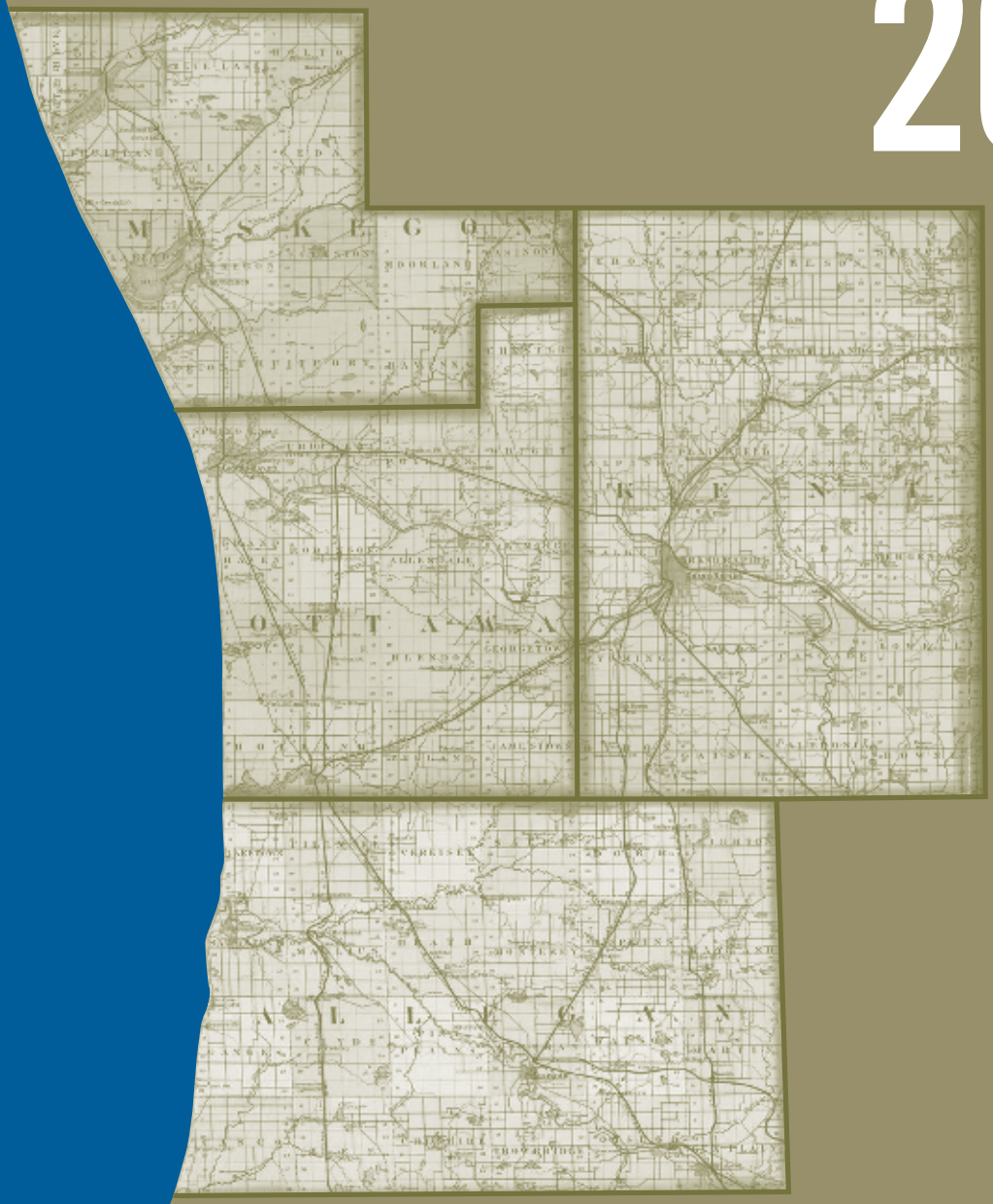
KENT COUNTY OTTAWA COUNTY MUSKEGON COUNTY ALLEGAN COUNTY

Health Check

ANALYZING TRENDS IN WEST MICHIGAN

2018



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Grand Valley State University

Health Check:
Analyzing Trends in West Michigan 2018

Kevin Callison, Ph.D., School of Public Health and Tropical Medicine
Tulane University

Leslie Muller, Ph.D., and Gerry Simons, Ph.D., Seidman College of Business
Grand Valley State University

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GRAND VALLEY STATE UNIVERSITY
OFFICE OF THE VICE PROVOST FOR HEALTH

January 12, 2018

Dear Colleagues,

I am pleased to present the ninth edition of *Health Check: Analyzing Trends in West Michigan for 2018.* This analysis presents critical health-related information to support decision making of regional health care, government, education, and business leaders. This publication is a rich collaboration between Grand Valley's Office of the Vice Provost for Health and our partners: the Seidman College of Business, Blue Cross Blue Shield of Michigan, Blue Care Network, and Priority Health.

The report, as in the past, examines changes in education and job growth, medical patents, demographics, and health care trends. National and state-wide data are compared with regional data to identify significant health-related trends and issues facing Kent, Ottawa, Muskegon, and Allegan (KOMA) counties. New this year, we utilized data on health insurance, primary care, and health care affordability from the annual VoiceKent community survey.

The data shows that West Michigan continues to experience job growth in the health sector, out-pacing both the state and national numbers. The education sector is on track to meet or exceed the demands of this projected growth.

The cost of health care continues to be a concern for over half of those surveyed. While the national discussion on health care continues, our data show that the number of uninsured has fallen to 9.9 percent in 2016 from 18.3 percent in 2011. While the uninsured rate is down, health care and prescription costs remain problematic. Other barriers to health care that were identified include the inability to find childcare, lack of transportation, and a fear or mistrust of the health care system.

Among findings that might call for further consideration is a significant decrease in medical patents since 2014, with only a small number of companies involved in medical patent innovation. Additionally, while West Michigan population growth continues to exceed state and national rates, slight decreases indicate a slowdown of migration to the KOMA area.

The health behaviors of our communities remain a principal force in the determination of services, programs, and costs of care for our region. Obesity and heavy drinking remain key factors in general population health risks. We also note an increase in the number of residents who are in fair to poor health or disabled.

We hope that continuing to provide these data annually facilitates better understanding of how health behaviors, growth trends, and health care access can impact our decisions and strategies for addressing health care issues in our region. We believe that the continued development of strong collaborations across sectors can help us to provide cost-effective, patient centered care, reduce social barriers, and develop a population health strategy that leads to improved outcomes. We would appreciate any feedback about your use of *Health Check* and recommendations regarding how we can make this publication even more useful to your organization.

Respectfully,

Jean Nagelkerk
Vice Provost for Health

Cook-DeVos Center for Health Sciences • 301 Michigan Street, N.E. • Grand Rapids, MI 49503-3314 • (616) 331-5500

Acknowledgments

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The publication authors especially thank **Spectrum Health, Priority Health, Blue Care Network,** and **Blue Cross Blue Shield of Michigan** for providing the average health care cost data. In particular, the following persons were invaluable for providing timely feedback and suggestions: Timothy Zeddies, Ph.D., M.H.S.A., vice president, System Analytics and Data Governance, Spectrum Health; Ines Vigil, M.D., M.P.H., M.B.A., vice president, Analytics and Improvement, Priority Health; Todd Osbeck, director, Advanced Analytics, Priority Health; Kathy Kulanda, executive assistant, Priority Health; Marla Tribble, data analytics analyst, Priority Health; Jian Yu, chief actuary officer and senior vice president, Advanced Analytics, Priority Health; Denice M. Logan, D.O., FACOI, west region medical director, Blue Care Network; David O. Brown, director, Provider Relations West Michigan, Blue Cross Blue Shield of Michigan and Blue Care Network; Steve Wanjiku biostatistician, Blue Cross Blue Shield of Michigan; Shlynn Rhodes, administrative manager, Blue Cross Blue Shield of Michigan; Min Tao, director, Clinical Epidemiology and Biostatistics, Blue Cross Blue Shield of Michigan; and Niketa Walawalkar, epidemiologist, Clinical Epidemiology and Biostatistics, Blue Cross Blue Shield of Michigan.

We are deeply indebted to Nancy Crittenden, marketing communications manager; Rick Luce, creative services manager; and the staff of Institutional Marketing at Grand Valley State University for their diligence, hard work, and timely responses to deadlines.

We thank all the participants in the hospital survey for their time and effort.

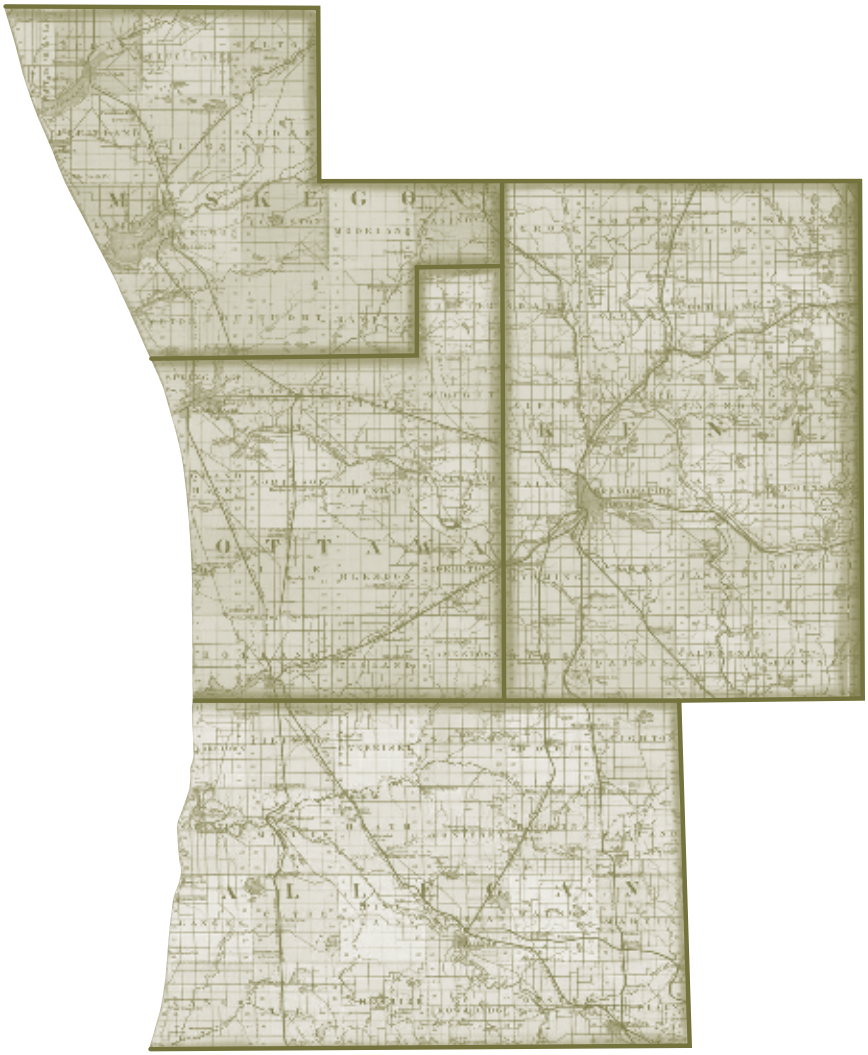
All the data used in this project (except the hospital survey and the insurance data) are based on primary and secondary sources. We acknowledge our data sources in each section by listing source information. Sometimes these sources are not duplicated or specifically cited in text discussions to preserve readability.

We are particularly indebted to the following organizations for use of their publicly available data:

- American Hospital Association (AHA)
- Behavioral Risk Factor Surveillance System (BRFSS), based on CDC protocol and the Michigan BRFSS
- Bureau of Labor Statistics (BLS)
- Center for Disease Control (CDC)
- Institute of Medicine of the Academies
- Michigan Department of Community Health (MDCH)
- Michigan Health and Hospital Association (MHHA)
- Michigan Labor Market Information (milmi.org as part of michigan.gov)
- U.S. Census Bureau
- U.S. Department of Health and Human Services (ARF file 2011–2012)
- United States Patent and Trademark Office (USPTO)
- World Intellectual Property Organization (WIPO)

Enrollment and graduation data were collected from websites owned by these colleges and universities:

- Albion College
- Andrews University
- Calvin College
- Central Michigan University
- Cornerstone University
- Davenport University
- Ferris State University
- Grand Valley State University
- Kuyper College
- Michigan State University
- Western Michigan University



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Knowledge Foundations

Education and Job Growth

Since emerging from the recession in early 2010, the U.S. has continued to add jobs each month. Overall, the number of jobs in the U.S. is up more than 10 percent from pre-recession levels in 2005. Although Michigan has not fared as well as the U.S. as a whole, the state has maintained generally positive job growth since 2010, reversing a trend of job losses through much of the 2000s. According to data gathered from the Bureau of Labor Statistics (BLS), job growth in the health care sector has outpaced growth in other industries in West Michigan with the exception of the personal care and service industries. In addition, health care jobs have grown at a faster pace in West Michigan than in either the state of Michigan or the entire U.S. Specifically, large job growth is predicted for physical and occupational therapy assistants, orthotists and prosthetists, and home health aides. We also note high demand for both nurse practitioners and physician assistants. Our analysis indicates that regional educational programs are graduating students at a rate that will meet or, in many cases, exceed projected job growth in many health-related occupations. Finally, we examine wage changes in health-care-related occupations in West Michigan over the past decade and find that physician assistants, dietitians, and physical therapists have seen the largest real wage growth. Alternatively, speech-language pathologists, diagnostic medical sonographers, and home health aides all saw large declines in real wages over the same period.

Medical Patents

There has been an increase in medical patent activity in West Michigan since the 1990s and a growing number of new innovators. Patents assigned in Kent County have increased from an annual average of 6.2 from 1990 to 1999, to 10.3 from 2000 to 2009, and to 13.3 patents from 2010 to 2015. However, behind these averages is a concerning recent development – there has been a significant decrease in the number of medical patents since 2014. In addition, medical patenting in the region is coming from a relatively small number of companies. Because patented medical innovations have a great potential for creating wealth and economic growth in West Michigan, continued R&D support is vital.

Health Care Trends

Demographic Changes

We continue to monitor various trends in population demographics in West Michigan and the Detroit region and compare changes in these trends to national averages. After maintaining an annual population growth rate above 1 percent from 2013 through 2015, the KOMA region saw its population growth rate fall to 0.8 percent in 2016. While still positive, this two-year trend in declining population growth in KOMA may indicate that migration into the area is slowing. Despite this recent downturn, the population growth rate in West Michigan exceeds the national growth rate and the growth rate for the state of Michigan as a whole. After several years of population loss, the state of Michigan has seen positive population growth for five consecutive years while the Detroit region appears to, once again, be experiencing population loss. The Detroit region's population growth rate has been negative for the past two years. Population age distribution trends appear to be holding steady. The proportion of the population over the age of 65 continues to increase both locally and nationally, which will create challenges for the health care system and drive demand for employment in the health care sector.

Health Care Overview

Due to recent changes to the Michigan Behavioral Risk Factor Surveillance System, we were unable to separately identify trends in health access and health behaviors for West and East Michigan and instead focused on the entire state. Over the past six years, we've seen the share of current smokers fall and the proportion of the population who drinks heavily remain constant. We continue to see a growing trend in the share of the population who is obese. Approximately one-third of the state's population is now obese and another third overweight. We document a large decline in the share of the state's population without health insurance.

Due mainly to increases in insurance availability provided through the Affordable Care Act, the share of uninsured Michigan residents has fallen from 18.3 percent in 2011 to 9.9 percent in 2016. This appears to have resulted in improvements in health care access, however nearly 13 percent of the state's population reports difficulties accessing care due to cost. Likely due to the aging demographic of the population, we see the proportion of Michigan residents who are either in fair-to-poor health or disabled on the rise.

Economic Analysis

Benchmarking Communities

Compared to a group of peer communities, we find that hospital admission rates in the Grand Rapids region are relatively low, however outpatient visits to hospitals are high and have grown significantly over the past decade. Emergency department admission rates in Grand Rapids are now above the national average as are total hospital expenses per admission, which could contribute to higher levels of health spending in the region. We find that Medicare expenditures in Grand Rapids are lower than the national average and are significantly below expenditures for Medicare beneficiaries in the Detroit region. We also provide suggestive evidence that these lower Medicare expenditures may be the result of a high level of care coordination in West Michigan.

Employer Health Insurance Survey

This is the second year we are partnering with The Employers Association (TEA) in conducting a survey of TEA member firms. All firms responding to the survey offered at least one health insurance plan to their employees. Preferred Provider Organization (PPO) plans were the most commonly offered plan type again this year, however, the percentage of firms offering them decreased by four percentage points from last year. Companies offering only a high deductible plan stayed constant at 42 percent, while those offering Health Savings Accounts (HSAs) only increased by one percentage point to 55 percent. While HSA offerings have not increased by much this year, the percentage of firms contributing to their employees' HSAs increased by 10 percentage points, from 54 percent to 64 percent. Employers increased their offerings of Health Reimbursement Accounts (HRAs) and Flexible Spending Accounts, by 8 percent and 7 percent, respectively.

Community Survey on Health Insurance, Primary Care, and Health Care Affordability

This year, we were fortunate to work with data from Grand Valley State University's Johnson Center of Philanthropy's annual VoiceKent (formally VoiceGR) survey of Kent County residents. Thirty-one percent of respondents get their health insurance from their employer, 23 percent from Medicaid, and 8 percent from the ACA Marketplace. Only 3 percent of individuals were uninsured at the time of the survey, considerably lower than Michigan's rate of 6 percent. Even with a low uninsured rate, only 74 percent of respondents saw their primary care doctor when they were sick, with 12 percent going to an urgent care center and 6 percent going to the ER. Not surprisingly, primary physician use was very low for the uninsured, with only one-third choosing that avenue. Health care and prescription costs continue to be a major concern for individuals, with 59 percent citing costs as a major barrier to getting care. Other barriers cited include the inability to find childcare (25 percent) and the inability to find transportation (22 percent). Fear or mistrust of the health care system was the reason given by 2 percent of respondents. Furthermore, 20 percent of individuals had difficulty paying medical bills, and 22 percent had difficulty affording prescriptions.

Major Medical Conditions: Expenditure and Utilization Analysis

We used member data provided by Blue Care Network, Blue Cross Blue Shield of Michigan, and Priority Health to examine average annual expenditures for those diagnosed with at least one of the following six chronic conditions: asthma, coronary artery disease (CAD), depression, diabetes, hyperlipidemia, and low back pain. In addition, we have added new data to our analysis this year and are now able to analyze geographic differences in hospital admissions, emergency department (ED) visits, and prescription fills. Understanding that, from year to year, small coding changes may affect the composition of the diagnosis categories, we find that expenditures for all conditions except low back pain have increased this year in KOMA after adjusting for inflation. We document particularly large expenditure increases for those diagnosed with hyperlipidemia and CAD. Expenditures for each of the chronic conditions tend to be higher in the Detroit region than in West Michigan with the exception of CAD. This is the fourth consecutive year of higher CAD spending in KOMA compared to Detroit making it unlikely that this difference is due to random variation. We find that average annual inpatient admissions and the average number of prescription fills are greater in the Detroit region than in KOMA for all six of the chronic conditions we study. Detroit also has higher rates of ED visits for each of the targeted conditions with the exception of CAD. Average annual ED visits for those diagnosed with CAD are nearly identical between the two regions. For the third year, we map variations in health expenditures for select conditions at the zip code level and, for the first time, include maps of variation in hospital admissions, ED use, and prescription fills. In general, the east side of the state contains more high expenditure and high utilization zip codes than the west, but areas to the north and southwest of Grand Rapids are consistently among the highest expenditure zip codes in our sample. We continue to observe a recent increase in high-expenditure zip codes for CAD in Grand Rapids.

