable Care Act (ACA) is included this year. Overall, the rollout of the ACA exchange and the Medicaid expansion have not changed physician practices to a great extent. The areas in which there are some effects are in overall larger patient volume, more administrative work, and difficulty finding a referring physician.

Major Medical Conditions — Cost Analysis: We include insurance cost data for specific diseases from Priority Health, Blue Care Network, and Blue Cross Blue Shield of Michigan. This year, we continue to include a more detailed look at the costs related to diabetes care. Understanding that, from year to year, coding differences make it difficult to compare costs, this year there was a substantial jump in costs for patients with coronary artery disease (CAD) in KOMA compared to the Detroit region. In addition, costs of all conditions in KOMA increased relative to the Detroit region. It is important to find ways to decrease costs. One way is to ensure that diabetics get the recommended tests, which reduces the costs of treatment by 15 percent, with a potential savings of $32.7 million.

> **Technical Note:** The Herfindahl-Hirschman Index is a measure of market concentration calculated using the sum of the squared market share of the firms (hospitals, in this report) being studied. We define the geographical market using the hospital referral regions defined in the Dartmouth Atlas of Health Care and calculate the market share of hospitals in specific regions using inpatient discharges from the Medicare Cost Reports.

References by Section

Job Projections
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Risk Profiles
BRFSS Data Source: http://www.michigan.gov/mdch/0,4612,7-132-2945_5104_5279_39424_39427-134707--00.html
County Population Source: http://www.census.gov/popest/data/counties/totals/2004/CO-EST2004-01.html
Low Birth Rate Source: http://www.cdc.gov/pednss/pednss_tables/pdf/national_table2.pdf

Knowledge Foundations

Education and Job Growth

The Michigan economy is continuing to move in the right direction since the devastating effects of the 2008 recession. An improving labor market (see Figures 1 and 2 and Table 1) with job gains in mining and logging, construction, manufacturing, trade, transportation and utilities, professional and business services, educational and health services, and leisure and hospitality, along with a rebounding housing market are just some examples of economic indicators supporting the state's healthy economy. Moreover, about one in five jobs in the next 10 years will be in the health care sector partly because of an aging population. The bad news is that not all of these jobs will pay a good salary with liberal benefits. Given the pressure to reduce health care costs, more services and responsibilities will move to job classifications with less training and specialized skills than traditionally required for some tasks. It should, therefore, not be surprising that job projections for physician assistants, nursing aides, and home health aides, etc. are robust and substantial.

Figure 1: Nonfarm Payroll Jobs Percent Change, January 2008–November 2013
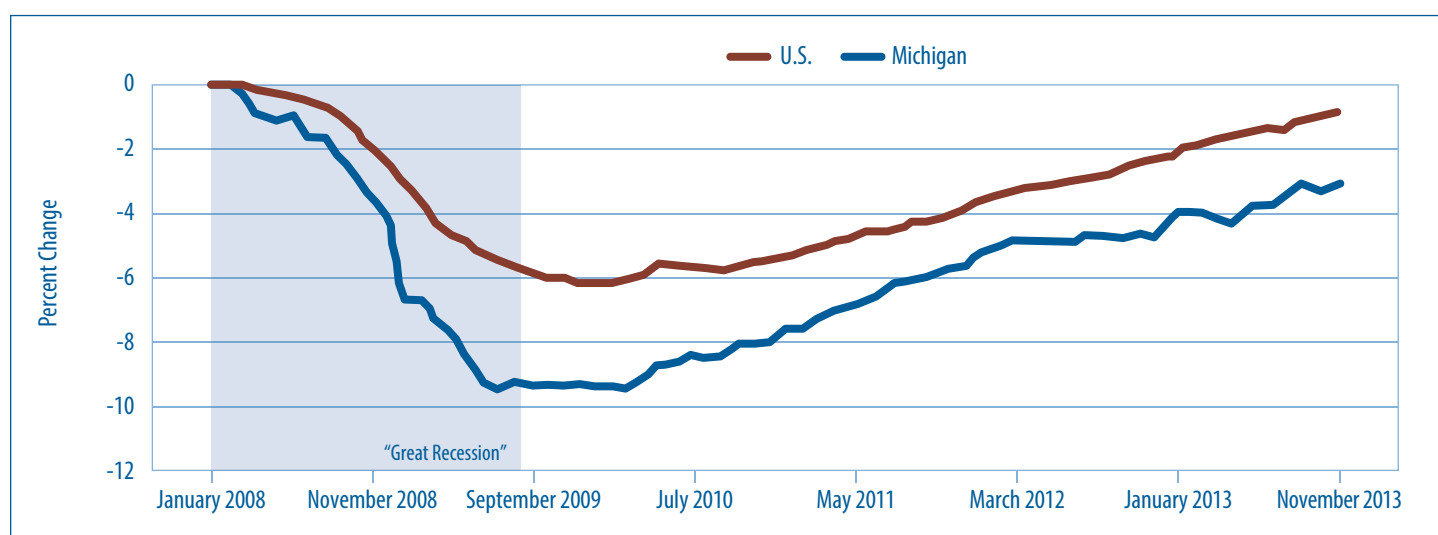
Source: U.S. Bureau of Labor Statistics. *2013 State Occupational Employment and Wage Estimates — Michigan.*

Figure 2: Percent Job Change, Second Quarter 2013–Third Quarter 2013
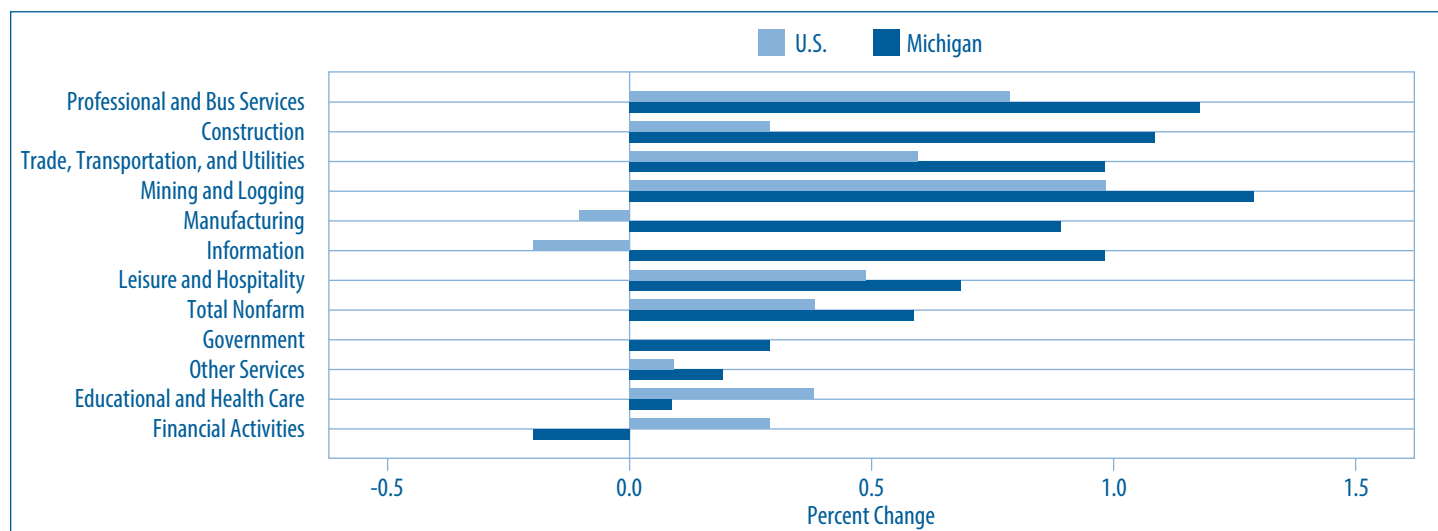
Source: U.S. Bureau of Labor Statistics. *2013 State Occupational Employment and Wage Estimates — Michigan.*

Given these changes and challenges, an important question to address is this:

Are we creating the required skills in our universities for growth in the health sector professions?

To answer this question, we proceed in three steps:

1. We provide the 2020 U.S. Bureau of Labor Statistics (BLS) forecasts for different medical professions in the state of Michigan.
2. We undertake an inventory of education programs in the health care sector for different specializations. The numbers in the current iteration are updated to reflect recent changes.
3. We make specific predictions for some selected health professions in West Michigan.

Table 1 provides the projections for different health care professions for the state of Michigan. These projections show that more than 6,000 openings will be created in the following areas: home health aides, nursing aides, and registered nurses. Other areas such as dental hygienists/assistants, emergency medical technicians and paramedics, physical therapists, physicians and surgeons, LPNs, medical assistants, and pharmacy technicians also show significant increases in employment opportunities. The robust projected increase in the employment of "second level personnel" such as nursing aides, home health aides, and medical assistants is not surprising given the pressure to reduce costs.

Tables 2–5 show historical data about the enrollment and graduation rates of universities in West Michigan. The data are from many different programs; we have incorporated as much data as possible. Other universities will be included when that information becomes available. Consequently, all the graduates may not be captured by our data set.

Table 6 makes projections specifically for West Michigan by matching the data set of graduates with some of the major job projections. To generate a forecast, we made some assumptions. Graduation rates are based on historical data, and we assume that similar graduation rates will continue until 2020. In order to find out what is happening in West Michigan, we use the definition employed by the Michigan Health and Hospital Association (MHA) to identify this regional labor market. The BLS 2020 projections for labor demand in Michigan are transferred to West Michigan by taking into account that only 26.74 percent of Michigan's labor force is in West Michigan. We do not take into account any additions (persons migrating into the area) and leakages (skilled labor leaving Michigan). Given these simplifying assumptions, it is interesting to assess which major professions will have shortages and surpluses. Our recent results indicate that occupations such as dental assistants and registered nurses will have significant shortages. On the other hand, some professions, particularly LPNs, occupational therapists, and family and general practitioners, are projected to have a significant surplus.

Table 7 presents inflation-adjusted growth in annual earnings in West Michigan and Portland, Oregon, for the period 2003–2013. Because the BLS projections have limitations, looking at wage growth can be used as a second indicator of labor shortages. Wages that are increasing compared to inflation and to other workers is an indication of a shortage, and wages that are dropping compared to inflation and other workers is an indication of a surplus. Using this method, only family practitioners, optometrists, and physician assistants are showing signs of shortages. In addition, LPNs, nursing aids, and home health aids are showing signs of surpluses. Moreover, it suggests that the 2020 BLS projections are not keeping up with the changes in the labor market seen in West Michigan. In particular, skilled workers might leave Michigan for better paying opportunities elsewhere in the country, such as Portland, Oregon.

It must be emphasized that our results are preliminary. Health care reform might change many of these projections significantly. For instance, in the future there may be a higher demand for medical records technicians to accommodate extensive conversions to electronic record keeping. Consequently, projections of many specific health professions are likely to change due to structural changes in health care regulations and government initiatives. We view our projections as a work in progress. Aligning future graduation rates in a more comprehensive manner with more accurate projections of job growth is a major research project by itself. Universities in West Michigan will be well-served if this kind of alignment between graduation rates and projected job growth is performed more comprehensively and accurately on a regular basis. Universities can discern future job growth niches and be more proactive in creating the skills that are required in the future. In the long run, it is important not only to create education opportunities in West Michigan, but also to adopt policies that encourage graduates to continue their lives in the state of Michigan after graduation. The future of West Michigan will depend largely upon whether we are able to create the necessary skills for the future and retain the skilled labor over the long haul.

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Michigan Economic and Workforce Indicators and Insights, 2013. Retrieved from http://www.milmi.org/admin/uploadedPublications/2057_Michigan_Economic_and_Worforce_Indicators_and_Insights_Summer_2013.pdf

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[1] Allegan, Barry, Barrien, Calhoun, Cass, Clare, Clinton, Eaton, Gratiot, Ionia, Isabella, Kalamazoo, Kent, Lake, Manistee, Mason, Mecosta, Missaukee, Montcalm, Muskegon, Newaygo, Oceana, Ottawa, Van Buren, and Wexford.

Table 1: Projected Health Care Professions in Michigan

| Occupation | Employment | | Change | Average Annual Openings (Based on Growth + Replacements) |
	2010 Actual	2020 Projected	%	
Anesthesiologists	1,190	1,340	12.6	39
Athletic Trainers	820	980	19.5	46
Audiologists	480	590	22.9	14
Biochemists and Biophysicists	320	400	25.0	15
Biological Scientists, All Other	530	570	7.5	16
Biological Technicians	2,930	3,430	17.1	150
Cardiovascular Technologists/Technicians	2,540	3,110	22.4	95
Chemical Technicians	1,970	2,020	2.5	33
Chemists	2,680	2,740	2.2	93
Chiropractors	1,540	1,730	12.3	49
Clinical/Counseling/School Psychologists	3,360	3,710	10.4	141
Dental Assistants	9,330	10,760	15.3	339
Dental Hygienists	8,610	10,400	20.8	352
Dentists, All Other Specialists	300	310	3.3	10
Dentists, General	3,950	4,140	4.8	136
Diagnostic Medical Sonographers	1,800	2,380	32.2	86
Dietetic Technicians	1,410	1,570	11.3	40
Dietitians and Nutritionists	1,900	2,120	11.6	89
Emergency Medical Tech and Paramedics	7,380	9,080	23.0	318
Epidemiologists	140	170	21.4	4
Family and General Practitioners	3,140	3,610	15.0	109
Health Care Practitioner/Tech Workers, All Other	3,100	3,460	11.6	145
Health Care Support Workers, All Other	7,290	8,150	11.8	197
Health Diagnose/Treat Practitioners, All Other	2,410	2,700	12.0	75
Health Technologists and Technicians, All Other	2,940	3,270	11.2	93
Home Health Aides	35,400	54,310	53.4	2,348
Internists, General	2,710	3,010	11.1	85
Licensed Practical and Licensed Vocational Nurses	18,650	21,140	13.4	747
Life Scientists, All Other	140	150	7.1	2
Massage Therapists	2,720	3,270	20.2	100
Medical and Clinical Laboratory Technicians	6,160	6,410	4.1	145
Medical and Clinical Laboratory Technologists	7,030	7,200	2.4	153
Medical Assistants	20,640	24,170	17.1	669
Medical Equipment Preparers	1,080	1,190	10.2	27
Medical Records/Health Info Technicians	4,760	5,320	11.8	151
Medical Scientists, Except Epidemiologists	1,580	2,060	30.4	58
Medical Transcriptionists	2,780	2,720	-2.2	43
Microbiologists	350	380	8.6	11
Nuclear Medicine Technologists	800	880	10.0	20
Nursing Aides, Orderlies, and Attendants	50,400	57,320	13.7	1,342
Obstetricians and Gynecologists	410	460	12.2	13
Occupational Health and Safety Specialists	1,170	1,240	6.0	49
Occupational Health and Safety Technicians	220	240	9.1	10
Occupational Therapist Aides	210	250	19.0	7
Occupational Therapists	4,100	4,980	21.5	166

Table 1: Projected Health Care Professions in Michigan (continued)

Occupation	Employment		Change	Average Annual Openings (Based on Growth + Replacements)
	2010 Actual	2020 Projected	%	
Occupational Therapist Assistants	750	950	26.7	32
Opticians, Dispensing	1,810	2,030	12.2	58
Optometrists	880	1,030	17.0	46
Oral and Maxillofacial Surgeons	210	230	9.5	7
Orthodontists	260	270	3.8	9
Orthotists and Prosthetists	400	430	7.5	11
Pediatricians, General	290	330	13.8	10
Pharmacists	9,170	10,430	13.7	359
Pharmacy Aides	1,050	1,190	13.3	31
Pharmacy Technicians	11,010	12,880	17.0	378
Physical Therapists	7,210	9,110	26.4	273
Physical Therapist Aides	990	1,290	30.3	45
Physical Therapist Assistants	2,430	3,140	29.2	109
Physician Assistants	3,550	4,210	18.6	135
Physicians and Surgeons, All Other	13,690	15,340	12.1	436
Podiatrists	370	390	5.4	9
Psychiatric Aides	2,550	2,750	7.8	53
Psychiatric Technicians	1,080	1,230	13.9	34
Psychiatrists	440	480	9.1	13
Psychologists, All Other	550	640	16.4	26
Radiation Therapists	560	620	10.7	17
Radiologic Technologists and Technicians	6,940	8,280	19.3	242
Recreational Therapists	850	950	11.8	41
Registered Nurses	87,170	104,000	19.3	3,260
Respiratory Therapists	3,610	4,420	22.4	151
Respiratory Therapy Technicians	480	480	0.0	8
Speech-language Pathologists	2,430	2,680	10.3	72
Surgeons	580	660	13.8	20
Surgical Technologists	2,650	2,920	10.2	74
Therapists, All Other	1,100	1,290	17.3	42
Veterinarians	1,970	2,550	29.4	97
Veterinary Assistant and Lab Animal Caretakers	2,270	2,410	6.2	49
Veterinary Technologists and Technicians	1,810	2,570	42.0	108

Color Key: ■ Students Enrolled Over Last 3 Years ■ Graduates Over Last 3 Years	Davenport University		Ferris State University		Grand Rapids Community College		Kellogg Community College	
Allied Health Sciences			215	33				
Biology								
Cardio Respiratory Care								
Chemistry								
Dental Assistant/Assisting					10	21		
Dental Hygiene/Hygienist			211	117	191	94	105	63
Dentistry (Pre)								
Diagnostic Medical Sonography			64	60				
Dietary and Food Service Management			20	2				
Electrocardiogram (ECG) Technician								
Emergency Medical Services							133	30
Emergency Medical Technician*							63	155
Environmental Science								
Fire Science								
Health								
Health Information Technology	1,223	248	245	116				
Health Insurance Claims Management	247	49						
Magnetic Resonance Imaging (MRI)							8	0
Medical Assistant**	779	409					420	89
Medical Billing		150						
Medical First Responder								
Medical Laboratory Technology			5	11			78	37
Medical Office Administration								
Medicine and Osteopathic Medicine (Pre)								
Mortuary Science (Pre)								
Nursing Assistant (CNA)								
Nursing***	237	182			789	397	1,036	732
Occupational Therapy Assistant					137	49		
Optometry (Pre)								
Paramedic								
Pharmacy (Pre)								
Pharmacy Technician								
Phlebotomy	176	77						
Physical Therapist Assistant							163	70
Physical Therapy (Pre)								
Physician Assistant (Pre)								
Psychology								
Radiography****			168	130	155	82	101	47
Respiratory Care			178	186				
Veterinary Medicine (Pre)								

Notes:

* Combined Emergency Medical Technician (SWMU) and EMT-Basic and EMT-Paramedic (KCC)

** Includes Medical Administrative Assistance (KCC), Medical Assistant (Davenport and Montcalm), Medical Assistant Office and Clinical (SWMU)

*** Includes Practical Nursing (Davenport), Practical Nurse (GRCC), Nursing (LMC), Nursing LPN (Muskegon CC), Nursing-Practical (KCC), Nursing (RN, Practical Nursing LPN, Paramedic to RN, LPN to RN) (SWMU)

**** Includes Radiologic Technology (Lake Michigan College and GRCC)

Tables do not include programs with no information readily available and programs with a value of zero for both enrollment and graduates.

Lake Michigan College		Montcalm Community College		Muskegon Community College		Southwestern Michigan College		TOTAL ENROLLMENT	TOTAL GRADUATES
								215	33
							4	0	4
1								1	0
							3	0	3
110	25							120	46
24								531	274
8								0	0
86	29							150	89
								20	2
						1		1	0
								133	30
						7	50	70	205
						0	9	0	9
						48	6	48	6
106								106	0
						141	37	1,609	401
								247	49
27	12							35	12
2		189	37			262	113	1,652	648
								150	0
						2		2	0
								83	48
		117	27					117	27
68								68	0
22								22	0
						23		23	0
514	208	361	228	614	282	437	141	3,988	2,170
								137	49
8								8	0
62	6					47	15	109	21
79								0	79
						77	22	77	22
						11	13	187	90
								163	70
135								135	0
23								23	0
196								196	0
150	59							574	318
								178	186
68								68	0

Table 3:
College and University Programs — Bachelor's Degree

Color Key: 🟦 Students Enrolled Over Last 3 Years
🟩 Graduates Over Last 3 Years

	Albion College		Andrews University		Calvin College		Central Michigan University		Cornerstone College			
Allied Health Sciences												
Animal Science/Preveterinarian			78									
Anthropology and Sociology												
Biochemistry	177*	60*	92	20	278	54						
Biochemistry and Molecular Biology												
Biochemistry and Molecular Biology/Biotechnology												
Biological Physics												
Biology	389	146	520	60	731	143	973	402	116	11		
Biomedical Laboratory Science												
Biomedical Sciences												
Biophysics			6									
Biopsychology												
Biosystems Engineering												
Biotechnology					39	9						
Cell and Molecular Biology												
Chemistry	64	16	24	4								
Clinical Exercise Science												
Clinical Laboratory Sciences												
Communication Disorders							632	258				
Dental Hygiene												
Diagnostic Medical Sonography												
Diagnostic Molecular Science												
Dietetics			55	19			356	90				
Environmental Biology/Microbiology												
Environmental Biology/Plant Biology												
Exercise Science	97	31							189	35		
Exercise Science — Kinesiology												
Genomics and Molecular Genetics												
Health Administration							451	142				
Health Care Systems Administration												
Health Communication												
Health Fitness												
Health Fitness in Preventive and Rehabilitative Programs							1,207	709				
Health Information Management												
Health Services Administration												
Health Studies												
Human Biology												
Kinesiology					369							
Medical Case Management												
Medical Laboratory Science												
Medical Laboratory Sciences			129	33								
Medical Technology												
Microbiology												
Molecular Diagnostics												
Neuroscience	51											
Nuclear Medicine Technology												
Nursing			388	82	852	180						
Nutrition Science			59									
Nutritional Sciences												
Occupational Therapy												
Physics			41	3	85	20						
Physiology												
Premedical Professions and Health Sciences												
Presocial Work	21											
Psychology	345	133	237	53	654	174			167	20		
Radiation Therapy												
Radiologic and Imaging Sciences												
Social Work					312	87			204	31		
Sociology	61	22	38	1	123	48						
Speech Pathology and Audiology					415	62						
Speech-language Pathology and Audiology			152	48								
Therapeutic Recreation												

Note: Tables do not include programs with a value of zero for both enrollment and graduates.

*Albion College did not provide data for 2013; data is from 2010-2012.

Davenport University		Ferris State University		Grand Valley State University		Hope College		Kalamazoo College		Michigan State University		Western Michigan University		TOTAL ENROLLMENT	TOTAL GRADUATES
		429	24	1,333	340									1,762	364
														78	0
								64						0	64
		29	7			14	3					224	30	637	114
										918	169			918	169
										350	88			350	88
														0	0
		265	247	2,003	320	433	113	171		41	11	902	140	6,373	1,764
										851	52			851	52
				4,032	690							1,703	265	5,735	955
														6	0
				179	21									179	21
										544	84			544	84
		112	17											151	26
				234	54									234	54
														88	20
				1,868	341									1,868	341
										177	55			177	55
														632	258
		140	63											140	63
				172	75									172	75
										15	16			15	16
										707	211	126	70	1,244	390
										43	9			43	9
										47	12			47	12
												1,168	200	1,454	266
						415	128							415	128
										436	109			436	109
														451	142
		976	275											976	275
				316	121									316	121
														0	0
														1,207	709
258	98	229	33											487	131
331	152													331	152
														0	0
										3,898	977			3,898	977
										2,840	516			3,209	516
169	76													169	76
				106	52									106	52
														129	33
		105	55											105	55
										521	187			521	187
		60												60	0
														51	0
		380	137											380	137
443	179	324	535	1,111	534	400	116			1,017	576	849	277	5,384	2,479
														59	0
										587	224			587	224
												276	128	276	128
				168	26	31	12	41		711	113	146	14	1,182	229
										897	305			897	305
														0	0
														21	0
		391	82	3,761	870	659	221	145		4,416	1,150	1,194	511	11,824	3,359
				106	53									106	53
				20	5									20	5
		555	154			222	83			653	170	295	207	2,241	732
		26	5	412	117	128	49			389	139	440	133	1,617	514
												194	90	609	152
														152	48
				388	108									388	108

Table 4:
College and University Programs — Master's

	Andrews University		Calvin College		Central Michigan University		Cornerstone University	
Color Key: ■ Students Enrolled Over Last 3 Years ■ Graduates Over Last 3 Years								
Biochemistry and Molecular Biology								
Biology/Biological Sciences	16	5			110	27		
Biomedical Laboratory Science/Operations								
Biomedical Sciences								
Biostatistics								
Biosystems Engineering								
Cell and Molecular Biology								
Chemical Engineering								
Clinical Laboratory Sciences								
Clinical Mental Health Counseling	55	17						
Clinical Nurse Specialist								
Communication Disorders*					55	97		
Comparative Medicine and Integrative Biology								
Counseling Psychology								
Dietetics					34			
Epidemiology								
Exercise Physiology								
Genetics								
Health Administration**					95	532	96	10
Health and Risk Communication								
Human Nutrition								
Integrative Pharmacology								
Kinesiology								
Laboratory Research in Pharmacology and Toxicology								
Medical and Bioinformatics								
Medical Laboratory Sciences	8							
Microbiology								
Neuroscience					7	6		
Nurse Practitioner								
Nursing								
Nursing Education	19	3						
Nutrition and Wellness	61	0						
Occupational Therapy								
Physician Assistant					271	126		
Pathobiology								
Pharmacology and Toxicology								
Physics					45	22		
Physiology								
Psychology								
Public Health								
Rehabilitation Counseling								
Speech-language Pathology***			50		208	97		
Social Work								
Sociology					4	4		
Vision Rehabilitation Therapy								

Notes:

* Includes Communicative Sciences and Disorders (MSU)

** Includes Health Care Administration

*** Includes Speech Pathology and Audiology (WMU), Speech Pathology (Calvin College)

Tables do not include programs with a value of zero for both enrollment and graduates.

Ferris State University		Grand Valley State University		Michigan State University		Western Michigan University		TOTAL ENROLLMENT	TOTAL GRADUATES
				3	4			3	4
		84	26			112	28	322	86
				25	8			25	8
		44	14					44	14
		105	46	5				110	46
				50	13			50	13
		89	35	1	3			90	38
				11	11			11	11
				46	6			46	6
								55	17
				8				8	0
				188	87			243	184
				24	6			24	6
						483	118	483	118
								34	0
				35	13			35	13
						79	39	79	39
					3			0	3
		156	39					347	581
				62	25			62	25
				14	11			14	11
				59	24			59	24
				179	83			179	83
				1				1	0
		28	8					28	8
								8	0
				5				5	0
				1	3			8	9
				2				2	0
289	54	41	20	535	157	45	5	910	236
								19	3
								61	0
		315	88			542	224	857	312
		364	102			237	105	872	333
				5	4			5	4
				288	33			288	33
				8	45			53	67
				14	1			14	1
				133	48	175	81	308	129
				642	120			642	120
				72	30			72	30
						183	82	441	179
						923	349	923	349
						37	11	41	15
						65	51	65	51

Table 5:
College and University Programs — Doctoral Degree

Color Key: ■ Students Enrolled Over Last 3 Years ■ Graduates Over Last 3 Years	Andrews University		Central Michigan University		Ferris State University		
Audiology			114	51			
Biochemistry and Molecular Biology							
Biochemistry and Molecular Biology — Environmental Toxicology							
Biological Sciences							
Biosystems Engineering							
Cell and Molecular Biology							
Cell and Molecular Biology — Environmental Toxicology							
Chemical Engineering							
Communicative Sciences and Disorders							
Comparative Medicine and Integrative Biology							
Counseling Psychology							
Epidemiology							
Genetics							
Genetics — Environmental Toxicology							
Health Administration			1	37			
Human Nutrition							
Kinesiology							
Medicine							
Neuroscience			25	2			
Nursing*							
Optometry					442	101	
Pathobiology							
Pharmacology and Toxicology							
Pharmacy					1,679	412	
Physics							
Physiology							
Psychology							
Physical Therapy	310	108	424	133			
Rehabilitation Counseling							
Social Work							
Sociology							

*Combined Nursing (GVSU) and Nursing Practice (MSU)

Note:
Table does not include programs with a value of zero for both enrollment and graduates.

Grand Valley State University		Michigan State University		Western Michigan University		TOTAL ENROLLMENT	TOTAL GRADUATES
				3	12	117	63
		153	26			153	26
		8	4			8	4
				3	11	3	11
		70	12			70	12
		113	11			113	11
			2			0	2
		178	25			178	25
		4	0			4	0
		89	9			89	9
				5	28	5	28
		58	7			58	7
		120	20			120	20
		2	1			2	1
						1	37
		36	3			36	3
		137	23			137	23
		6,014	433			6,014	433
		87	4			112	6
197	15	39	12			236	27
						442	101
		16	3			16	3
		35	6			35	6
						1,679	412
		397	42			397	42
		22	7			22	7
		147	46	11	24	158	70
426	128					1,160	369
		60	12			60	12
		76	8			76	8
				4	14	4	14

Table 6: Need for Selected Professions

Selected Professions	Average Annual West MI Graduates	Average Job Projection in MI (Growth and Replacements)	Average Annual West MI Component of Job Projection	Average West MI Over/Under Provisioned (Annual Average)
Dental Assistants	15	339	91	-75
Dental Hygienists	112	352	94	18
Diagnostic Medical Sonographers	55	86	23	32
Dietitians and Nutritionists	94	89	24	70
EMTs and Paramedics	85	318	85	0
Family and General Practitioners	144	109	29	115
Home Health Aides	NA	2,348	628	NA
RNs	739	3,260	872	-133
Nursing Aides	NA	1,342	359	NA
LPNs	723	747	200	524
Medical Assistants	216	669	179	37
Medical and Clinical Lab Techs	55	145	39	16
Occupational Therapist Assistants	16	32	9	8
Occupational Therapists	147	166	44	102
Optometrists	34	46	12	21
PAs	111	135	36	75
Pharmacy Technicians	NA	378	101	NA
Physical Therapists	123	273	73	50
Respiratory Therapists	62	151	40	22
Speech-language Pathologists	60	75	20	40
Surgical Technologists	NA	74	20	NA

Assumptions:

1. Growth is linear and projected evenly between years.
2. West Michigan component is 26.7 percent of total Michigan population in the labor force based on the west side population in the labor force for year 2011.
3. Graduation rates are based on annual historical data for the whole reporting period.
4. No modifications were made for leaving or entering the state.