Knowledge Foundations

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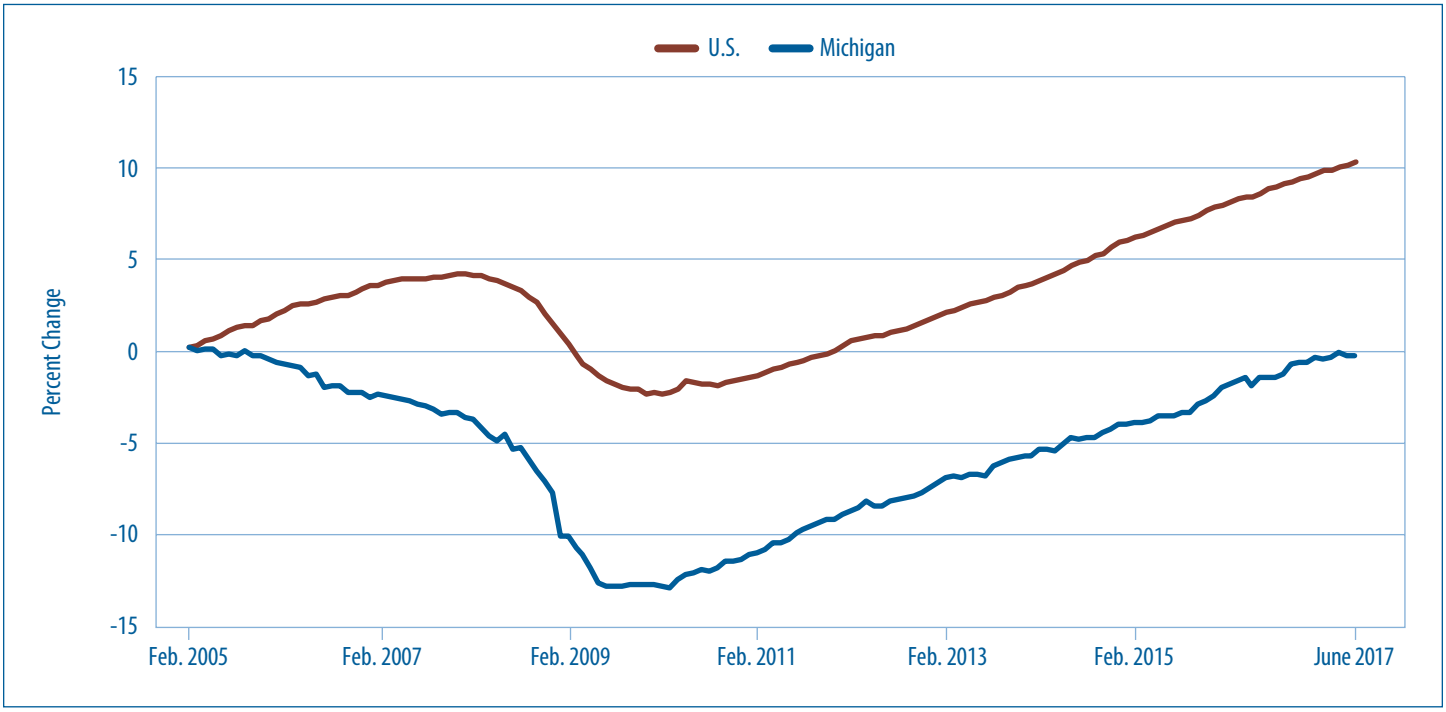
Education and Job Growth

We begin our discussion of trends in job growth by tracking annual changes in total employment for the U.S. and for the state of Michigan. **Figure 1** plots growth in nonfarm payroll jobs from February 2005 through June 2017. Prior to the recession, the trends in job growth for Michigan and the U.S. were diverging. While the U.S. added jobs from early 2005 through late 2007, Michigan lost approximately 3.5 percent of its nonfarm payroll jobs over the same period. The recession in 2008 had devastating effects on job growth for both Michigan and the U.S. At the height of the recession, jobs had fallen by more than 2 percent nationally and by nearly 13 percent in Michigan from their 2005 levels. Despite the divergent pre-recession trends, both the state of Michigan and the U.S. began adding jobs in early 2010. By April 2014, job growth in the U.S. had recovered to its pre-recession peak and has continued to increase. As of June 2017, the number of nonfarm payroll jobs in the U.S. has grown by more than 10 percent since early 2005. Michigan, on the other hand, continues to have slightly fewer nonfarm payroll jobs in 2017 than in early 2005. While this certainly is not a desirable outcome, the trend of relatively consistent job growth since the recession is promising. However, the rate of job growth in Michigan appears to have slowed over the late spring and early summer months of 2017. This data is still preliminary, but should be monitored closely for signs of a potential economic slow-down.

Figure 1: Nonfarm Payroll Jobs Percent Change, February 2005 to June 2017



Source: U.S. Bureau of Labor Statistics, 2016 State Occupational Employment and Wage Estimates

Figure 2 provides a more detailed analysis of employment changes by examining job growth or job losses at the industry level from 2005 to 2016. We plot data for the Grand Rapids metropolitan statistical area (MSA), the state of Michigan, and the entire United States. The Grand Rapids region has experienced significant job growth (> 20 percent) over this period in four occupational categories: personal care and service (79 percent growth), health care practitioners and technical occupations (50 percent growth), transportation and material moving (23 percent), and management occupations (23 percent). Employment in personal care and service occupations is not typically associated with high wages, so robust job growth concentrated in this area may be a cause for concern. Alternatively, Grand Rapids has seen substantial employment growth over the past decade in higher wage occupations categorized by health care practitioners and technical occupations. Local growth in these occupations has surpassed growth rates for the state and for the nation as a whole. In fact, employment for health care practitioners and technical occupations in Grand Rapids grew at nearly three times the statewide rate and at nearly double the national rate since 2005. Employment sectors in the U.S. that suffered the largest job losses over this period include construction and extraction and production occupations, a function of the housing bubble that burst in 2006 and precipitated the recession.

Figure 2: Job Growth for Select Major Occupational Groups, 2005–2016

National 2005: http://www.bls.gov/oes/2005/may/oes_nat.htm
National 2016: http://www.bls.gov/oes/2016/may/oes_nat.htm

Michigan 2005: http://www.bls.gov/oes/2005/may/oes_mi.htm
Michigan 2016: http://www.bls.gov/oes/2016/may/oes_mi.htm

Grand Rapids 2005: http://www.bls.gov/oes/2005/may/oes_24340.htm
Grand Rapids 2016: http://www.bls.gov/oes/2016/may/oes_24340.htm

Given these shifts in employment, we next examined whether universities in the central and western parts of the state are producing students equipped with the required skills to meet the health care sector's growing labor demand.

To analyze this issue, we proceeded in three steps:

1. We obtained the 2024 U.S. Bureau of Labor Statistics (BLS) forecasts for different medical and health care-related professions in Michigan.
2. We undertook an inventory of health services education programs in colleges and universities in the western and central parts of the state.
3. We made specific predictions for employment demand in the Grand Rapids area for several selected health professions.

Table 1 provides the employment projections for a variety of health care occupations identified in the BLS data for Michigan. We compared short-run employment projections for 2018 to projected employment in 2024 and calculated the 10-year employment growth rate. The largest projected growth in employment is in physical and occupational therapy, home health care, and orthotics and prosthetics. We also identified large projected employment growth for nurse practitioners and diagnostic medical sonographers. These projections appear to be heavily influenced by the health needs of an aging population. (See the Demographic Changes section in this publication for further discussion of the implications of the aging demographic in West Michigan.)

Tables 2 through 5 provide data on enrollment and graduation in health-related fields from several central and west Michigan universities. These data are from a number of different programs and, although likely incomplete, represent our best attempt at collecting information on local educational trends.

Table 6 presents employment projections that are specific to West Michigan by matching the data on graduates in **Tables 2 through 5** with the BLS job projections for various occupations. Areas where the West Michigan region appears to have more annual graduates than projected available jobs include dental hygienists, nurses, dietitians and nutritionists, speech-language pathologists, and occupational therapists. In contrast, occupations such as medical and clinical lab technologists and dental assistants show potential job openings in excess of the number of annual West Michigan graduates.

Finally, **Table 7** presents inflation-adjusted growth in annual earnings for health professions in Grand Rapids, Michigan, and the United States. Once again, data for the wage estimates come from the BLS, and we compared changes in these estimates from 2006 to 2016. We specifically focused on fields in which real earnings have increased or decreased by more than 10 percent over this time. In Grand Rapids, the occupations with the largest decline in real earnings included speech-language pathologists, diagnostic medical sonographers, and home health aides. Note that speech-language pathologists were identified as one of the most over-supplied fields in **Table 6,** which would tend to put downward pressure on wages for workers in this field. We also found that family and general practitioners in Grand Rapids saw a decline in real earnings over the past decade; this is in contrast to positive earnings growth, on average, for family and general practitioners in the U.S. Occupations seeing the largest real earnings gains in the Grand Rapids region from 2006 to 2016 include physician assistants, dieticians and nutritionists, and physical therapists.

When we compared earnings changes in Grand Rapids to those in Michigan or the entire U.S. we found several similarities, but also several interesting differences. For example, over the past decade, real wages for diagnostic medical sonographers, speech-language pathologists, and family and general practitioners all increased nationally, but have declined in Michigan and Grand Rapids. In addition, wages for occupational therapists increased by double digits in Michigan and the U.S. but are reported to have declined in Grand Rapids.

We emphasize that our estimates are subject to change based on changes in the economy or changes in the regulatory environment in which health care providers and health systems operate. In the long run, it is important not only to create educational opportunities in Michigan, but also to adopt policies that encourage graduates to continue their lives and employment in Michigan after graduation. The continued growth and success of the West Michigan region will depend largely on our capacity to create and retain a skilled workforce with the ability to adapt to an evolving labor market.

Table 1: Projected Health Care Employment in Michigan

Occupation	Employment		Projected Employment Growth Percentage
	Employment 2018	Employment 2024	
Anesthesiologists	750	760	1.3
Athletic Trainers	1,000	1,060	6.0
Audiologists	500	540	8.0
Biochemists and Biophysicists	570	610	7.0
Biological Scientists, All Other	320	330	3.1
Biological Technicians	900	900	0.0
Cardiovascular Technologists/Technicians	2,260	2,510	11.1
Chemical Technicians	2,750	3,060	11.3
Chemists	3,760	3,760	0.0
Chiropractors	2,060	2,040	-1.0
Clinical/Counseling/School Psychologists	3,410	3,510	2.9
Dental Assistants	9,800	9,590	-2.1
Dental Hygienists	10,100	9,850	-2.5
Dentists, General	4,810	4,750	-1.2
Dentists, All Other Specialists	310	300	-3.2
Diagnostic Medical Sonographers	2,670	2,980	11.6
Dietitians and Nutritionists	2,170	2,290	5.5
EMT and Paramedics	7,380	8,010	8.5
Epidemiologists	120	130	8.3
Family and General Practitioners	4,910	4,830	-1.6
Health Care Practitioner/Tech Workers, All Other	850	890	4.7
Health Care Support Workers, All Other	3,440	3,570	3.8
Health Diagnosing/Treating Practitioners, All Other	970	980	1.0
Health Technologists and Technicians, All Other	3,300	3,510	6.4
Home Health Aide	41,350	47,870	15.8
Internists, General	6,310	6,100	-3.3
Licensed Practical and Licensed Vocational Nurses	15,520	15,830	2.0
Massage Therapists	3,400	3,750	10.3
Medical and Clinical Laboratory Technicians	6,980	7,280	4.3
Medical and Clinical Laboratory Technologists	7,410	7,690	3.8
Medical Assistant	24,690	25,430	3.0
Medical Equipment Preparers	1,830	1,900	3.8
Medical Records/Health Info Technicians	4,330	4,500	3.9
Medical Scientists, Except Epidemiologists	2,610	2,820	8.0
Medical Transcriptionists	2,690	2,470	-8.2
Microbiologists	320	340	6.3
Nuclear Medicine Technologists	770	730	-5.2
Nurse Practitioners	3,150	3,570	13.3
Nursing Assistants	52,870	55,630	5.2
Obstetricians and Gynecologists	570	570	0.0
Occupational Health and Safety Specialists	1,280	1,310	2.3
Occupational Health and Safety Technicians	260	270	3.8
Occupational Therapists	4,970	5,420	9.1
Occupational Therapist Aides	760	790	3.9
Occupational Therapist Assistants	1,000	1,160	16.0

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

Occupation	Employment		Projected Employment Growth Percentage
	Employment 2018	Employment 2024	
Opticians, Dispensing	3,350	3,710	10.7
Optometrist	1,250	1,310	4.8
Oral and Maxillofacial Surgeons	310	300	-3.2
Orthotists and Prosthetists	330	380	15.2
Pediatricians, General	870	860	-1.1
Pharmacists	9,320	9,220	-1.1
Pharmacy Aides	830	820	-1.2
Pharmacy Technicians	11,750	12,190	3.7
Physical Therapists	9,430	10,570	12.1
Physical Therapist Aides	1,310	1,490	13.7
Physical Therapist Assistants	4,090	4,770	16.6
Physician Assistants	4,090	4,500	10.0
Physicians and Surgeons, All Other	13,300	13,610	2.3
Podiatrists	470	450	-4.3
Psychiatric Aides	2,220	2,290	3.2
Psychiatric Technicians	650	640	-1.5
Psychiatrists	640	660	3.1
Psychologists, All Other	420	430	2.4
Radiation Therapists	540	560	3.7
Radiologic Technologists	7,130	7,070	-0.8
Recreational Therapists	960	1,030	7.3
Registered Nurses	98,900	105,290	6.5
Respiratory Therapists	4,360	4,590	5.3
Respiratory Therapy Technicians	170	140	-17.6
Speech-language Pathologists	3,350	3,490	4.2
Surgeons	880	890	1.1
Surgical Technologists	3,510	3,660	4.3
Therapists, All Other	1,220	1,300	6.6
Veterinarians	2,770	2,700	-2.5
Veterinary Assistant and Lab Animal Caretakers	2,240	2,180	-2.7
Veterinary Technologists and Technicians	3,580	3,730	4.2

Source:
http://milmi.mt.gov/datasearch/projections-excel

Table 2:
College and University Programs — Associate's Degree/Certificate

Color Key: Students Enrolled Over Last 3 Years; Graduates Over Last 3 Years

	Davenport University		Ferris State University		Grand Rapids Community College		Lansing Community College[1]	
Allied Health Sciences			216	44				
Biology							1,232	32
Chemistry							762	11
Dental Assistant/Assisting					40	72		
Dental Hygiene/Hygienist			165	118	190	92	422	69
Diagnostic Medical Sonography			65	60				
Dietary and Food Service Management			14	7				
Electrocardiogram (ECG) Technician								
Emergency Medical Services								
Emergency Medical Technician[2]								
Fire Science							322	135
Gerontology			0	93	24	0		
Health Information Technology	601	220	168	133				
Health Insurance Claims Management	118	35						
Kinesiology							572	23
Magnetic Resonance Imaging (MRI)								
Medical Assistant[3]	535	275						
Medical Billing								
Medical Laboratory Technology			14	7				
Medical Office Administration								
Nursing[4]	153	147			697	452	3,363	551
Nursing Assistant (CNA)								
Occupational Therapy Assistant					150	60		
Paramedic								
Pharmacy Technician								
Phlebotomy	5	31						
Physical Therapist Assistant								
Radiography[5]			157	118	131	65	379	72
Respiratory Care			130	80				
Surgical Technology								

Notes:
[1]Lansing Community College data is for 2013–2015
[2]Combined Emergency Medical Technician (SWMU), and EMT-Basic, and EMT-Paramedic (KCC)
[3]Includes Medical Administrative Assistance (KCC), Medical Assistant (Davenport and Montcalm), Medical Assistant Office, and Clinical (SWMU)
[4]Includes Practical Nursing (Davenport), Practical Nurse (GRCC), Nursing-Practical (KCC), and Nursing (RN, Practical Nursing LPN, Paramedic to RN, LPN to RN) (SWMU)
[5] Includes Radiologic Technology (GRCC)
Tables do not include programs with no information readily available and programs with a value of 0 for both enrollment and graduates.

	Southwestern Michigan College		West Shore Community College		Montcalm Community College		Kellogg Community College		TOTAL ENROLLMENT	TOTAL GRADUATES
									216	44
									1,232	32
									762	11
									40	72
							112	54	889	333
									65	60
									14	7
	3	0							3	0
							74	15	74	15
	3	1					53	109	56	110
	37	9							359	144
									24	93
	58	31							827	384
									118	35
									572	23
							16	0	16	0
	162	77			133	43	193	32	1,023	427
			18	4					18	4
							12	20	26	27
					168	41			168	41
	444	134	93	81	344	140	1,075	804	6,169	2,309
	1	0	42	2					43	2
									150	60
	10	2	3	3					13	5
	11	10							11	10
	3	3							8	34
							157	71	157	71
			18	0			102	53	787	308
									130	80
									177	56

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

Color Key: Students Enrolled Over Last 3 Years / Graduates Over Last 3 Years	Albion College		Aquinas College		Calvin College		Central Michigan University		Cornerstone College	
Allied Health Sciences										
Animal Science/Preveterinarian										
Athletic Training	60	16	50	7			201	74		
Biochemistry	84	41			390	91	201	55		
Biochemistry and Molecular Biology										
Biochemistry and Molecular Biology/Biotechnology					7	3				
Biology	347	117	264	89	616	153	902	723	186	3
Biomedical Laboratory Science										
Biomedical Sciences										
Biopsychology										
Biosystems Engineering										
Cardiac Rehabilitation									10	0
Cell and Molecular Biology										
Chemistry	54	19	28	11	92	21	108	24		
Clinical Laboratory Sciences										
Communication Disorders							589	248		
Dental Hygiene										
Diagnostic Medical Sonography										
Dietetics							313	111		
Environmental Biology/Microbiology										
Environmental Biology/Plant Biology										
Exercise Science	144	39	95	14			1,167	611	205	45
Genomics and Molecular Genetics										
Health Administration							419	171		
Health Care Systems Administration										
Health Communication										
Health Fitness in Preventive and Rehabilitative Programs							69	256		
Health Information Management										
Health Services Administration										
Human Biology										
Kinesiology					539	98				
Medical Case Management										
Medical Laboratory Sciences										
Medical Technology										
Microbiology										
Molecular Diagnostics										
Neuroscience	16	0					404	137		
Nuclear Medicine Technology										
Nursing*			540	0	869	184				
Nutritional Sciences										
Occupational Therapy										
Physics	29	9			53	12	27	11		
Physiology										
Public Health										
Psychology	278	99	194	96	592	158			247	174
Radiation Therapy										
Radiologic and Imaging Sciences										
Social Work					356	78	516	165	160	36
Sociology	51	24	57	25	116	37	136	195		
Speech Pathology and Audiology					452	109				
Therapeutic Recreation					158	30				

Notes:
[1]Nursing Program for Aquinas is a partnership with Detroit Mercy, and students graduate from Detroit Mercy with a BSN.
Tables do not include programs with a value of 0 for both enrollment and graduates.

	Davenport University		Ferris State University		Grand Valley State University		Hope College		Kuyper College		Michigan State University		Western Michigan University		TOTAL ENROLLMENT	TOTAL GRADUATES
			525	123	2,806	657									3,331	780
											1,819	367			1,819	367
					943	203	74	22			417	67	83	36	1,828	425
			27	6	177	13							240	35	1,119	241
							130	29			866	166			996	195
			128	24							296	54			431	81
			158	276	1,983	317	486	165			34	8	743	113	5,719	1,964
											914	195			914	195
					3,619	715							1,887	285	5,506	1,000
					152	29									152	29
											645	104			645	104
															10	0
					260	52									260	52
					395	78					867	176	213	20	1,757	349
											139	65			139	65
															589	248
			124	44											124	44
					750	88									750	88
											646	212	71	48	1,030	371
											57	7			57	7
									6	1	64	10			70	11
					2,224	430	471	122	9	0			1,201	268	5,516	1,529
											504	142			504	142
															419	171
			760	296											760	296
					316	106									316	106
															69	256
	493	98	247	63											740	161
	771	138													771	138
											4,243	1,086			4,243	1,086
											3,242	877			3,781	975
	543	63													543	63
			123	53	246	51									369	104
			0	2											0	2
											489	148			489	148
			50	34											50	34
											1,530	183			1,950	320
			227	104											227	104
	2,116	415	1,922	716	1,436	617	516	133			1,280	572	795	326	9,474	2,963
											585	127			585	127
													289	146	289	146
					152	18					783	87	130	22	1,174	159
											817	247			817	247
			38	0											38	0
			373	96	3,241	860	762	253			3,711	1,120	1,099	438	10,497	3,294
					313	50									313	50
					116	22									116	22
			637	172	1,377	390	337	89	174	37	643	199	315	201	4,515	1,367
			36	6	404	129	186	70			386	107	373	126	1,745	719
													233	103	685	212
					432	98									590	128

Table 4:
College and University Programs — Master's Degree

Color Key: Students Enrolled Over Last 3 Years; Graduates Over Last 3 Years

	Andrews University		Davenport University		Calvin College		Central Michigan University	
Animal Science								
Biochemistry and Molecular Biology								
Biology/Biological Sciences	12	7					81	79
Biomedical Laboratory Science/Operations								
Biomedical Sciences								
Biostatistics								
Cell and Molecular Biology								
Chemical Engineering								
Chemistry							78	21
Clinical Mental Health Counseling	77	27						
Communication Disorders							3	115
Comparative Medicine and Integrative Biology								
Counseling Psychology								
Dietetics							30	59
Epidemiology								
Exercise Physiology								
Health Administration							137	445
Health and Risk Communication								
Integrative Pharmacology								
Kinesiology								
Laboratory Research in Pharmacology and Toxicology								
Medical and Bioinformatics			60	0				
Medical Laboratory Sciences	11	0						
Neuroscience							29	4
Nursing			78	0				
Nursing Education	1	3						
Nutrition and Wellness	66	8						
Occupational Therapy			78	0				
Physician Assistant							211	133
Pathobiology								
Pharmacology and Toxicology								
Physics							74	21
Physiology								
Psychology								
Public Health								
Speech Language Pathology					101	77	240	115
Social Work	193	75						
Sociology							0	2
Vision Rehabilitation Therapy								

Note:
Tables do not include programs with a value of 0 for both enrollment and graduates.

	Ferris State University		Grand Valley State University		Michigan State University		Western Michigan University		TOTAL ENROLLMENT	TOTAL GRADUATES
					42	13			42	13
					0	3			0	3
			106	40			104	30	303	156
					47	7			47	7
			48	9					48	9
			103	47	38	7			141	54
			104	40					104	40
					14	14	38	9	52	23
							29	8	107	29
									77	27
					192	95			195	210
					27	7			27	7
							429	120	429	120
									30	59
					48	11			48	11
							64	32	64	32
			223	59					360	504
					27	20			27	20
					30	13			30	13
					183	91			183	91
					0	2			0	2
			62	18					122	18
									11	0
					1	0			30	4
290	70	52	9	532	189	51	15	1,003	283	
									1	3
									66	8
			388	149			571	284	1,037	433
			424	136			241	114	876	383
					1	1			1	1
					425	84			425	84
					5	43	10	16	89	80
					9	5			9	5
					145	54	281	97	426	151
			314	96	561	268			875	364
			249	141			182	90	772	423
175	0	1,074	485			1,053	380	2,495	940	
					0	15	26	7	26	24
							80	49	80	49

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		
Animal Science							
Audiology			135	33			
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							
Chemistry							
Communicative Sciences and Disorders							
Comparative Medicine and Integrative Biology							
Counseling Psychology	90	2					
Epidemiology							
Genetics							
Genetics — Environmental Toxicology							
Health Administration			0	61			
Human Nutrition							
Kinesiology							
Medicine			804	0			
Neuroscience			38	7			
Nursing							
Optometry					439	111	
Pathobiology							
Pharmacology and Toxicology							
Pharmacy					1,753	412	
Physical Therapy	282	131	489	134			
Physics							
Physiology							
Psychology							
Rehabilitation Counseling							
Social Work							
Sociology							

Note:
Tables do not include programs with a value of 0 for both enrollment and graduates.

	Grand Valley State University		Michigan State University		Western Michigan University		TOTAL ENROLLMENT	TOTAL GRADUATES
			63	13			63	13
					65	14	200	47
			149	19			149	19
			3	5			3	5
					77	10	77	10
			66	16			66	16
			108	18			108	18
			3	0			3	0
			158	33			158	33
			597	94	94	15	691	109
			15	0			15	0
			96	11			96	11
					163	17	253	19
			57	10			57	10
			80	17			80	17
			3	1			3	1
							0	61
			37	6			37	6
			127	34			127	34
			6,261	599			7,065	599
			76	19			114	26
	308	56	48	4			356	60
							439	111
			10	6			10	6
			17	3			17	3
							1,753	412
	503	145					1,274	410
			430	62	72	7	502	69
			44	2			44	2
			135	43	275	39	410	82
			55	6			55	6
			64	15			64	15
			131	21	87	8	218	29

Table 6: Need for Selected Professions in Michigan

Selected Professions	Average Annual West MI Graduates	Employment 2018	Employment 2024	Projected 10-year Employment Growth	Average Annual Job Openings in Michigan*	Average Annual Job Openings in West Michigan*
Dental Assistant	24	9,800	9,590	4.4	267	40
Dental Hygienist	111	10,100	9,850	4.1	194	33
Diagnostic Medical Sonographer	49	2,670	2,980	19.7	96	22
Dietitian and Nutritionist	143	2,170	2,290	10.6	38	9
EMT and Paramedic	38	7,380	8,010	16.9	228	22
Family and General Practitioner	40**	4,910	4,830	3.6	142	17
Home Health Aide	NA	41,350	47,870	26.2	1,852	243
LPN	770	15,250	15,830	5.5	510	98
Medical and Clinical Lab Technologist	44	7,410	7,690	8.8	231	46
Medical Assistant	142	24,690	25,430	10.8	725	99
Nurse Practitioners	NA	3,150	3,570	23.5	136	17
Nursing Assistant	NA	52,870	55,630	9.7	1,637	309
Occupational Therapist	193	4,970	5,420	16.3	166	43
Occupational Therapy Assistant	20	1,000	1,160	26.1	51	23
Optometrist	37	1,250	1,310	12.9	56	7
Physician Assistant	128	4,090	4,500	19.4	158	31
Physical Therapist	137	9,430	10,570	21.9	422	94
Respiratory Therapist	NA	4,360	4,590	10.9	142	31
RN	1,082	98,900	105,290	12.4	3,372	650
Speech-language Pathologist	212	3,350	3,490	7.7	107	25
Surgical Technologist	19	3,510	3,660	9.6	65	20

Notes:
*Includes job growth and job replacement
**Assumes that 20 percent of medical school graduates are family or general practitioners.

Table 7: Average Annual Earnings for Select Health Care Professions

Selected Professions Color Key: Above 7% Below Negative 7% (-7%)	2006 Mean Annual Earnings			2016 Mean Annual Earnings			% Change in Real Annual Earnings		
	Grand Rapids	Mich.	U.S.	Grand Rapids	Mich.	U.S.	Grand Rapids	Mich.	U.S.
Dental Assistant	$39,454	$38,418	$36,728	$41,780	$35,780	$37,890	5.90	-6.87	3.16
Dental Hygienist	$66,919	$69,301	$74,325	$62,580	$61,450	$73,440	-6.48	-11.33	-1.19
Diagnostic Medical Sonographer	$68,789	$64,396	$69,181	$59,690	$61,490	$71,750	-13.23	-4.51	3.71
Dietitian and Nutritionist	$50,550	$55,407	$57,014	$57,570	$55,320	$59,670	13.89	-0.16	4.66
EMT and Paramedic	$37,668	$34,073	$34,990	$33,820	$31,260	$36,110	-10.22	-8.26	3.20
Family and General Practitioner	$169,150	$181,591	$178,400	$149,980	$174,980	$200,810	-11.33	-3.64	12.56
Home Health Aide	$25,846	$23,596	$23,930	$22,790	$22,560	$23,600	-11.82	-4.39	-1.38
LPN	$44,704	$46,133	$44,680	$42,520	$46,660	$44,840	-4.89	1.14	0.36
Medical and Clinical Lab Technologist	$57,598	$59,086	$60,181	$57,090	$56,100	$62,440	-0.88	-5.05	3.75
Medical Assistant	$31,573	$31,918	$32,370	$32,910	$30,490	$32,850	4.24	-4.47	1.48
Nurse Practitioner	NA	NA	NA	$96,820	$97,790	$104,610	NA	NA	NA
Nursing Assistant	NA	NA	NA	$28,370	$28,750	$27,650	NA	NA	NA
Occupational Therapist	$74,944	$69,586	$74,420	$71,290	$78,490	$83,730	-4.88	12.80	12.51
Occupational Therapy Assistant	$41,168	$47,657	$50,133	$45,610	$51,520	$59,530	10.79	8.11	18.74
Optometrist	$112,731	$120,898	$117,326	$105,480	$113,090	$117,580	-6.43	-6.46	0.22
Physician Assistant	$92,504	$89,206	$88,420	$114,110	$96,350	$102,090	23.36	8.01	15.46
Physical Therapist	$74,848	$81,003	$81,015	$84,320	$87,440	$87,220	12.65	7.95	7.66
Respiratory Therapist	NA	$56,693	$57,871	$53,950	$55,320	$60,640	NA	-2.42	4.78
RN	$65,431	$71,074	$71,110	$61,970	$69,100	$72,180	-5.29	-2.78	1.50
Speech-language Pathologist	$92,849	$79,325	$72,432	$69,250	$77,620	$78,210	-25.42	-2.15	7.98
Surgical Technologist	NA	$45,430	$44,490	$41,560	$43,100	$46,800	NA	-5.13	5.19

Note:
*2006 Mean Annual Wages are inflated to 2016 dollars.

Medical Patents

A patent is the property right granted to an inventor or assignee for a new or improved product, process, or piece of equipment. Patents are used as indicators of economic growth because of the investment that went into creating the innovations as well as the investment opportunities that result from the innovations.

There are drawbacks, however, to relying on patent data to measure innovative activity. Some inventors and assignees choose not to register patents for their innovations because doing so will require them to divulge details to competitors. In addition, not all patents have a substantial impact on economic progress. On the whole though, patents are seen as reflecting significant contributions to society and the economy in general. The use of patents is particularly relevant in the medical field due to the large amount of spending for medical research and development (R&D).

The database of the U.S. Patent and Trademark Office (USPTO) indicates the name and location of both a patent's inventor and its assignee (owner). In some cases, the inventor owns the patent. But in corporate settings, the business itself is usually the assignee while an individual researcher is the inventor. This can then result in location differences — where the inventor lives in Kent County, but the company that owns the patent is located in China, for example, or the inventor lives in Germany, but the assignee is a company in West Michigan. To evaluate the economic significance of innovative activities, it can be useful to consider inventors and assignees separately.

Figure 1 shows the number of new medical patents granted by the USPTO to inventors residing in Kent County and, separately, patents with assignees in Kent County, from the year 1990 through 2016. For those with inventors living in Kent County, the average annual number of patents increased from 12.6 in the years 1990 to 1999 to 16.3 in the years 2000 to 2009, with a further increase to an average of 23.6 in the years 2010 to 2016. For those with assignees in Kent County, the average annual number of patents increased from 6.2 in the years 1990 to 1999, to 10.3 in the years 2000 to 2009, and to 13.3 patents in the years 2010 to 2016. This growth in medical patents owned by entities in Kent County or invented by innovators in Kent County is an indicator of economic progress as new discoveries and improvements can result in technological advancements. Over time, such innovations could encourage greater investment and lead to additional job opportunities in the regional economy.

Although both of the measures displayed in **Figure 1** have a positive trend, there has been a significant decrease in patenting since 2014, with the annual number of new patents with inventors living in Kent County falling by 50 percent from 2006 to 2016 and the annual number of new patents with assignees located in Kent County falling by 64 percent over the same period. The patenting process often involves significant delays between application and approval, resulting in time lags where a patent applied for in 2016, for example, is not approved (or issued) until 2019. However, this would not explain the recent declines seen in **Figure 1,** as the data presented is for the year that the patents were actually issued, not by the year of application.

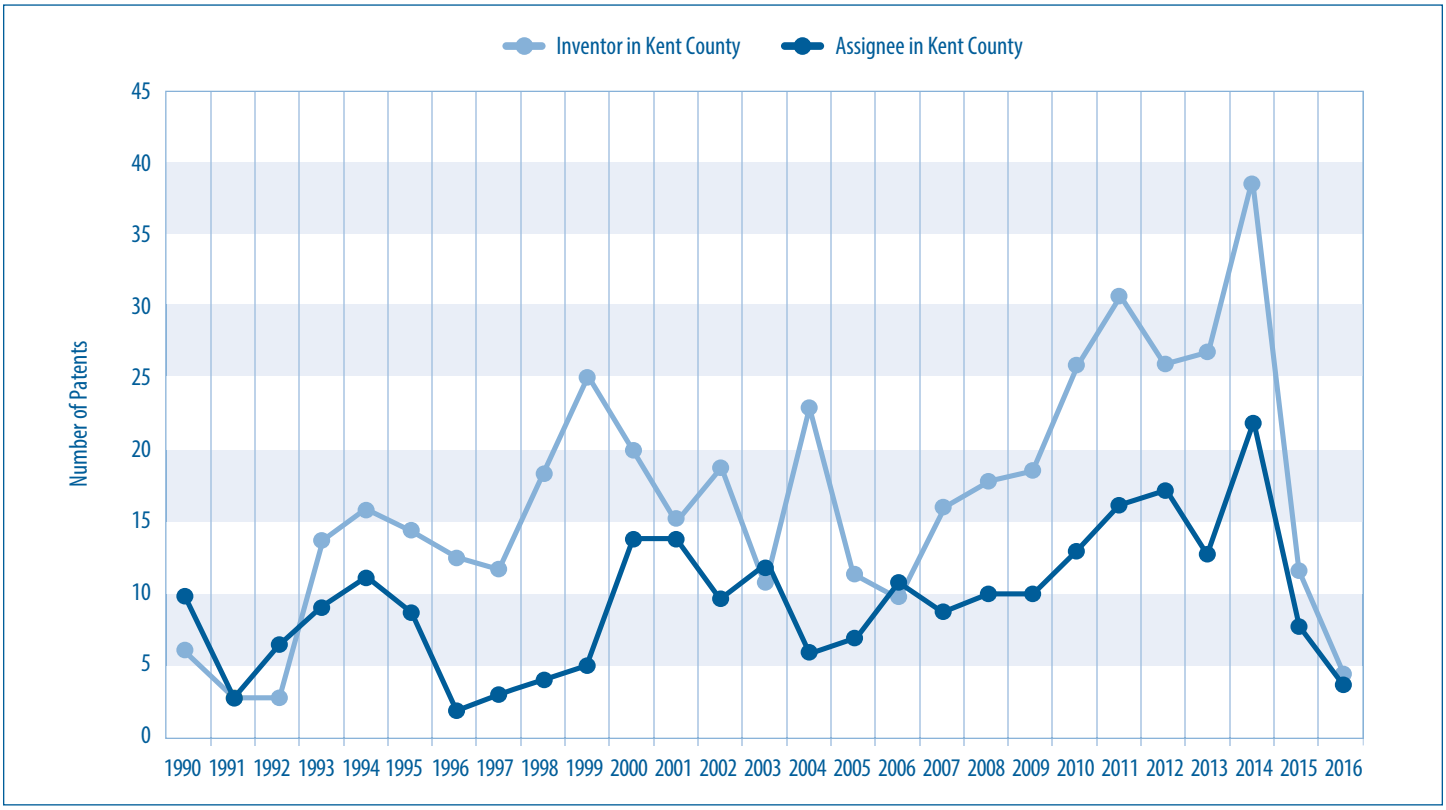
To see if this recent change in medical patenting is specific to Kent County, we can compare **Figure 1** with **Figure 2,** which shows the parallel data for the state of Michigan as a whole. The two figures have similar patterns, with generally upward trends followed by stark declines since 2014. Furthermore, rather than a regional aberration, the decline in medical patenting appears to be a national phenomenon, as can be seen in **Table 1,** which shows the percentage change in the annual number of new medical patents for Kent County, Michigan, and the entire U.S.A., from 2006-2016.

A patent obtained through the USPTO only gives property right protection in the U.S. While this protection is sufficient for some inventors and assignees, others choose to apply for patents in other countries in order to receive property rights elsewhere. One way to do this is through the World Intellectual Property Organization (WIPO). Filing an international patent application with the WIPO allows an inventor to then pursue patent rights in up to 150 countries simultaneously.

The number of non-duplicate medical patent applications filed by West Michigan companies at the WIPO and at the USPTO from 2011 through 2016 is shown in **Figure 3.** Since the year 2011, there have been 113 medical patent filings from twelve West Michigan companies. However, the majority of these filings come from only three companies, which together are responsible for approximately 70 percent of the total number of filings. Although the most prolific companies consistently apply for medical patents over time, the same is not true for all of the others — 40 percent of all the listed companies did not apply for any medical patents in 2016. In contrast to the data shown in **Figures 1 and 2,** the number of new medical patent applications by these companies in 2016 was more than double the number in 2015.

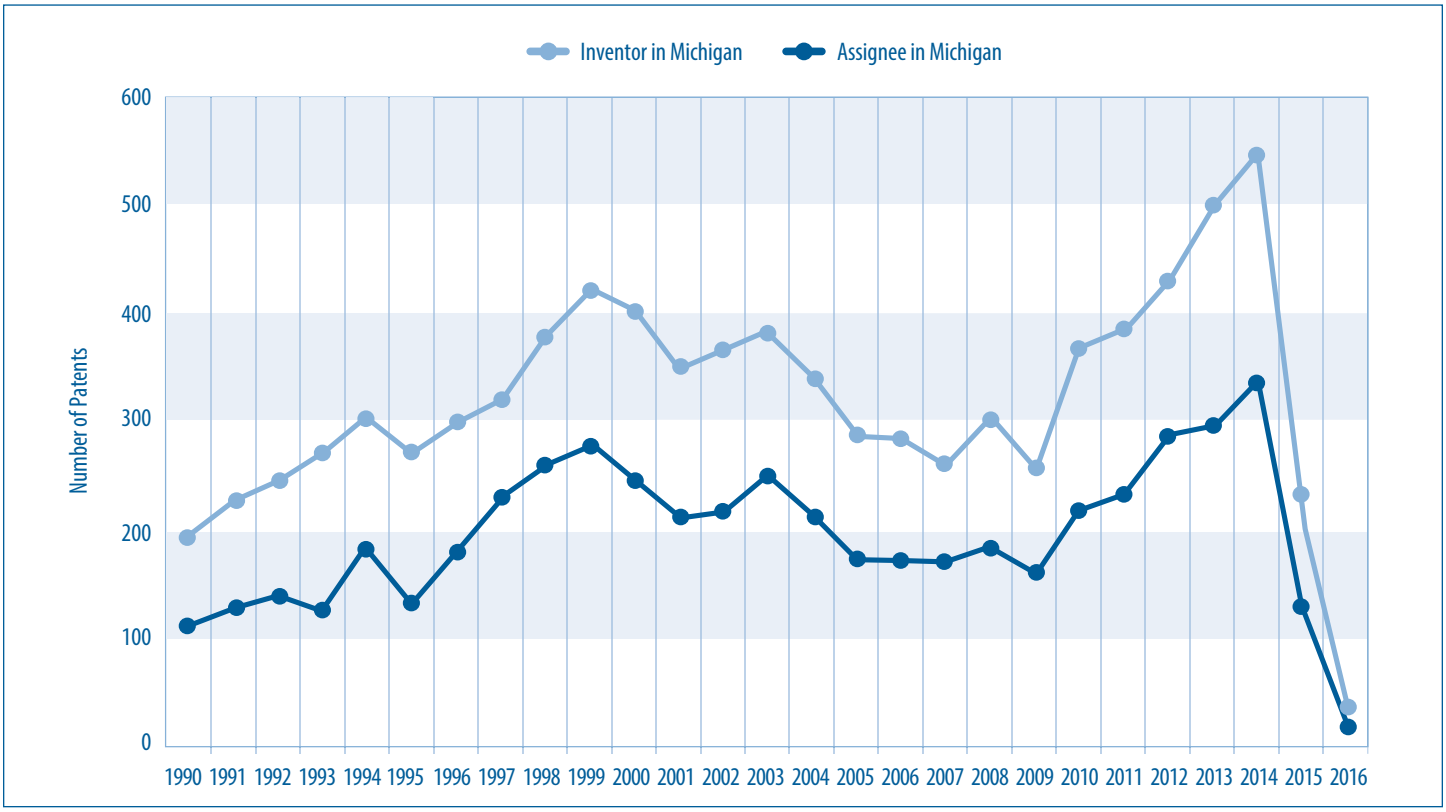
The information shown in these three figures indicates that, although there is a growing rate of overall medical patenting in West Michigan, the level of patenting is relatively modest, with the majority of it being conducted by a small number of regional companies. Furthermore, there is some reason for concern, with the recent decreases in patenting behavior. With increased R&D activity, patented medical innovation in West Michigan could become a significant driver of regional economic growth.