Notes:

1. Job projections based on BLS data.
2. Data was collected from Albion College, Calvin College, Central Michigan University, Cornerstone University, Davenport University, Ferris State University, Grand Rapids Community College, Grand Valley State University, Hope College, Lake Michigan College, Michigan State University, Montcalm Community College, Southwestern Michigan College, and Western Michigan University.
3. Nursing data is combined for licensed practical, vocational, and registered nurses.
4. Kuyper College indicated that they had no medical programs.
5. Table does not include medical programs from Aquinas College.
6. Annual job projection in Michigan is based on annual projected job growth and replacements.

Reference:

Michigan Department of Technology, Management, and Budget. *Occupational employment forecasts 2010–2020*. Retrieved November 2, 2012 from
http://www.milmi.org/admin/uploadedPublications/1440_occ_2016.htm

Table 7: Average Hourly Wages for Select Health Care Jobs

Selected Professions	Grand Rapids, MI			Portland, OR		
Color Key: ■ Above 7% ■ Below Negative 7% (-7%)	2003*	2013	% Change	2003*	2013	% Change
Dental Assistants	$16.87	$17.91	6.19%	$19.51	$19.35	-0.81%
Dental Hygienists	$27.71	$28.00	1.04%	$38.96	$39.01	0.12%
Diagnostic Medical Sonographers	$28.42	$28.21	-0.75%	$36.07	$40.76	13.01%
Dietitians and Nutritionists	$25.70	$26.01	1.19%	$28.45	$30.40	6.86%
EMTs and Paramedics	$15.10	$15.20	0.66%	$21.49	$20.60	-4.15%
Family and General Practitioners	$82.55	$93.11	12.79%	$76.03	$85.59	12.57%
Home Health Aides	$12.55	$10.15	-19.11%	$12.28	$12.08	-1.64%
LPNs	$29.32	$28.64	-2.33%	$33.68	$40.58	20.49%
Medical Assistants	$13.40	$12.14	-9.39%	$13.77	$13.87	0.75%
Medical and Clinical Lab Techs	$20.64	$19.05	-7.69%	$23.24	$24.17	4.00%
Nursing Aides	$15.56	$14.81	-4.80%	$17.26	$16.96	-1.73%
Occupational Therapist Assistants	$26.06	$27.01	3.64%	$29.55	$30.16	2.05%
Occupational Therapist	$20.43	$19.77	-3.25%	$22.12	$26.33	19.01%
Optometrists	$30.06	$28.67	-4.63%	$32.66	$36.70	12.35%
PAs	$54.20	$63.22	16.63%	$36.21	$48.10	32.84%
Pharmacy Technicians	$40.28	$44.95	11.58%	$42.71	$55.13	29.08%
Physical Therapists	$13.61	$13.74	0.92%	$17.74	$17.49	-1.42%
Respiratory Therapists	$33.39	$35.42	6.09%	$33.52	$37.84	12.90%
RNs	$23.20	$24.25	4.51%	$25.73	$30.91	20.13%
Speech-language Pathologists	$37.53	$39.59	5.49%	$34.75	$35.11	1.04%
Surgical Technologists	$19.46	$19.37	-0.44%	$22.26	$23.85	7.13%
Nonskilled Average	$11.72	$10.48	-10.60%	$12.50	$11.65	-6.78%

*Wages are adjusted to 2013 dollars using CPI Index.

Medical Patents

A patent is the intellectual right granted to an inventor or an organization for a new idea or improvement they have created. It is often seen as indicative of economic growth attributed to the positive effects of inventions and innovations and the investment opportunities resulting from the new ideas. The use of patents to assess the production of new information should be read with caution though because some entities choose to not register patents for their own protection. Registering a patent will require them to divulge details that they might not want their competitors to know. In addition, not all patents actually lead to a substantial impact in the economy's progress. Amidst diverse interpretation of the value of patents, they still reflect a significant contribution to the society and the economy in general. The medical field, being one of the frontiers in research and development, is one sector where the use of patents can be relevant.

Figure 1 shows the number of medical patents assigned to inventors in Kent County. A positive trend can be observed with the average number of patents increasing from 12.6 in the years 1990 to 1999, to 16.3 in the years 2000 to 2009, and a further increase to an average of 24.4 from January 2010 to September 2014. The steady progress of the innovative activities in the county is regarded as a high potential catalyst for entrepreneurship and emerging businesses in the community.

Figure 2 presents the number of medical patents assigned to corporations in Kent County. Similar to the trends in Figure 1, there has been a growth in the average number of patents per decade, increasing from 6.2 patents on average in the years 1990 to 1999, to 10.3 patents in the years 2000 to 2009, and to 14.6 patents in the years 2010 to September 2014. This finding is equivalent to an increase of 66.1 percent from the 1990s to 2000s, and an increase of 41.7 percent from the 2000s to 2010s. The growth in corporate patents in Kent County is seen as an indicator of economic progress as new discoveries and improvements possibly result in advancements in technology. Eventually, innovations could encourage investments and lead to regional job opportunities.
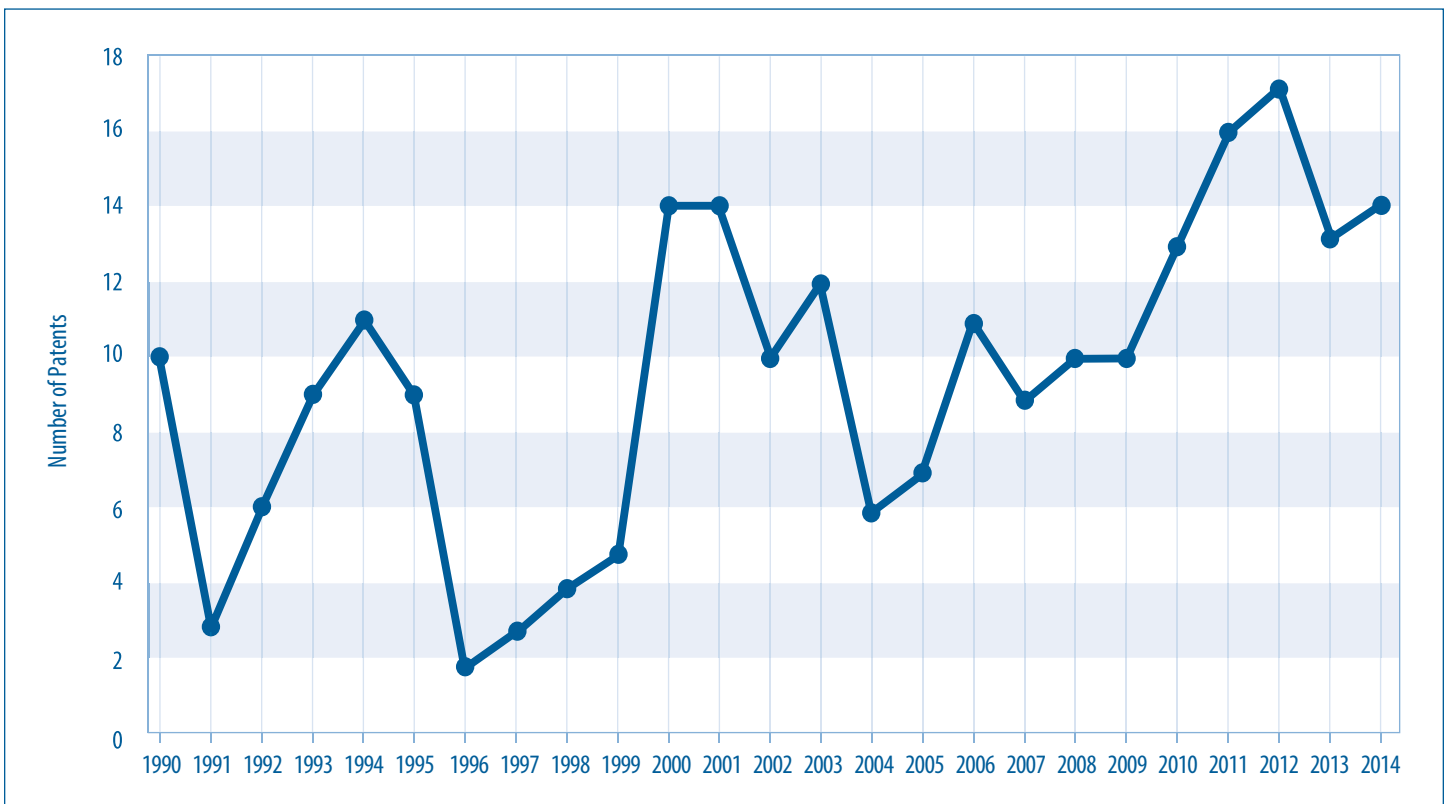
The number of medical patents, patent applications, and prepatents by corporations in the West Michigan region are shown in **Figure 3**. The data includes patents and patent applications to the U.S. Patent and Trademark Office (USPTO) and prepatents at the World Intellectual Property Office (WIPO) from the counties of Kent, Ottawa, Muskegon, and Allegan. Since the year 2000, there were 537 patents, patent applications, and prepatents from 33 corporations. The majority of the patents are led by six corporations contributing to 80 percent of the total number. After the period of 2000 to 2010, the patenting activity has continued in the succeeding years especially by the lead corporations. **Figure 3**, along with figures 1 and 2, consistently show that research and development are well in-place and sustained in the area, poising West Michigan for substantial opportunities ahead.

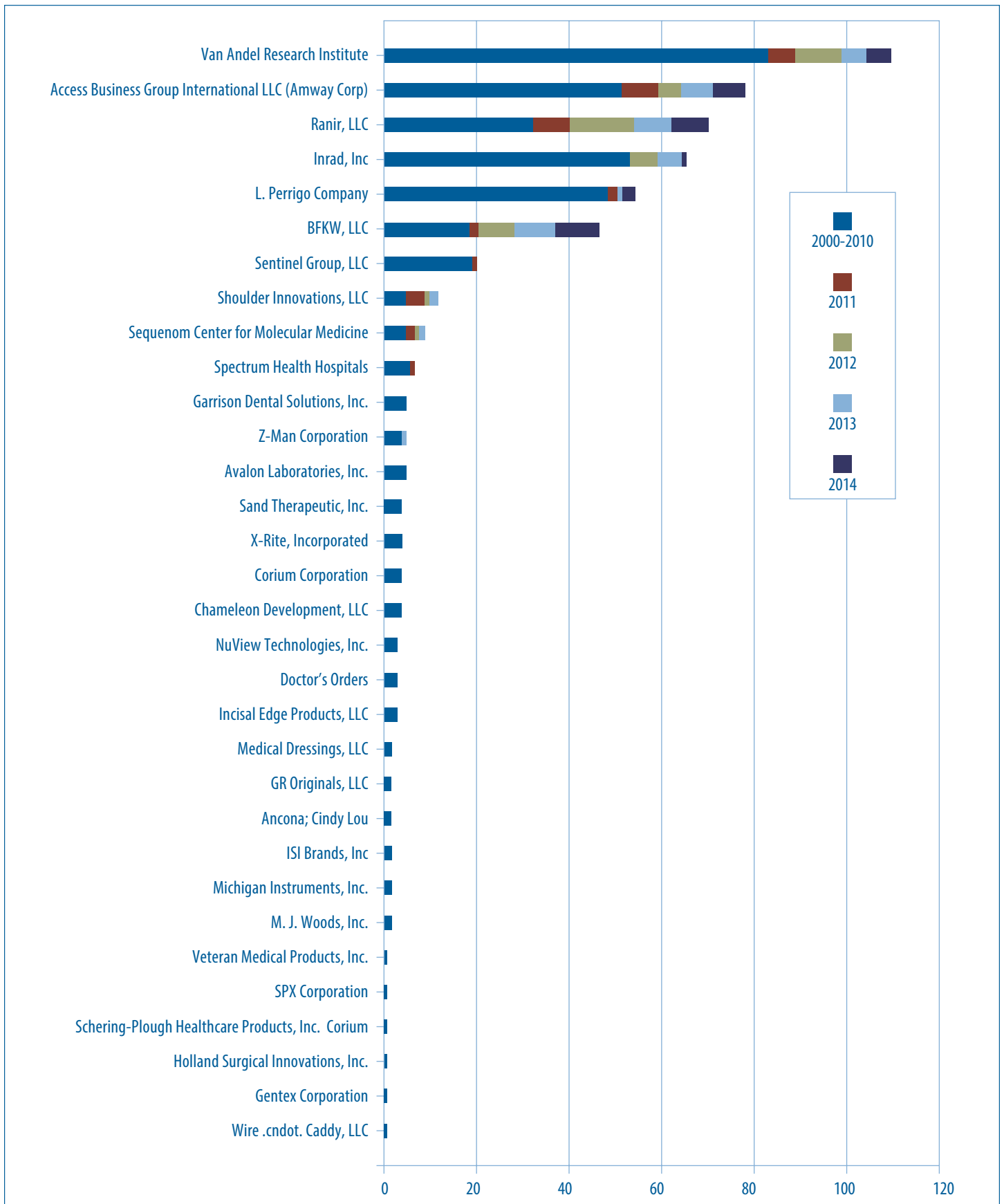**Figure 1: Medical Patents by Inventors Living in Kent County**

Source: United States Patent and Trademark Office
http://patft.uspto.gov/netahtml/PTO/search-adv.htm
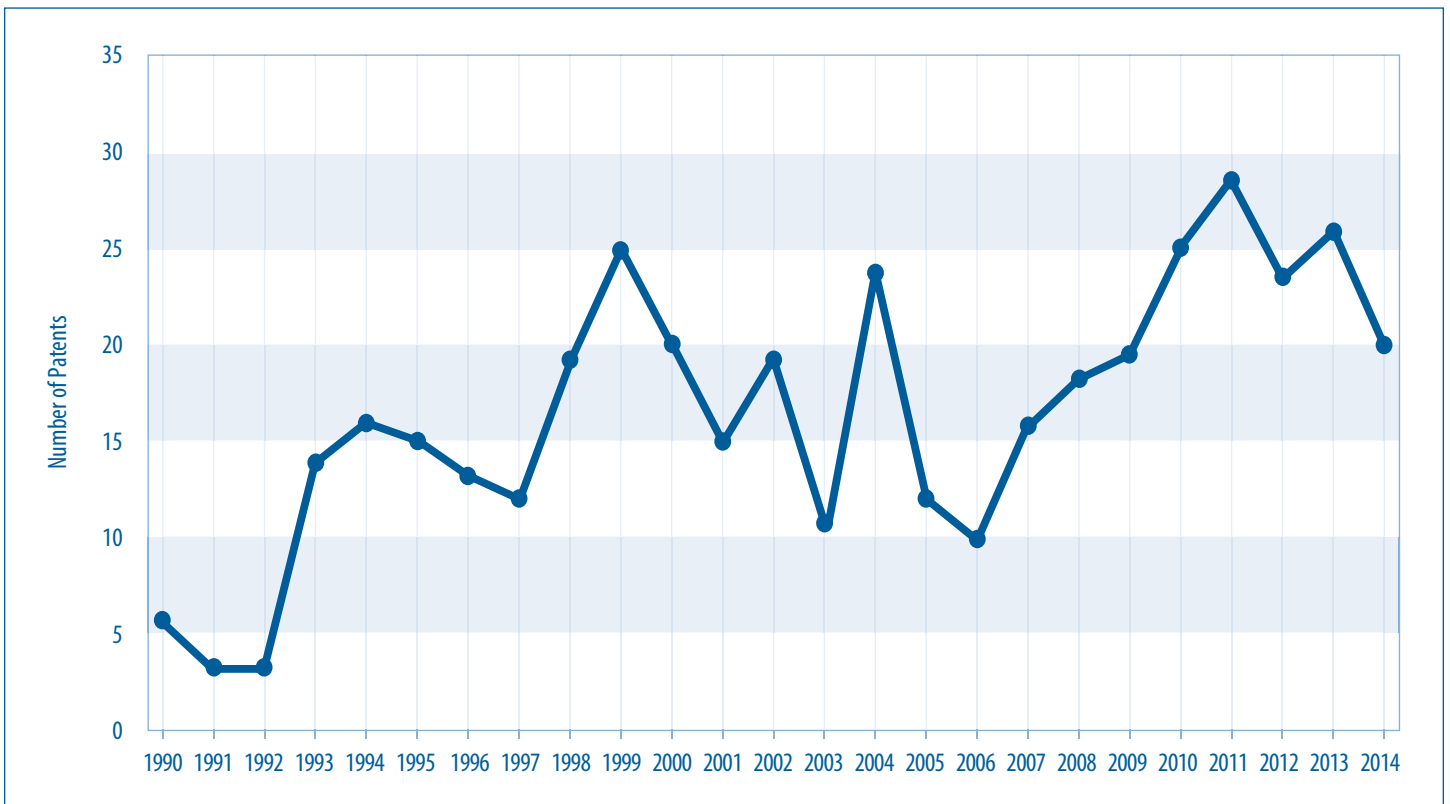
Figure 2: Medical Patents by Assignee in Kent County

Source: United States Patent and Trademark Office
http://patft.uspto.gov/netahtml/PTO/search-adv.htm

Figure 3: Medical Patents, Patent Applications, and Prepatents in the KOMA Region*

Legend:
- 2000-2010
- 2011
- 2012
- 2013
- 2014

Companies (top to bottom):
- Van Andel Research Institute
- Access Business Group International LLC (Amway Corp)
- Ranir, LLC
- Inrad, Inc
- L. Perrigo Company
- BFKW, LLC
- Sentinel Group, LLC
- Shoulder Innovations, LLC
- Sequenom Center for Molecular Medicine
- Spectrum Health Hospitals
- Garrison Dental Solutions, Inc.
- Z-Man Corporation
- Avalon Laboratories, Inc.
- Sand Therapeutic, Inc.
- X-Rite, Incorporated
- Corium Corporation
- Chameleon Development, LLC
- NuView Technologies, Inc.
- Doctor's Orders
- Incisal Edge Products, LLC
- Medical Dressings, LLC
- GR Originals, LLC
- Ancona; Cindy Lou
- ISI Brands, Inc
- Michigan Instruments, Inc.
- M. J. Woods, Inc.
- Veteran Medical Products, Inc.
- SPX Corporation
- Schering-Plough Healthcare Products, Inc. Corium
- Holland Surgical Innovations, Inc.
- Gentex Corporation
- Wire .cndot. Caddy, LLC

X-axis: 0, 20, 40, 60, 80, 100, 120

*Includes patents since 1990 for companies that have actively patented since 2000.
Sources:
http://patft.uspto.gov/netahtml/PTO/search-adv.htm
www.wipo.int/pctdb/en

Health Care Trends

GRAND VALLEY
STATE UNIVERSITY

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Demographic Changes

Long-term population and age distribution changes have significant effects on the consumption of health care resources. Since older populations require more extensive care than younger populations, an aging demographic can result in increased health care utilization and expenditures. Additionally, geographic shifts in population distribution can affect demand for care and resource allocation in particular localities.

Population Growth

Figure 1 displays population growth rates for KOMA, the Detroit region, the entire state of Michigan, and the U.S. as a whole. Throughout the 1990s, KOMA's population growth exceeded both the growth rate for the state of Michigan and the growth rate for the U.S. However, Michigan was particularly hard-hit by the recession in the early 2000s and growth rates for both KOMA and the Detroit region fell precipitously. Though KOMA was able to maintain positive population growth throughout the 2000s, the Detroit region experienced a population loss beginning in the early 2000s that lasted for more than a decade. KOMA's population growth began escalating again in 2010 and has once again surpassed the national growth rate. Importantly, these trends indicate a geographic shift in the population distribution in Michigan from the east to the west. If this trend continues, demand for health care resources could be affected. For example, while the share of total state Medicare expenditures fell for both KOMA and the Detroit region from 2008 to 2013, the decline was more than 10 times larger for the Detroit region.

Age Distribution

An important development in demographic trends in the U.S. over the next several years will be the aging of the baby boomers, those born between 1946 and 1964. **Figures 2 through 4** depict population distributions by age for KOMA, the Detroit region, and the U.S. A clear trend in all three figures is the steady aging of the population. While only the third most populous age group in 1990, there are now more people between the ages of 45 and 64 than any other age group. Additionally, since 2010, the percentage of the population over the age of 65 has experienced the largest growth of any of the age categories. Due to the aging of the population and the growth in the percentage of those over the age of 45, the population between the ages of 5 and 19, 20 and 34, and 35 and 44 all account for a smaller percentage of the total population today than they did in 1990. These trends are important for a number of reasons.

First, health care expenditures are closely related to age. More than 50 percent of lifetime spending on medical care occurs after the age of 65. Due to the demographic shift apparent in Figures 2 through 4, the Centers for Medicare and Medicaid Services project total Medicare spending to nearly double between 2013 and 2022. This change will be especially salient for the Detroit region which, compared to the national average, has a higher proportion of its population in the 45 to 64 and 65 and over age categories.

By contrast, KOMA is in a more favorable position with a population distribution that is slightly younger than the U.S. as a whole. However, increasing medical expenditures associated with an aging population are likely to be a challenge across the entire state.

Second, all three figures indicate that the share of those over the age of 65 has already or likely will soon eclipse the share of those in the prime working ages of 35 to 44. Since Medicare is primarily funded through taxes on employment, participants in the labor market effectively subsidize health insurance for the elderly. The number of workers per Medicare beneficiary has fallen steadily since 1965. Whereas in 2000, four workers supported each Medicare enrollee, the number of workers per beneficiary is projected to fall to 2.8 by 2020. The implications for the long-term sustainability of the Medicare Part A trust fund are grim, despite recent declines in Medicare expenditure growth rate projections.

Finally, the aging of the population has important implications for employer-sponsored health insurance. As the share of the workforce over the age of 45 grows, the cost of private health insurance obtained through employment will likely continue to increase. From 2003 to 2013, average annual employer-sponsored health insurance premiums for family coverage increased 80 percent, from $9,068 to $16,351. Gains from a steady reduction in the growth rate of health care expenditures since the early 2000s, due in part to reduced income growth and a shift toward high-deductible health insurance plans, are likely to be at least partially offset by this shift in the age distribution of workers.

References

Alemayehu, B. and K.E. Warner, 2004. The lifetime distribution of health care costs. *Health Services Research*, 39(3): 627-642.

Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. *2012 annual report*. Retrieved September 6, 2014 from https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/ReportsTrustFunds/downloads/tr2012.pdf

Centers for Medicare and Medicaid Services. *Medicare geographic variation public use files*. Retrieved September 6, 2014 from http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Geographic-Variation/GV_PUF.html

Centers for Medicare and Medicaid Services. *National health expenditure data*. Retrieved September 6, 2014 from http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html

Kaiser Family Foundation. *2013 employer health benefits survey*. Retrieved September 6, 2014 from http://kff.org/report-section/2013-summary-of-findings/

Figure 1: Annual Population Growth Rate 1991–2013

Legend: U.S. — Michigan — KOMA — Detroit Region

Y-axis: Population Growth Rate (in percentages), from -10 to 20

X-axis: 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
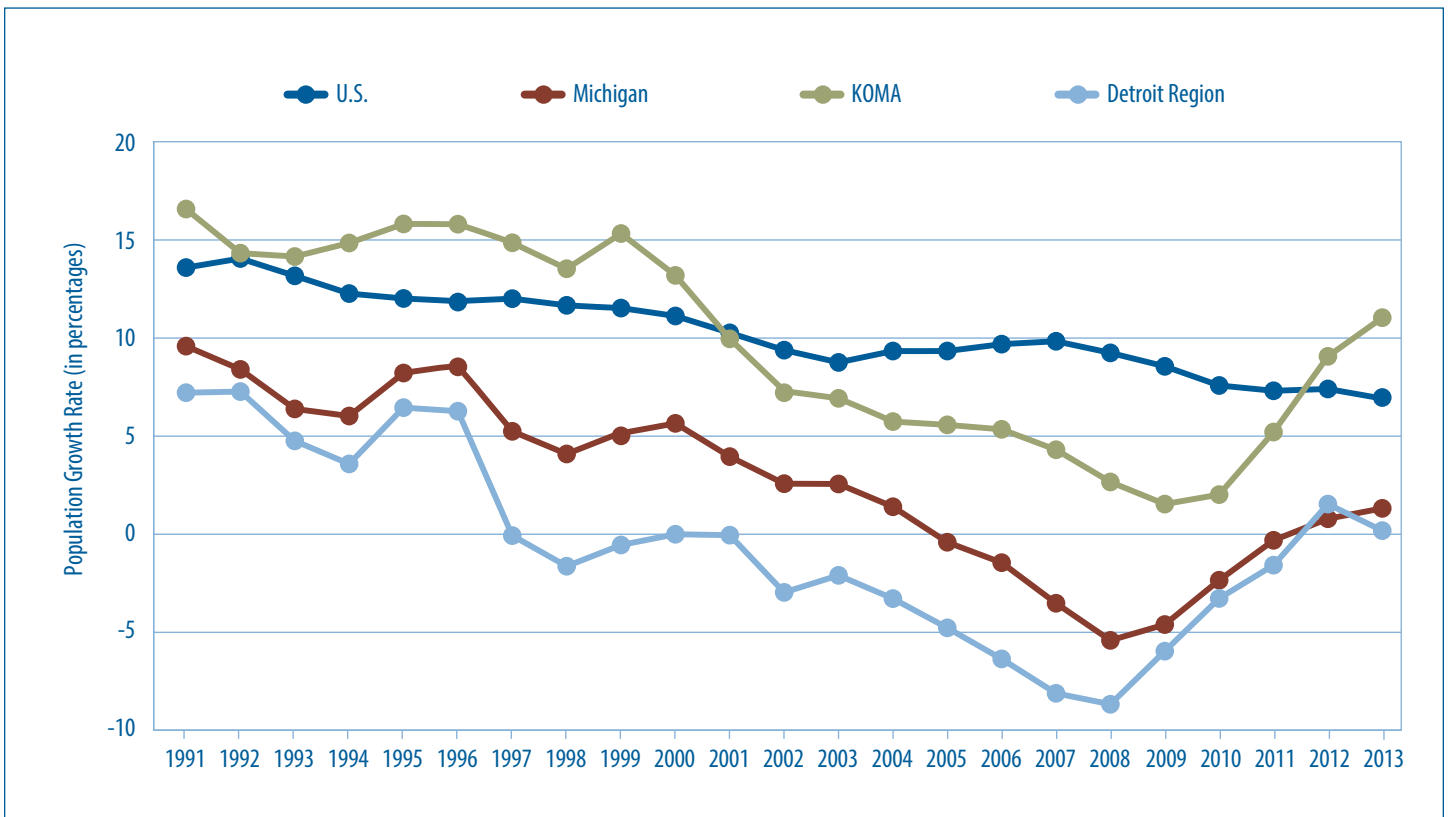
Figure 2: Population Distribution as a Percent of KOMA

Age Groups

Legend: 5–19 — 20–34 — 35–44 — 45–64 — 65 and over

Y-axis: Percent of Population, from 0 to 30

X-axis: 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
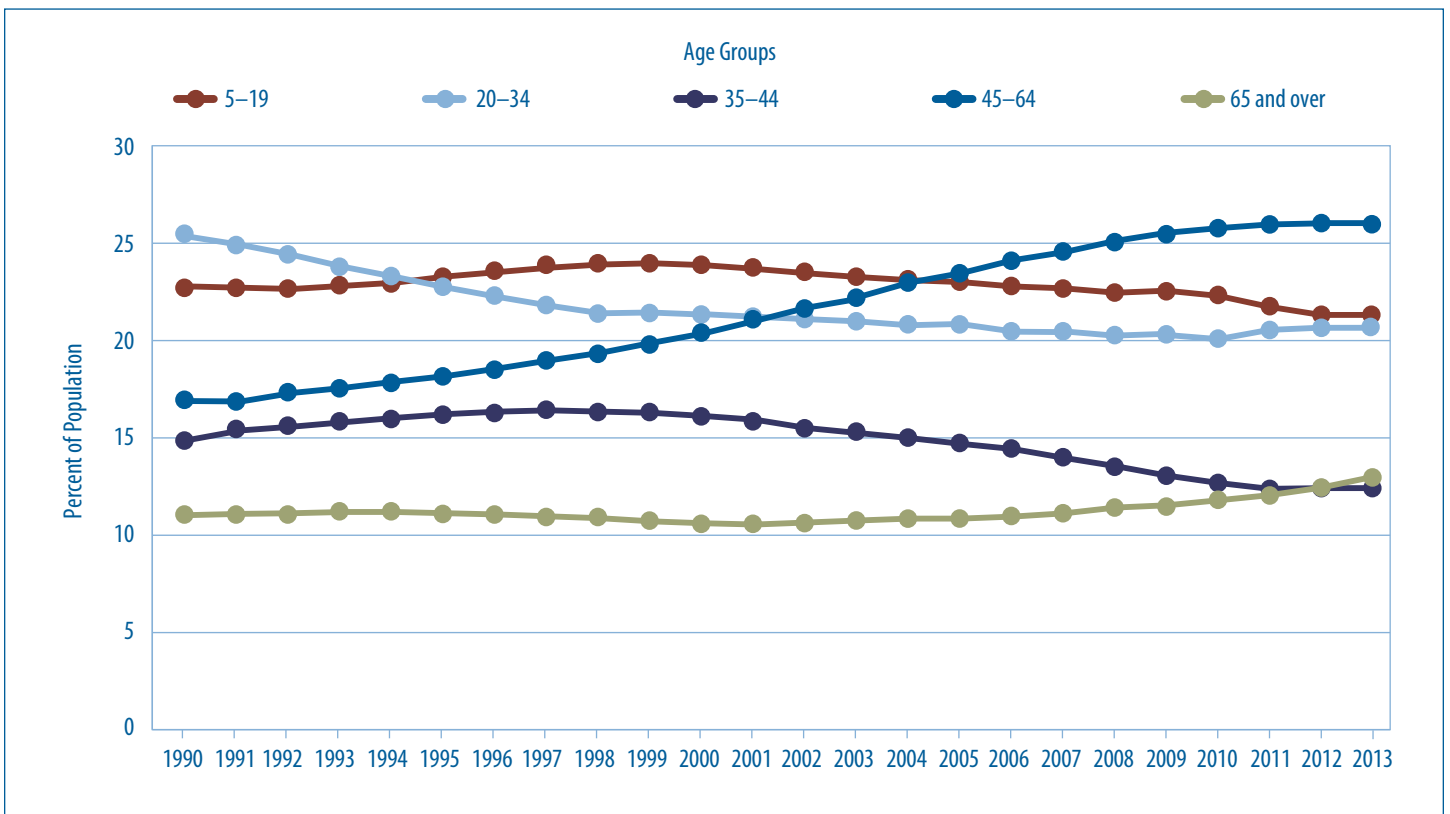
Figure 3: Population Distribution as a Percent of the Detroit Region