Figure 1: Medical Patenting in Kent County



Source: United States Patent and Trademark Office
www.uspto.gov

Figure 2: Medical Patenting in Michigan



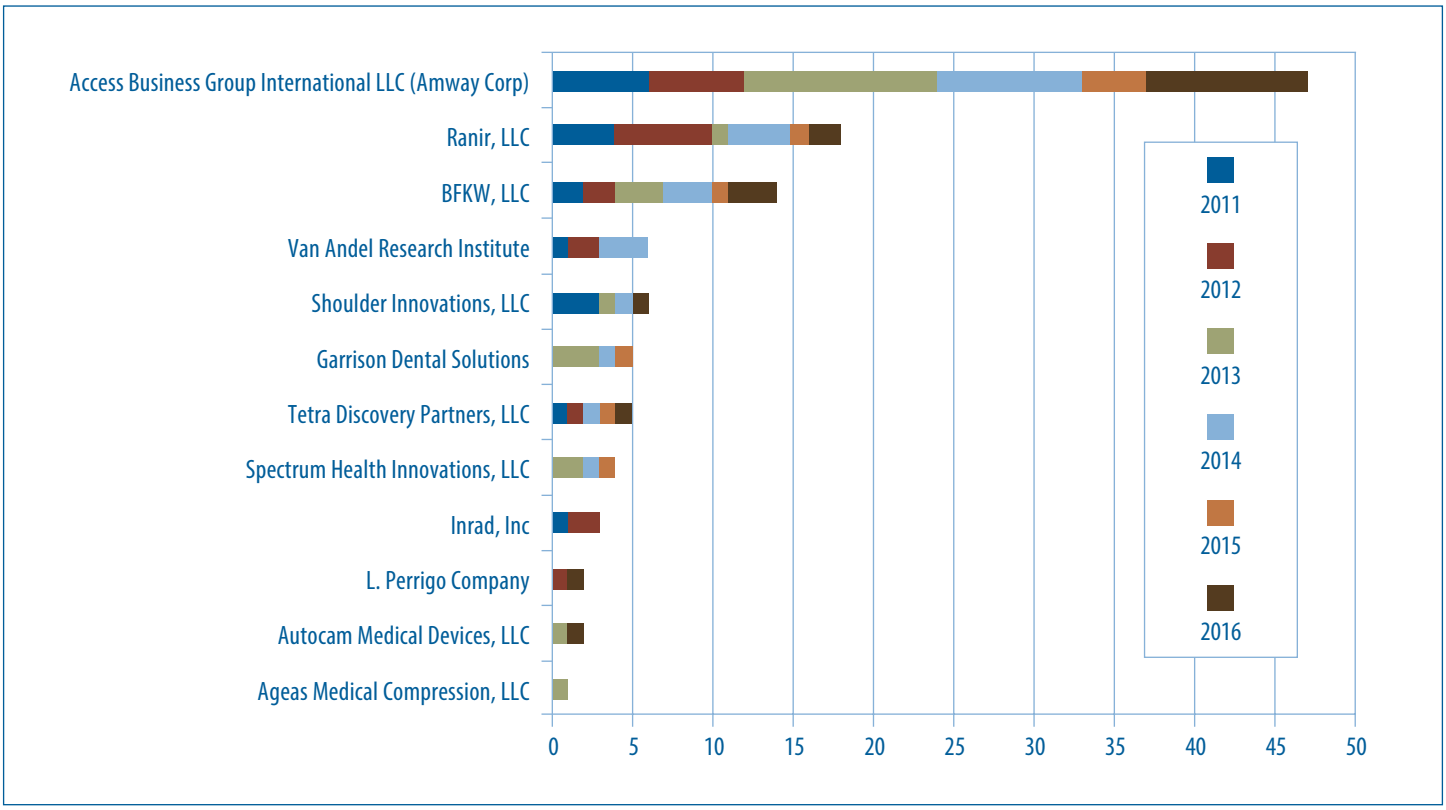
Source: United States Patent and Trademark Office
www.uspto.gov

Table 1: Percentage Change in New Medical Patents by Location of Inventor and Assignee, 2006-2016

	Location of Inventor			Location of Assignee		
	Kent County	Michigan	U.S.A.	Kent County	Michigan	U.S.A.
% Change 2006–2016	-50	-88	-92	-64	-89	-92

Source: United States Patent and Trademark Office
www.uspto.gov

Figure 3: Medical Patent Applications in West Michigan, KOMA Region*



*Kent, Ottawa, Muskegon, and Allegan Counties
Sources: United States Patent and Trademark Office and World Intellectual Property Organization
www.uspto.gov and www.wipo.int

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 services. We continue to monitor two demographic trends that have become apparent over the past several years: 1) continued population growth on the west side of the state and 2) a general aging of the population. Since older populations have more complex health care needs 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 Kent, Ottawa, Muskegon, and Allegan counties (KOMA), the Detroit region (Oakland, Macomb, and Wayne counties), the entire state of Michigan, and the U.S. as a whole. Throughout the 1990s, KOMA's population growth rate exceeded both the growth rate for the state of Michigan and the growth rate for the U.S. However, Michigan was particularly impacted by the recession in the mid 2000s and growth rates for both KOMA and the Detroit region fell precipitously. While 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. Although Detroit achieved positive population growth in the early part of this decade, it appears to have leveled off and has remained near zero for the past four years. KOMA's population growth rate began escalating in 2010 and surpassed the national growth rate in 2011. Over the past three years, the positive population growth in West Michigan has continued at a slower pace with growth rates falling from 1.2 percent in 2014 to 0.8 percent in 2016. Importantly, given the Detroit region's negative to near zero population growth rate over the past 15 years, these trends are indicative of a geographic shift in the population distribution in Michigan from the east side of the state to the west. In fact, from 2000 to 2010, the state center of population shifted nearly a mile to the west. If this trend continues, demand for health care resources and health care infrastructures could be affected. For example, while the share of total state Medicare expenditures fell for both KOMA and the Detroit region from 2010 to 2014, the relative decline was more than 20 times larger for the Detroit region (Centers for Medicare and Medicaid Services, 2017).

Age Distribution

An important development in demographic trends in the U.S. continues to 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. The clear trend in all three figures is the steady aging of the population. For example, persons between the ages of 45 and 64 now outnumber all other age groups despite being only the third most populous age group in 1990. 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 populations 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 several 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 (Alemayehu & Warner, 2004). Due to the demographic shifts apparent in **Figures 2 through 4,** the Centers for Medicare and Medicaid Services project total Medicare spending to nearly double between 2015 and 2026. 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. The share of the population over the age of 65 in the Detroit region grew from approximately 12 percent in 1990 to more than 15 percent in 2016. 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 prove challenging across the entire state.

Second, **Figures 2 through 4** indicate that the proportion of the population over the age of 65 has already eclipsed the proportion between the prime working ages of 35 and 44. Since the Medicare program 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 1995. Whereas in 2000, four workers supported each Medicare enrollee, the number of workers per beneficiary is projected to fall to 2.8 by 2020 (Board of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, 2012). 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. The most recent Congressional Budget Office projections of Medicare solvency suggest that the Part A trust fund will be exhausted by 2029 (Congressional Research Service, 2017).

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 2005 to 2017, average annual employer-sponsored health insurance premiums for family coverage increased 72 percent, from $10,880 to $18,764, while real annual wages increased by less than 2 percent over the same period (Kaiser Family Foundation, 2017). 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.

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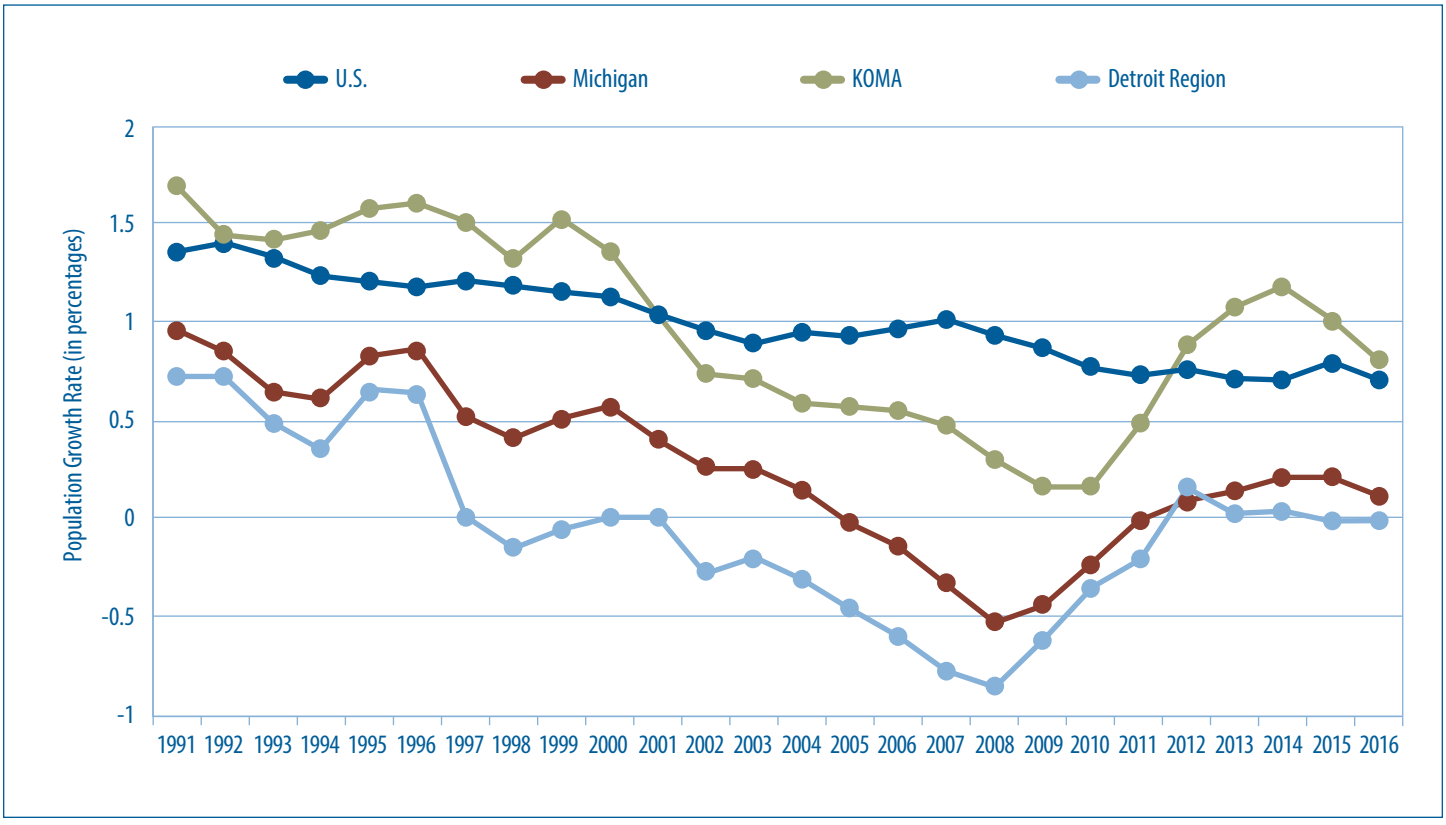
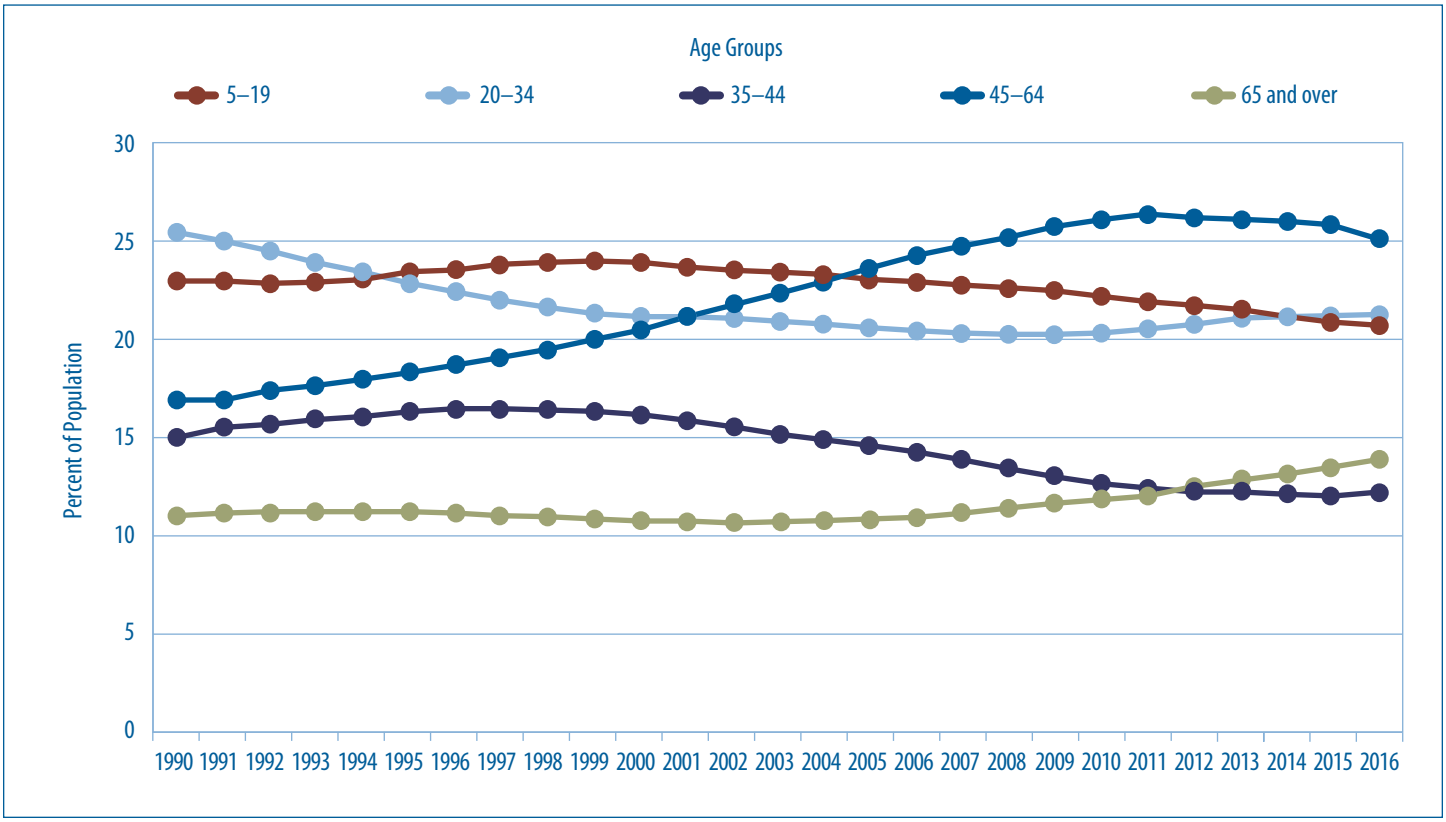
Figure 1: Annual Population Growth Rate 1991–2016



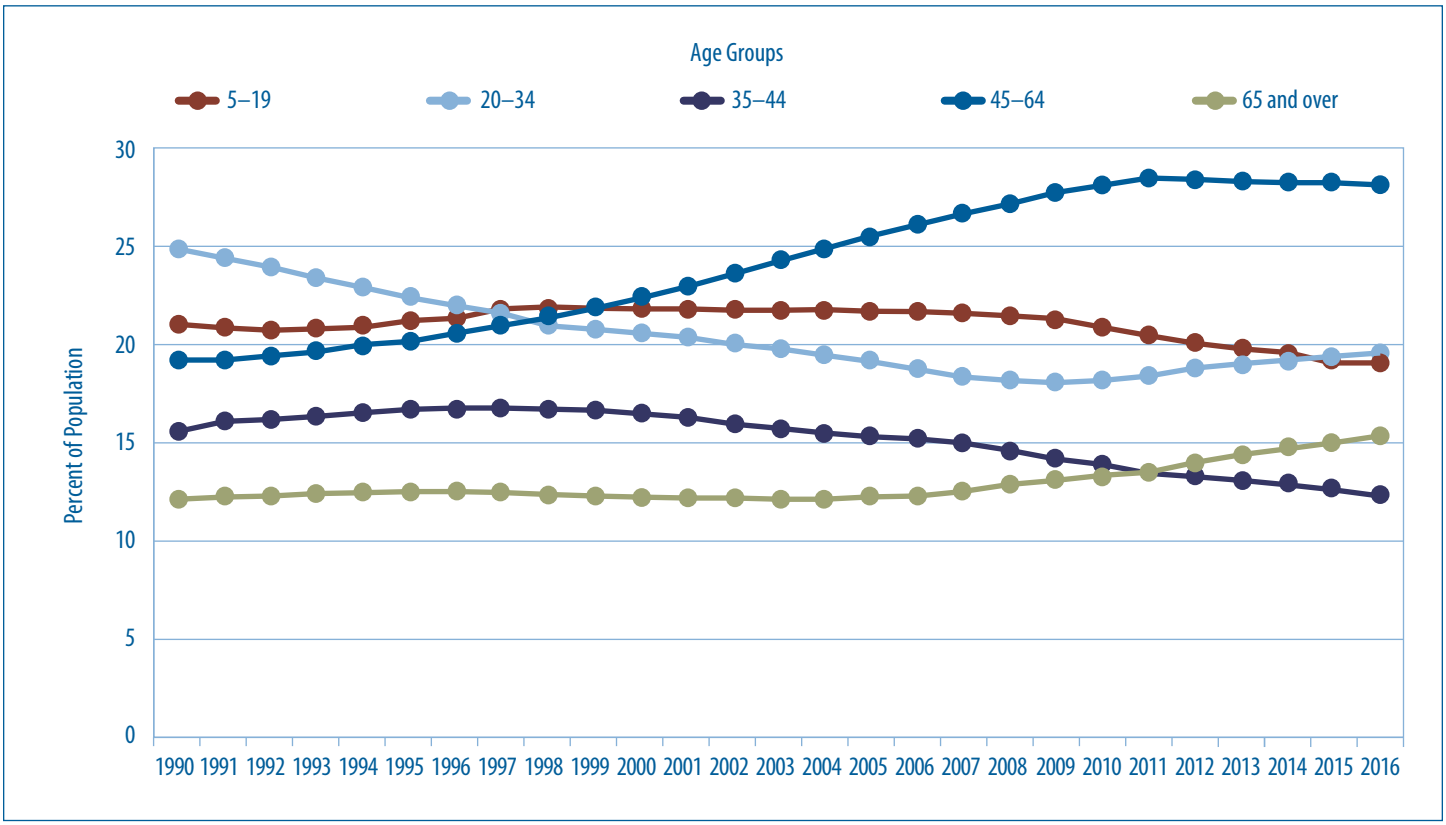
Source: U.S. Census. *Population and housing unit estimates*

Figure 2: Population Distribution as a Percent of KOMA



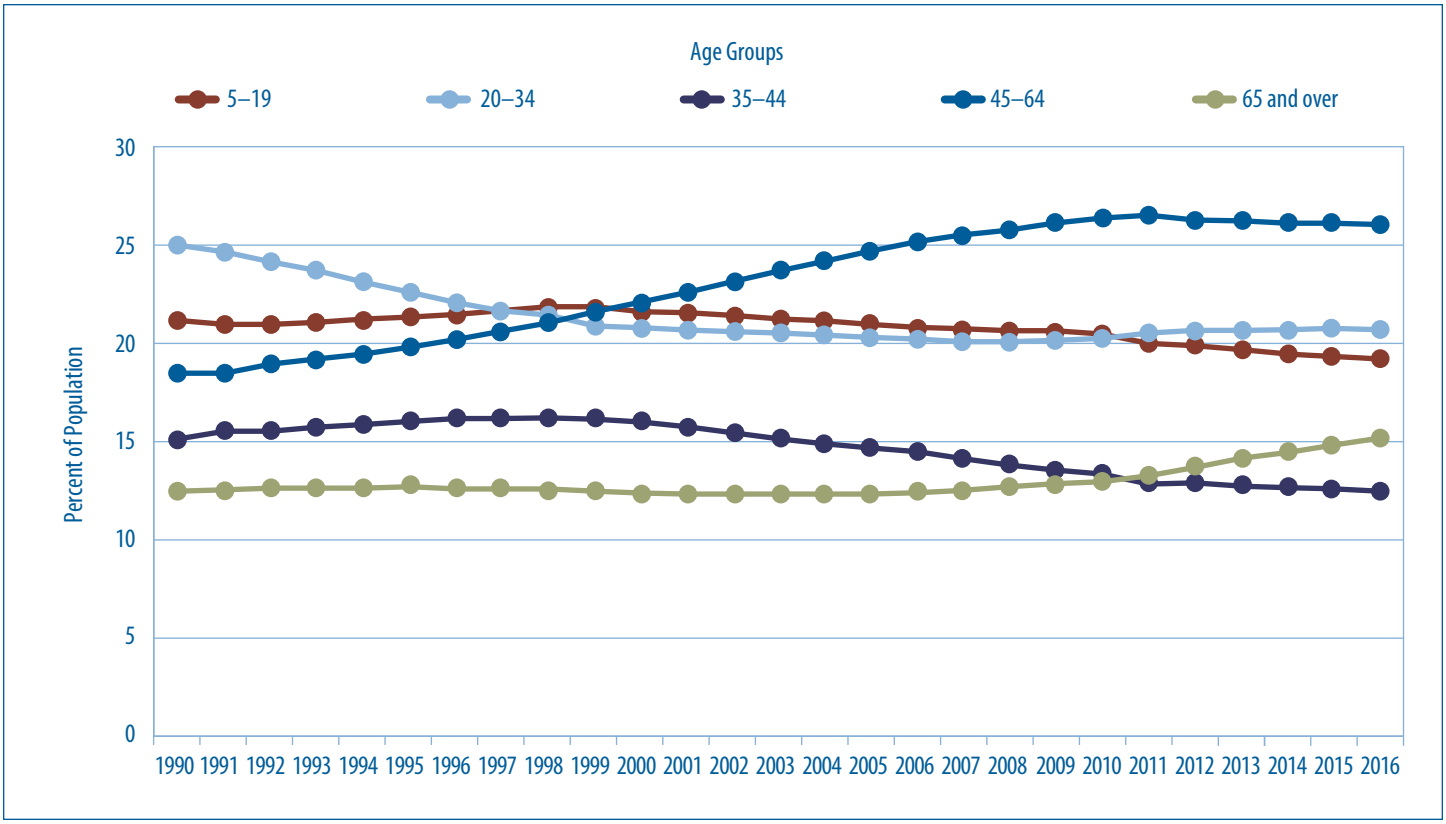
Source: U.S. Census. *Population and housing unit estimates*

Figure 3: Population Distribution as a Percent of the Detroit Region



Source: U.S. Census. *Population and housing unit estimates*

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



Source: U.S. Census. *Population and housing unit estimates*

Health Care Overview

In this section, we consider population differences in behavioral risk factors and access to care. In past editions of *Health Check,* we contrasted these measures between West Michigan (Allegan, Ionia, Kent, Montcalm, and Ottawa counties) and the Detroit Region (Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties). However, due to changes at the Michigan Department of Health and Human Services, data at the county level were not available at the time of publication. Therefore, we present estimates for the entire state of Michigan using data from the 2016 Behavioral Risk Factor Survey (MiBRFS). A caveat about this data: all estimates are based on self-reported surveys. Consequently, the actual incidence and prevalence rates for the factors examined may differ from those reported by respondents.

Risk Factors

Figure 1 presents estimates of the prevalence of heavy drinking, defined as the proportion of adults in the state who reported consuming an average of more than two alcoholic drinks per day for men or more than one per day for women. Heavy drinking has remained relatively stable from 2011 to 2016 with approximately 7 percent of the population classified as heavy drinkers. This finding is slightly above the national average of 6 percent. Using data from 2010, the CDC estimated that excessive alcohol consumption cost the state of Michigan approximately $8 billion per year through losses in workplace productivity, health care expenses, criminal justice expenses, motor vehicle crashes, and property damage. This total cost estimate translates to a per capita annual cost of $826, higher than Ohio ($739), Indiana ($689), Illinois ($757), or Wisconsin ($783) (Sacks et al., 2010).

Figure 2 displays estimates of the proportion of the adult population in Michigan who currently smoke cigarettes. The share of smokers in the state has declined steadily since 2011 when 23.3 percent of the adult population smoked. As of 2016, 20.4 percent of Michigan adults were current smokers. While the decline in cigarette consumption is welcome, the share of smokers in Michigan is still significantly higher than the national average of 15.1 percent (CDC, 2017). In 2014, the Department of Health and Human Services estimated that cigarette smoking was responsible for 480,000 annual deaths (U.S. Department of HHS, 2014). Treatment for illnesses related to smoking and tobacco use can be costly and resource intensive. Reductions in the prevalence of smoking and tobacco use could lead to increased worker productivity and provide relief for rising health care expenditures (Berman et al., 2014)

Figure 3 plots the obesity rate over time for adults in Michigan. Obesity is defined by a body mass index (BMI) greater than or equal to 30. Approximately one-third of the population in the state is considered to be obese and the prevalence of obesity has increased over time. If we include those who meet the definition of being overweight ($25 \leq BMI < 30$), then 65 percent of adults in Michigan are either overweight or obese. These estimates are similar to the share of the overall U.S. population who is overweight or obese and are in line with obesity rates in other Midwestern states (Ogden et al., 2014).

Recent studies place the health care costs associated with obesity at between 10 percent and 20 percent of total U.S. health-related spending (Cawley & Meyerhoefer, 2012; Finkelstein et al., 2009).

Finally, **Figures 4 and 5** present measures of health status by plotting the share of the population in each region reporting that their general health was either "fair" or "poor" and the share that suffers from a disability. Trends over time have been relatively stable for both outcomes. Fair/poor health status declined somewhat in 2014, but has since risen. Currently, about one out of every six adults in the state consider themselves to be in either fair or poor health. The prevalence of a self-reported disability in the population had declined from 28.2 percent in 2011 to 24.9 percent in 2014 before rising to 25.1 percent in 2015 and 26.7 percent in 2016. It is likely that both of these trends are due, in some part, to the aging of the population reported in the previous section.

Access to Care

In addition to an examination of the risk factors associated with poor health outcomes, we are also interested in measures involving access to health care services. **Figure 6** plots the percentage of the population in the state that reports having no health insurance. Uninsured rates in the state have fallen significantly with the improving economy and the expanded health insurance options available under the Affordable Care Act. For example, as of October 9, 2017, more than 650,000 people have enrolled in the Healthy Michigan expansion of the state's Medicaid program (MDHHS, 2017b). Coinciding with Michigan's decision to adopt the Medicaid expansion, uninsured rates in the state fell from 17.4 percent in 2013 to 12.7 percent in 2014 — a dramatic one-year decline of 4.7 percentage points. The uninsured rate has continued to decline in the years following Medicaid expansion and was estimated to be a historic low 9.9 percent in 2016.

Figure 7 indicates that while the reduction in the number of uninsured has improved access to care, there is still reason to be concerned. Nearly 13 percent of adults in Michigan report a lack of access to physician care due to concerns over cost. While we have seen uninsured rates fall, access to care remains problematic for some and could indicate that even those with health insurance are experiencing cost-related access issues. As we will discuss in a following section of this publication, out-of-pocket costs for those with insurance have risen recently as high-deductible health plans have become more prevalent

Figure 8 continues to examine the issue of access to care by plotting the share of the population in the state with no routine checkup in the past year. Although we've seen a significant decrease in the past five years, approximately 27 percent of respondents go without an annual, routine checkup. Forgoing an annual checkup may act to lower health care expenditures in the short-run, but could lead to higher spending in the long-run through reduced early-detection and prevention efforts.

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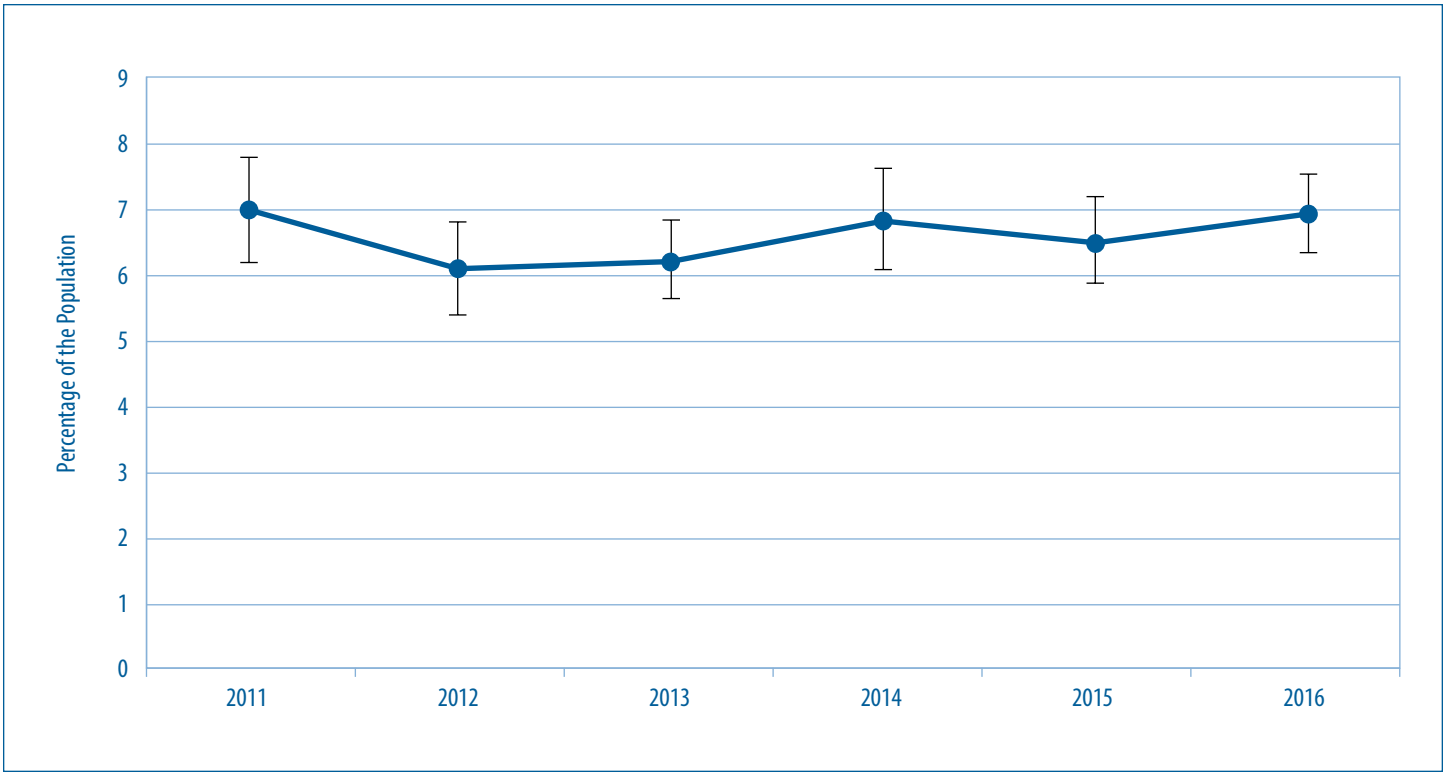
Figure 1: Heavy Drinking

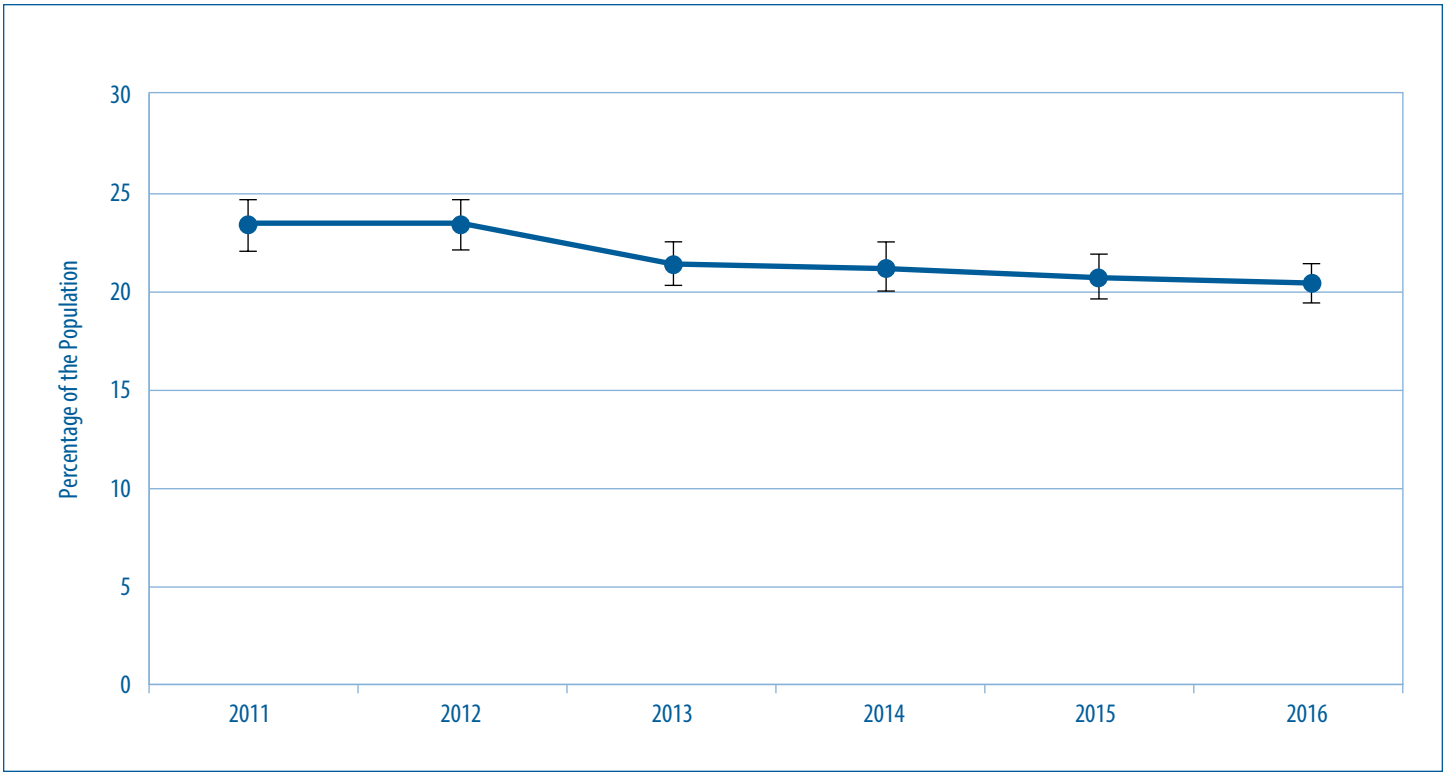


Source: MDHHS, 2017a

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.

Note: Vertical lines represent error bars

Figure 2: Current Smokers

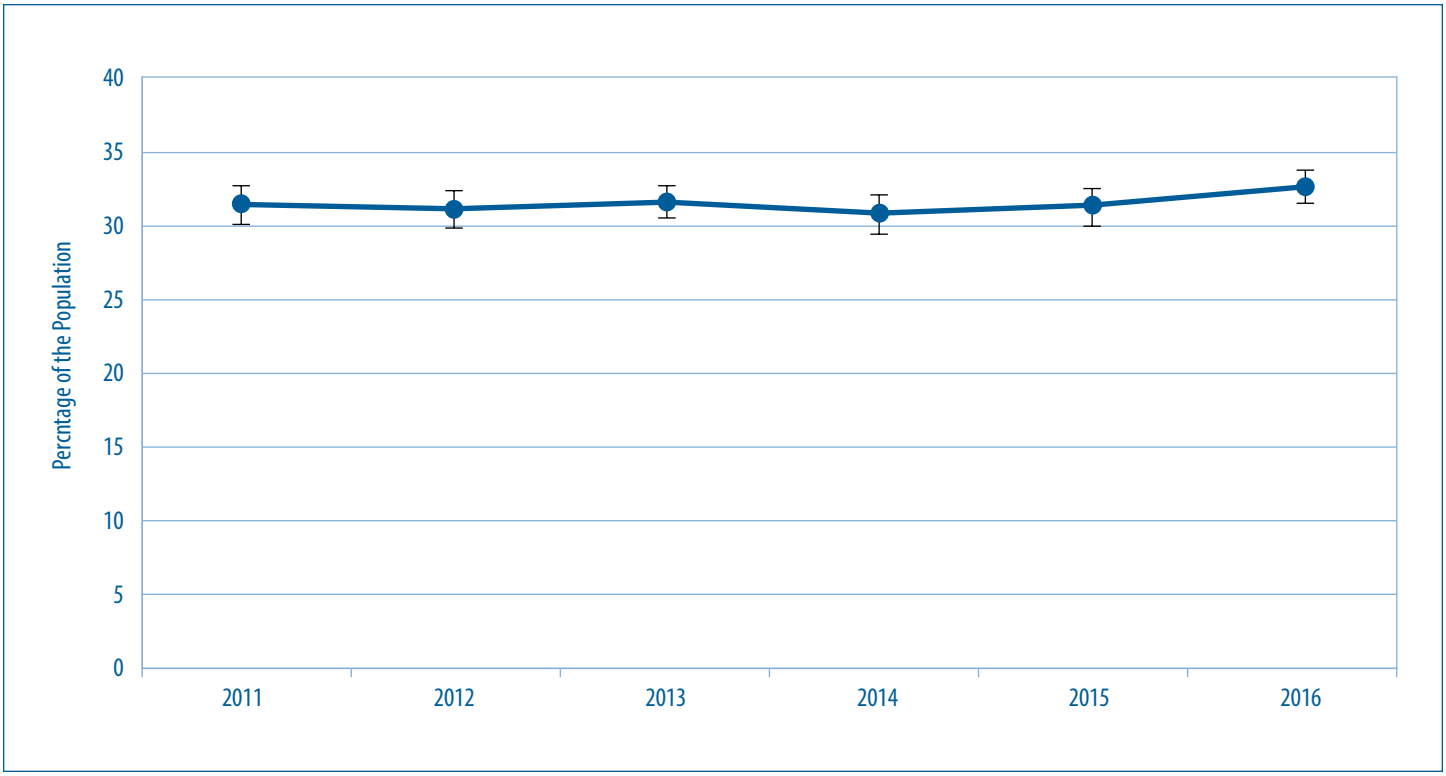


Source: MDHHS, 2017a

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

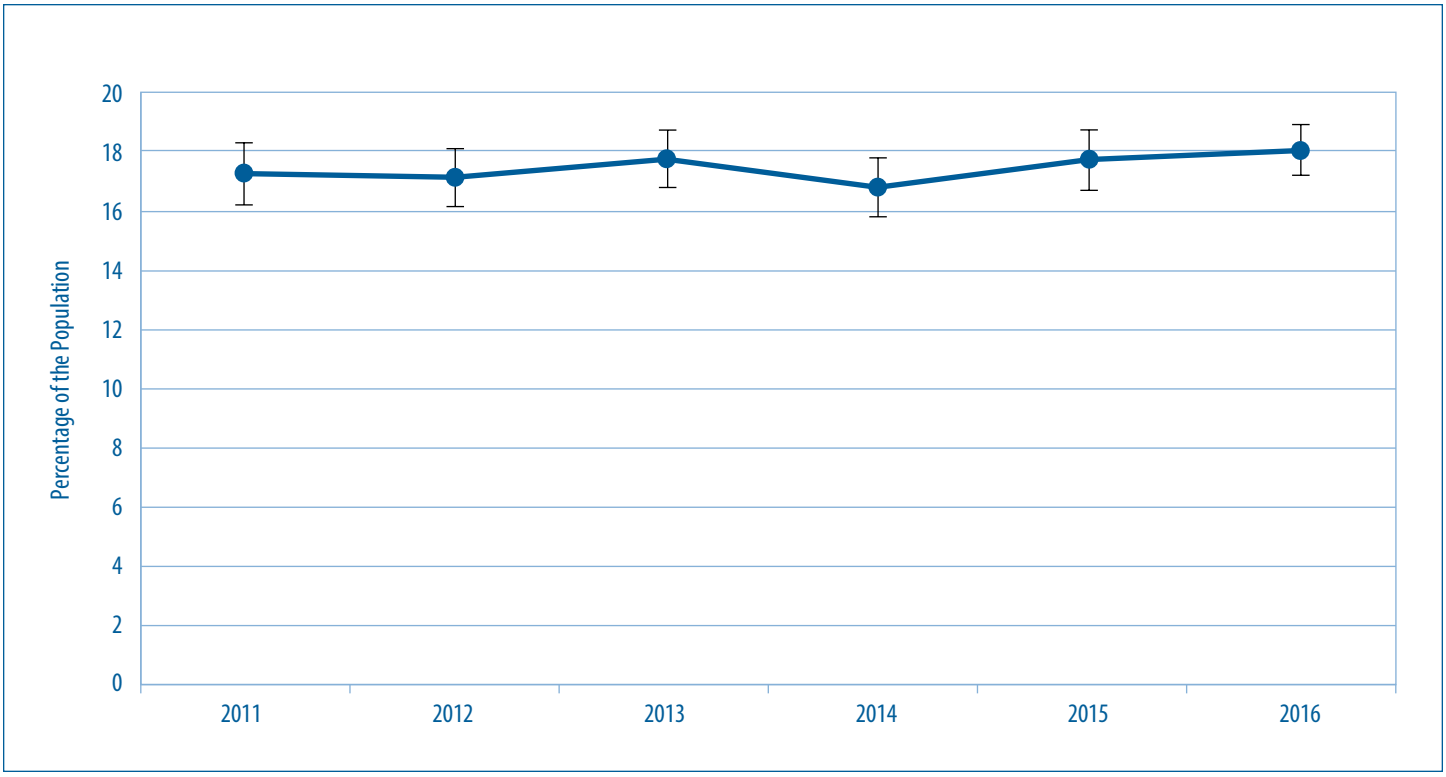
Note: Vertical lines represent error bars

Figure 3: Obesity



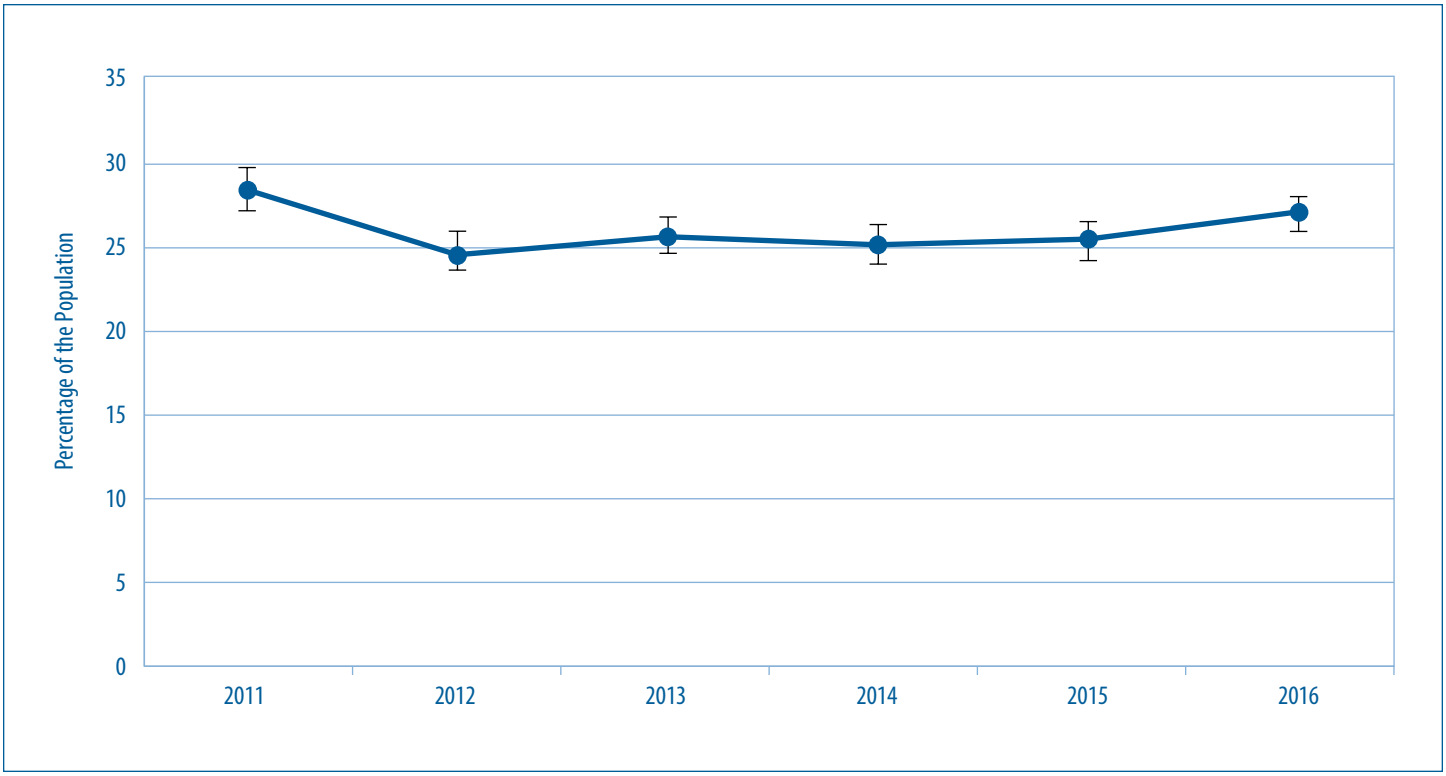
Source: MDHHS, 2017a
Definition: Among all adults, the proportion of respondents whose Body Mas Index (BMI) was greater than or equal to 30.
Note: Vertical lines represent error bars