Age Groups
- 5–19
- 20–34
- 35–44
- 45–64
- 65 and over

Percent of Population
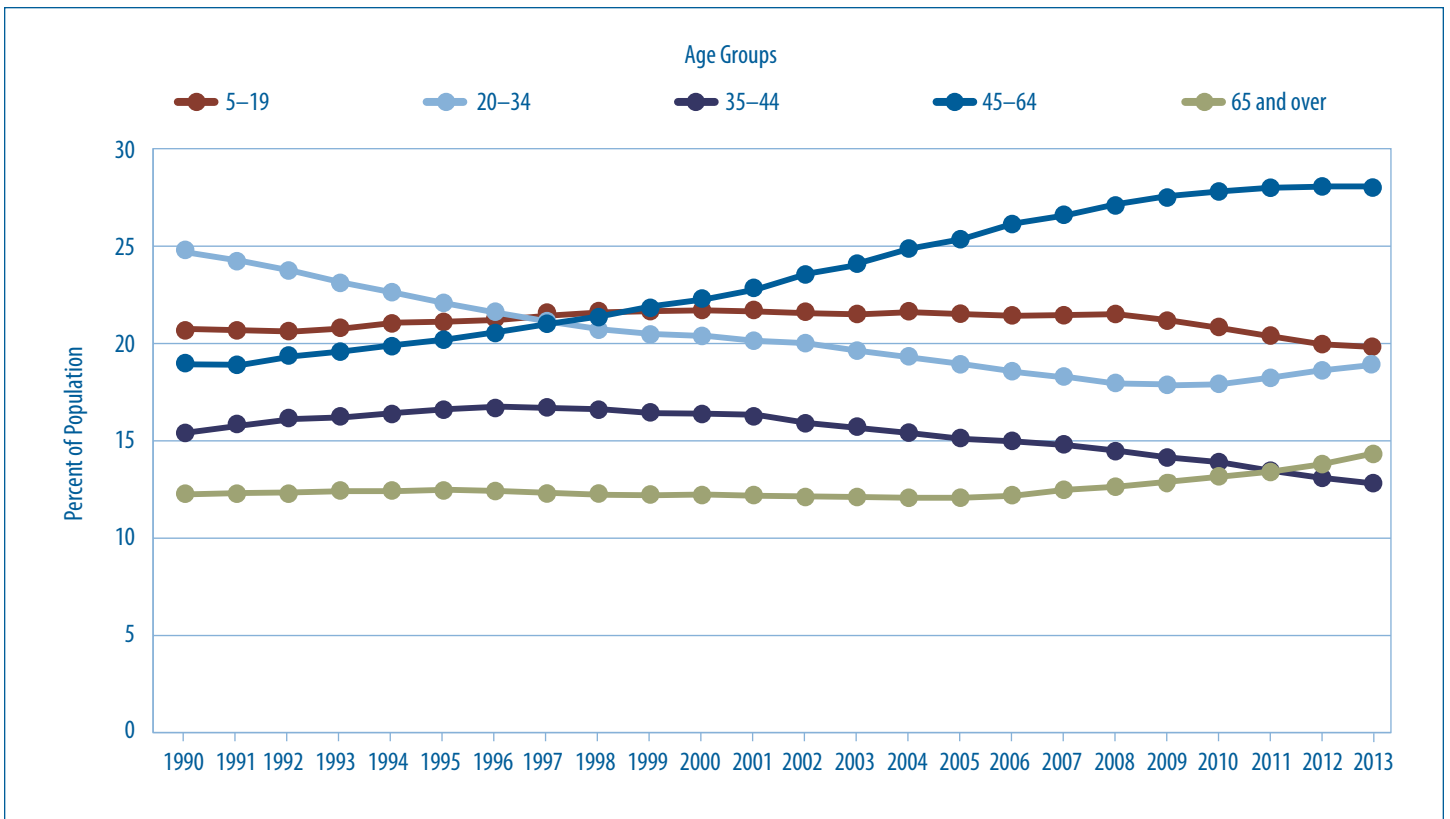
Figure 4: Population Distribution as a Percent of Total United States

Age Groups
- 5–19
- 20–34
- 35–44
- 45–64
- 65 and over

Percent of Population
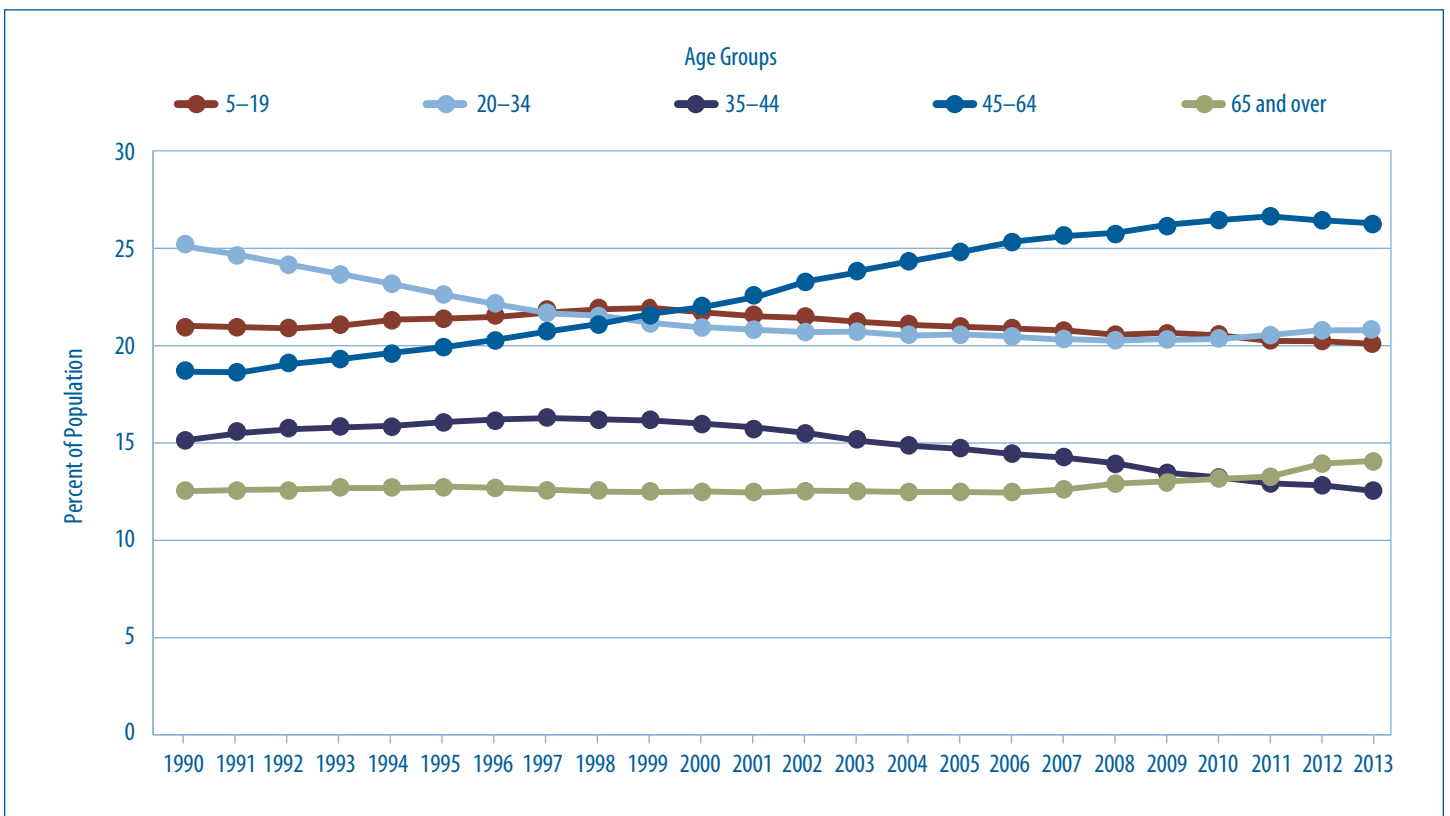
Health Care Overview

In this section, we consider how major risk factors and access to care can influence major diseases and general health outcomes. This overview is explained by the process model depicted on the following page. For each variable, we compare West Michigan (Allegan, Barry, Ionia, Kent, Lake, Mason, Mecosta, Montcalm, Muskegon, Newaygo, Oceana, Osceola, and Ottawa counties) with the Detroit region (Macomb, Oakland, and Wayne counties) and examine how the trend is changing over time. This kind of benchmarking and trend analysis gives us a relative picture that evolves over time. This year, we include an update of each variable based on 2013 data. A caveat about this data: It is based on self-reported surveys. Consequently, the actual incidence might be different.

This is a change from previous Health Check publications because the data collected by the Center for Disease Control (CDC) and analyzed by the Michigan Department of Community Health was handled differently after 2012. Therefore, even though we created consistent geographic areas for all years, the data prior to 2011 is still not comparable statistically to 2013. In addition, all data is not comparable to previous Health Check publications because the geographic regions are different.

Risk Factors

The following major risk factors contribute to unhealthy outcomes: heavy drinking, binge drinking, smoking, inadequate physical activity, and obesity. The latest 2013 data on drinking continues to raise concern: West Michigan is worse than the Detroit region in heavy drinking and marginally below it in terms of the percentage of binge drinkers in the most recent year reported. A comparison of data over time reveals a much larger increase in the percentage of binge drinkers in the Detroit region (3.5 percent) and West Michigan (2 percent) compared to the percentage of heavy drinkers, which increased marginally by 0.4 percent and 0.9 percent in the two regions over the eight-year reporting window, 2005–2013.

In contrast to the Detroit region, which saw a marginal increase of 0.5 percent in current smokers, in West Michigan the numbers dropped by 1.4 percent in the 2005–2013 period. Currently about 20 percent of West Michigan residents smoke.

The percentage of persons who indulge in no leisure time physical activity, although consistently lower in West Michigan compared to the Detroit region, has shown a larger jump of 2.4 percent in the region over the Detroit region's smaller 1.5 percent increase since 2005. Approximately 25 percent of the Detroit region's residents indulge in no physical activity compared to 23 percent of West Michigan residents in the most recent reporting period.

Although the Detroit region performed better than West Michigan on the proportion of overweight residents until 2012, in the last reported year, the region's performance dropped by 2.5 percent on this measure, consequently raising its current overweight population to par with West Michigan's 35.5 percent. While the percentages have increased in both regions for adults who are obese, obesity increased by 5.4 percent in the Detroit region compared to 7.8 percent in West Michigan since 2005. The small decrease in the overweight population in West Michigan perhaps is a reflection of more people being classified as obese over time. Given the linkages between obesity and diabetes, high blood pressure, heart disease, and cancer, obesity is becoming a major issue for the state and the nation. Presently about 32.8 percent of the West Michigan population is obese (BMI greater than or equal to 30). As the West Michigan population continues to age, obesity is likely to continue as a major challenge for us.

Access to affordable health care is a major issue for the nation. For the period just prior to the rollout of the Affordable Care Act Coverage Provisions, 2005–2013, both regions showed increases in the number of people with no health care coverage. The percent of people with no health care coverage increased by 5.9 percent amongst both Detroit and West Michigan region residents. Almost 17 percent of the West Michigan population has no health care coverage. This is one of the byproducts of a weak economy combined with an increase in poverty rates since 2000. There are likely to be significant changes in access to health care with the implementation of the Affordable Care Act.

Disease Incidence

Next, we consider two diseases: diabetes and asthma. The latest figures indicate that the incidence of diabetes has increased more rapidly in the Detroit region (2.1 percent) compared to West Michigan (1 percent) since 2005. Approximately 9 percent of the West Michigan population has diabetes. These numbers seem to track closely with the trends in the overweight population. Lowering the incidence and better management of this chronic disease can decrease costs significantly.

West Michigan does better than the Detroit region with regard to asthma rates. It also ranks below it in terms of the increase in the prevalence of the disease since 2005. While the prevalence of asthma increased by 2.7 percent in West Michigan, the increase in Detroit was 3.8 percent in the seven year period examined. The overall picture for West Michigan with regard to the incidence of diabetes and asthma is beginning to improve.
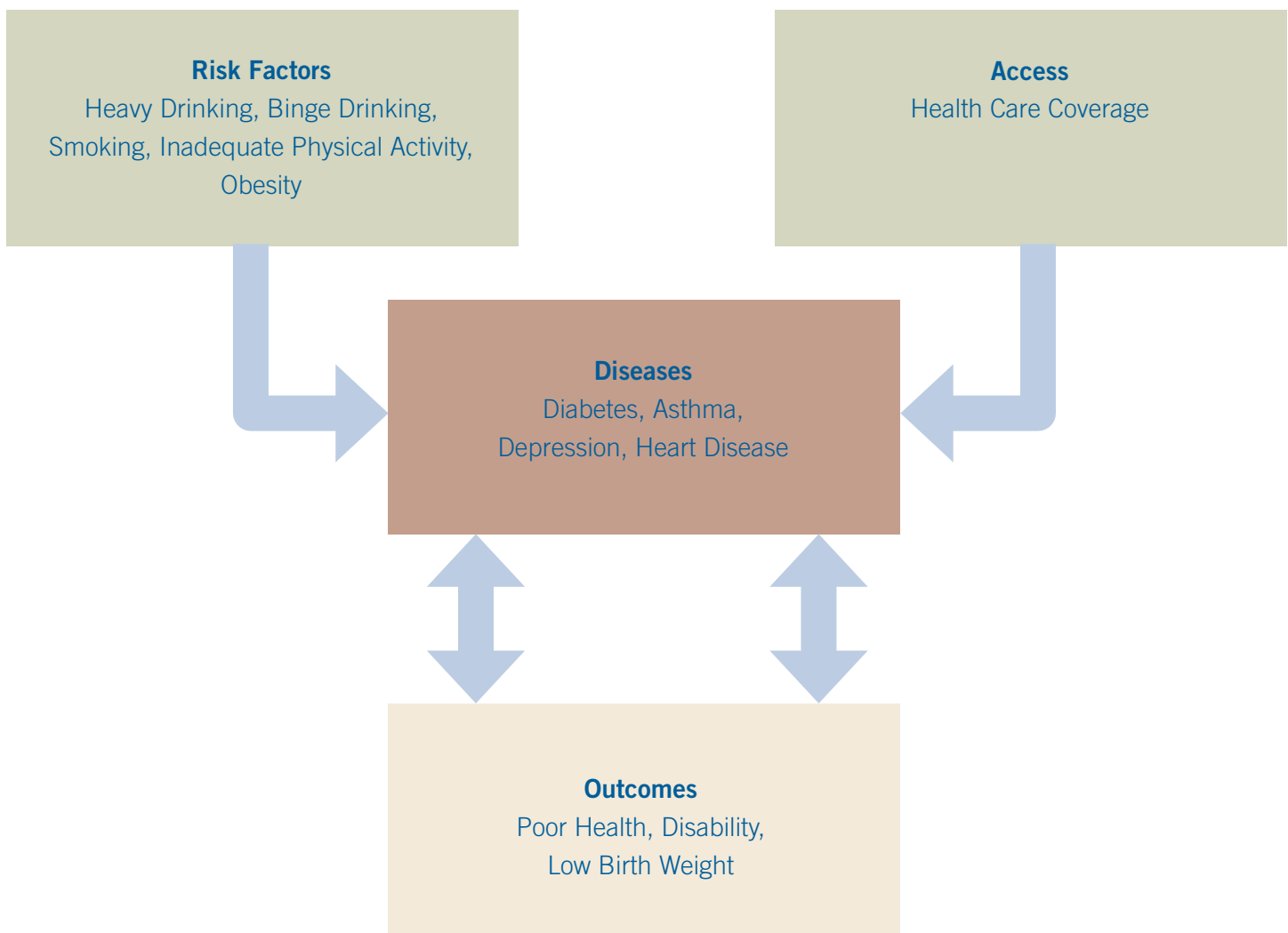
Health Outcomes

To measure health outcomes, two issues are considered: overall health status and low birth weight. In overall reported health status, West Michigan is better than the Detroit region. Although the proportion of population reporting their health to be in either fair or poor condition has trended up in both regions, West Michigan registered a smaller jump of 3 percent compared to the Detroit region where the findings rose by 4.2 percent over the 2005–2013 period.

The incidence of low birth weight (LBW) babies continues to be an important health indicator. Babies born weighing less than 2,500 grams are one of the major drivers of health care utilization. Estimates by the Institute of Medicine (July 13, 2006. *Pre-term birth: Causes, consequences, and prevention*) propose that

$26.2 billion is spent annually on hospital expenditure of preterm infants. Other estimates put the cost of care of preterm infants at 15 times the expense of full-term infants and rising. This recent estimate does not include rehospitalizations and long-term care; consequently, ultimate lifetime expenditures attributable to low birth weight would be substantially higher. Slightly more than 7 percent of babies are LBW in recent reporting. This percentage has been relatively constant across time in both West Michigan and the Detroit region. West Michigan's incidence of low weight births was two percentage points lower than Detroit's in 2013. Reducing this percentage significantly can result in substantial reduction in health care services and costs. Public policy needs to devote more attention to this major issue.

Health Care Overview Process Model

Risk Factors
Heavy Drinking, Binge Drinking, Smoking, Inadequate Physical Activity, Obesity

Access
Health Care Coverage

Diseases
Diabetes, Asthma, Depression, Heart Disease

Outcomes
Poor Health, Disability, Low Birth Weight

RISK FACTOR: HEAVY DRINKING

Definition: Among all adults, the proportion who reported consuming an average of more than two alcoholic drinks per day for men or more than one per day for women.

How is West Michigan doing?
- The only year West Michigan's percentage was LOWER than the percentage for Detroit was in 2008.
- After holding steady at about 5.7 percent, West Michigan's percentage has become progressively WORSE since 2010.

Figure 1: Heavy Drinking
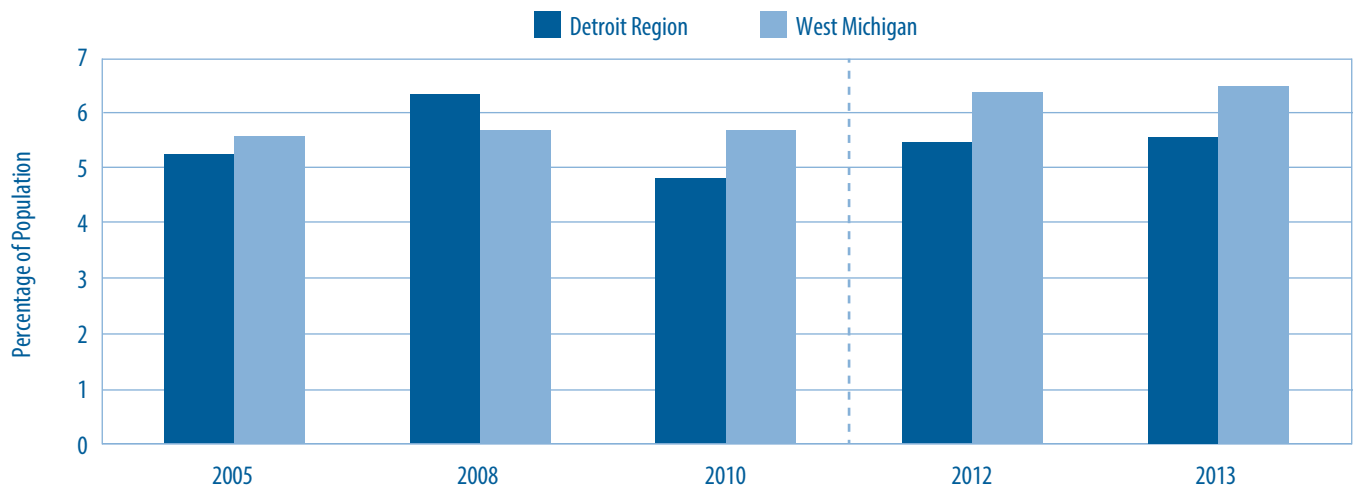
RISK FACTOR: BINGE DRINKING

Definition: Among all adults, the proportion who reported consuming five or more drinks per occasion (for men) or four or more drinks per occasion (for women) at least once in the previous month.

How is West Michigan doing?
- West Michigan and Southeast Michigan have consistently moved in the same direction since 2005, going up or down at the same time.
- After a drop in the proportion of adults binge drinking in 2010, the numbers for both West Michigan and the Detroit region became WORSE in 2012.
- Both regions show a slight drop in 2013, with West Michigan performing slightly BETTER than the Detroit region.

Figure 2: Binge Drinking
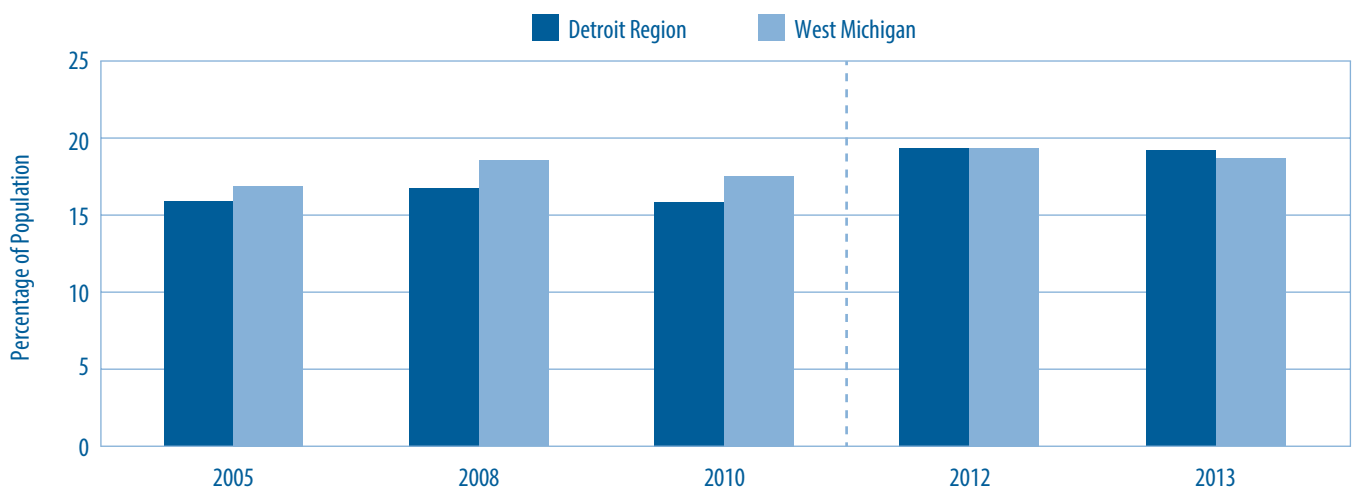
RISK FACTOR: CURRENT SMOKERS

Definition: Among all adults, the proportion who reported that they had ever smoked at least 100 cigarettes (five packs) in their life and that they smoke cigarettes now, either every day or some days.

How is West Michigan doing?
• Although both regions showed a drop in the percentage of current smokers in 2010, the percentage in each region has since increased. However, West Michigan's proportion of smoking has been LOWER than the Detroit region's since 2010.

Figure 3: Current Smokers
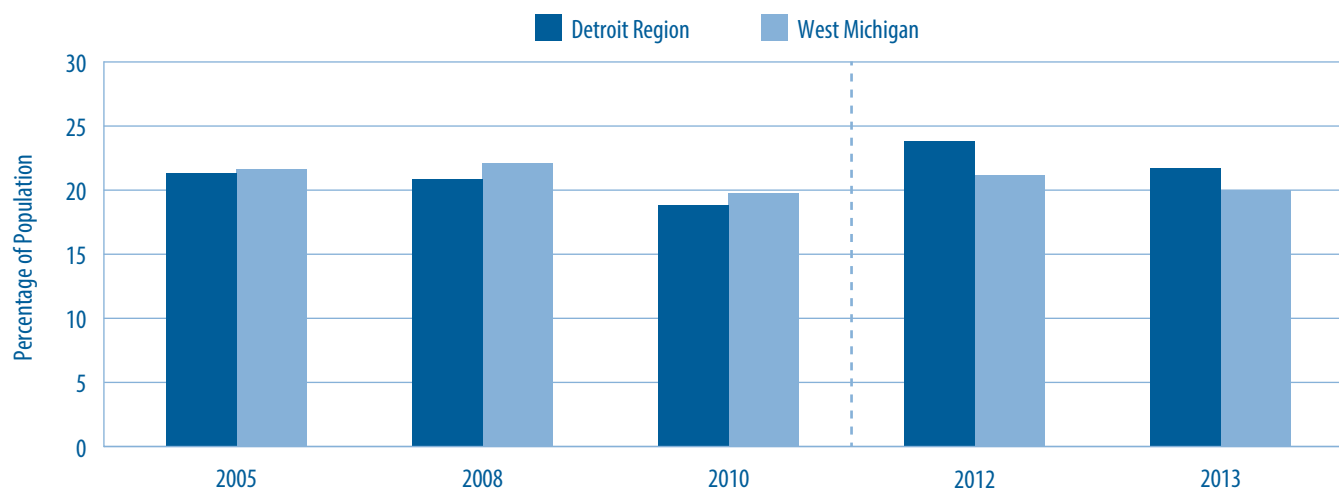
RISK FACTOR: INADEQUATE PHYSICAL ACTIVITY

Definition: Among all adults, the proportion who reported not participating in any leisure-time physical activities or exercise such as running, calisthenics, golf, gardening, or walking during the past month.

How is West Michigan doing?
• West Michigan has consistently performed BETTER than the Detroit region.
• A greater percentage of West Michigan's population participates in leisure time physical activity than the population of the Detroit region.
• However, leisure time activity of West Michigan's residents has dropped by 2.4 percent in the last year.

Figure 4: No Leisure-Time Physical Activity
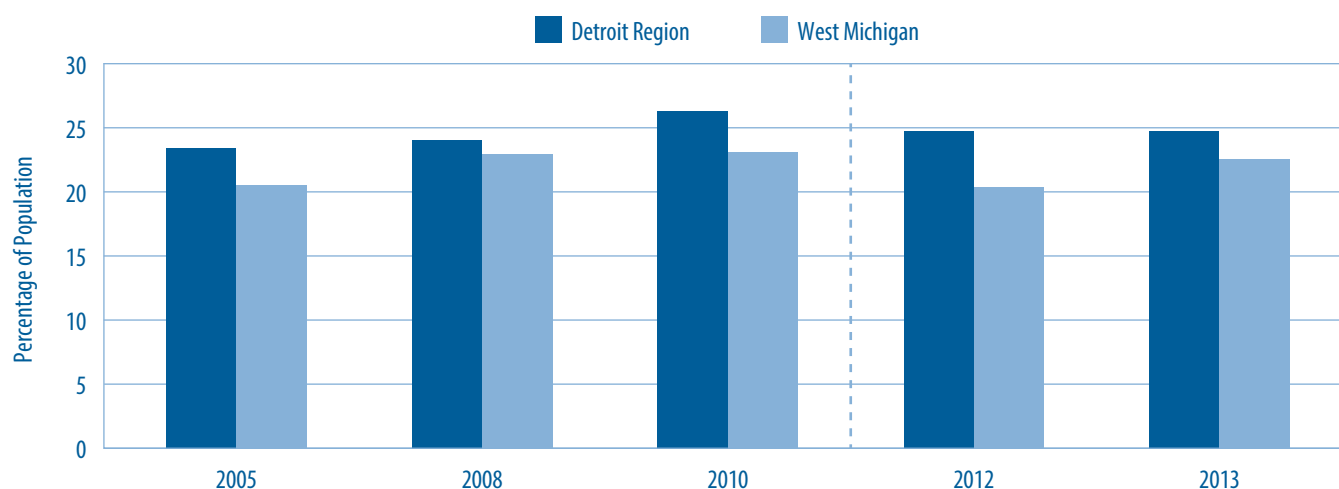
RISK FACTOR: OVERWEIGHT

Definition: Among all adults, the proportion of respondents whose Body Mass Index (BMI) was greater than or equal to 25 but less than 30.

How is West Michigan doing?
- After faring consistently WORSE than the Detroit region, the proportion of the overweight population in West Michigan fell by 1 percent in 2013 and is currently at par with the Detroit region.
- The proportion of overweight population in the Detroit region after consistently trending downward since 2005, increased by 2.5 percent in the last year reported

Figure 5: Overweight
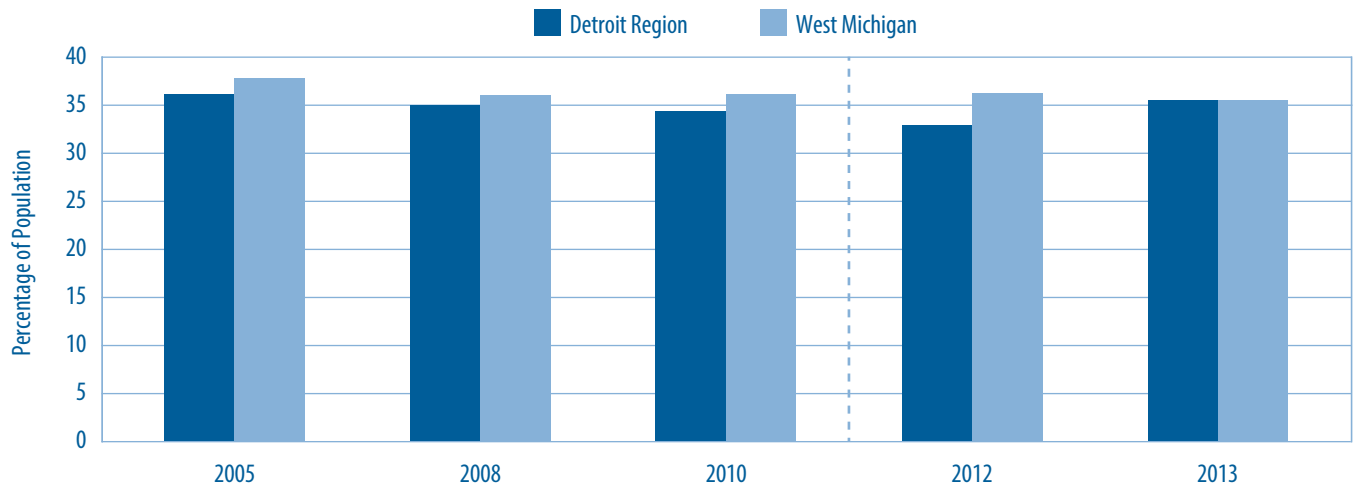
RISK FACTOR: PREVALENCE OF OBESITY

Definition: Among all adults, the proportion of respondents whose Body Mass Index (BMI) was greater than or equal to 30.

How is West Michigan doing?
- After faring BETTER than the Detroit region since 2005, the percentage of West Michigan's obese population increased by 5.5 percent in the 2012-2013 period.
- The Detroit region, after consistently trending upward since 2005, fared BETTER than West Michigan and the obesity percentage dropped by 1.3 percent in the 2012-2013 period.

Figure 6: Prevalence of Obesity
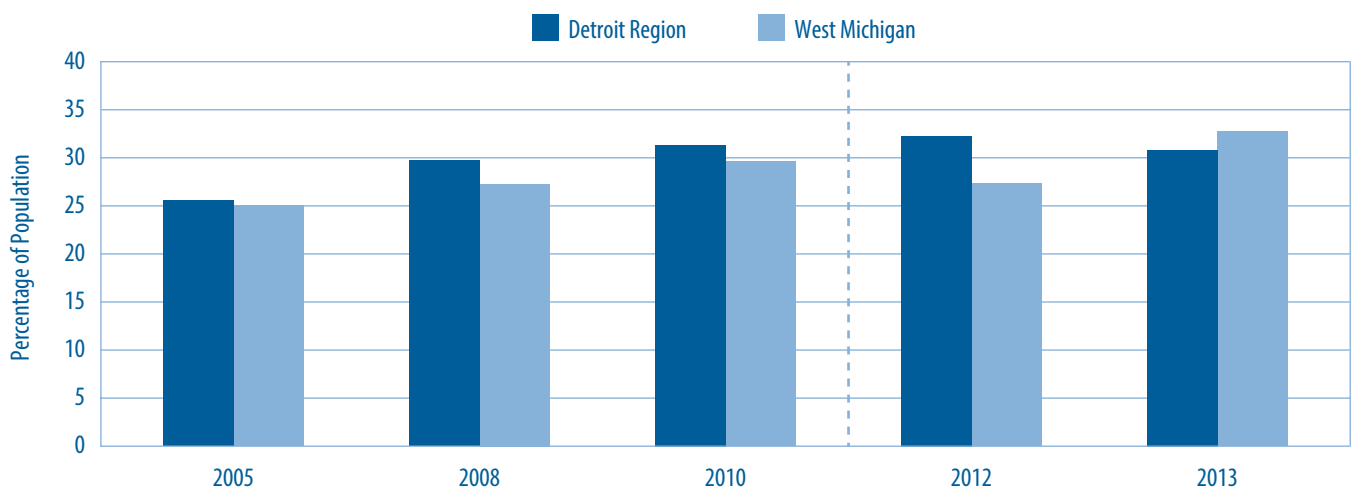
ACCESS: NO HEALTH CARE

Definition: Among adults aged 18–64 years, the proportion who reported having no health care coverage, including health insurance, prepaid plans such as HMOs, or government plans, such as Medicare.

How is West Michigan doing?
- West Michigan is doing BETTER than the Detroit region.
- While the proportion of adults with no health coverage has continuously risen in the Detroit region, the number for West Michigan after showing an encouraging drop in 2012 has gone up by approximately 3 percent in the last one year reported.

Figure 7: No Health Care Coverage
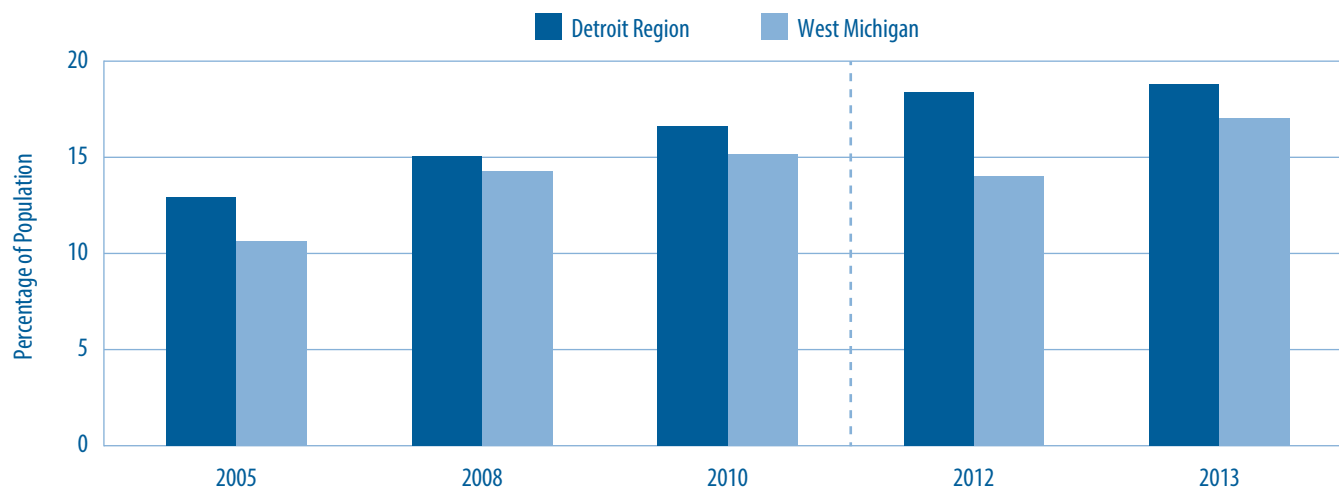
DISEASE: DIABETES

Definition: Among all adults, the proportion who reported that they were ever told by a doctor that they had diabetes. Adults told they have prediabetes and women who had diabetes only during pregnancy were classified as not having been diagnosed.

How is West Michigan doing?
- Overall, West Michigan has done BETTER than the Detroit region in most time periods.
- After an increase in the prevalence of diabetes over time in West Michigan, the latest numbers reveal a 1.4 percent improvement in the region.
- Numbers for the Detroit region improved marginally by approximately 0.6 percent over the last three years reported.

Figure 8: Prevalence of Diabetes
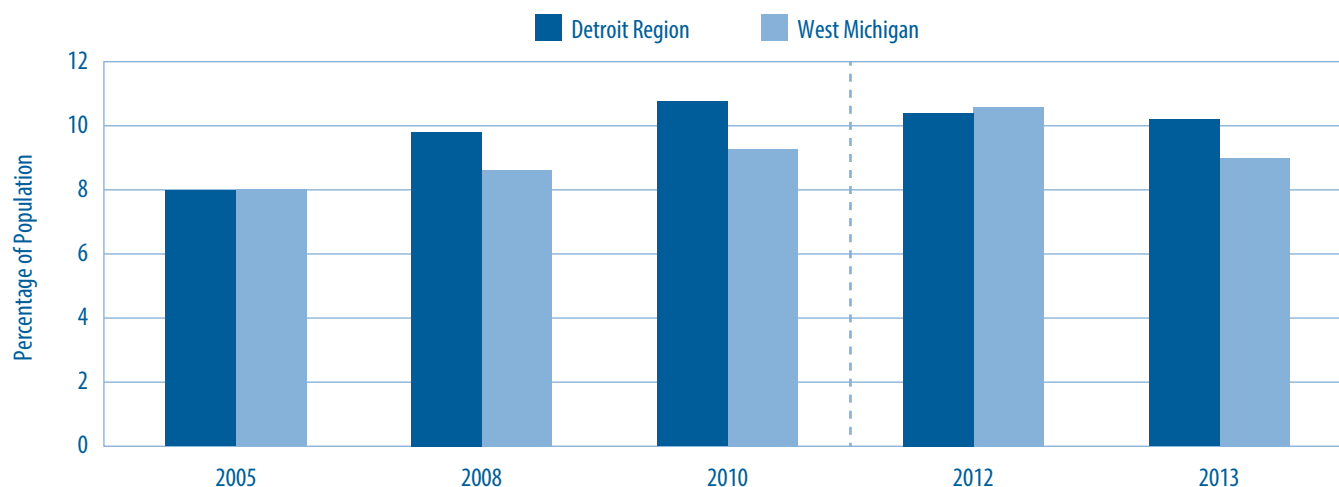
DISEASE: ASTHMA

Definition: Among all adults, the proportion who reported that they were ever told by a doctor, nurse, or other health care professional that they had asthma.

How is West Michigan doing?
- West Michigan is doing BETTER than the Detroit region.
- The prevalence of people diagnosed with asthma, after increasing over time in West Michigan, showed a marginal drop of 0.3 percent in the last one year reported.
- The numbers for Detroit, with the exception of a marginal drop in 2012, have continuously trended upward.

Figure 9: Prevalence of Lifetime Asthma
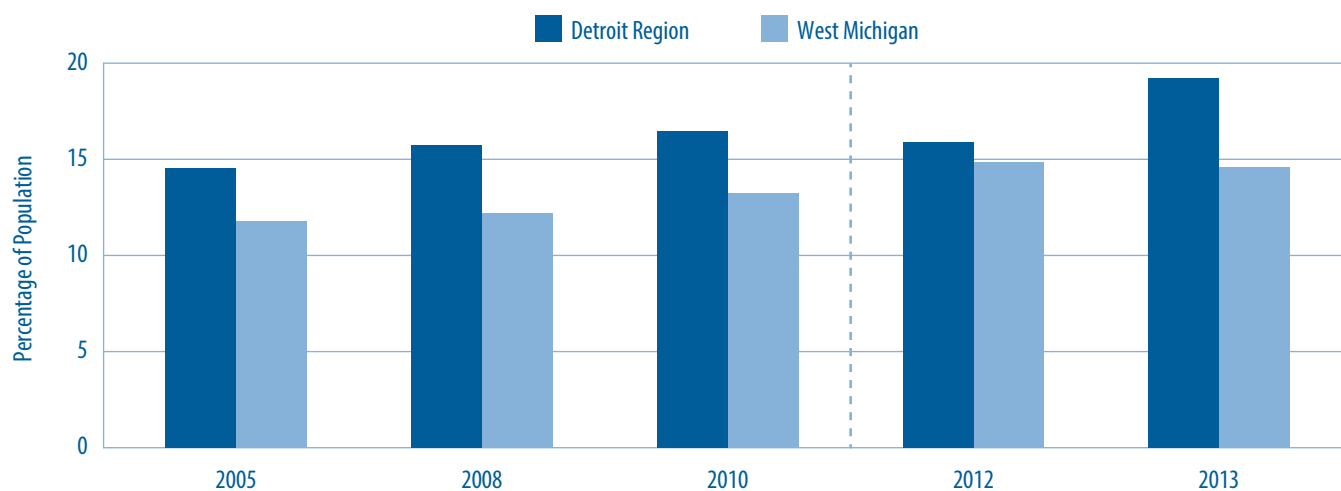
OUTCOME: FAIR OR POOR HEALTH

Definition: Among all adults, the proportion who reported that their health, in general, was either fair or poor.

How is West Michigan doing?
- West Michigan is BETTER than the Detroit region.
- Both West Michigan and the Detroit region are trending upward since 2010.

### Figure 10: Health Status — Fair or Poor Health
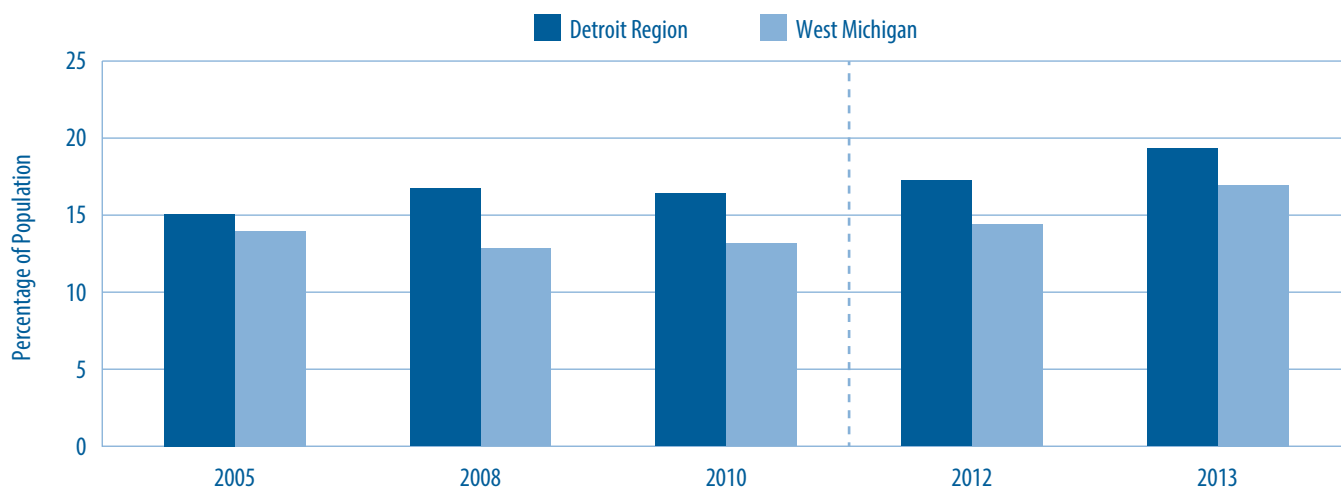
OUTCOME: LOW BIRTH WEIGHT

Definition: Babies born weighing less than 2,500 grams, represented as a percentage of total births. The data is not self-reported and represents actual incidences of low birth weight.

How is West Michigan doing?
- West Michigan is BETTER than the Detroit region.
- After holding almost steady for more than 10 years, while the numbers for the Detroit region improved in 2011, they are becoming slightly WORSE for West Michigan.

Figure 11: Low Birth Weight
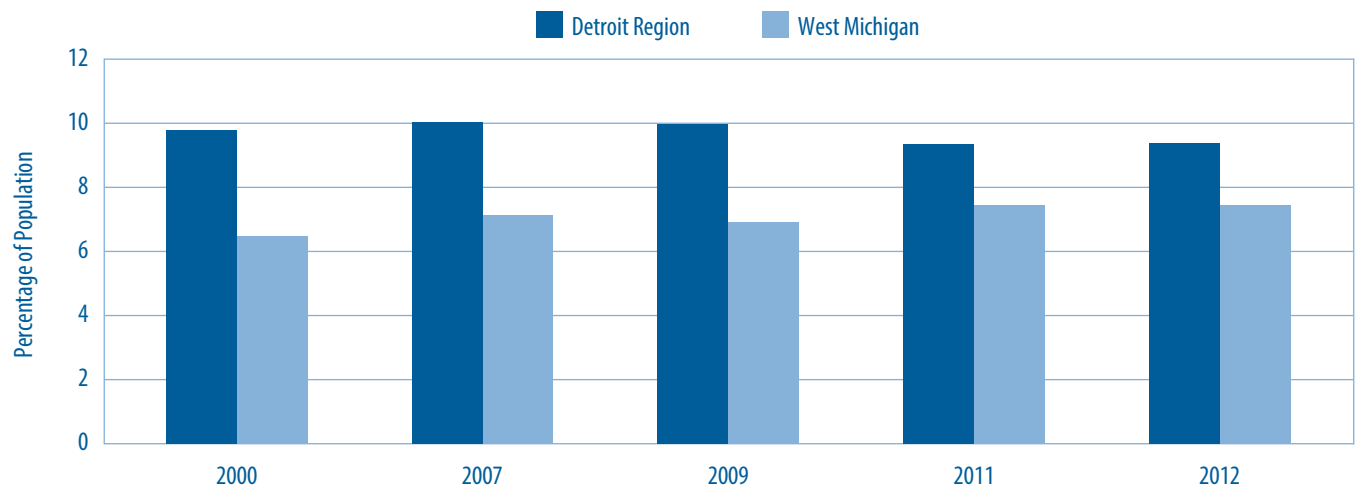
Note — All Graphs

Data prior to 2011 is not comparable statistically to 2012. All data is not comparable to previous Health Check publications because the geographic regions are different.

Sources — All Graphs

BRFSS Data Source: http://www.michigan.gov/mdch/0,4612,7-132-2945_5104_5279_39424_39427-134707--,00.html
County Population Source: http://www.census.gov/popest/data/counties/totals/2004/CO-EST2004-01.html
Low Birth Rate Source: http://www.cdc.gov/pednss/pednss_tables/pdf/national_table2.pdf

Women's Health

Research has demonstrated significant differences between women and men in the onset of, symptoms for, and responses to treatment for disease. Historically, women have been the custodians of family health, suggesting that keeping women healthy is beneficial not only for their children and families but also for our communities and our society.

In this section, we present 2012 data from the Michigan Department of Community Health to highlight the prevalence of various behaviors, medical conditions, and treatments among the female population of KOMA, the Detroit region, and Michigan. We also present gender differences to examine the impact of particular conditions and treatments on women and men in each region. The intent is to provide data-based rationale for improving women's health and the medical care they receive through exploration, dissemination, and integration of knowledge of women's health and gender-based differences.

U.S. Census Bureau population estimates are displayed in **Table 1**. Approximately 51 percent of the population living in KOMA, the Detroit region, and Michigan is female. Of the female population, the majority is in the childbearing ages of 15–44 in all three regions. Socioeconomic status is not only a strong predictor of health, it is also a key factor in determining health inequities across populations. While a little more than a quarter of the female population aged 25 and older has a bachelor's degree or higher in all three areas examined, a comparison of median annual earnings of males with median annual earnings of females reveals a significant wage gap of 40 cents per dollar in KOMA, followed by 35 cents per dollar in both the Detroit region and Michigan. The national wage gap is approximately 20 cents. Although a smaller percentage of women than men are unemployed in the three regions, the high unemployment rate (8.5–11.9 percent) and lack of jobs that pay a living wage make poverty a reality, especially for women. Census data reveals that close to 19 percent of the female population in the Detroit region live below the poverty line followed by 18.5 percent in Michigan and 17 percent in KOMA.

While the divorce rate is higher and the marital rate lower for females in KOMA, the Detroit region, and Michigan relative to men, a larger percentage of women under the age of 65 have health insurance coverage compared to men in all three regions examined.

Table 1: Demographic Characteristics of Female Population

	KOMA	Detroit Region	MI
Percent of female population	50.79	51.66	50.91
Female/Male ratio	1.03	1.07	1.04
Age distribution of female population (percent)			
10–14	7.15	6.50	6.40
15–19	7.13	6.39	6.80
20–44	32.56	31.52	30.90
45–64	26.09	28.40	28.20
65–84	11.55	12.83	13.50
85+	2.40	2.80	2.70
Percent of female population in the reproductive age group 15–44	39.69	37.91	37.70
Percent of female population 25 and older			
with a H.S. degree	29.34	27.58	30.00
with a B.A. degree or higher	27.38	28.00	26.00
Earnings ratio	60.42	64.82	65.10
Wage gap	0.40	0.35	0.35
Percent of females below poverty level	17.15	19.11	18.50
Percent of females in the labor force	60.85	57.77	58.21
Female/Male ratio	0.89	0.94	0.93
Percent of females employed	91.37	88.14	88.78
Female/Male ratio	0.90	0.96	0.96
Percent of females unemployed	8.63	11.86	11.22
Female/Male ratio	0.77	0.86	0.75
Percent of females			
Never married	29.45	32.24	29.50
Female/Male ratio	0.85	0.84	0.82
Married	49.79	42.88	46.60
Female/Male ratio	0.94	0.91	0.94
Separated	1.55	1.97	1.80
Female/Male ratio	1.57	1.35	1.38
Widowed	7.88	9.87	9.40
Female/Male ratio	3.90	3.39	3.62
Divorced	11.32	13.04	12.80
Female/Male ratio	1.21	1.27	1.19
No health insurance coverage under age 65	47,171	212,064	498,067
Percent of women under age 65 with no coverage	8.02	10.69	9.89
Female/Male ratio	0.72	0.82	0.81

Table 2 presents data on natality for KOMA, the Detroit region, and Michigan. Preterm birth (defined as an infant born at less than 37 weeks gestation) and low birth weight (defined as a birth weight of less than 2500 grams) are of significant public health importance because of their association with fetal and neonatal morbidity and mortality, impaired cognitive development, and the advent of chronic diseases such as hypertension, coronary artery disease, stroke, metabolic syndrome, diabetes, malignancies, osteoarthritis, and dementia later in life. While the highest ratio of low birth weight babies was recorded in the Detroit region (95.1 per 1,000 live births), the rates for KOMA, Michigan, and the United States were 75.2, 84.6, and 80.0 respectively. Overall, the incidence of preterm, low birth weight, and very low birth weight babies is the smallest in KOMA.

KOMA also has the lowest rate of teenage mothers. Moderately strong evidence suggests that the risk of preterm/low birth weight follows a U-shaped curve, with high percentages of LBW births at the extremes of maternal age. Moreover, research indicates that, while the incidence of preterm/low birth weight babies increases with poverty and unintended pregnancies, unmarried women have an increased risk of preterm/intrauterine-growth-restricted births compared with married women. In comparison to the Detroit region and Michigan, more women are married in KOMA and fewer live below the poverty line in the region.

Because low birth weight babies experience severe health and developmental difficulties, their incidence can impose large costs on society. For each preterm LBW baby, the lifetime costs for permanent impairments of neonatal origin, for instance, can be about $676,800. Furthermore, while increasing the birth weight from the 800–1000 gram range to the "normal" weight range can potentially result in savings of more than $127,000 in initial hospital charges, reducing the preterm birth rate by 20 percent can lead to savings of $2 billion per year in health care costs nationally. Employing the LBW rate reported for the three regions in **Table 2**, the lifetime costs of $676,800 per preterm infant puts the average total cost per 1,000 live births at $64.3 million for the Detroit region, $50.9 million for KOMA, and $57.2 million for Michigan. Consequently, the lower LBW rate for KOMA results in a savings of $13.4 million more than the Detroit region and $6.3 million compared to Michigan. According to 2011 numbers, Medicaid paid for a higher percentage of births in KOMA (43.5 percent) compared to the Detroit region (40.4 percent). In Michigan, 45.1 percent of births were funded by Medicaid. This difference in numbers can perhaps be due to better support structures available to women in KOMA compared to the Detroit region.

Table 2: Natality

	MI		KOMA		Detroit Region	
	Total Number	Total Rate	Total Number	Total Rate	Total Number	Total Rate
Live births	112,708	11.4	15,700	13.5	45,505	11.8
Teenage mothers	8,998	79.8*	1150	73.3*	3,493	76.8*
Low birth weight	9,535	84.6*	1180	75.2*	4,327	95.1*
Under 1500 grams	1,775	15.7*	203	12.9*	894	19.7*
Less than 37 weeks gestation	13,798	122.4*	1621	103.3*	6,397	140.6*
Prenatal care began in first trimester	83,766	743.2*	11820	752.9*	33,850	743.9*

*Per 1,000 live births

Sources:
Almond D, Chay KY, Lee DS. The costs of low birth weight. *Quarterly Journal of Economics* 2005;120(3):1031-83.
Barker DJ, Gluckman PD, Godfrey KM, Harding JE, Owens JA, Robinson JS. Fetal nutrition and cardiovascular disease in adult life. *Lancet* 1993;341(8850):938-41.
McCormick MC. The contribution of low birth weight to infant mortality and childhood morbidity. *The New England Journal of Medicine* 1985;312(2):82-90.
Petrou S. Economic consequences of preterm birth and low birthweight. *BJOG: an International Journal of Obstetrics and Gynaecology* 2003; 110(Suppl 20):17-23.
Waldron I, Hughes ME, Brooks TL. Marriage protection and marriage selection — prospective evidence for reciprocal effects of marital status and health. *Social Science & Medicine* 1996;43(1):113-23.

Table 3 displays the leading diagnoses for hospitalizations of women in comparison to men. The numbers are higher for women than men for most of the diagnoses presented in the table particularly for the Detroit region and Michigan. While the female to male ratio is the highest for heart disease (3.09) in the Detroit region, followed by injury and poisoning (2.51), diabetes (2.06), intervertebral disc disorders (1.82), cancer (1.55), diverticula of intestine (1.46), and diseases of the skin (1.11), Michigan leads in kidney/urinary infections (2.92), osteoarthrosis (1.52), chronic bronchitis (1.27), diseases of the blood (1.3), and septicemia (1.08). With the exception of gallbladder stones (2.06) and psychoses (1.35), the female to male ratios, although greater than one in a large number of cases, are smaller in KOMA compared to the Detroit region and Michigan.

Table 3: Leading Diagnoses for Hospitalizations by Gender

Principal Diagnosis	KOMA		Detroit Region		MI	
	Percent Female*	F/M Ratio	Percent Female	F/M Ratio	Percent Female	F/M Ratio
All hospitalizations	58.23	1.39	57.79	1.37	57.24	1.34
Newborns and neonates (Less than 7 days)	48.67	0.95	46.25	0.86	48.57	0.94
Heart diseases	46.95	0.88	75.52	3.09	46.14	1.00
Injury and poisoning	48.84	0.95	71.49	2.51	51.19	1.05
Septicemia	49.85	0.99	51.69	1.07	51.95	1.08
Osteoarthrosis and allied disorders	53.72	1.16	50.66	1.03	60.28	1.52
Psychoses	57.53	1.35	51.39	1.06	49.34	0.97
Cancer (malignant neoplasms)	49.38	0.98	60.77	1.55	49.92	1.00
Cerebrovascular diseases	51.17	1.05	52.19	1.09	52.20	1.09
Pneumonia	49.07	0.96	51.44	1.06	51.53	1.06
Diseases of the skin and subcutaneous tissue	49.49	0.98	52.66	1.11	50.32	1.01
Chronic bronchitis	46.70	0.88	52.57	1.11	55.94	1.27
Intervertebral disc disorders	50.22	1.01	64.49	1.82	50.60	1.02
Diabetes mellitus	51.85	1.08	67.31	2.06	47.44	0.90
Kidney/urinary infections	53.95	1.17	53.37	1.14	74.47	2.92
Care involving use of rehabilitation procedures	51.39	1.06	52.23	1.09	51.67	1.07
Gallbladder stones (cholelithiasis)	67.28	2.06	59.01	1.44	n/a	n/a
All infectious and parasitic diseases except septicemia	48.34	0.94	52.67	1.11	56.55	1.30
Diseases of the blood and blood-forming organs	50.12	1.00	52.22	1.09	56.54	1.30
Diverticula of intestine	56.48	1.30	59.41	1.46	n/a	n/a
All other hospitalization conditions	55.80	1.26	57.22	1.34	56.50	1.30

*Percentage of total hospitalization

Table 4 reports some of the leading treatments women and men receive upon hospitalization. Focusing first on birth-related procedures, it is observed that of all live births, the largest percentage of babies are delivered via C-section in the Detroit region (33.91 percent), followed by Michigan (32.47 percent), and KOMA (30.04 percent). Cesarean deliveries result in higher costs, longer hospitalizations, and are likely to increase risks of short and long term morbidity, compared to a normal vaginal delivery. Moreover, cesarean-delivered babies are more likely to be premature and have low birth weight. Furthermore, the Detroit region also leads in the percentage of births that were medically induced (23.29 percent) in comparison to Michigan (20.69 percent) and KOMA (18.78 percent). Percentages of both labor induction and electronic fetal monitoring are higher in the Detroit region and have the side effect of increased risk of leading to cesarean delivery.

A comparison of **Tables 3 and 4** reveals that although a larger percentage of all persons hospitalized for heart disease are women (particularly in the Detroit region) only a smaller proportion of these women receive the treatments listed in Table 4, such as coronary artery bypass graft and coronary artery stents. Research on gender differences in the management of coronary artery disease has consistently found that women are less likely to receive the standard interventions and aggressive treatments compared to men when they are hospitalized for chest pain or myocardial infarction.

Table 4: Most Common Procedures Performed in Hospital Short-stay by Gender

Selected Procedures	KOMA		Detroit Region		MI	
	Total	F/M Ratio	Total	F/M Ratio	Total	F/M Ratio
All procedures	209,037	1.38	942,637	1.25	2,223,877	1.22
Diagnostic cardiac catheterization; coronary arteriography	9,047	0.55	57,476	1.20	130,654	0.67
Circumcision	6,837	--	20,292	--	48,020	0
Repair of current obstetric laceration	6,068	--	18,951	--	38,299	--
Manually assisted delivery	5,771	--	13,572	--	37,768	--
Artificial rupture of membranes to assist delivery	5,574	--	12,998	--	33,896	--
Fetal monitoring	5,408	--	34,624	--	46,377	--
Cesarean section	4,716	--	15,431	--	36,593	--
Hemodialysis	2,973	0.86	22,551	1.27	37,419	0.89
Medical induction of labor	2,949	--	10,600	--	23,317	--
Laminectomy; excision intervertebral disc	2,869	0.88	9,657	0.60	25,250	0.91
Diagnostic ultrasound of heart (echocardiogram)	2,356	0.72	11,854	0.97	27,246	0.79
Percutaneous transluminal coronary angioplasty	1,585	0.43	9,682	1.48	22,784	0.54
Insertion, revision, replacement removal of cardiac pacemaker	1,222	0.83	6,898	0.90	17,604	0.84
Coronary artery bypass graft	1,164	0.34	5,837	1.02	13,612	0.37
Insertion of drug-eluting coronary artery stent(s)	979	0.43	6,832	0.80	16,083	0.54
All other procedures	73,720	1.12	2,822	0.29	886,845	1.10

Sources:

Sheifer et. al. Race and sex differences in the management of coronary artery disease. *American Heart Journal* 2000; 139(5): 848-857

Shulman et. al. The effect of race and sex on physicians' recommendations for cardiac catheterization. *The New England Journal Of Medicine* 1999; 340(8): 618-626

Travis et. al. Gender Differences in the Treatment of Non – ST-Segment Elevation Myocardial Infarction. *Clinical Cardiology* 2010; 33(2): 99-103

Table 5 displays the number of deaths for ten leading causes by gender. The data reveals that in all three regions, heart disease, cancer, lower respiratory diseases, and stroke kill more women than does any other disease. In comparison to men, although fewer women die from heart disease and cancer, more die from chronic lower respiratory disease and stroke in the three regions. Moreover, the numbers reveal that a woman's risk of dying from Alzheimer's is more than two times that of a man. As women are generally the primary caregivers of adults with Alzheimer's disease they shoulder disproportionately the risks as well as the burdens. According to research done at Brigham and Women's Hospital, Alzheimer's disease costs society $300 billion per year, and, as baby boomers age, this number is likely to increase significantly in the near future. Overall, with the exception of diabetes and suicide, fewer women in KOMA die from the ten leading causes listed in Table 5 compared to the Detroit region and Michigan

Table 5: Ten Most Common Causes of Death by Gender

Cause of Death	KOMA		Detroit Region		MI	
	Percent Female*	F/M Ratio	Percent Female	F/M Ratio	Percent Female	F/M Ratio
1. Heart disease	48.48	0.94	49.62	0.98	48.94	0.96
2. Cancer	47.47	0.90	49.28	0.97	47.78	0.92
3. Chronic lower respiratory diseases	49.88	1.00	54.64	1.20	52.62	1.11
4. Stroke	60.30	1.52	60.52	1.53	59.67	1.48
5. Unintentional injuries	39.66	0.66	38.95	0.64	38.96	0.64
6. Alzheimer's disease	66.96	2.03	69.17	2.24	69.68	2.30
7. Diabetes mellitus	54.82	1.21	48.18	0.93	49.03	0.96
8. Kidney disease	49.56	0.98	50.15	1.01	50.22	1.01
9. Pneumonia/influenza	48.73	0.95	55.11	1.23	52.43	1.10
10. Intentional self-harm (suicide)	22.40	0.29	23.29	0.30	20.00	0.25
All other causes	55.06	1.23	52.40	1.10	52.92	1.12

*Percentage of total hospitalization

Table 6 presents information on ambulatory care sensitive hospitalizations by gender. Ambulatory care sensitive conditions, such as asthma, diabetes, or hypertension, are conditions where timely and effective ambulatory care can decrease hospitalizations by preventing the onset of an illness or condition, controlling an acute episode of an illness, or managing a chronic disease or condition. As a result, high rates of ambulatory care sensitive hospitalizations in a community may be an indicator of a lack of or failure of prevention efforts, a primary care resource shortage, poor performance of primary health care delivery systems, or other factors that create barriers to obtaining timely and effective care.