Figure 4: Health Status - Fair or Poor Health



Source: MDHHS, 2017a
Definition: Among all adults, the proportion of respondents who reported that their health, in general, was either fair or poor.
Note: Vertical lines represent error bars

Figure 5: Disabled

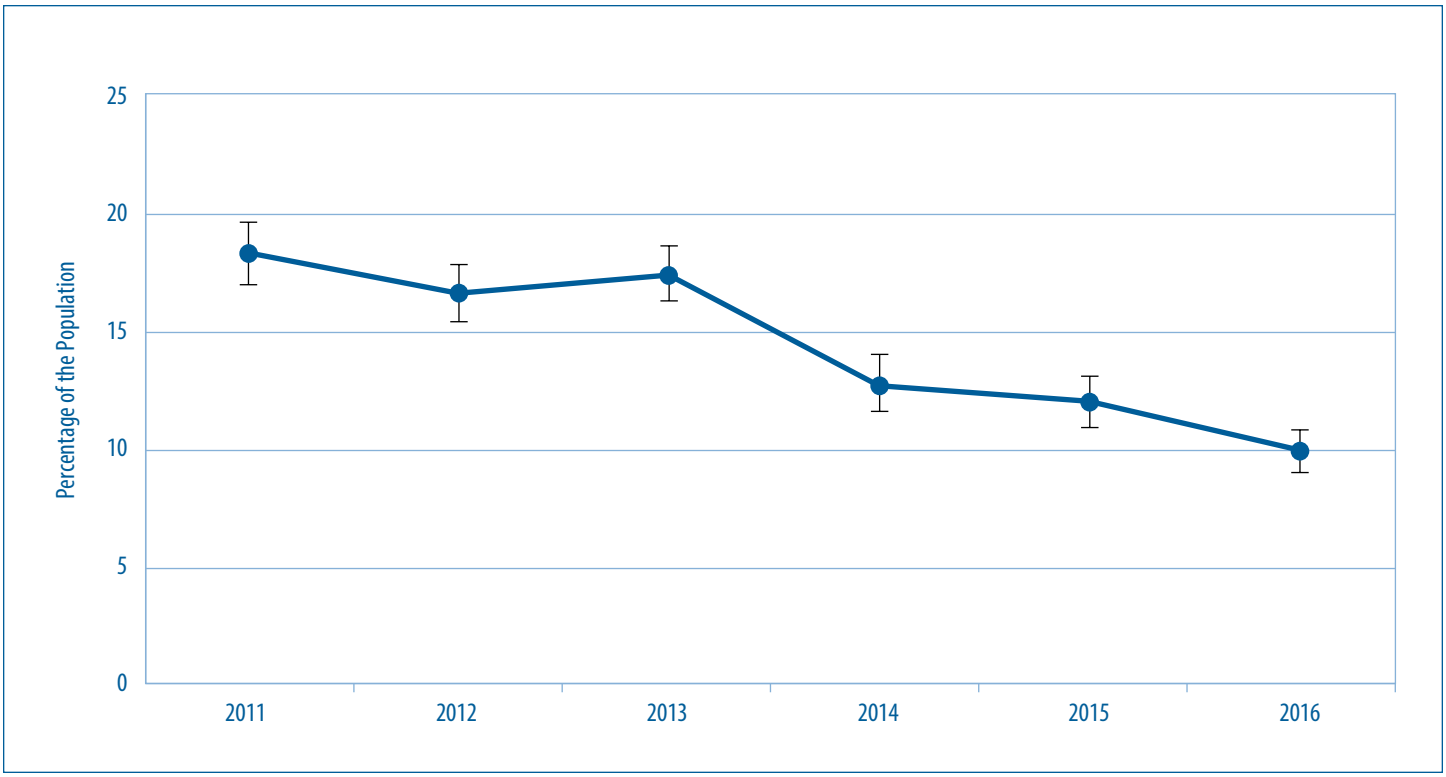


Source: MDHHS, 2017a

Definition: Among all adults, the proportion who reported being limited in any activities because of physical, mental, or emotional problems, or reported that they required use of special equipment (such as a cane, a wheelchair, a special bed, or a special telephone) due to a health problem.

Note: Vertical lines represent error bars

Figure 6: No Health Insurance

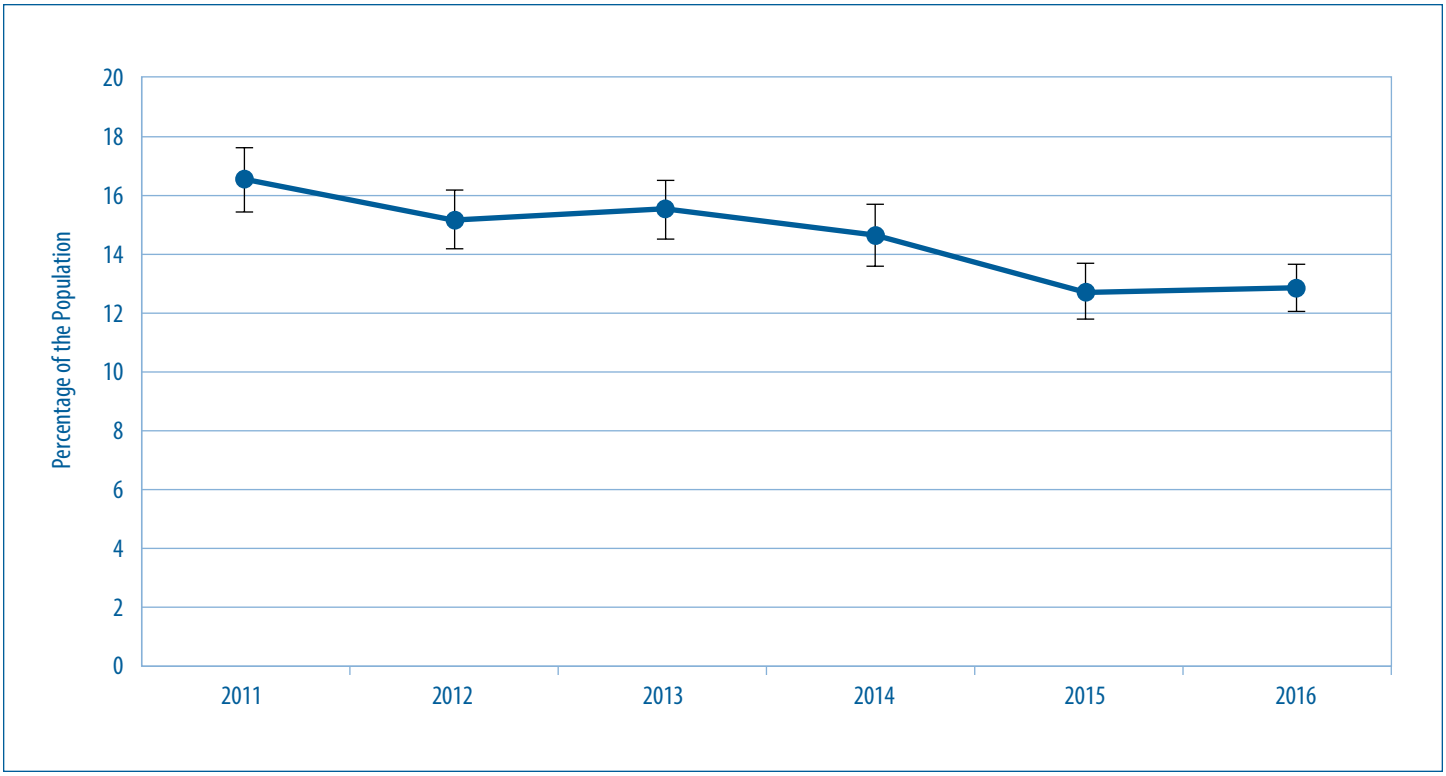


Source: MDHHS, 2017a

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 or Medicaid.

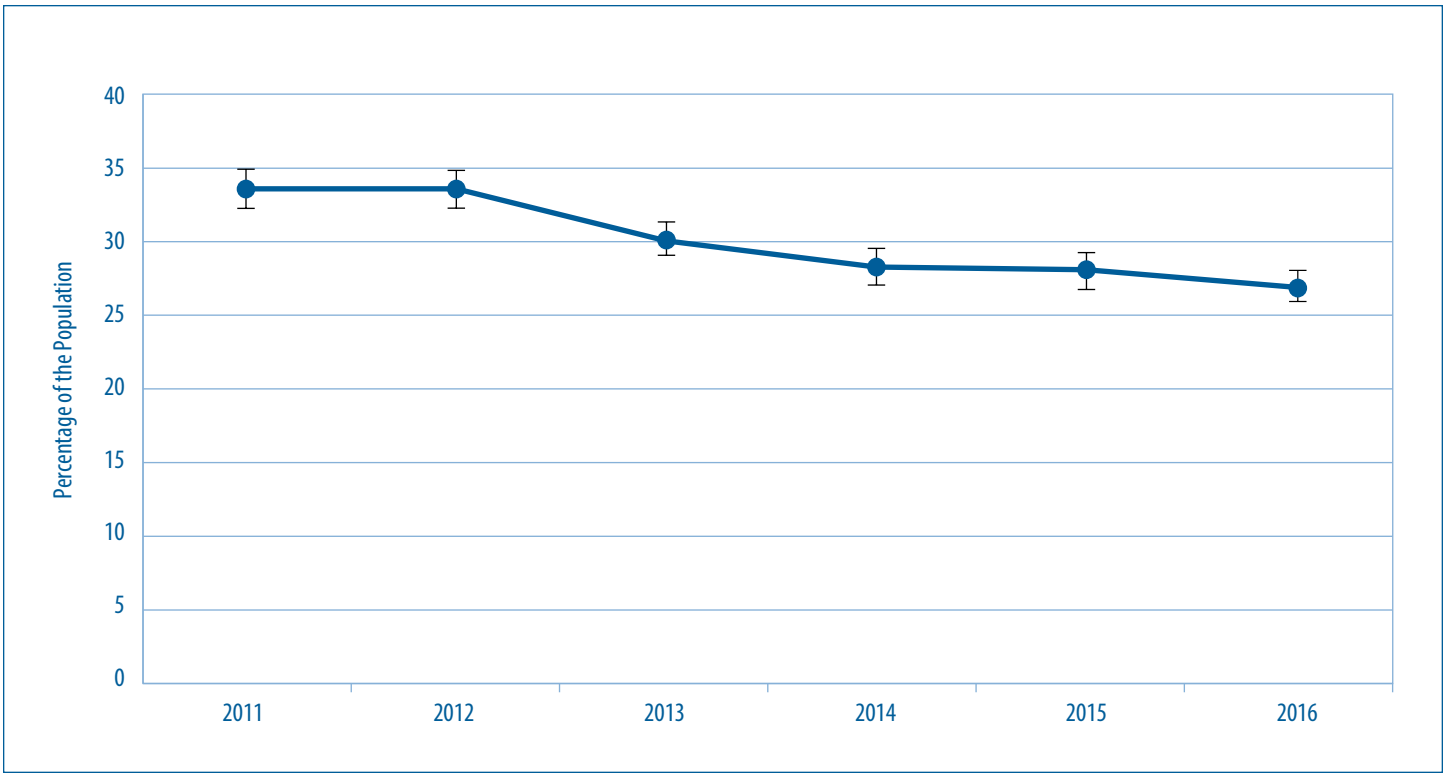
Note: Vertical lines represent error bars.
Various sources report uninsurance rates in Michigan ranging from 6 percent to 10 percent of the population.

Figure 7: No Health Care Access Due to Cost



Source: MDHHS, 2017a
Definition: Among all adults, the proportion who reported that in the past 12 months, they could not see a doctor when they needed to due to the cost.
Note: Vertical lines represent error bars

Figure 8: No Routine Checkup in Past Year



Source: MDHHS, 2017a
Definition: Among all adults, the proportion who reported that they did not have a routine checkup in the past year.
Note: Vertical lines represent error bars

Economic Analysis

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Benchmarking Communities

In this section, we compare the Grand Rapids combined statistical area to a selected group of metropolitan areas to examine differences in the supply of hospital services, hospital expenses, and Medicare expenditures[1]. This year, we were able to acquire several additional years of data for this section which has led us to update our methodology. We now compare changes in hospital utilization and expenditures for the Grand Rapids region to changes for a "benchmark" region calculated as the population-weighted outcome average for Louisville, KY; Buffalo, NY; Rochester, NY; and Milwaukee, WI. These regions were selected as benchmark communities based on similarities to Grand Rapids in a variety of regional metrics including population density, earnings estimates, unemployment rates, and population age and race distributions. We also include outcomes for the Detroit region and for the entire U.S. We note that the passage of the Affordable Care Act in 2010 and the 2014 Medicaid expansion in Michigan likely had significant impacts on the trends discussed below.

The Supply and Utilization of Hospital Services

Figures 1-7 provide a detailed examination of both hospital capacity and utilization across Grand Rapids and the comparison regions. Utilization measures such as admissions, outpatient hospital visits, and emergency department visits are measured as per capita rates using the number of residents in each region as the denominator. A downside to the use of these per capita utilization rates is that they do not account for the inflow of patients from outside the region or the outflow of patients to other regions. For example, a destination hospital like the Cleveland Clinic attracts patients from outside of the Cleveland region who contribute to the numerator in the utilization calculation, but not to the denominator. In cases where patient inflow is particularly high, utilization measures will be overstated.

Figure 1 includes data on the number of hospital beds per 1,000 residents in each region from 2005 to 2015. This measure serves as a proxy for hospital capacity. For Grand Rapids, the benchmark communities, and the U.S., per capita hospital inpatient capacity has declined over the past decade. Alternatively, Detroit has experienced an increase in per capita hospital beds since 2005. Nationally, the trend has been a movement away from investments in additional inpatient capacity, which means that Detroit's increase is likely due to the region's population losses rather than the construction of new beds. We note that Grand Rapids has fewer beds per capita than the national average. It's likely that this results in lower overhead, which could lead to less costly hospital care.

Figure 2 displays the number of hospital admission per 1,000 residents. While **Figure 1** focused on inpatient capacity, **Figure 2** provides data on inpatient utilization. Grand Rapids has significantly fewer admissions per capita than the benchmark regions and remains below the national average. This could be an indication of a relatively healthy population in West Michigan or a stronger reliance on outpatient rather than inpatient care. In either case, given the high cost associated with inpatient care, fewer hospital admissions bode well for the Grand Rapids region. Hospital admissions have generally been falling over time, but this does not appear to be true over the past decade in Detroit. After a slight decrease in per capita admissions in 2007, Detroit has seen increasing admission rates in nearly every subsequent year.

Figure 3 plots per capita outpatient visits from 2005 to 2015. While inpatient admissions have fallen over this period, outpatient visits have increased, indicating a substitution between the two types of care. Of note in **Figure 3** is the steep increase in outpatient hospital visits in both the Grand Rapids and Detroit regions over this period. Outpatient hospital visits increased from approximately two per person per year in Grand Rapids in 2005 to nearly four per person per year in 2015. The increase in Detroit was of a similar magnitude. If this growth is simply reflecting the substitution between outpatient hospital visits and inpatient stays, then this would likely represent a net decline in expenditures due to the high cost of hospital admissions. However, this substitution is unlikely to fully explain the changes in **Figure 3** since the decline in per capita hospital admissions for Grand Rapids over the past decade has been moderate and per capita admissions actually increased in Detroit (see **Figure 2**).

Another factor to consider is that, since values in **Figure 4** are calculated as the ratio of outpatient visits to the number of area residents, those coming from outside the Grand Rapids or Detroit areas to receive treatment are included in the numerator, but not in the denominator of the calculation. Therefore, the large increases in outpatient hospital visits from 2005 to 2015 could be driven, in part, by changes in the inflow of patients to the area. To test this hypothesis, we used hospital-level data to calculate the share of hospital admissions in Kent, Ottawa, Muskegon, and Allegan counties (KOMA) that belonged to residents of those counties. In other words, if only KOMA residents visited KOMA hospitals, then this share would equal 100 percent. **Figure 4** plots the KOMA resident share of local hospital admissions for years 2006, 2008, 2010, 2012, and 2014. In 2006, 82.5 percent of admissions to KOMA hospitals were from people living in a KOMA zip code. By 2014, that figure had fallen to 80.7 percent. Based on an average

[1] Because the Grand Rapids metropolitan statistical area (MSA) definition has recently changed, we use the more consistent definition of the core-based statistical area. The Detroit region is defined using the smaller metropolitan division categorization. All other regions are defined using the MSA.

[2] The analysis was also conducted removing anyone with a Florida zip code due to the possibility of splitting time between West Michigan and Florida. Results were not substantially changed.

annual admissions figure of approximately 125,000 for KOMA hospitals, this change translates to 2,375 more patients from outside the KOMA counties admitted to local hospitals in 2014 compared to 2006[2]. So, while we have seen an increase in patients from outside the KOMA region using local hospitals, the magnitude has been rather small and does not lend much support to the claim that West Michigan is a destination for people from outside the region seeking hospital care. Clearly, testing geographic changes in inpatient admissions is not equivalent to testing changes in outpatient hospital visits, but we believe that inpatient treatments would be more likely than outpatient treatments to draw patients from outside the area.

A more plausible explanation for the growth in outpatient visits to hospitals in both Grand Rapids and Detroit involves the transition to provider-based billing arrangements (also known as hospital outpatient billing) as independent physician practices increasingly align with hospital systems (Medicare Payment Advisory Commission, 2012). Provider-based billing allows for qualified hospital-affiliated physician practices to charge an additional facility fee for patient care (American College of Physicians, 2013). Reliance on this potential source of additional hospital revenue has increased sharply over the study period and has been credited with accelerating the rate at which physician practices have aligned with hospital systems[3]. Furthermore, hospital alignment has become increasingly attractive to physicians as a means to leverage the scalability and efficiencies needed to comply with quality-based reporting needs and to invest in efforts to modernize their practices (e.g. electronic medical records, billing and accounting systems, etc). Importantly, for the data displayed in **Figure 3**, patient visits to non-hospital settings are often categorized as hospital outpatient visits under a provider-based billing system[4]. So what appears to be a doubling of per capita outpatient visits to hospitals in Grand Rapids from 2005 to 2015 could simply be a change in billing practices. Moving forward, recent attempts by the Centers for Medicare and Medicaid policy to reduce the advantages of provider-based billing could affect future trends in **Figure 3**[5].

Figure 5 examines an additional component of hospital utilization by plotting per capita emergency department (ED) visits for Grand Rapids and each of the comparison regions. Most notably, **Figure 5** indicates that Detroit experiences far more ED use than either Grand Rapids or the national average, which likely contributes to a higher cost of care on the east side of the state. Reflecting the trend seen in **Figure 5**, the Grand Rapids region has experienced significant growth in ED utilization over the past decade. At 363 ED visits per 1,000 residents, Grand Rapids ED use was below both the benchmark communities and the national average in 2005. By 2015, ED visits in Grand Rapids had increased to 470 per 1,000 residents. The higher rate of increase observed between 2014 and 2015 for all regions is likely a function of increased insurance coverage associated with the Affordable Care Act. Overall, this trend of increasing ED use in the Grand Rapids region should be a concern for stakeholders in the region. ED use is generally more expensive than care provided in other outpatient settings and many visits to the ED are for non-emergent conditions (Honigman et al., 2013; Weinick, Burns, & Mehrotra, 2010). One clear way to address rising costs of health care provision would be to reverse this upward trend in ED use.