A comparison of the three regions indicates that KOMA not only has the lowest rate for all potentially avoidable hospitalizations, but also that it performs significantly better than the Detroit region and Michigan on all acute and chronic hospitalizations. In short, the numbers suggest that, overall, KOMA does a superior job of managing primary care over the comparison regions. In terms of gender differences, the numbers reveal that all three regions can do a better job of providing primary care to women. Although KOMA again performs better, the overall average of the female to male ratio for all ambulatory care sensitive conditions, all avoidable hospitalizations, and all acute and chronic hospitalization is greater than one.

Table 6: Ambulatory Care Sensitive Hospitalizations By Gender

	KOMA		Detroit Region		MI	
	Female Total Rate*	F/M Ratio	Female Total Rate*	F/M Ratio	Female Total Rate*	F/M Ratio
All Ambulatory Care Sensitive Conditions	15.41	1.14	35.79	1.31	28.29	1.25
All Avoidable Hospitalizations	1.04	0.85	2.14	1.12	1.58	1.07
Congenital syphilis	0.00	--	0.01	2.60	0.00	2.29
Failure to thrive, age <1 year	0.02	0.92	0.02	0.72	0.02	0.81
Dental problems	0.07	1.21	0.14	1.05	0.11	1.01
Vaccine-preventable diseases	0.01	1.00	0.03	0.78	0.03	0.87
Iron deficiency anemia, age 0–5 years	0.01	0.88	0.02	0.70	0.02	0.68
Nutritional deficiencies	0.93	0.83	1.92	1.14	1.41	1.09
All Acute Hospitalizations	8.73	1.24	20.37	1.39	16.17	1.34
Bacterial pneumonia	1.67	0.98	2.82	1.14	2.81	1.07
Cellulitis	0.87	1.03	2.11	1.03	1.64	0.99
Convulsions	0.27	1.25	0.40	1.15	0.35	1.13
Dehydration (primary diagnosis)	0.36	1.22	0.85	1.44	0.64	1.33
Dehydration (secondary diagnoses)	3.92	1.21	9.57	1.29	7.21	1.27
Gastroenteritis	0.20	1.83	0.64	1.88	0.53	1.88
Hypoglycemia	0.02	1.00	0.03	1.56	0.02	1.35
Kidney/urinary infection	1.20	2.80	3.54	2.90	2.68	2.92
Pelvic inflammatory disease	0.09	n/a	0.18	n/a	0.13	n/a
Severe ear, nose, and throat infections	0.12	1.00	0.19	1.22	0.13	1.06
Skin grafts with cellulitis	0.01	0.50	0.03	0.98	0.02	0.80
All Chronic Hospitalizations	5.64	1.08	13.29	1.23	10.54	1.17
Angina	0.03	0.94	0.08	1.11	0.08	1.12
Asthma	0.66	1.33	2.49	1.87	1.72	1.78
Chronic obstructive pulmonary	1.14	1.25	3.31	1.38	2.79	1.27
Congestive heart failure	2.09	1.05	3.97	1.08	3.33	1.05
Diabetes	0.84	0.88	1.75	0.93	1.38	0.92
Grand mal and other epileptic conditions	0.64	0.94	1.03	0.97	0.78	0.94
Hypertension	0.23	1.60	0.64	1.74	0.46	1.68
Tuberculosis (nonpulmonary)	0.00	--	0.00	0.18	0.00	0.19
Pulmonary tuberculosis	0.00	0.00	0.01	0.71	0.00	0.54

* Per 1,000 females in the population
-- Indicates mean cannot be calculated

Economic Analysis

Benchmarking Communities

In this section, we compare the Grand Rapids combined statistical area to several metropolitan areas to examine differences in the supply of hospital services, hospital expenses, Medicare expenditures, and a number of quality metrics. Rochester, NY; Louisville, KY; and Buffalo, NY were selected as Grand Rapids' peer communities based on a variety of regional metrics including population density, earnings, unemployment rates, age, and race. Cleveland, OH; Milwaukee, WI; Portland, OR; and Akron, OH have been used as comparison communities in earlier versions of this publication, and they are once again included here.

Figure 1 displays the population of each metropolitan statistical area (MSA) in 2003 and 2012. While Grand Rapids is smaller than Cleveland, Milwaukee, and Portland, the population growth rate in Grand Rapids has exceeded nearly every other comparison community over the past decade. **Figure 2** presents the total number of hospital beds by MSA, providing an indication of the relative size of the health care system in each community. Though Grand Rapids' population is larger than all but three of the comparison communities, only Akron has fewer hospital beds. Additionally, **Figure 2** highlights a trend away from investment in inpatient capacity as only Portland has more hospital beds in 2012 than in 2003.

The Supply and Utilization of Hospital Services

Figures 3–10 provide a detailed examination of both hospital capacity and utilization across Grand Rapids and the seven comparison communities. Scaling the total number of hospital beds by population, **Figure 3** indicates that only Portland has fewer hospital beds per capita than Grand Rapids. Due primarily to population loss, beds per capita have increased slightly in Cleveland, while falling in each of the other MSAs.

Per capita hospital admissions are highlighted in **Figure 4**. Other than Portland, Grand Rapids residents experience the fewest hospital admissions per capita. While changes in the rate of inpatient admissions in Grand Rapids have been minimal over the past decade, we have seen a large increase in the number of outpatient hospital visits. **Figure 5** suggests that Grand Rapids hospitals see a greater per capita volume of outpatient visits than most of the comparison communities along with the largest growth rate of any of the included MSAs. This trend is further reinforced in **Figure 6**, which shows that per capita emergency department visits are relatively high in Grand Rapids and have grown at a significant rate. This trend is troubling given the high costs associated with emergency department treatment.

Figures 7 and 8 suggest that not only are Grand Rapids residents relatively less likely to be admitted to the hospital than most of the comparison communities, but their stays tends to be shorter. Only Portland residents experience fewer per capita inpatient days, while the average length of a hospital stay has fallen faster for Grand Rapids than any other comparison community.

Figure 9 displays the total number of surgeries per capita in each MSA. Here, only hospitals in Portland and Akron perform fewer per capita surgeries than hospitals in Grand Rapids.

Finally, **Figure 10** highlights the supply of hospital-based personnel per 1,000 residents. These personnel counts represent the total number of full-time equivalent hospital employees excluding medical and dental residents, interns, and other trainees. Only Portland reports fewer per capita hospital-based health care personnel than Grand Rapids, and while the rate of employment growth in the hospital industry has generally been positive, both Portland and Milwaukee have fewer per capita hospital personnel in 2012 than in 2003.

Hospital Expenses and Medicare Expenditures

Figure 11 examines payroll and benefit expenses per hospital employee, which is inflation-adjusted using the consumer price index. Grand Rapids appears similar to many of the comparison communities, while Buffalo and Portland have both experienced larger growth in per-employee costs.

Figure 12 indicates that only Cleveland, Portland, and Milwaukee have total hospital expenses per admission higher than those in Grand Rapids. In addition, total expenses per admission in Grand Rapids have grown at a faster rate since 2003 than the comparison communities. To clarify, these are estimates of the average per admission cost to the hospital of treating each patient. The data in **Figure 12** can be used as a measure of system efficiency or can indicate the complexity of procedures being done locally (more complex procedures have higher costs per admission). However, since Grand Rapids experiences a shorter average length of inpatient stay (Figure 8) and relatively few per capita surgeries compared to the peer communities, it is unlikely that procedure complexity is driving the increased hospital expenses.

Figure 13 displays the average-adjusted Medicare expenditures per Medicare Fee-for-Service (FFS) enrollee. Data for Figures 13–18 are from the Dartmouth Atlas of Health Care and the CMS Medicare Geographic Variation Public Use File. Due to the methodology employed by these groups, geographic regions are defined as the hospital referral region (HRR) and not the MSA. These figures are adjusted for regional differences in prices, population age, gender, and race. While average Medicare expenditures in Grand Rapids are largely similar to the comparison regions, **Figure 14** suggests a troubling trend. From 2003 to 2012, per-enrollee Medicare FFS expenditures in Grand Rapids increased by 32.4 percent, nearly three times faster than the average growth rate of the other seven comparison communities. Furthermore, limiting the comparison to the average expenditure growth in the peer communities of Rochester, Louisville, and Buffalo, Grand Rapids expenditure growth outpaced peer growth by a factor of five. Importantly, these data only include FFS Medicare beneficiaries. Because expenditure data for those enrolled in Medicare Advantage plans is not typically made public, that population is excluded from the analysis. Nationally, FFS Medicare beneficiaries make up approximately two-thirds of all Medicare enrollees, however, the proportion of Medicare Advantage enrollees in West Michigan is higher than the national average.

Outcomes

Finally, we examine regional differences in several outcomes that are commonly thought to be markers of care quality. In most cases, patients in Grand Rapids demonstrate better outcomes than patients in the comparison communities. For example, Grand Rapids FFS Medicare enrollees with diabetes are more likely to receive the A1C test (**Figure 15**), which is used to measure the effectiveness of diabetes management. In another sign of the quality of care for diabetics, Grand Rapids FFS Medicare enrollees experience the fewest leg amputations per capita (**Figure 16**).

In a more comprehensive measure of care coordination, only FFS Medicare beneficiaries in Portland have fewer hospital discharges for ambulatory-sensitive conditions (**Figure 17**). This finding indicates a relatively small degree of potentially preventable hospitalizations in Grand Rapids compared to the peer communities.

Figure 18 displays the percentage of Medicare Part D enrollees who fill a prescription for a beta-blocker in the first six months following a heart attack. This is the only measure of treatment quality where Grand Rapids seems to lag behind the comparison regions.

In conclusion, while expenditure growth over the past decade in Grand Rapids has outpaced all of the comparison communities, the quality of care administered in Grand Rapids appears to be quite high. Moving forward, efforts to maintain quality while addressing expenditure growth are likely to be a vital component to the success of the health care system in Grand Rapids and West Michigan.

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American Hospital Association. 2005. *AHA Hospital Statistics 2005 Edition*. Health Forum, LLC.

American Hospital Association. 2014. *AHA Hospital Statistics 2014 Edition*. Health Forum, LLC.
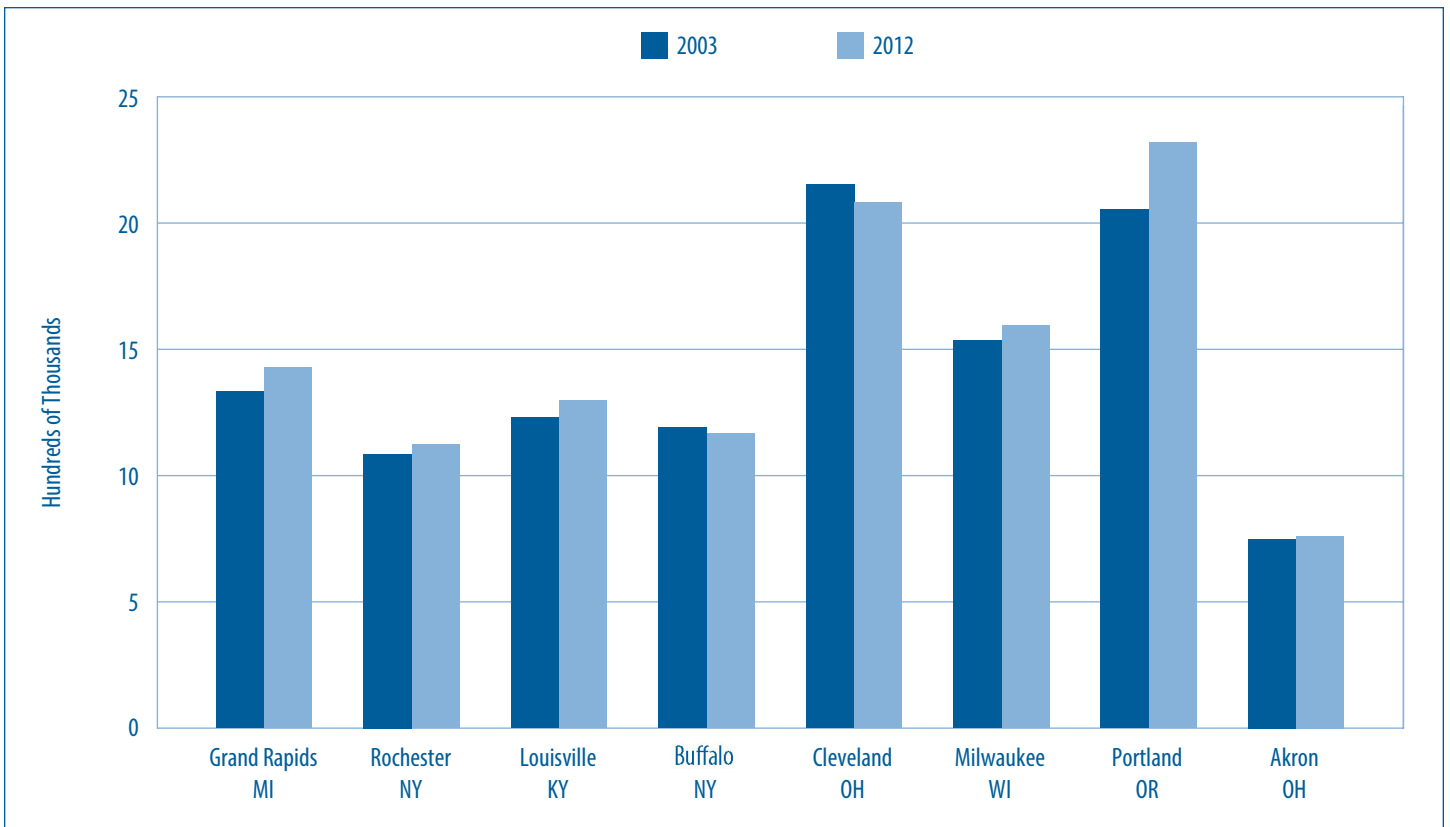
Figure 1: MSA Population

Figure 1: MSA Population

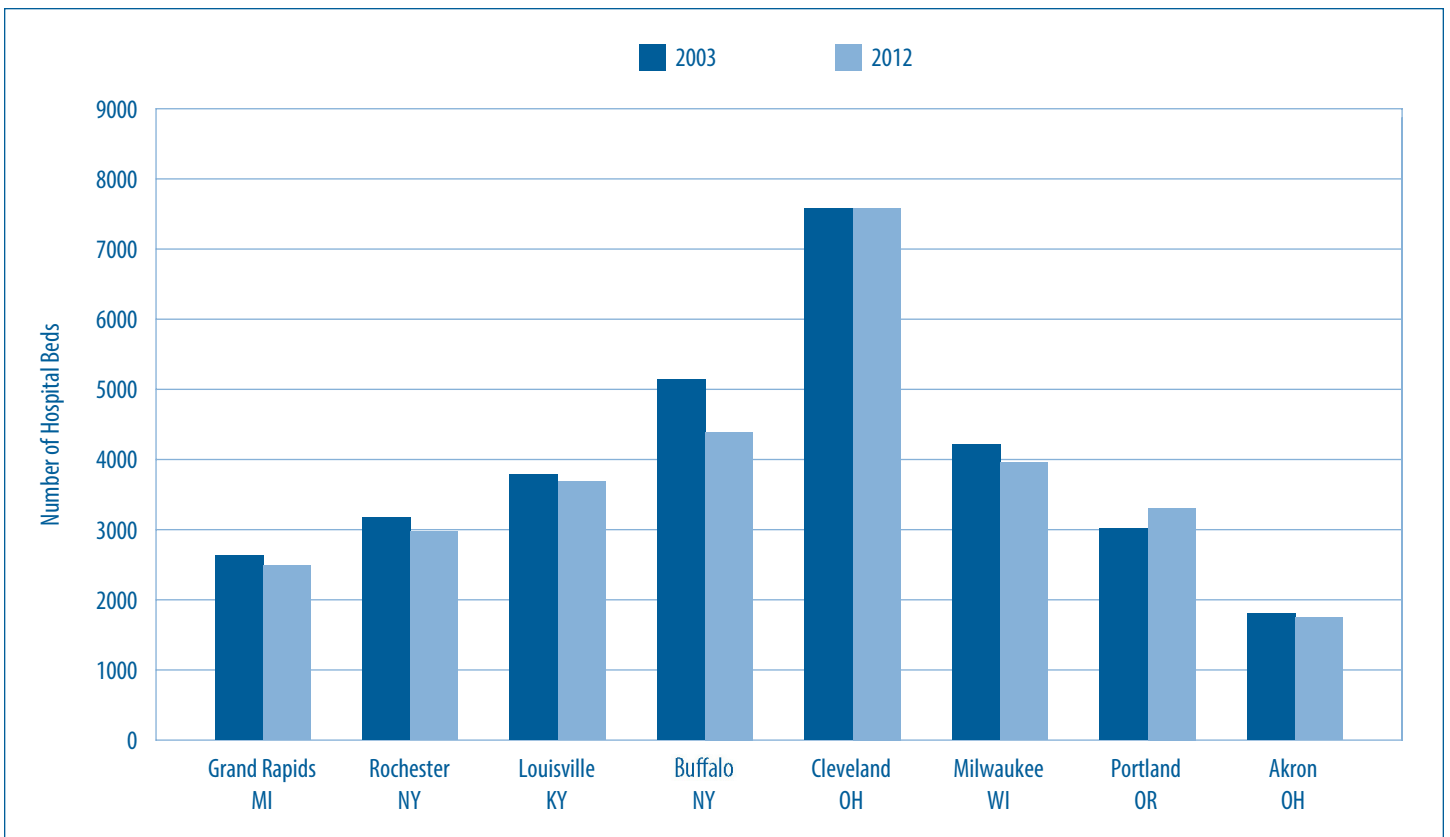Legend: 2003, 2012

Y-axis: Hundreds of Thousands (0, 5, 10, 15, 20, 25)

Categories: Grand Rapids MI, Rochester NY, Louisville KY, Buffalo NY, Cleveland OH, Milwaukee WI, Portland OR, Akron OH

Figure 2: Total Number of Hospital Beds

Figure 2: Total Number of Hospital Beds

Legend: 2003, 2012

Y-axis: Number of Hospital Beds (0, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000)

Categories: Grand Rapids MI, Rochester NY, Louisville KY, Buffalo NY, Cleveland OH, Milwaukee WI, Portland OR, Akron OH

Figure 3: Hospital Beds per 1,000 Population

Figure 3: Hospital Beds per 1,000 Population

Figure 4: Hospital Admissions per 1,000 Population
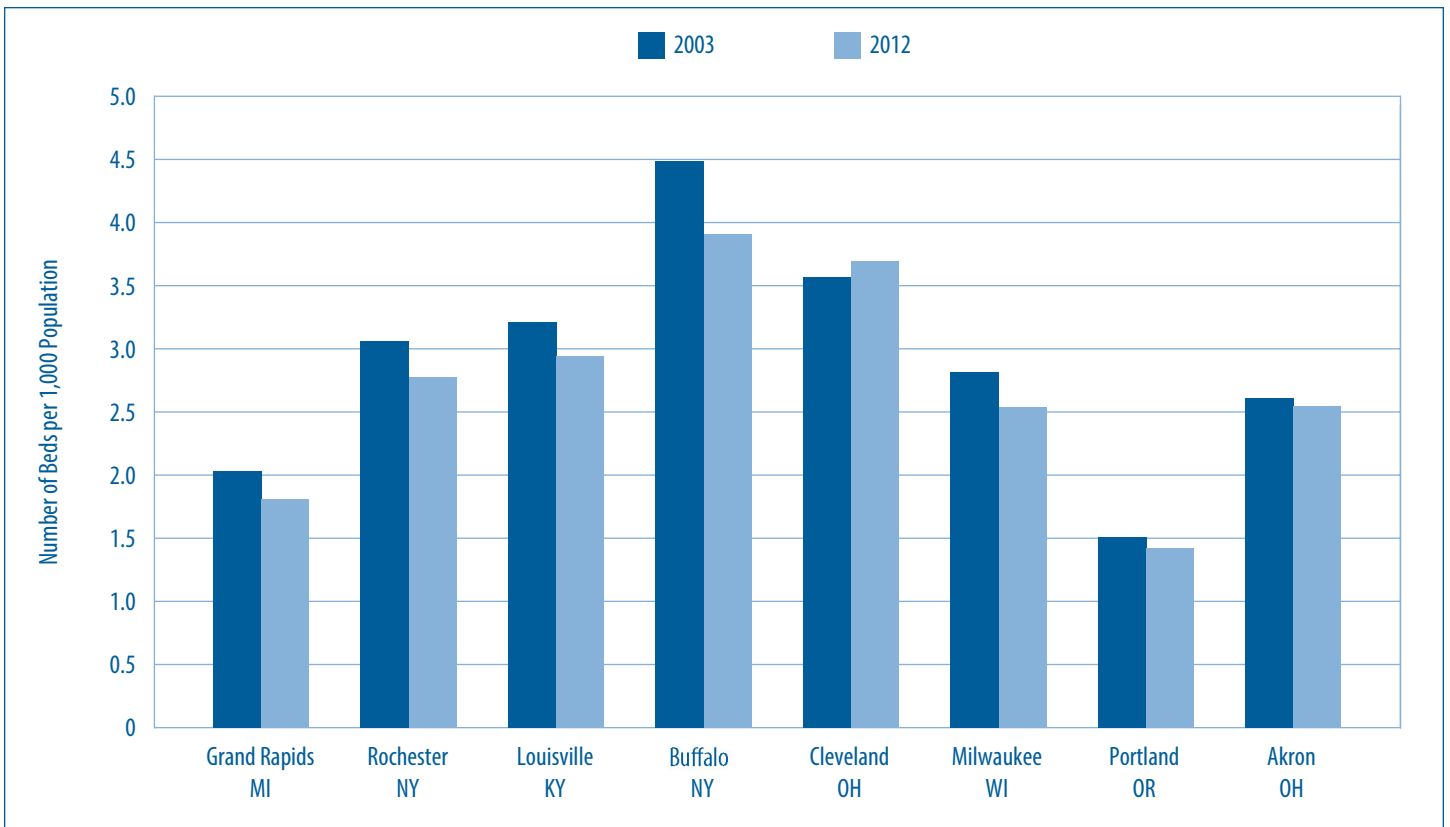
Figure 4: Hospital Admissions per 1,000 Population
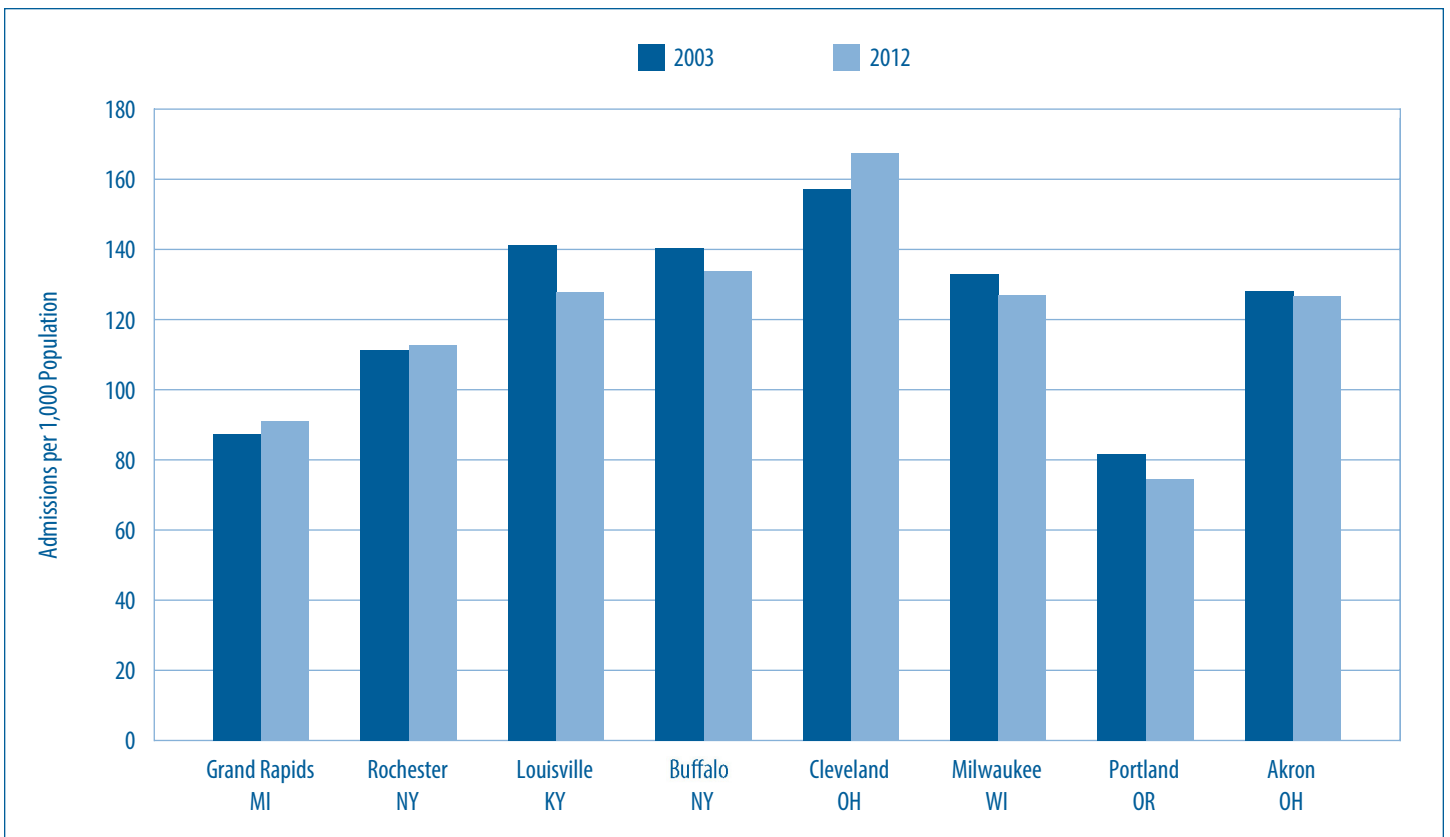
Figure 5: Outpatient Visits to Hospitals per 1,000 Population

Number of Outpatient Visits to Hospitals per 1,000 Population — bar chart comparing 2003 and 2012 for Grand Rapids MI, Rochester NY, Louisville KY, Buffalo NY, Cleveland OH, Milwaukee WI, Portland OR, Akron OH.
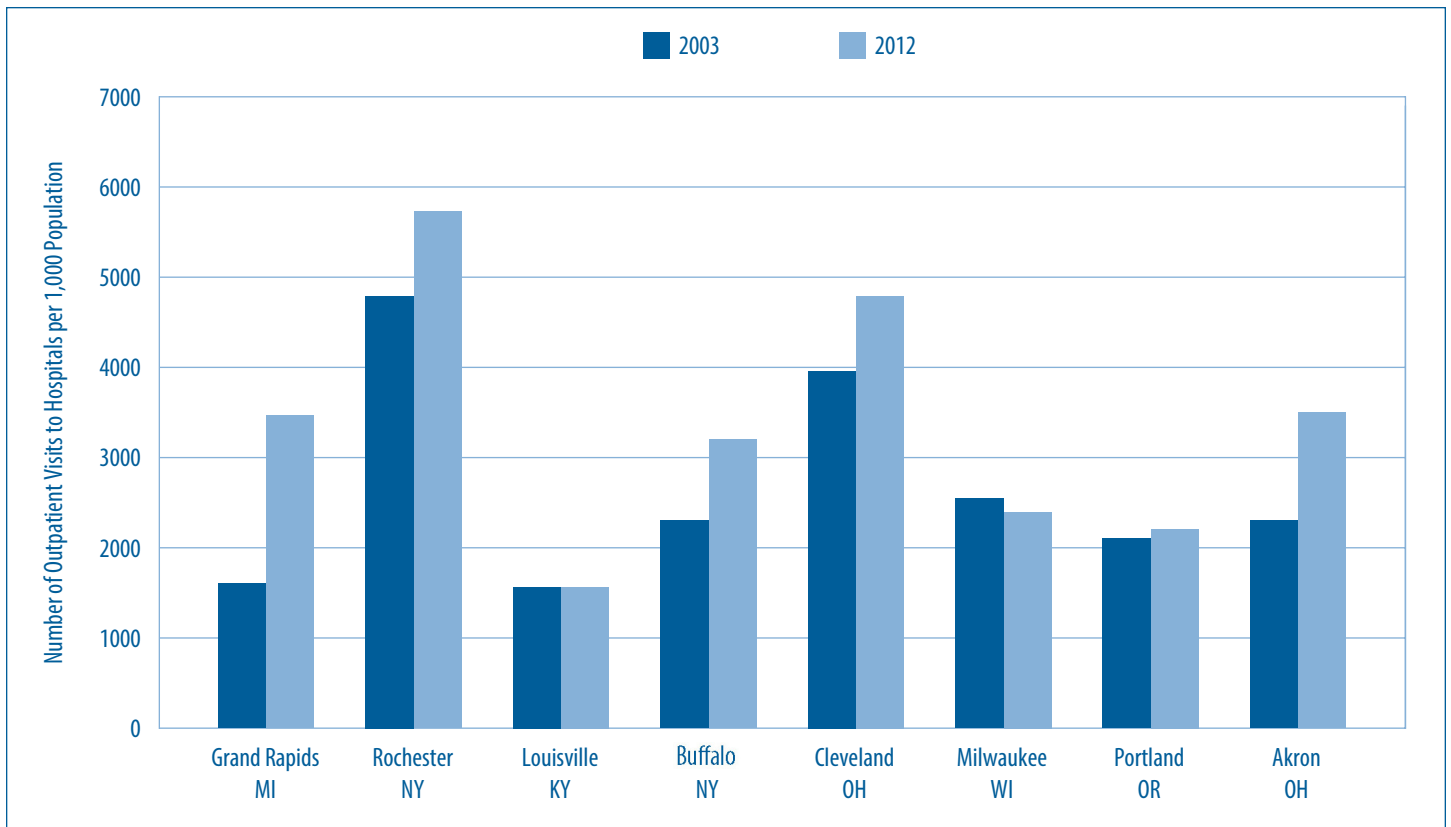
Figure 6: Emergency Department Visits per 1,000 Population

Number of ED Visits per 1,000 Population — bar chart comparing 2003 and 2012 for Grand Rapids MI, Rochester NY, Louisville KY, Buffalo NY, Cleveland OH, Milwaukee WI, Portland OR, Akron OH.

Figure 7: Inpatient Days per 1,000 Population
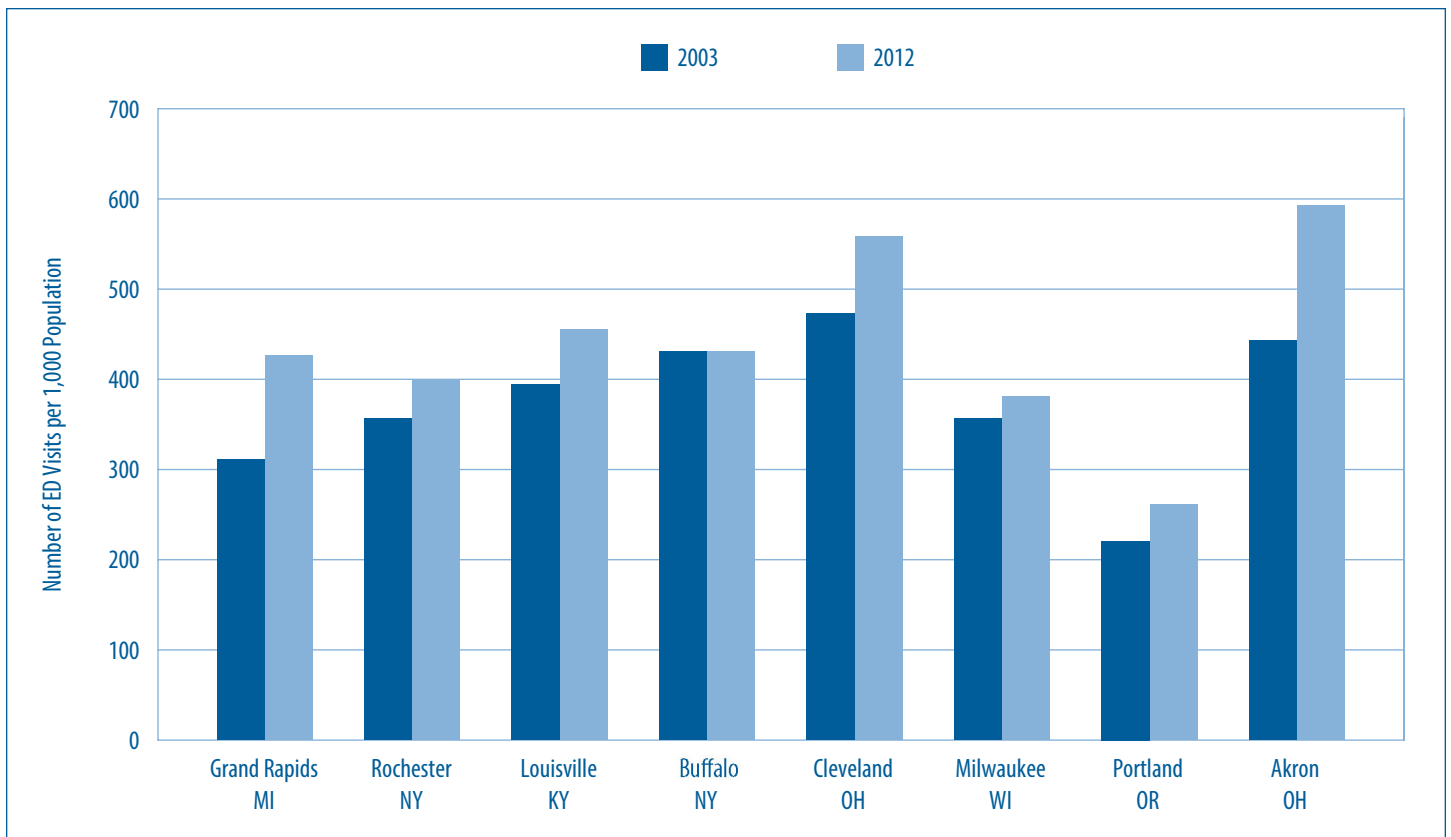
Figure 7: Inpatient Days per 1,000 Population

Figure 8: Average Hospital Length of Stay
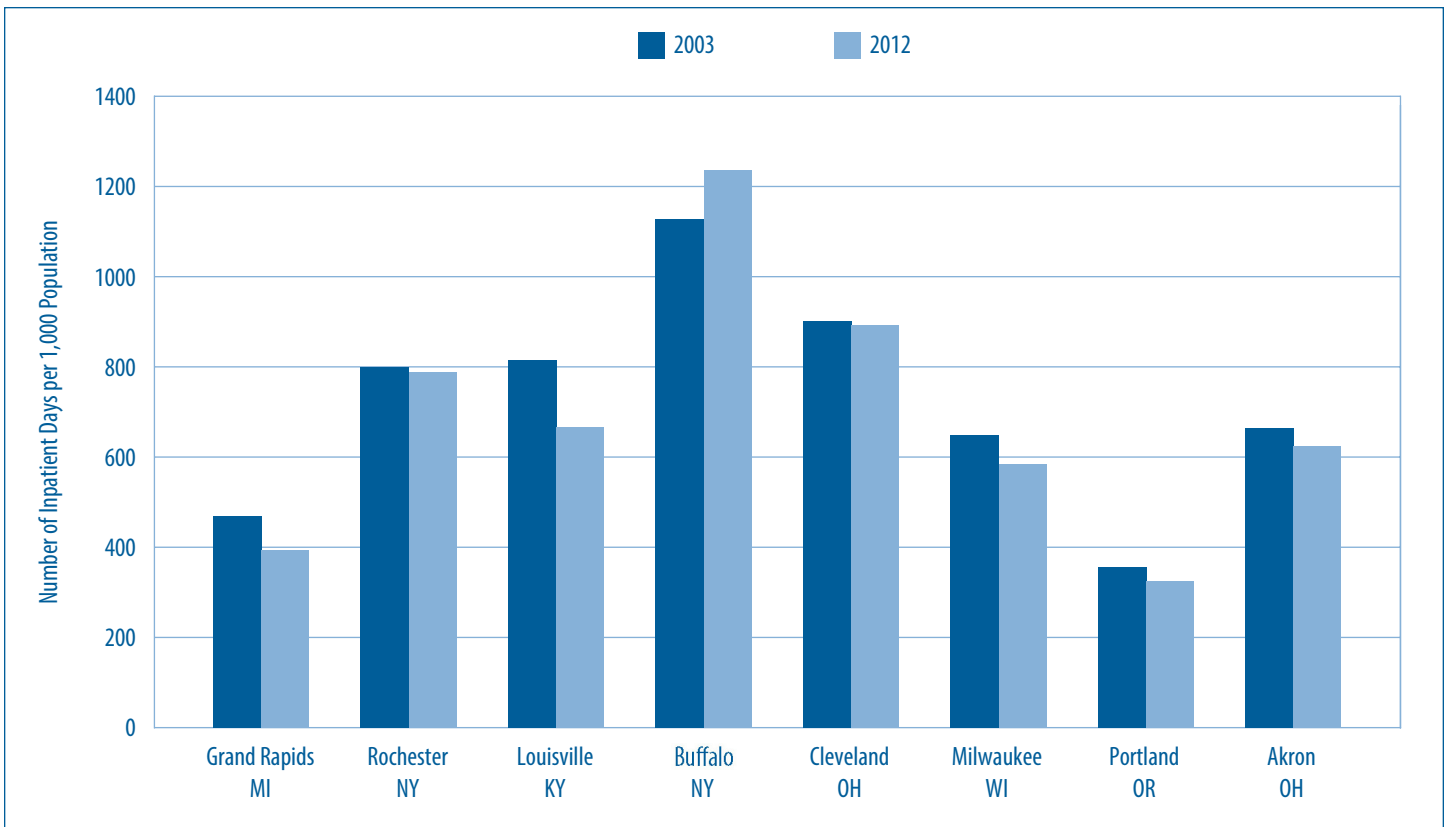
Figure 8: Average Hospital Length of Stay
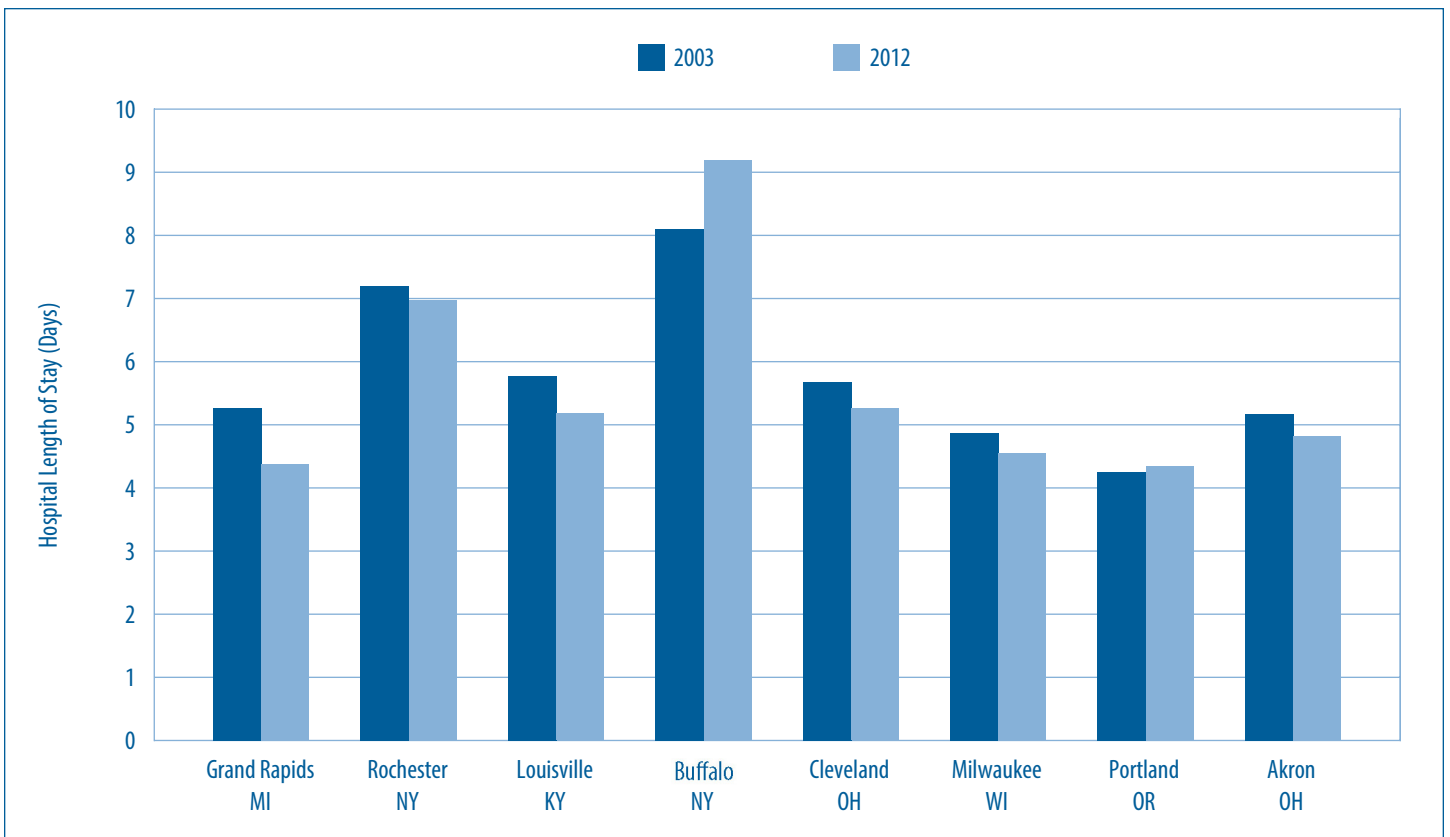
Figure 9: Hospital Surgeries per 1,000 Population

Legend: 2003, 2012

Y-axis: Hospital Surgeries per 1,000 Population (0 to 180)

X-axis categories: Grand Rapids MI, Rochester NY, Louisville KY, Buffalo NY, Cleveland OH, Milwaukee WI, Portland OR, Akron OH
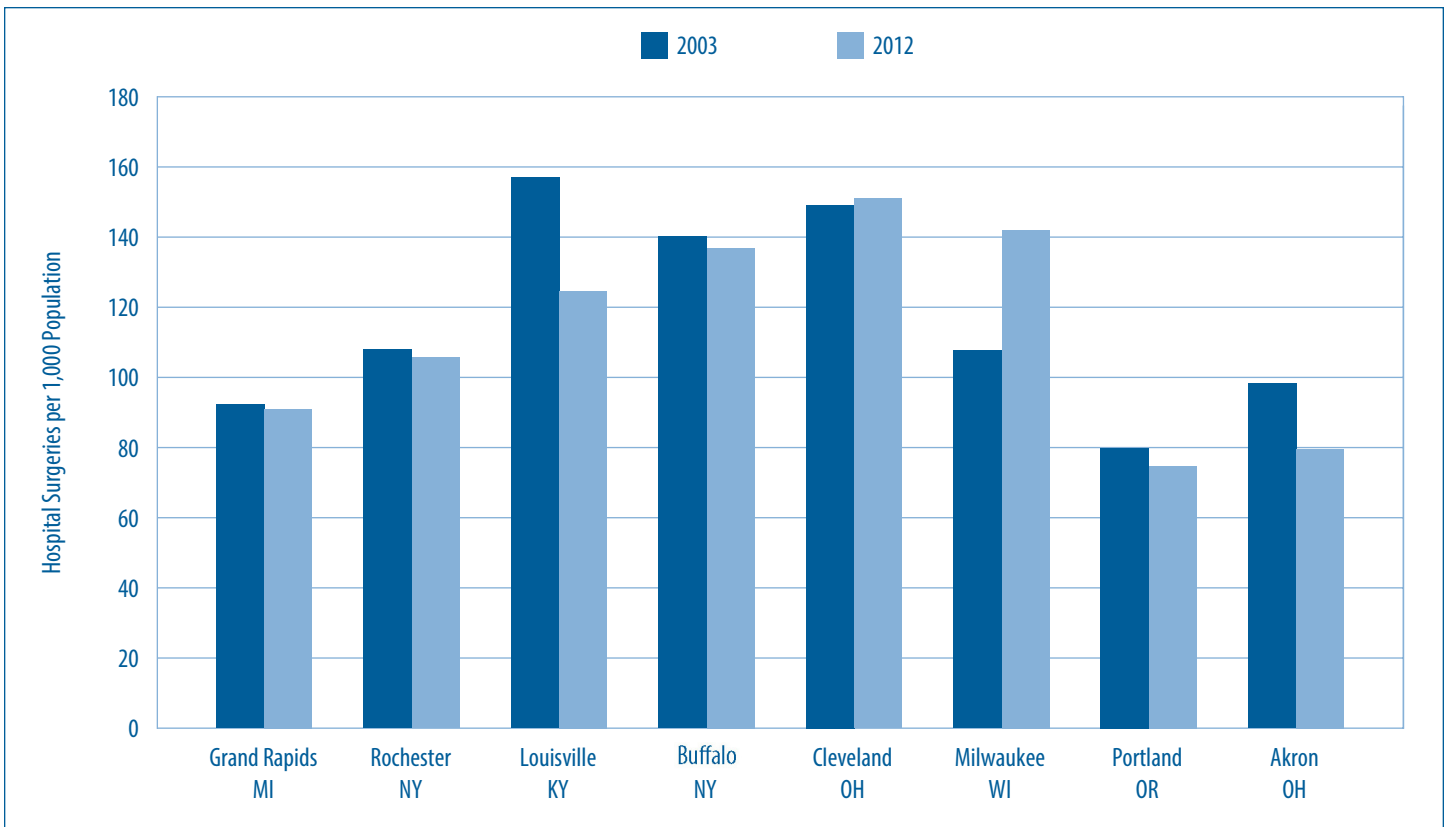
Figure 10: Hospital-based Personnel per 1,000 Population

Legend: 2003, 2012

Y-axis: Hospital-based Medical Personnel per 1,000 Population (0 to 35)

X-axis categories: Grand Rapids MI, Rochester NY, Louisville KY, Buffalo NY, Cleveland OH, Milwaukee WI, Portland OR, Akron OH

Figure 11: Payroll and Benefit Expenses per Hospital Employee
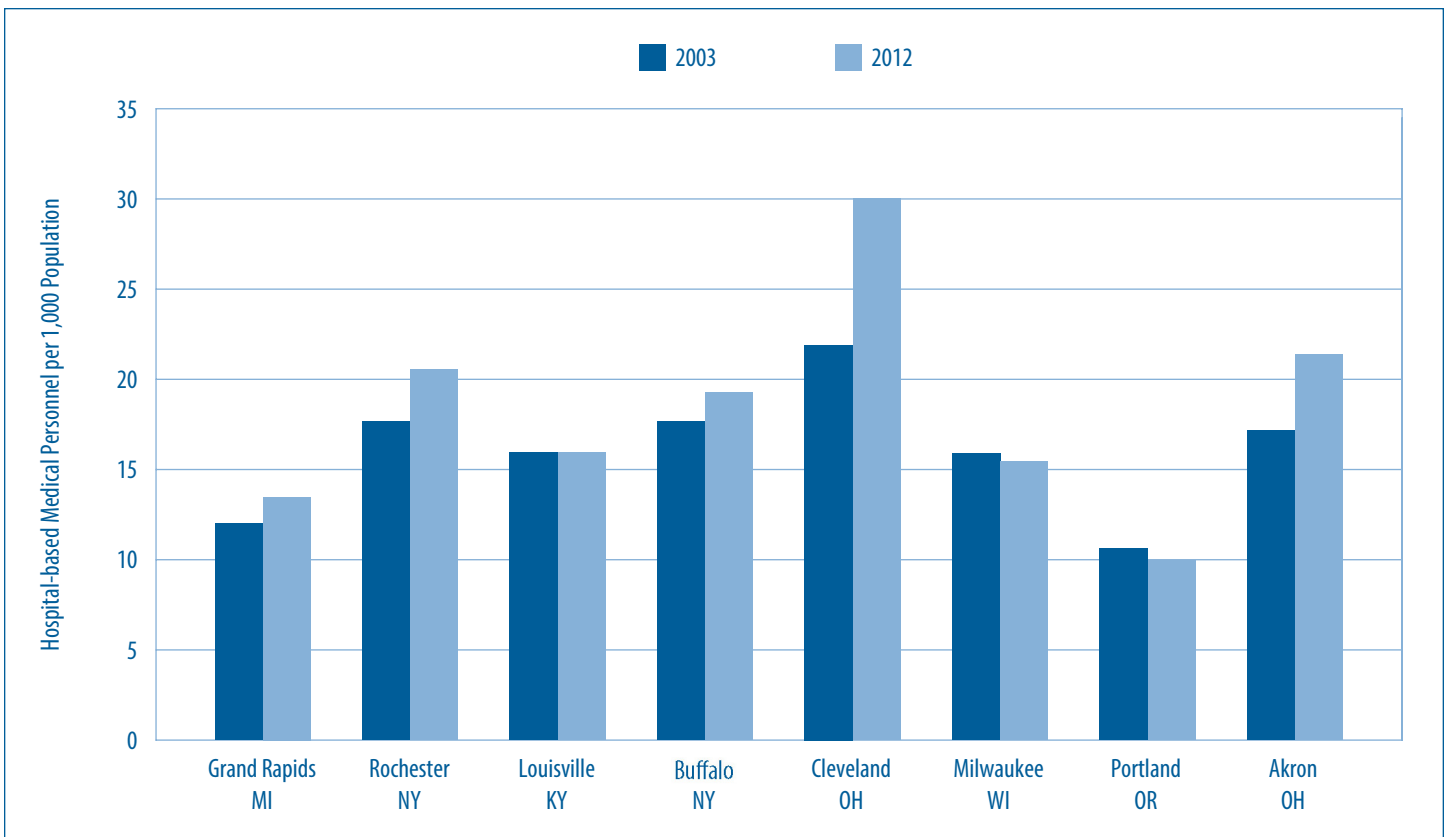
Figure 11: Payroll and Benefit Expenses per Hospital Employee