Figure 2 suggested that Grand Rapids residents are relatively less likely to be admitted to the hospital than those in the benchmark communities and **Figure 6** indicates that our hospital length of stays tend to be shorter as well. The average length of hospital stays in Grand Rapids has declined over the past decade and remains below the national average. Given the expense that accompanies a day in the hospital, minimizing the average length of stay can have a substantial impact on the overall cost of care.

Finally, **Figure 7** highlights the supply of hospital-based personnel per 1,000 residents in each region. These personnel counts represent the total number of full-time equivalent (FTE) hospital employees excluding medical and dental residents, interns, and other trainees. As noted in the Education and Job Growth section of this publication, the rate of employment growth in the health care sector in West Michigan has been positive and is reflected in the increase in hospital-based personnel for Grand Rapids over the past decade. However, despite this increase, the Grand Rapids region remains below the national average for per capita hospital-based personnel. This is likely a contributing factor to the relatively low cost of care experienced in West Michigan. Interestingly, we find a relatively steep increase in per capita hospital-based personnel in the Detroit region over this time period. In 2005, Detroit had approximately 15.5 hospital-based FTEs for every 1,000 residents. By 2015, that number had increased to nearly 20.

Hospital Expenses and Medical Expenditures

Figure 8 examines payroll and benefits expenses per hospital employee, which is inflation-adjusted to 2015 dollars using the consumer price index. Average compensation for hospital workers in Grand Rapids is below the national average and below the benchmark levels. Payroll and benefit expenses for hospital employees in Grand Rapids peaked in 2010, fell from 2011 through 2013 and remained largely stable in 2014 and 2015. On the other hand, Detroit has relatively high levels of compensation for hospital employees, though the level has fallen recently from its high in 2008.

Figure 9 displays total hospital expenses per admission. It is important to recognize that **Figure 9** is measuring the expenses reported by the hospital to provide treatment for the average admission, but does not represent patient or insurer expenditures on hospital care. Even after adjusting for inflation, the growth in hospital expenses per admission for all of the comparison regions has been

[3] According to the 2012 MedPac Report to Congress, "Growth in the percentage of [evaluation and management] office visits that are provided in [hospital outpatient departments] has accelerated, increasing at an annual rate of 3.5 percent from 2004 through 2008, by 9.9 percent in 2009, and by 12.9 percent in 2010."

[4] The data source for Figure 3, the American Hospital Association Hospital Statistics publication, instructs reporting hospitals that "visits to satellite clinics and primary group practices should be included if revenue is received by the hospital."

[5] For more information, see Price et al. (2016).

substantial over the past decade. Despite the relatively low hospital employee compensation noted in **Figure 8**, we see that hospital expenses per admission in Grand Rapids are significantly higher than the national average and are approximately $3,000 greater per admission than Detroit. We do note, however, that hospital expenses in Grand Rapids are now in line with the benchmark group. Growth in per-admission hospital expenses could be explained by at least two factors: 1) increasing reliance on advanced technology; and 2) changes in the overall illness severity of hospitalized patients. Newer and more advanced health care technologies often tend to be cost-increasing rather than cost-reducing (Kumar, 2011). If technological advancement generates improved outcomes, then the additional expenses may be worthwhile. However, even worthwhile spending raises overall costs.

Due in part to changes in the payment incentives for inpatient care, certain types of care have migrated to outpatient settings (Berenson, Ginsburg, & May, 2011). As a result, the health of the average patient admitted to the hospital today is likely to be worse than the health of the average patient admitted in 2005. Ultimately, the effect of this shift in treatment settings has been to reduce the hospital share of total health expenditures, but increase per admission expenses (Moses et al., 2013).

Figure 10 plots per capita Medicare expenditures for both Fee-for-Service (FFS) and Medicare Advantage (MA) enrollees from 2007 through 2015. These figures represent the average, annual, per capita government expenditure for a Medicare beneficiary in each of the comparison communities. Data on FFS Medicare enrollment and expenditures were obtained through the Centers for Medicare and Medicaid Services' (CMS) Geographic variation public use file (2017). Measures of MA plan enrollment were created by using the CMS Monthly Enrollment by Contract/Plan/State/County Files and averaging monthly plan enrollment for each year, while data on plan reimbursements were gathered from the annual CMS Plan Payment Data Files. Due to the methodology employed by these groups, geographic regions for **Figure 10** are defined as the primary county in the MSA (e.g. estimates for Grand Rapids are specific to Kent County). Expenditures in **Figure 10** are adjusted for regional differences in prices, population age, gender, and race. These figures include expenditures for physician and hospital care, but exclude expenditures on prescription medications. Additionally, in cases where treatment was received in a county outside of where the patient resides, CMS assigns expenditures to the county in which the patient lived and not the county where the treatment was performed. Notably, Medicare expenditures for all regions and the U.S. as a whole fell from 2010 through 2014. This unprecedented string of year-over-year reductions in per-member Medicare expenditures received a good deal of attention, but downward trend appears to be leveling off. In fact, between 2014 and 2015, average Medicare expenditures for the Grand Rapids region (Kent County) increased from $9,118.77 per member per year to $9,135.86 per member per year.

Care Coordination

Lastly, **Figure 11** provides evidence on the quality of care received in each region using hospital discharges for ambulatory care-sensitive conditions as a proxy for care coordination. This measure is often equated to preventable hospitalizations and can be used as an indicator of care efficiency. In this case, a lower number is preferable, so Grand Rapids performs particularly well. Overall, it appears that Grand Rapids and West Michigan Medicare FFS residents receive a higher level of care coordination than those in many of the comparison regions.

Data for **Figure 11** were collected from the Dartmouth Atlas of Health Care and exhibit two primary differences from the previous figures. First, **Figure 11** focuses solely on Medicare FFS beneficiaries and does not include data on Medicare Advantage enrollees. Claims data for Medicare Advantage enrollees are typically not made available to researchers. Nationally, slightly more than one-third of Medicare beneficiaries are enrolled in a Medicare Advantage plan. However, Medicare Advantage enrollment in Grand Rapids is now above fifty percent. This should be kept in mind when evaluating the following figures. Additionally, the Dartmouth Atlas of Health Care defines geographic regions at the hospital referral region (HRR) level and not the MSA .

In conclusion, while Grand Rapids compares favorably to the comparison regions on metrics associated with care coordination and efficiency, there are several areas of concern and opportunities for potential improvement. For example, rates of outpatient visits to hospitals and ED visits in Grand Rapids are above the national average and have grown substantially over the past decade. If, as the evidence suggests, this increase in outpatient hospital visits is due to the practice of provider-based billing, then this pattern is adding to the overall cost of care, but is not adding value. It simply represents a transfer of resources from patients and insurers to providers. Additionally, total hospital expenses per admission in Grand Rapids are above the national average and grew at a relatively steep rate from 2011 to 2014 before declining somewhat in 2015. On the plus side, per capita Medicare expenditures in the Grand Rapids area remain below the national average despite a small uptick in the past year. Evidence presented in this section suggests that high levels of care coordination may have been a significant factor in limiting the growth of Medicare expenditures in West Michigan.

[6] The Dartmouth Atlas of Health Care defines HRRs as "regional health care markets for tertiary medical care that generally requires the services of a major referral center. The regions were defined by determining where patients were referred for major cardiovascular surgical procedures and for neurosurgery."

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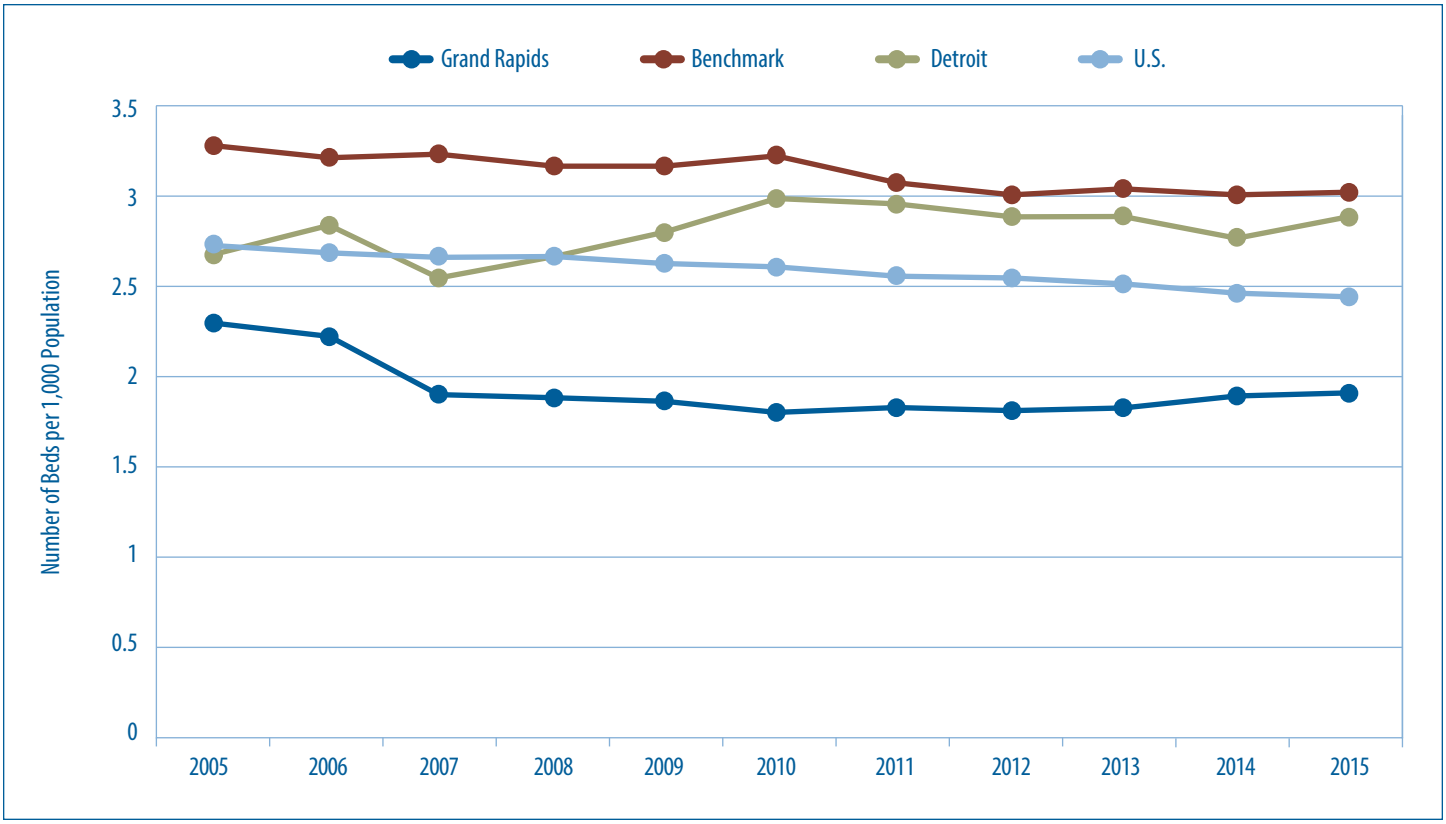
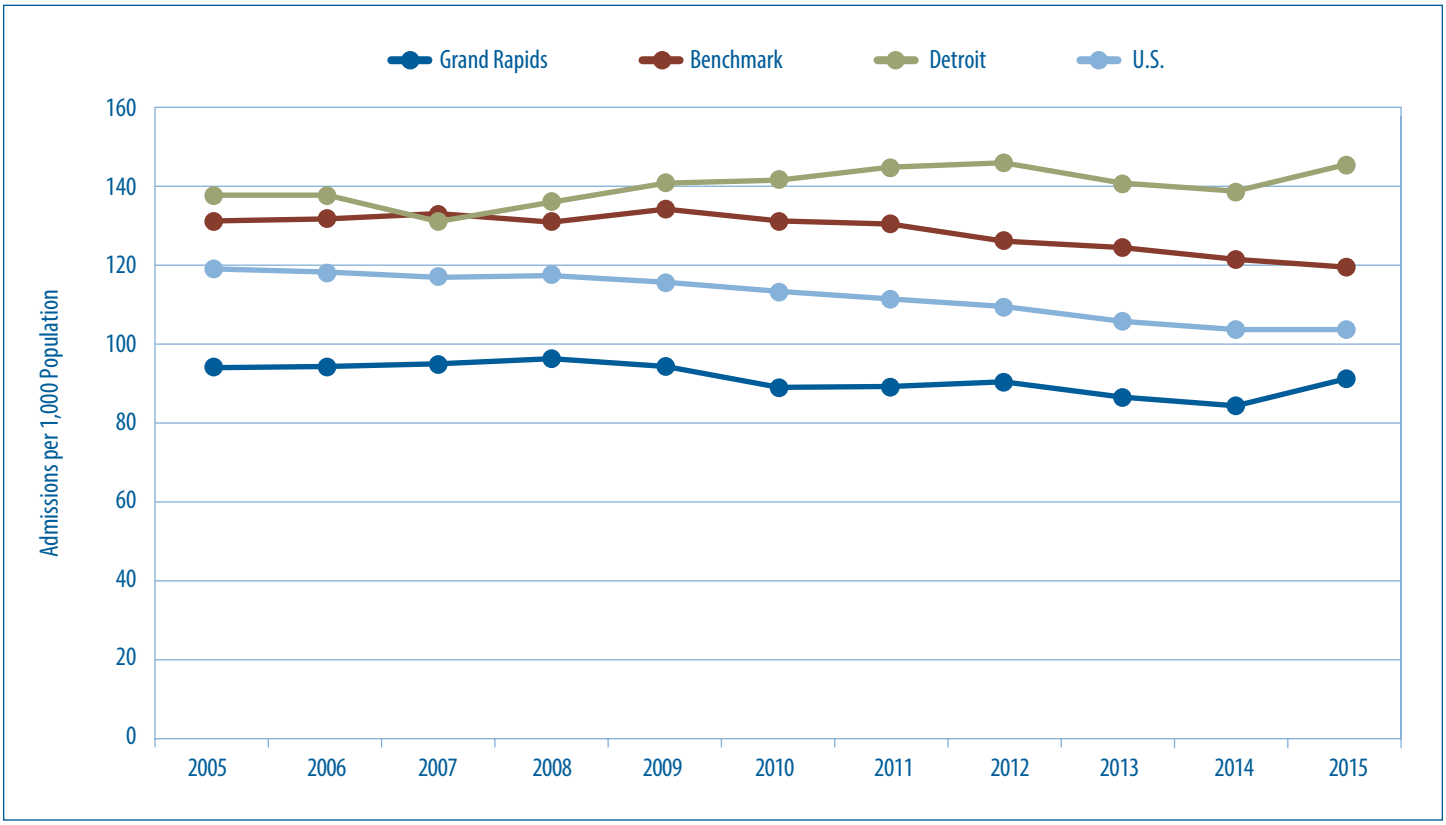
Figure 1: Hospital Beds per 1,000 Population



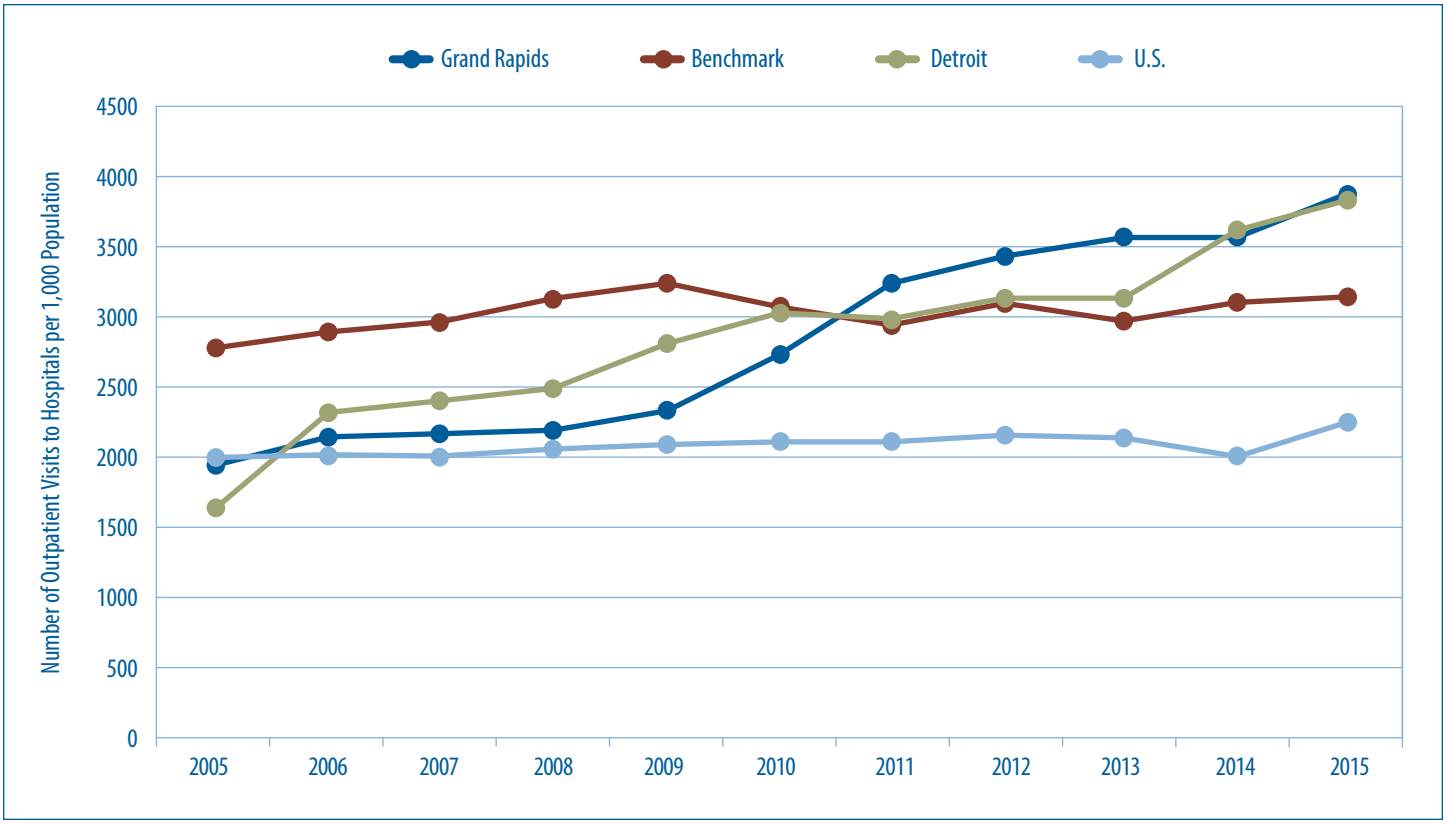
Source: U.S. Census. *Bureau population data estimates*

Figure 2: Hospital Admissions per 1,000 Population



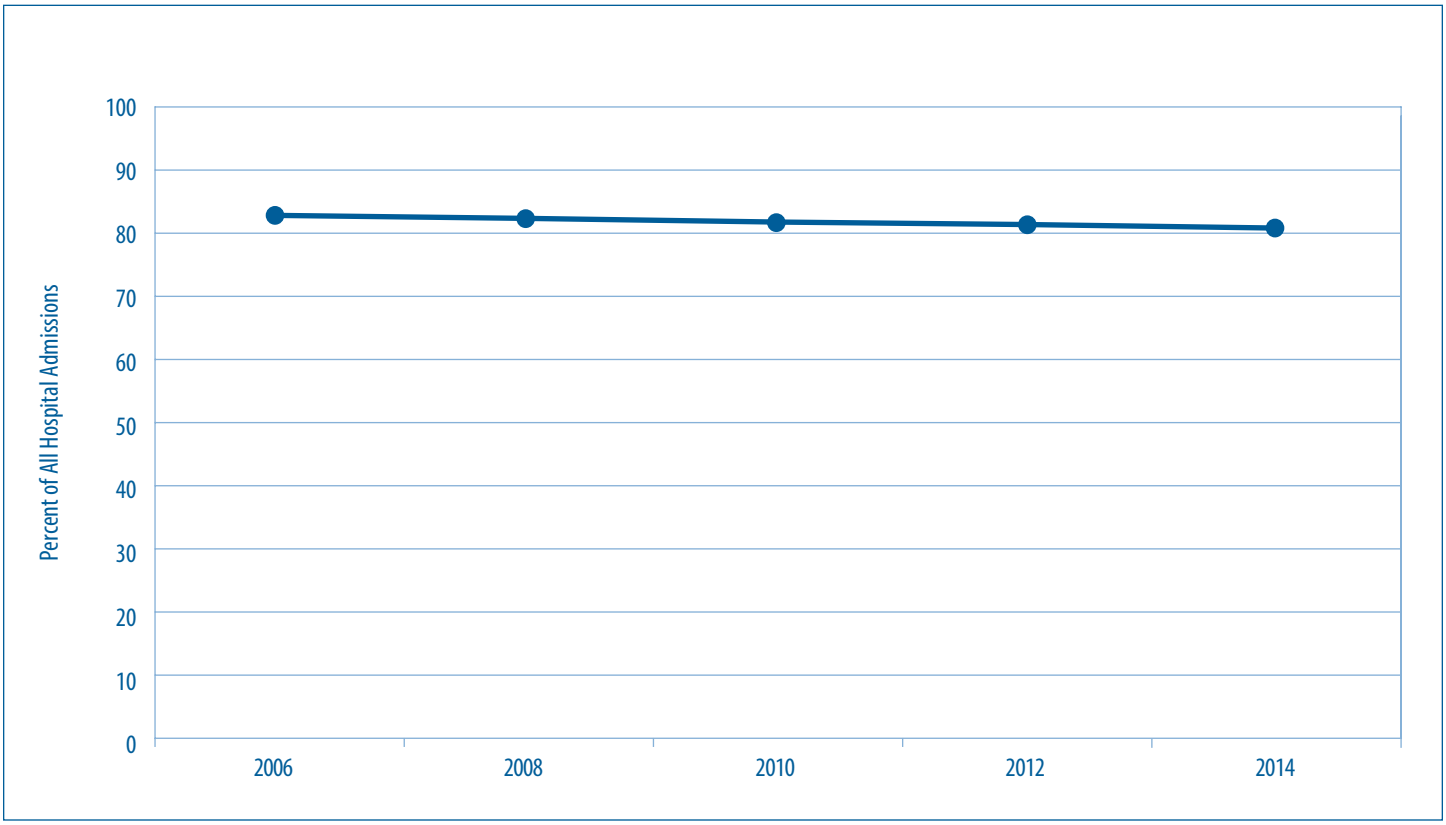
Source: American Hospital Association. *AHA hospital statistics, 2017*