Figure 12: Total Hospital Expenses per Admission
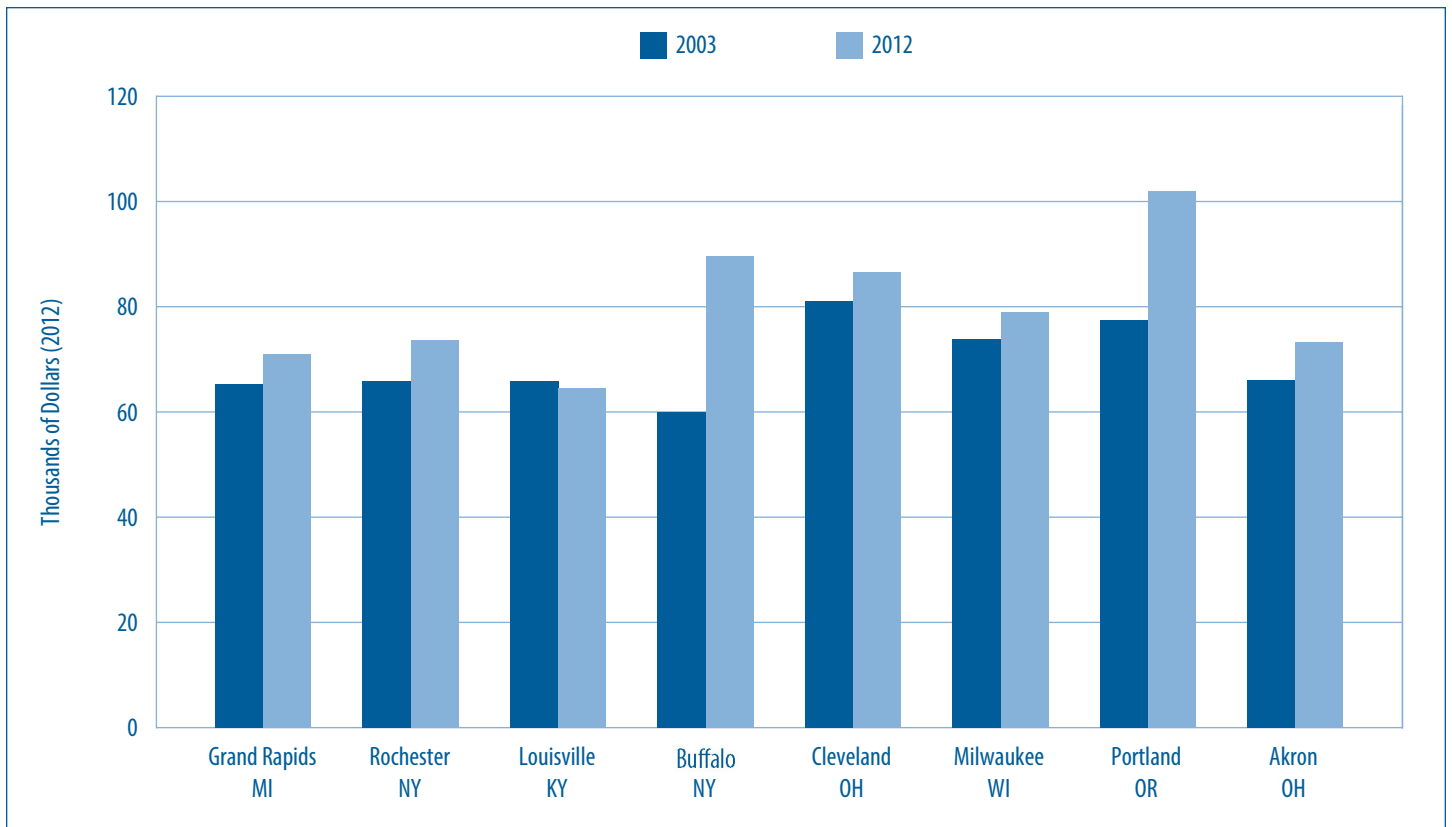
Figure 12: Total Hospital Expenses per Admission
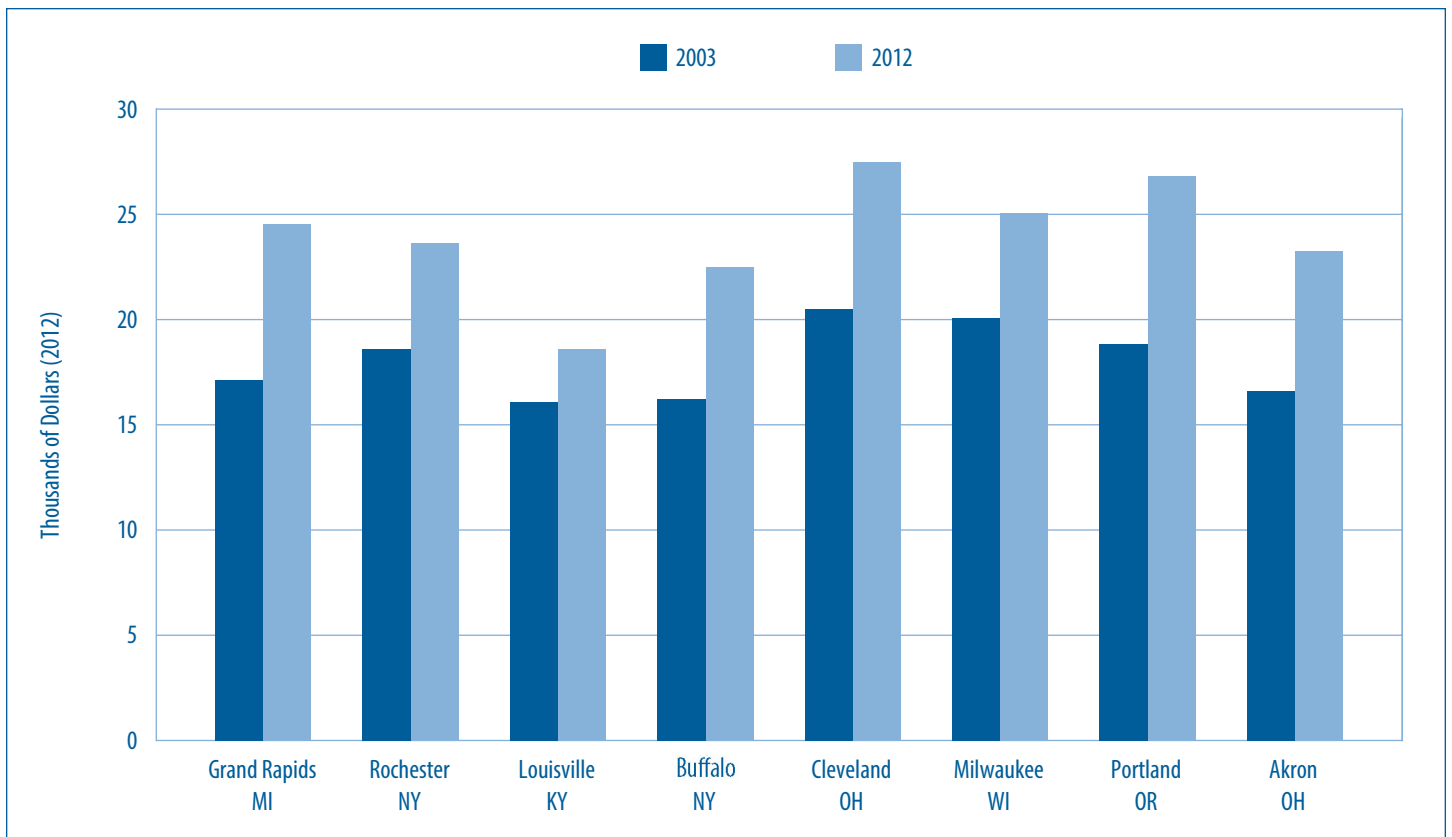
Figure 13: Adjusted Medicare Expenditures per FFS Enrollee
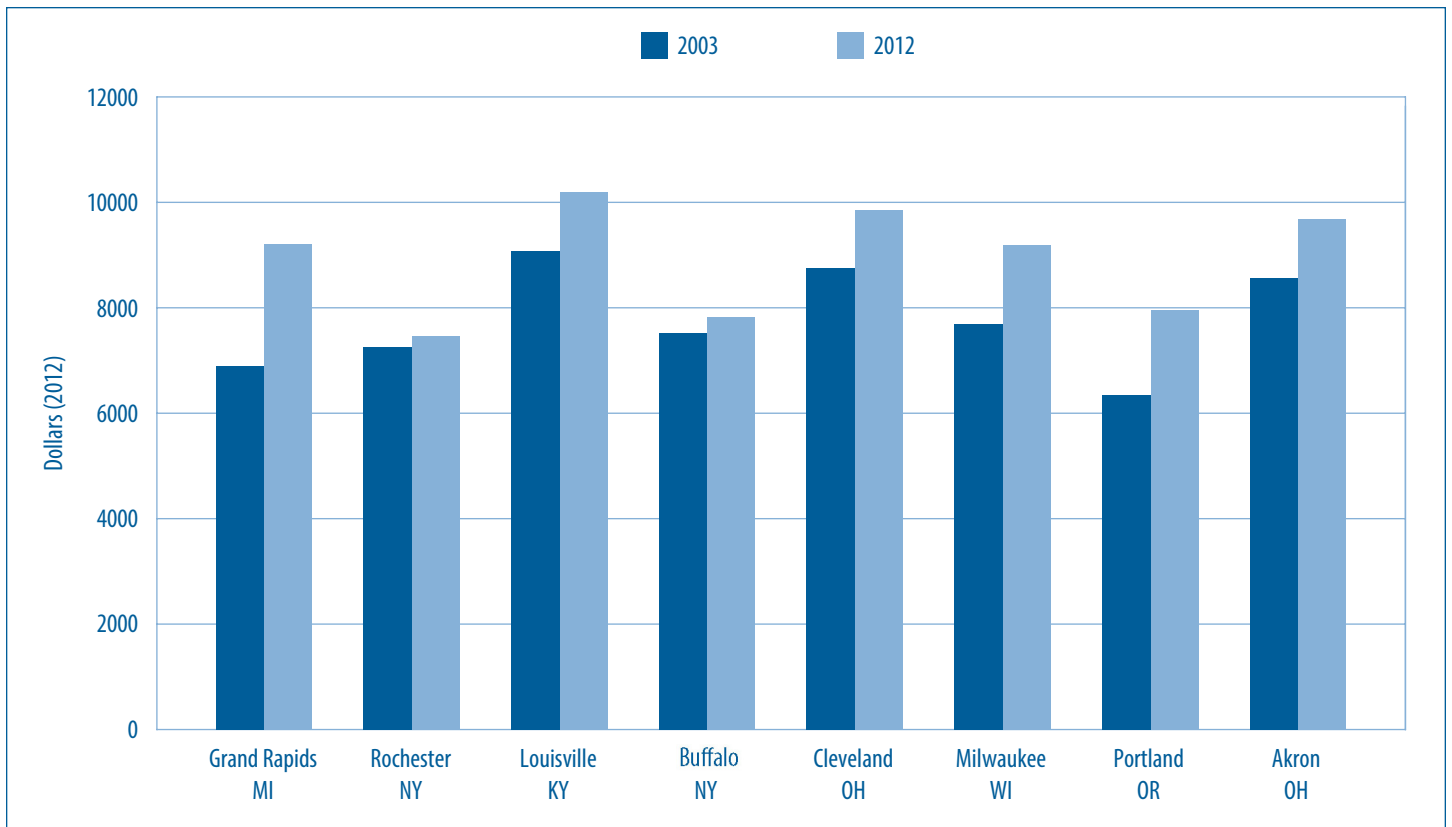
Figure 14: Adjusted FFS Medicare Expenditure Growth Rate, 2003–2012
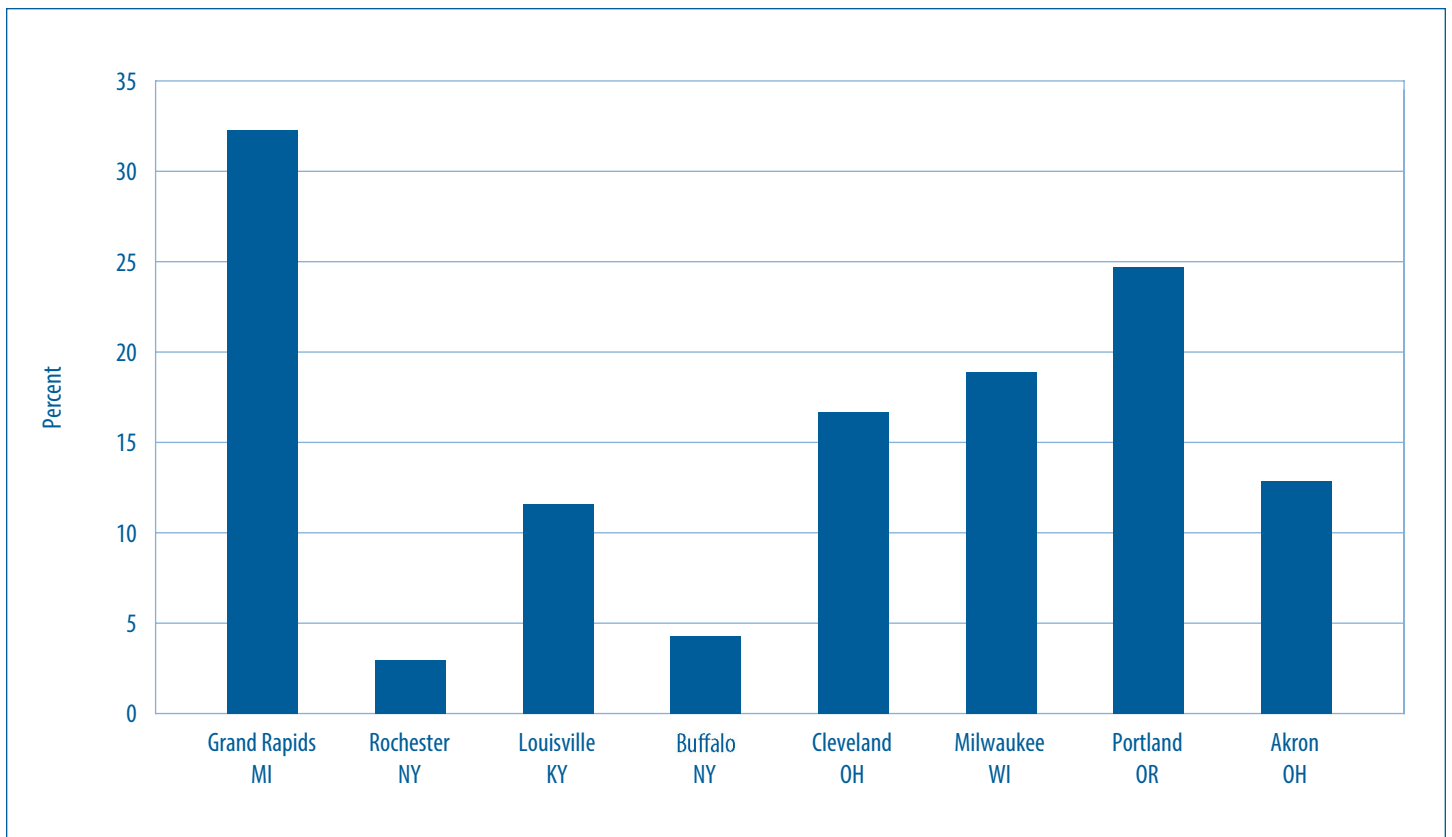
Figure 15: Percent of FFS Diabetics Age 65-75 with Hemoglobin A1C Test, 2011
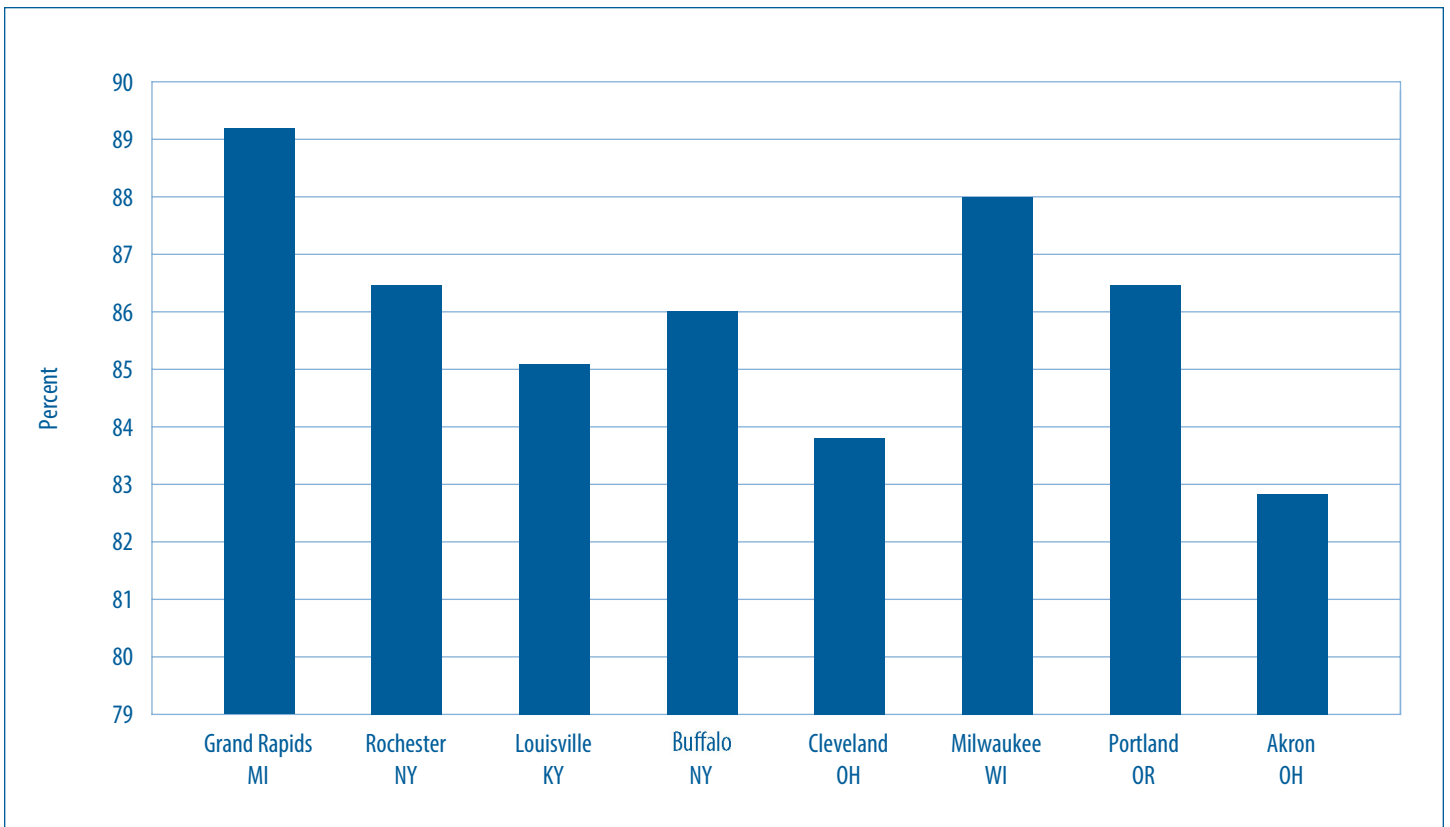
Figure 16: Leg Amputations per 1,000 FFS Medicare Enrollees, 2011
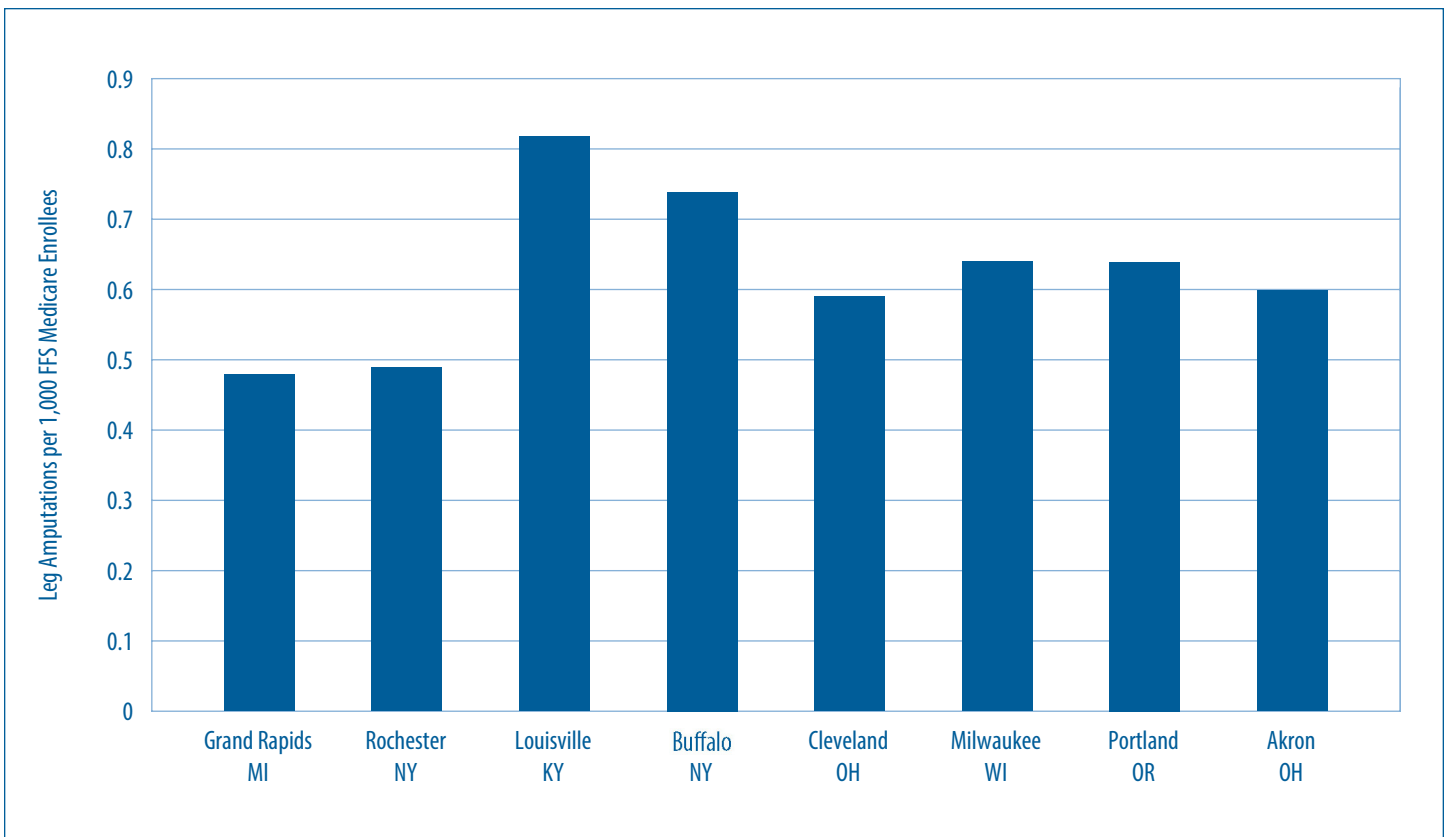
Figure 17: Discharges for Ambulatory Care Sensitive Conditions per 1,000 FFS Medicare Enrollees, 2011
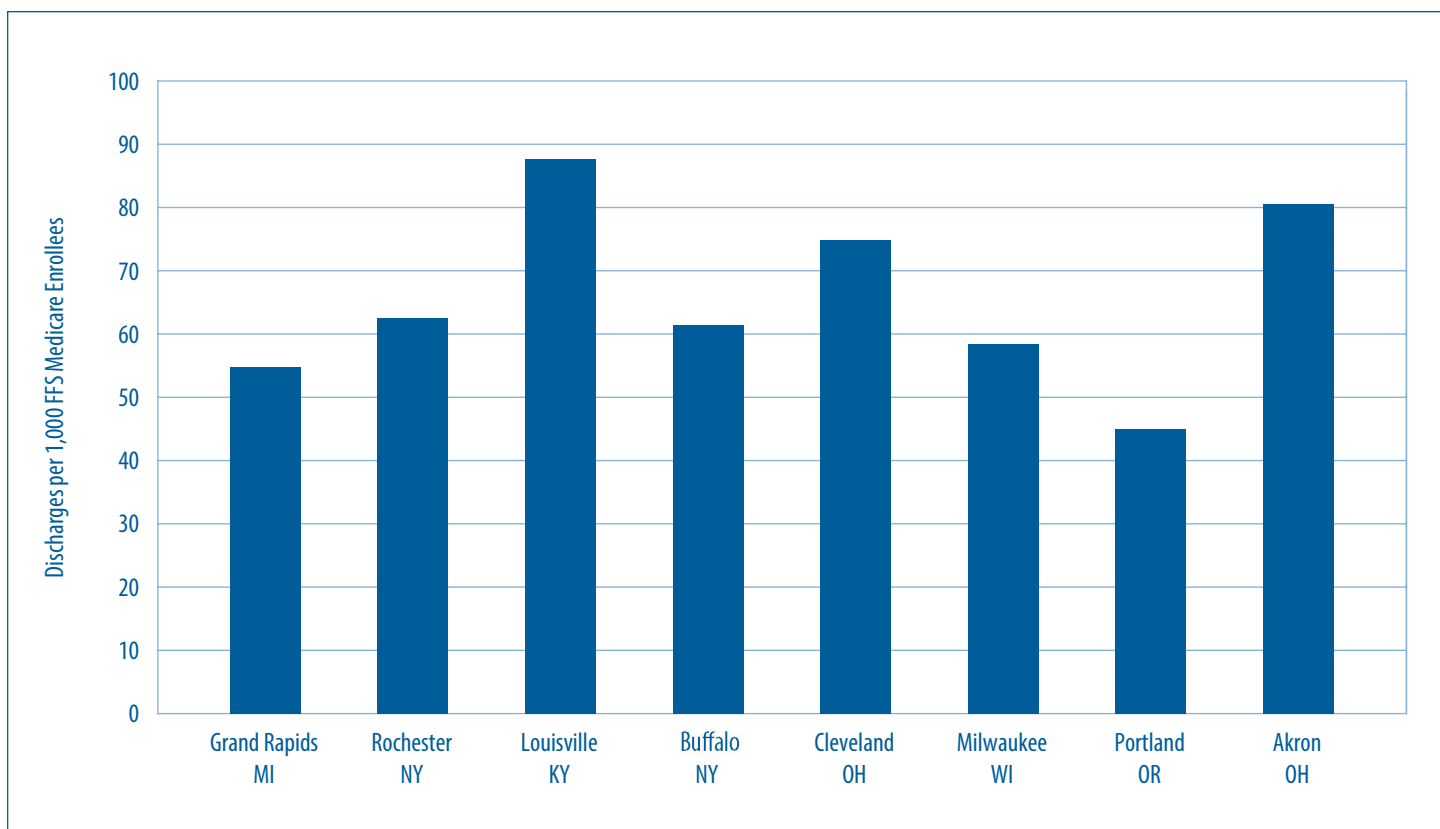
Figure 18: Percent of Medicare Part D Enrollees Filling Beta-blocker Prescriptions in the First Six Months Following a Heart Attack, 2008–2010
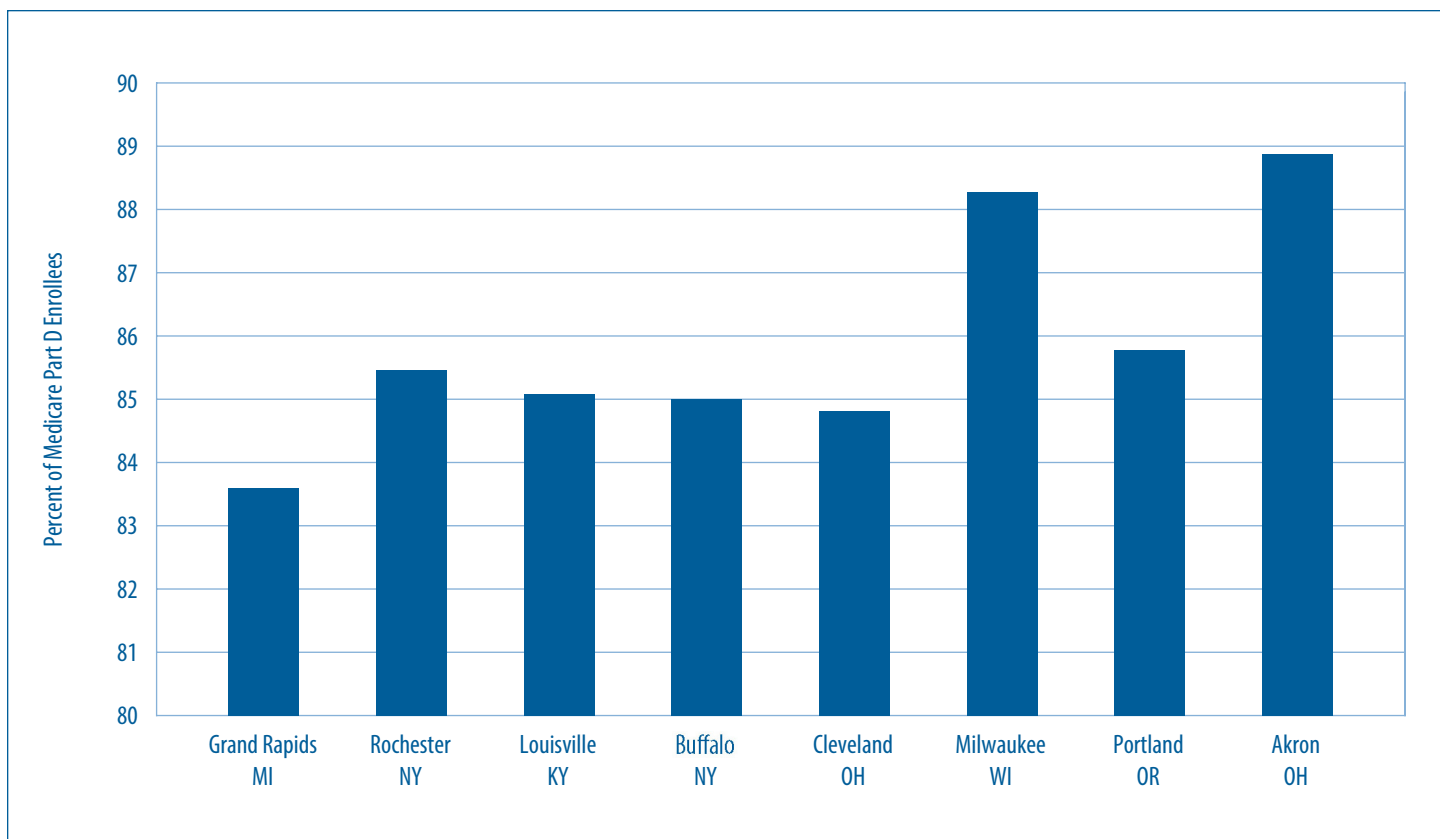
The Affordable Care Act and Primary Care Physicians in Michigan

In 2010, the Affordable Care Act (ACA) was passed by the U.S. Congress. Since then, the various parts of the act have been rolled out. In October 2013, the private insurance exchanges opened to the public. All individuals, regardless of employment status, became eligible to purchase health insurance from participating private insurance companies. Federal subsidies also are available to assist those with income below 400 percent of the poverty line. One of the goals of the exchanges is to increase the percentage of Americans with health insurance and, in doing so, incentivize more individuals to seek preventative medical care.

In April 2014, Michigan expanded Medicaid to adults without children and individuals living at up to 138 percent of the poverty line. The hope is to close the gap in health coverage at the bottom of the income distribution, since many people still cannot afford the exchange plans. As of September 2014, 400,000 people have been newly enrolled in Medicaid (*Detroit News*, 2014).

Information on how patients are fairing under the law is readily available. However, there is not a lot of information on what changes primary care physicians (PCPs) are experiencing in their practices. One of the concerns is that the influx of new patients will overwhelm the existing shortage of PCPs, leading to less time with patients and an overall increase in hours worked. In addition, given that many of these patients have Medicaid, finding a physician to take them may be difficult. The amount of administrative work and finding a referring physician in the relatively narrow exchange market are also issues that have been raised.

To find out how Michigan PCPs practices may (or may not) be changing, we distributed a survey to a random selection of PCPs in KOMA, Kalamazoo, Ingham, and Eaton counties in September 2014. We received a total of 50 survey responses. The survey is comprehensive and asks questions related to opinions of the ACA, specific changes within the practice, acceptance of new Medicaid patients, and participation in the exchange networks.

Figure 1 shows physicians' opinions of the ACA as compared to a year ago. Sixteen percent of physicians said their opinion is more positive now; 49 percent said it is more negative; and 33 percent said it is neither more positive nor negative. Michigan physicians appear to have a more favorable view of the ACA as compared to physicians nationally, as 61 percent said their view was more negative, with only 8 percent saying it was better (Coker, 2013).

We also asked physicians about specific changes in their practices. **Figure 2** shows three areas in which at least a quarter of physicians reported changes due to the ACA. Twenty-five percent of doctors said patient volume has increased, while 33 percent report that administrative work increased. In addition, due to the somewhat narrow networks of participating physicians in the exchange plans, 29 percent have had more difficulty making referrals.

Figure 3 shows the areas in which the ACA has resulted in little change to physician practices. In the time leading up to the opening of the exchanges, there was a concern that doctor's offices would see a large uptick of patients with chronic illness, due to the lack of preventative care when patients were uninsured. This concern has not come to fruition, with only 13 percent of physicians reporting an increase in these types of patients versus 72 percent who have seen no change. Similarly, 70 percent of physicians have not seen a decrease in the time spent with their patients.

Because of the existing shortage of PCPs before the ACA was enacted, there was the expectation that the use of registered nurses (RNs) and physician assistants (PAs) would significantly increase with the law. However, only 12 percent of survey respondents have attributed an increase in the use of RNs and PAs to the ACA, while 20 percent have cited other reasons for this increase. Seventy-one percent have seen no changes (**Figure 3**).

Another expectation with the increased coverage was an increase in preventative or wellness checkups. **Figure 3** shows that only 8 percent of physicians have seen an increase in these services due to the ACA, with 82 percent seeing no changes at all. These numbers could mean that the newly insured are not taking advantage of the free preventative care offered under the ACA, or it is just simply too early after implementation to see the numbers increasing.

Most new patients will come from the exchanges or Medicaid. Are physicians participating in the exchange networks or accepting new Medicaid patients? The numbers are mixed. **Figure 4** shows that while 10 percent of physicians have increased their Medicaid loads, 13 percent have limited their number of Medicaid patients, and 67 percent have made no changes. Finding a physician participating in the exchange networks could prove more difficult. While 49 percent of PCPs are currently participating or are planning to participate, 31 percent are not and do not plan to participate (**Figure 5**).

Overall, the rollout of the ACA exchange and the Medicaid expansion have not changed physician practices to a great extent. The areas in which there are some effects are in overall larger patient volume, more administrative work, and difficulty finding a referring physician. Furthermore, individuals covered under Medicaid should not see a significant change in physician accessibility, with only a small percentage of practices limiting new Medicaid patients.
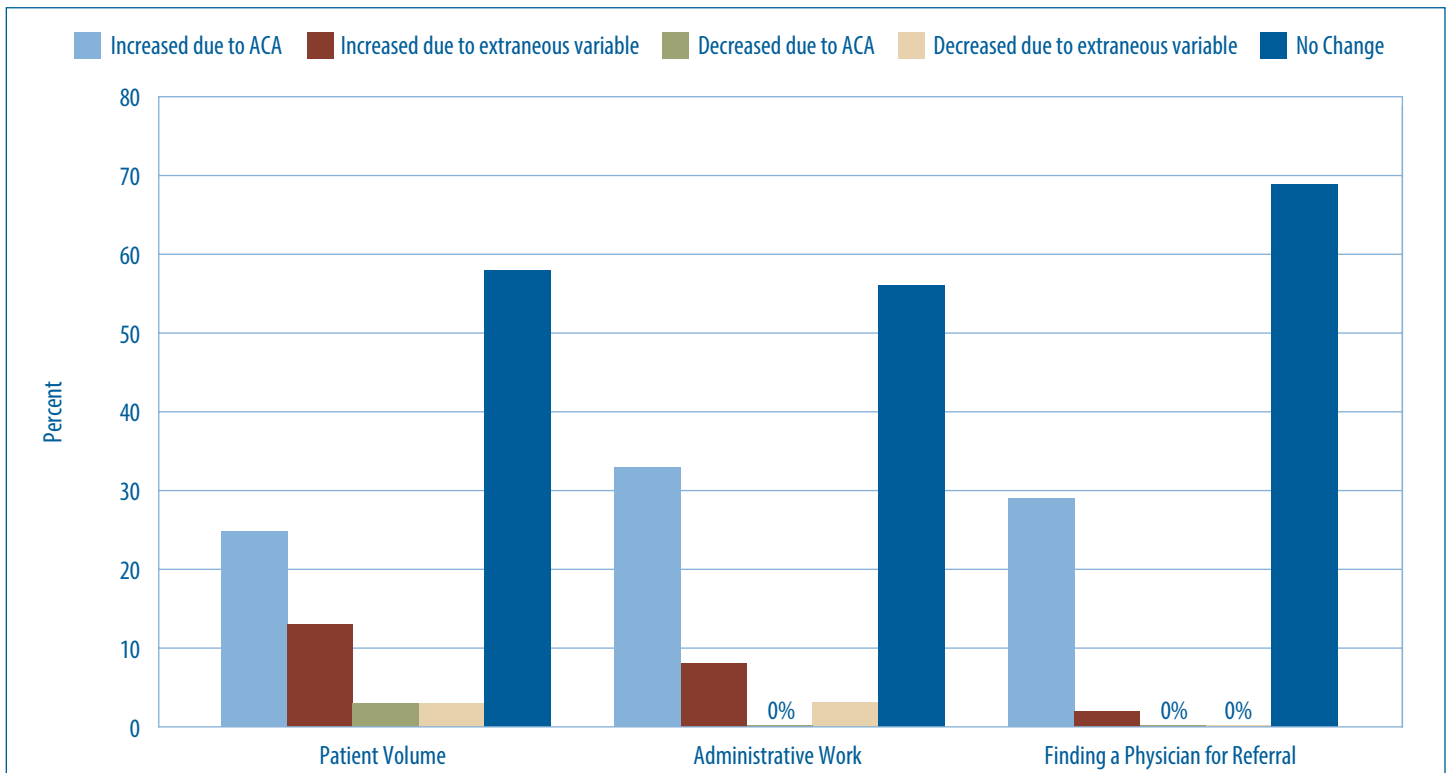
References:

Detroit News. New Medicaid Enrollment Exceeds 400,000. September 25, 2014. Retrieved October 10, 2014 from http://www.detroitnews.com/story/news/politics/2014/09/25/new-michigan-medicaid-enrollment-exceeds-k/16209081/

Jackson Coker. 2013. *Physicians on the Affordable Care Act.* Industry Report.

[1] See *Commonwealth Fund Affordable Care Act Tracking Survey* (2014)

[2] Many physicians already limit their Medicaid patients due to extremely low reimbursement rates from the government.

Figure 1: Physician Perceptions of the Affordable Care Act

Neither positive nor negative
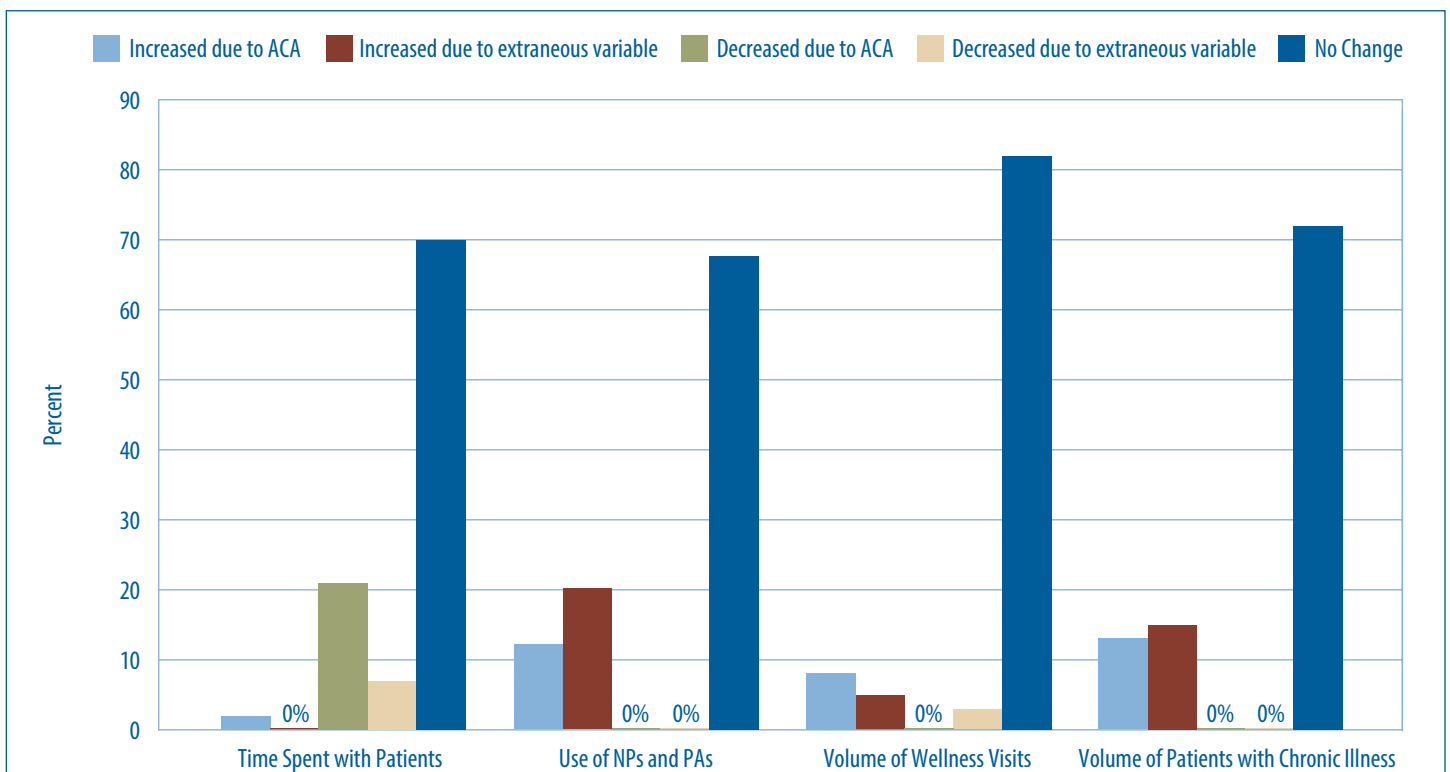33%

Positive
18%

Negative
49%
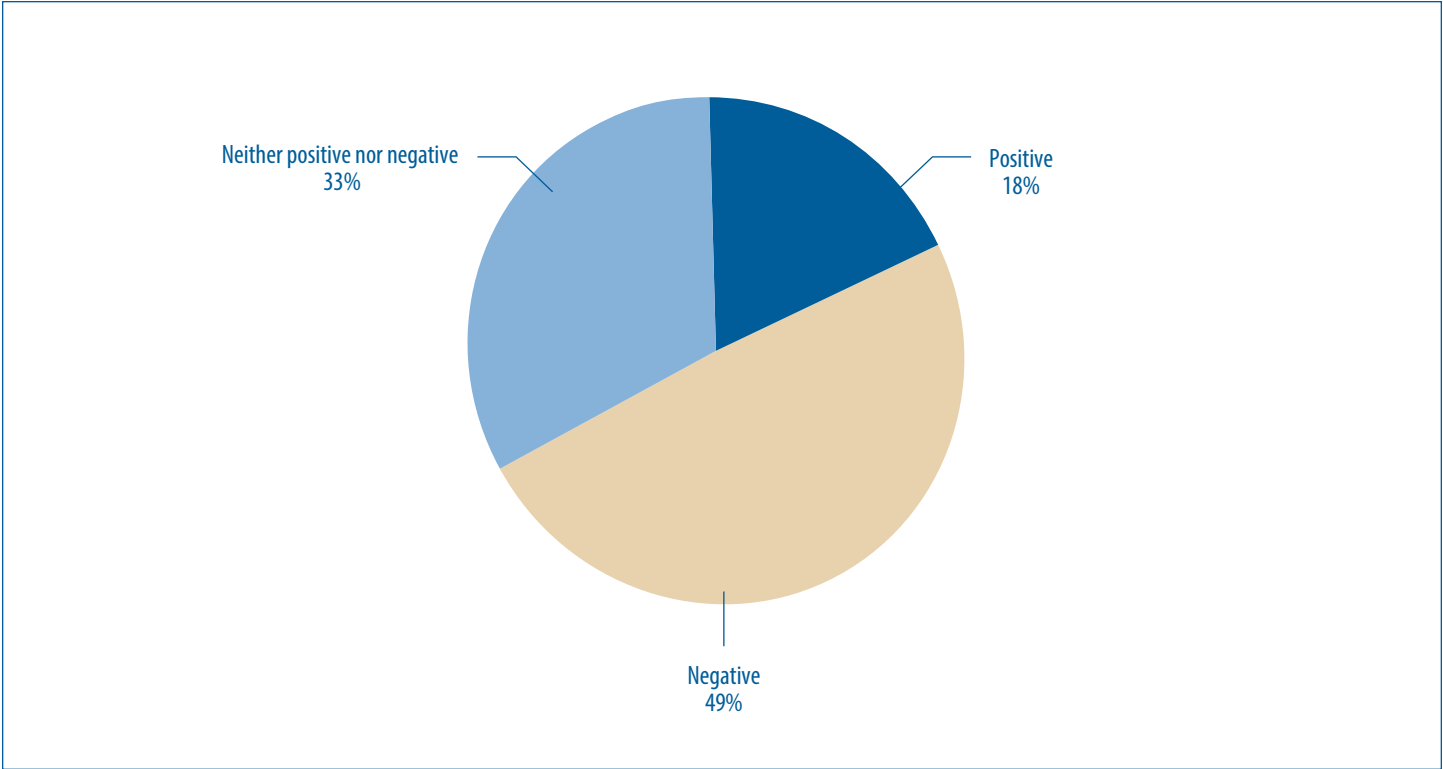
Note:
Data based on 38 observations.

Figure 2: Changes to Physician Practices Due to the Affordable Care Act

Legend: Increased due to ACA · Increased due to extraneous variable · Decreased due to ACA · Decreased due to extraneous variable · No Change

Y-axis: Percent (0–80)

Categories: Patient Volume, Administrative Work, Finding a Physician for Referral

Note:
Patient Volume and Administrative Work data are based on 34 observations. Finding a Physician for Referral data is based on 36 observations.
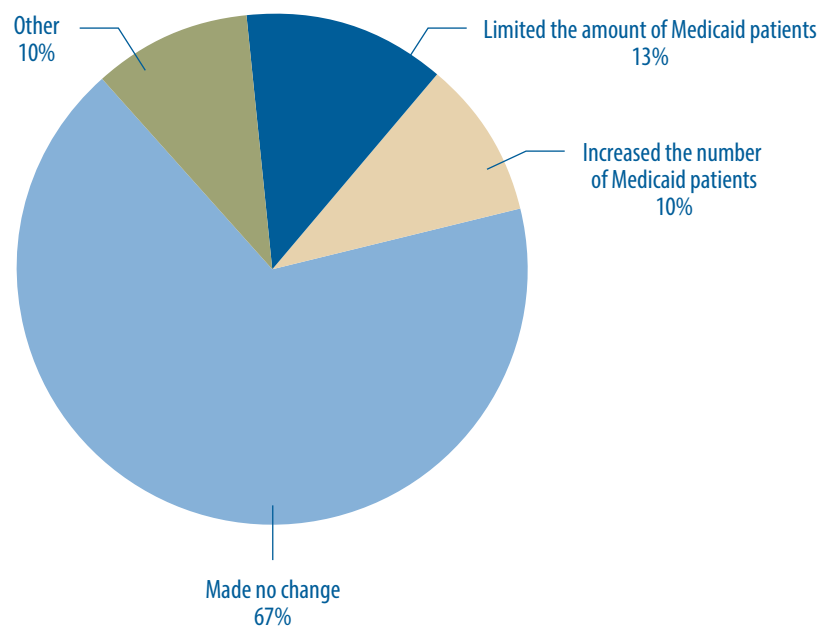
Figure 3: Changes to Physician Practices Because of the ACA

Legend: Increased due to ACA · Increased due to extraneous variable · Decreased due to ACA · Decreased due to extraneous variable · No Change

Y-axis: Percent (0–90)

Categories: Time Spent with Patients, Use of NPs and PAs, Volume of Wellness Visits, Volume of Patients with Chronic Illness

Note:
Time Spent with Patients data is based on 36 observations. Use of NPs and PAs and Volume of Wellness Visits data are based on 35 observations. Volume of Patients with Chronic Illness data is based on 34 observations.

Figure 4: Changes Made to Physician Practices Because of the Medicaid Expansion

Other
10%

Limited the amount of Medicaid patients
13%

Increased the number
of Medicaid patients
10%

Made no change
67%

Note:
Data based on 40 observations.

Figure 5: Participation in the ACA Health Exchange Networks

Undecided
24%

Not participating, and
do not plan to do so
27%

Planning on participating,
but not currently participating
10%

Currently Paricipating
39%
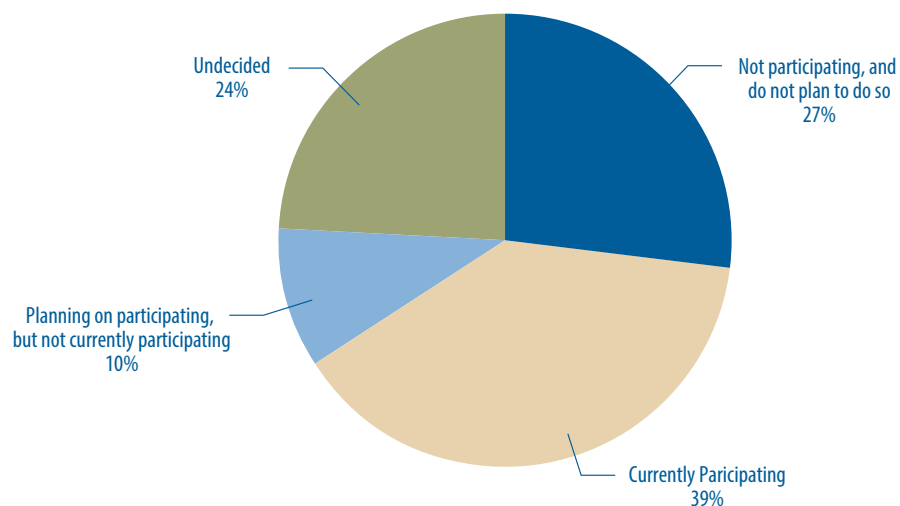
Note:
Data based on 36 observations.

Major Medical Conditions: Cost Analysis

This year, this section will again look at the costs of major medical conditions, as well as take a deeper look at diabetes testing and its effect on costs. This analysis provides general information about some of the most common medical conditions to assist with focusing community resources to improve the health of the community. The long-term purpose of this analysis is to identify the medical cost of high-cost diseases and to determine ways to reduce the main drivers of costs for each disease.

The data presented here is an average from Priority Health (PH), Blue Care Network (BCN), and Blue Cross/Blue Shield of Michigan (BCBSM) for the year 2013. The following factors can result in significant differences between PH and BCBSM:

- **Differences in benefit structures.** The cost data for PH, BCN, and BCBSM is different in part because the former two are primarily HMOs and the latter is primarily a PPO. Typically, the benefit structure for an HMO is different compared to a PPO. In an HMO, because all services are provided by the Primary Care Physician (PCP) or a PCP referral, patient care is generally managed by more effective triage. Also, in most cases, there is no patient responsibility after an annual deductible has been reached. In a PPO, the patient generally is responsible for paying a higher out-of-pocket percentage of total costs, subject to a maximum cap. The fixed overhead and coordinating expenditures of each organization are not included in the average cost per patient. The data presented here show the dollar cost paid by both the insurance plan and the patient for medical services.

- **Disease selection.** The patient mix for specific conditions might be quite different due to differences in demographics, behavioral profiles, and health and disease status. In other words, patients in some counties insured by one provider may be sicker than patients in other counties who are insured by a different provider. In addition, during the study period, BCBSM was regarded as an insurance of last resort which may affect their cost data.

- **Expenditures beyond disease.** In each case, the average patient cost data is for services not only related to the disease for the patient, but also for other medical costs the patient may have incurred. Differences in these other costs also can result in variation in average patient cost data.

The data from each insurance company can vary considerably because of these factors. Thus we average the data for all three companies to arrive at a more robust estimate.

Overall Analysis

This year there are six conditions that rank among the most costly diseases for insurance providers. **Table 1** provides the average cost per patient, based on information from all three providers, for each of the six diseases. The average cost is higher for coronary artery disease (CAD) and diabetes because those two conditions require a much greater intensity of services for treatment — and those services are higher-cost services.

Table 1: Estimated Cost for the KOMA Population Over 20 and Under 65 Years Old

Condition	Average Cost per Patient 2013	Average Cost per Patient 2012	Prevalence Rate	Estimated Total Cost
Asthma	$6,380	$6,209	1.9%	$83,903,756
Coronary Artery Disease	$20,295	$16,300	2.4%	$337,137,780
Depression	$9,775	$9,744	9.0%	$608,928,640
Diabetes	$10,861	$10,779	7.4%	$556,299,486
Hyperlipidemia	$7,109	$8,321	23.9%	$1,176,016,839
Low Back Pain	$4,311	$4,065	5.3%	$158,147,022

The average cost per patient from 2013 is provided for all six of the conditions. The diagnostic codes used to identify conditions evolved once again in 2014, so comparisons between years may not be consistent because the criteria were updated this year. In addition, a change in cost can be attributed to many sources: the population with the condition, costs of treatment, the coexistence of other conditions, and the intensity of the condition. Therefore, a change should not be thought of as a change in cost for treating that specific condition, but a change in the average cost for people with that condition.

As a result of a change in our data analysis and data specifications, this year's data allowed for more accurate prevalence rates. This year, the average prevalence rate from PH, BCN, and BCBSM was used, avoiding the need to use CDC survey data; therefore, the prevalence rate more accurately represents the 18-64 age group.

The total cost burden of each condition in the KOMA area was calculated. For each condition, the prevalence rate is applied to the population between ages 20 and 64 to estimate the number of people with the condition and then a total cost estimate is generated for the entire KOMA region. Applying more accurate numbers to only the population between ages 20 and 64 provides a better snapshot of that population, but will likely understate the overall costs for the entire population.

What is striking about hyperlipidemia (high cholesterol) is that although it is the most costly disease (nearly $1.2 billion), its high cost comes from its high prevalence rate and not from the average cost per patient. Hyperlipidemia as well as diabetes and CAD are directly linked to obesity, so the prevalence of those three diseases is tied to increasing obesity rates. Finally, this year the cost of depression continues to place second among the six conditions.

To find an overall cost for the six conditions, two factors need to be taken into account. First, an individual with asthma might also have other conditions (like CAD). Second, even healthy people have health care costs. Using costs for each condition for people who do not have the other conditions results in costs that are between 60 and 85 percent of the cost for all people with the condition. This is because some people have multiple conditions. In addition, for males between the ages of 30 and 40, (a segment that tends to use the health care system in a limited way), average annual health care expenditures were $1,563. Adjusting the total costs for these two factors results in an estimated cost for all six conditions in KOMA of $970 million. This compares to worker compensation (according to the Bureau of Economic Analysis for 2012) in KOMA of $29,877 million. Therefore, the cost associated with treating these six common conditions accounts for three percent of total compensation for the working age population.

It is important to note that these social costs do not specifically estimate the average cost of the disease for individuals who are over 65 years old. Since the disease costs for individuals over 65 years are likely to be higher, both per patient cost and the social cost estimates should be regarded as conservative and understated. These numbers are preliminary and should be viewed with caution since they are sensitive to the prevalence rate in a particular year.

From a public policy point of view, two insights emerge. First, one primary method we can employ to reduce the overall social costs is to reduce the prevalence of diabetes and hyperlipidemia (related to obesity) and asthma (related to air pollution).

Second, we can try to lower the costs of CAD primarily by reducing the cost of treatment, as well as trying to lower the long-term prevalence rate. For diabetes, hyperlipidemia, and asthma, the primary driver seems to be the prevalence rate. For CAD, the primary driver is the cost of treatment. However, costs can be reduced by lowering both the prevalence rate, as well as the cost of treatment.

Differences in Total Annual Cost per Patient Between KOMA and the Detroit Region

Figure 1: Major Medical Costs
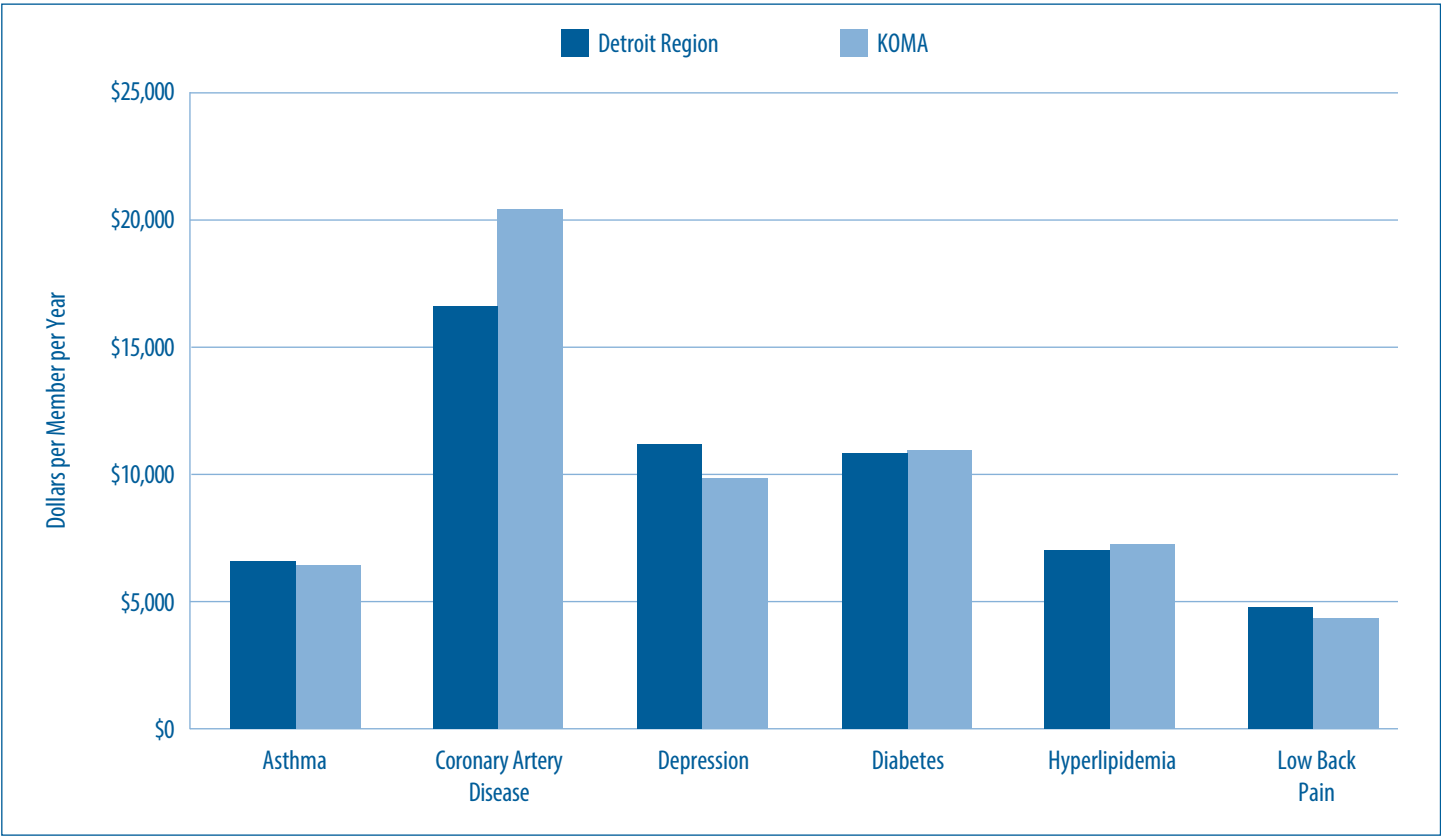
It is interesting to make a comparison between KOMA and the Detroit region. In all figures, the costs shown include either actual pharmacy costs or an average pharmacy cost allocated to individuals without pharmacy coverage.

Last year (2012), all conditions were more expensive in the Detroit region compared to KOMA. This year, coronary artery disease is substantially more expensive in KOMA. Two conditions, diabetes and hyperlipidemia also have averages more expensive in KOMA, but are not statistically significant. Costs for CAD also were higher in KOMA in 2011, but the current gap is more than double the difference seen at that time.

In addition, there are different prevalence rates across KOMA and the Detroit region as seen in **Figure 2**. The prevalence rates for hyperlipidemia and CAD are higher in the Detroit region with all other conditions having higher prevalence rates in KOMA. This suggests a greater focus on heart disease is necessary in the Detroit region.

One reason for this difference might be a result of the lifestyle choices outlined earlier in the Health Overview section. People in the Detroit region are more likely to have no leisure time physical activity, be obese, smoke, and have no health care coverage than people in the KOMA region.

**Figure 2: Prevalence Rates of Insured Population**
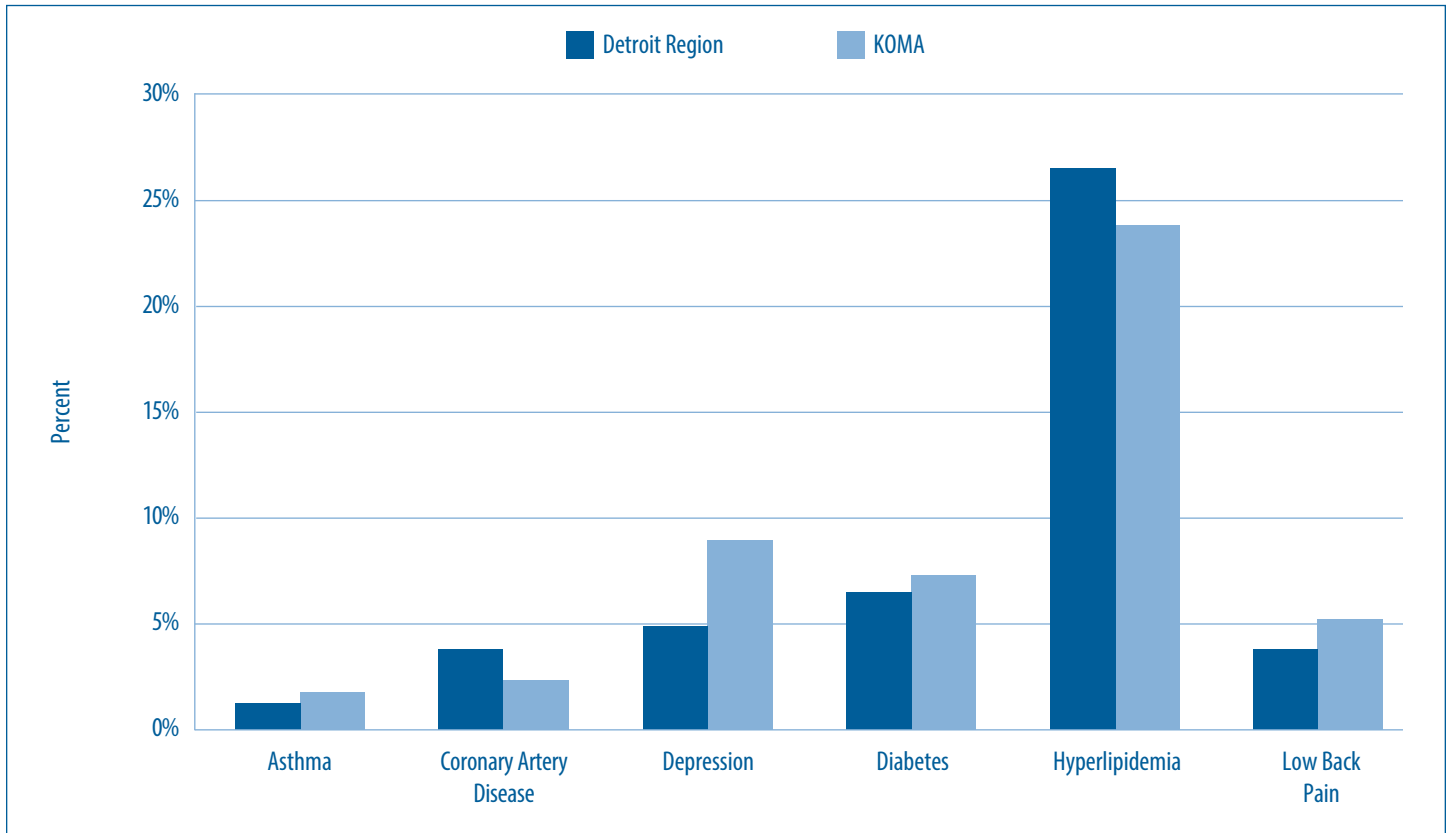
Diabetes Testing and Influence Over Cost

Patients with diabetes have higher annual medical costs due to the nature of the disease and the complicated interactions the disease has with other medical conditions. To identify cost-saving measures, we analyzed data on diabetic testing from each of the three insurers. Adjusted for differences in risk status, those patients who had their HbA1c level checked had an average annual cost of $9,946, whereas those who did not have the test had an average annual cost of $12,669. That is a difference of $2,273. Those patients who had the LDL-C test (cholesterol) had an average annual cost of $9,839, whereas those who did not have the LDL-C test had an average annual cost of $12,489. Patients who were tested for nephropathy had an average annual cost of

$10,373, and those who were not tested for nephropathy had an average annual cost of $9,775. The average annual cost for patients who received all three tests decreased by $1,752 or 15 percent. This improvement has increased compared to previous reports suggesting increased effectiveness of testing diabetic patients for complications and for monitoring their health status. Currently, 64 percent of diabetics covered by the three insurers receive all three tests. The cost savings associated with testing adherence suggest that if the remaining 36 percent of diabetics received all three tests, potential savings in the KOMA region would total $32.7 million.

Figure 3: Average Annual Cost Per Patient with Diabetes
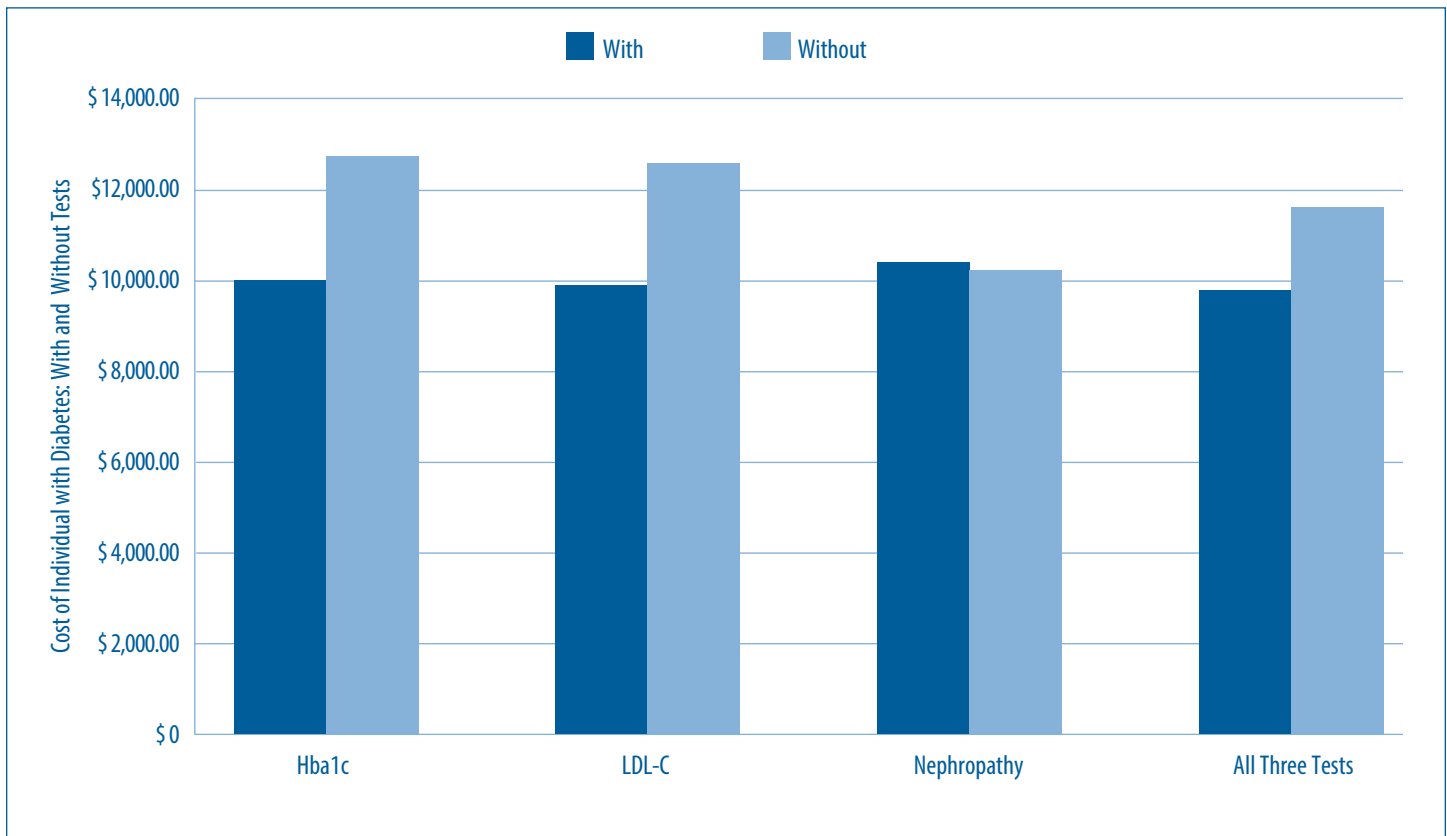
Sources of Variation

Cost differences between KOMA and the Detroit region can occur for many reasons: differences in the underlying health of the population, cost of living, access to health care, and cultural differences regarding how to access health care. In addition, depression has considerable variation in diagnosis and treatment. More detailed investigation is required to determine the precise source of the differences.

It is not surprising that higher prevalence of a disease drives up the total overall costs for that disease. The overall cost and prevalence of a disease between KOMA and the Detroit region may be due to differences in age as well as behavioral factors such as exercise, nutrition, smoking, alcoholism, and drug use. Since we are not able to control for these factors, it is best to rely on aggregate data so that most of these factors can balance out in a large sample.

It is important not to draw any quick conclusions given all the different sources of variation, caveats, and high level of aggregation in the data.

In the future, it will be interesting to compare average costs over time to examine how they are responding to an aging population. County level average cost data is too broad a measure to draw any reliable conclusions about what drives up individual medical costs. *Linking individual cost data with specific risk profiles* can help us more narrowly identify what specific behavioral factors are influencing health costs.

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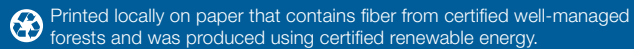
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