Figure 3: Outpatient Visits to Hospitals per 1,000 Population



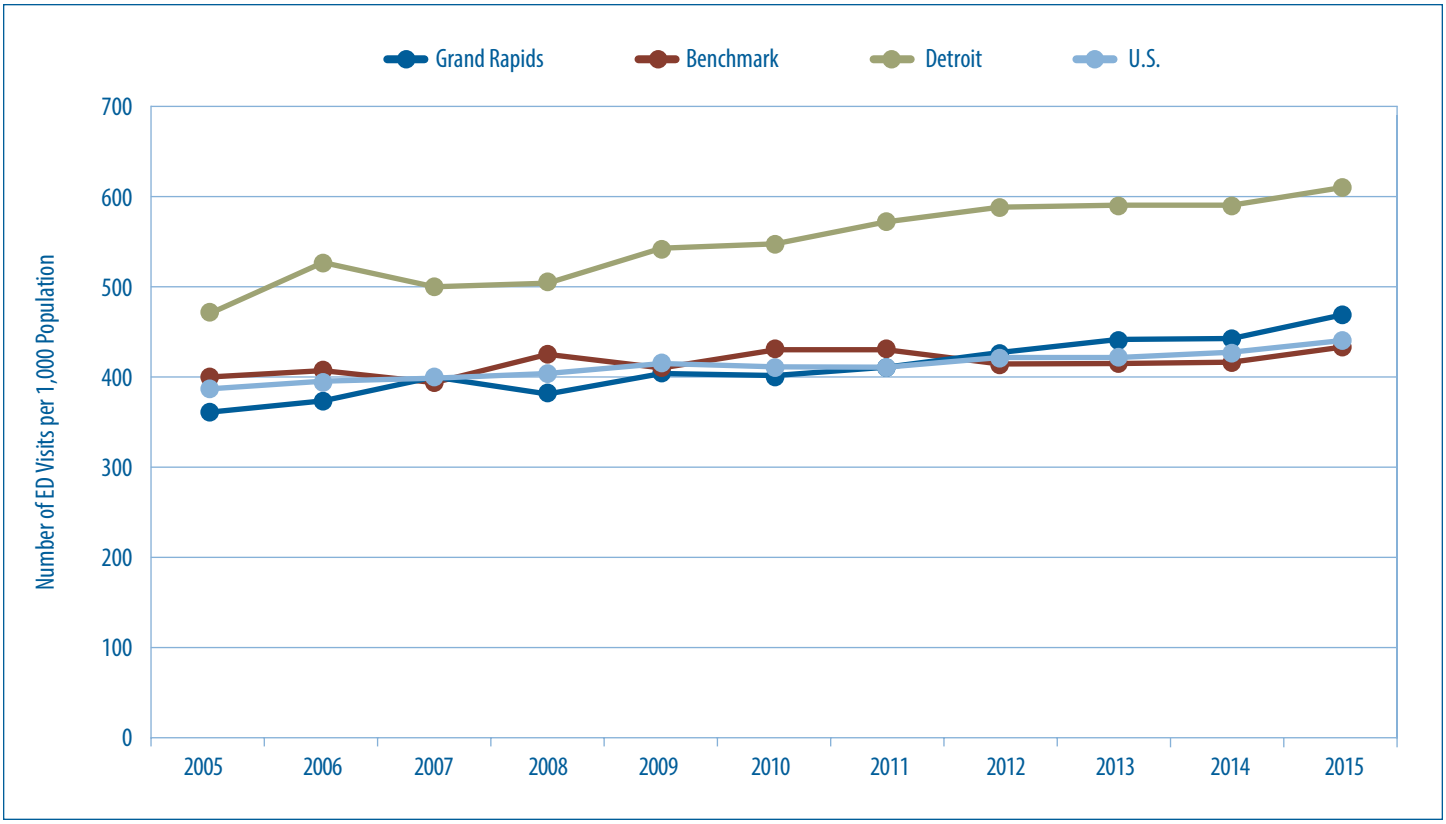
Source: American Hospital Association. *AHA hospital statistics, 2017*

Figure 4: KOMA Resident Share of Local Hospital Admissions



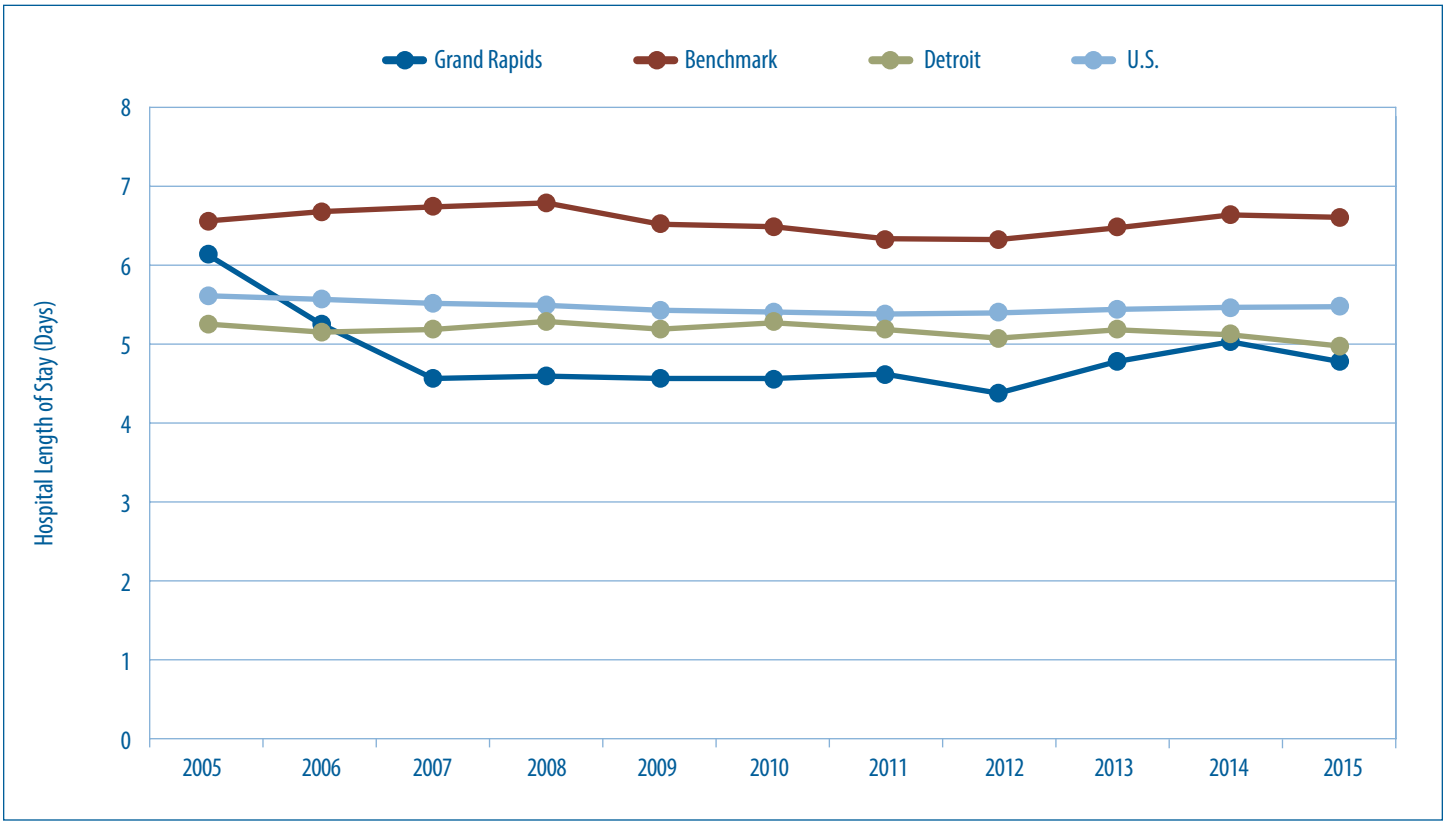
Source: Health Care Utilization Project's State Inpatient Databases

Figure 5: Emergency Department Visits per 1,000 Population



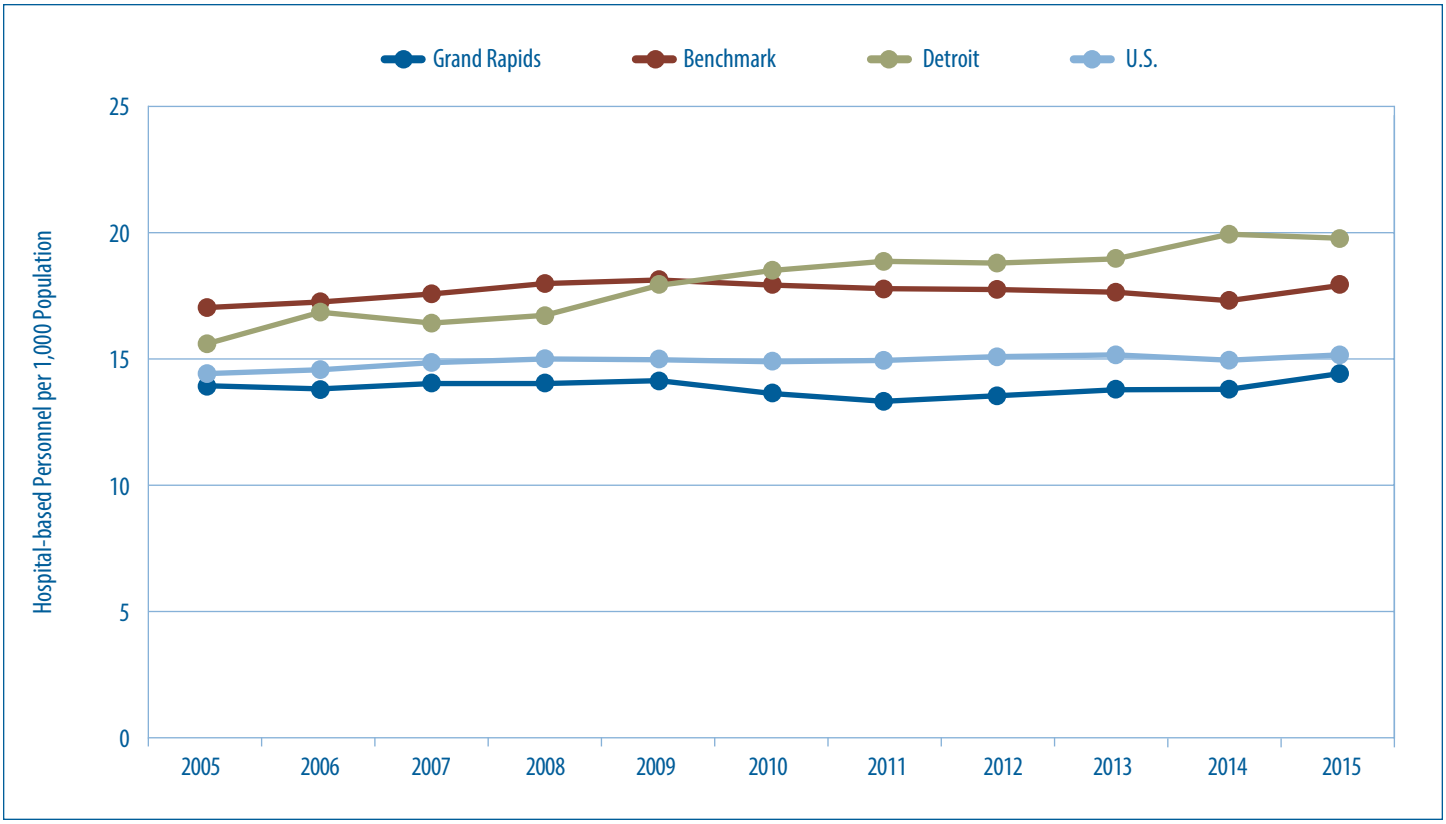
Source: American Hospital Association. *AHA hospital statistics, 2017*

Figure 6: Average Hospital Length of Stay



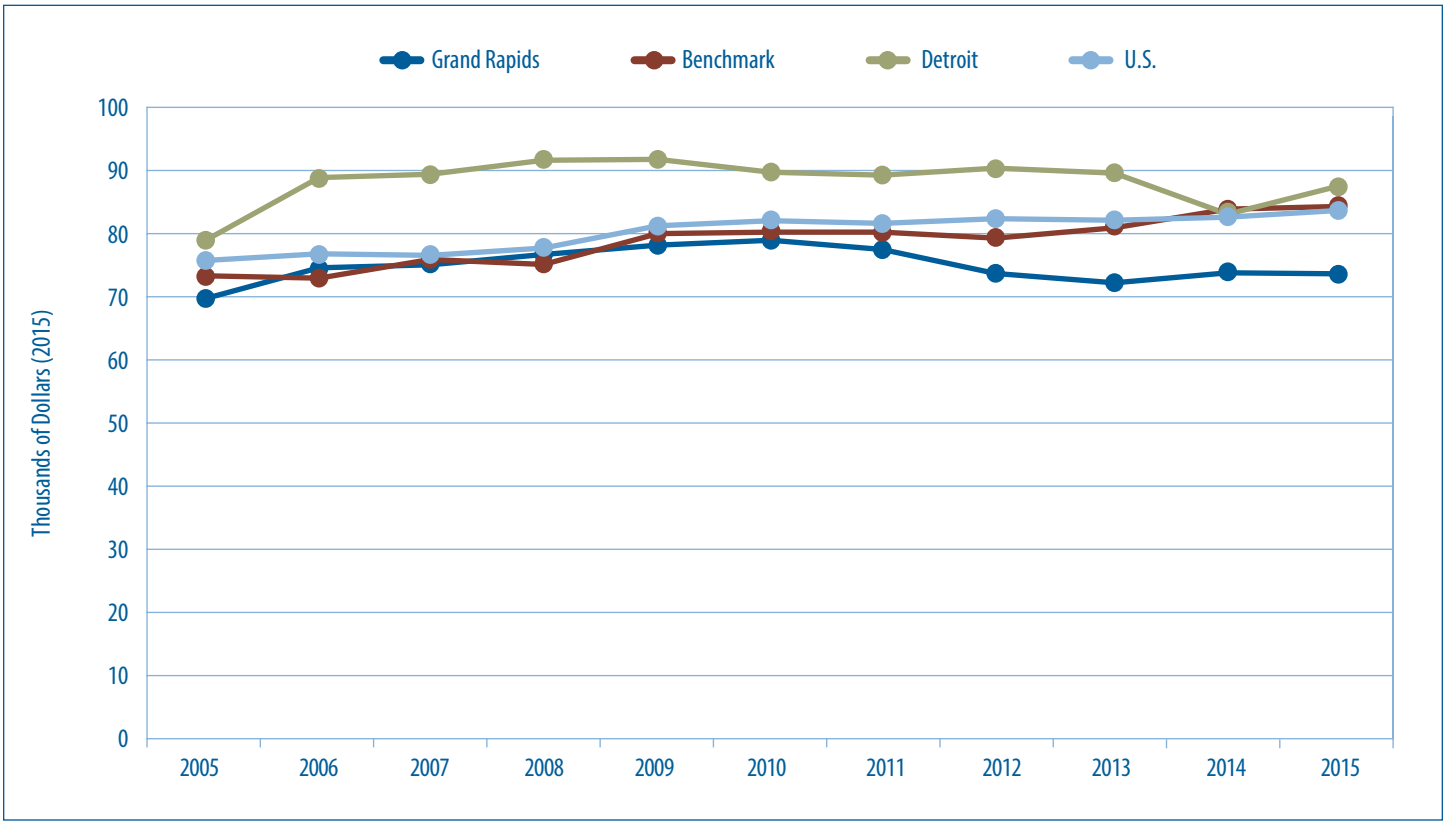
Source: American Hospital Association. *AHA hospital statistics, 2017*

Figure 7 - Hospital-based Personnel per 1,000 Population



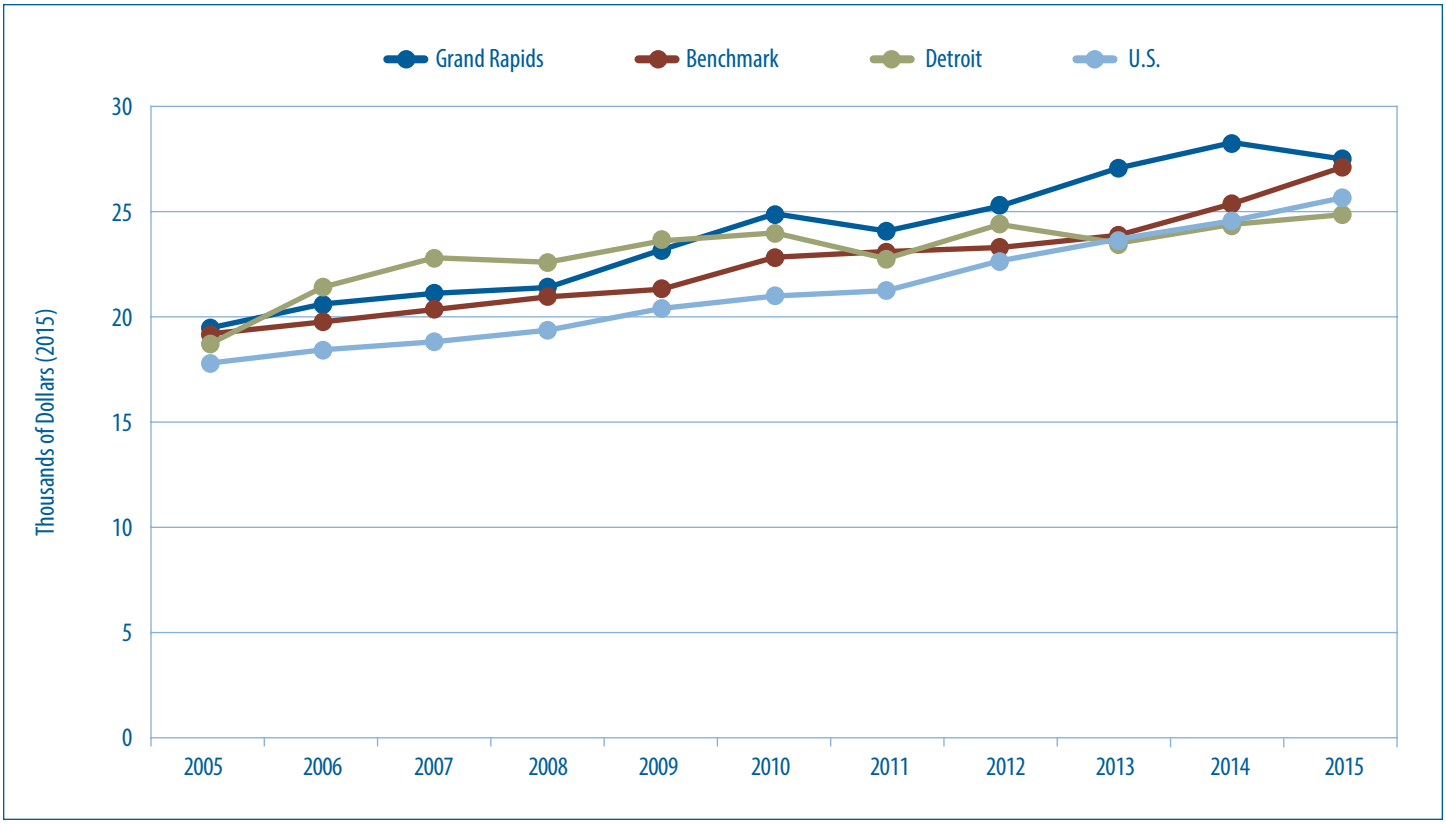
Source: American Hospital Association. *AHA hospital statistics, 2017*

Figure 8: Payroll and Benefit Expenses per Hospital Employee



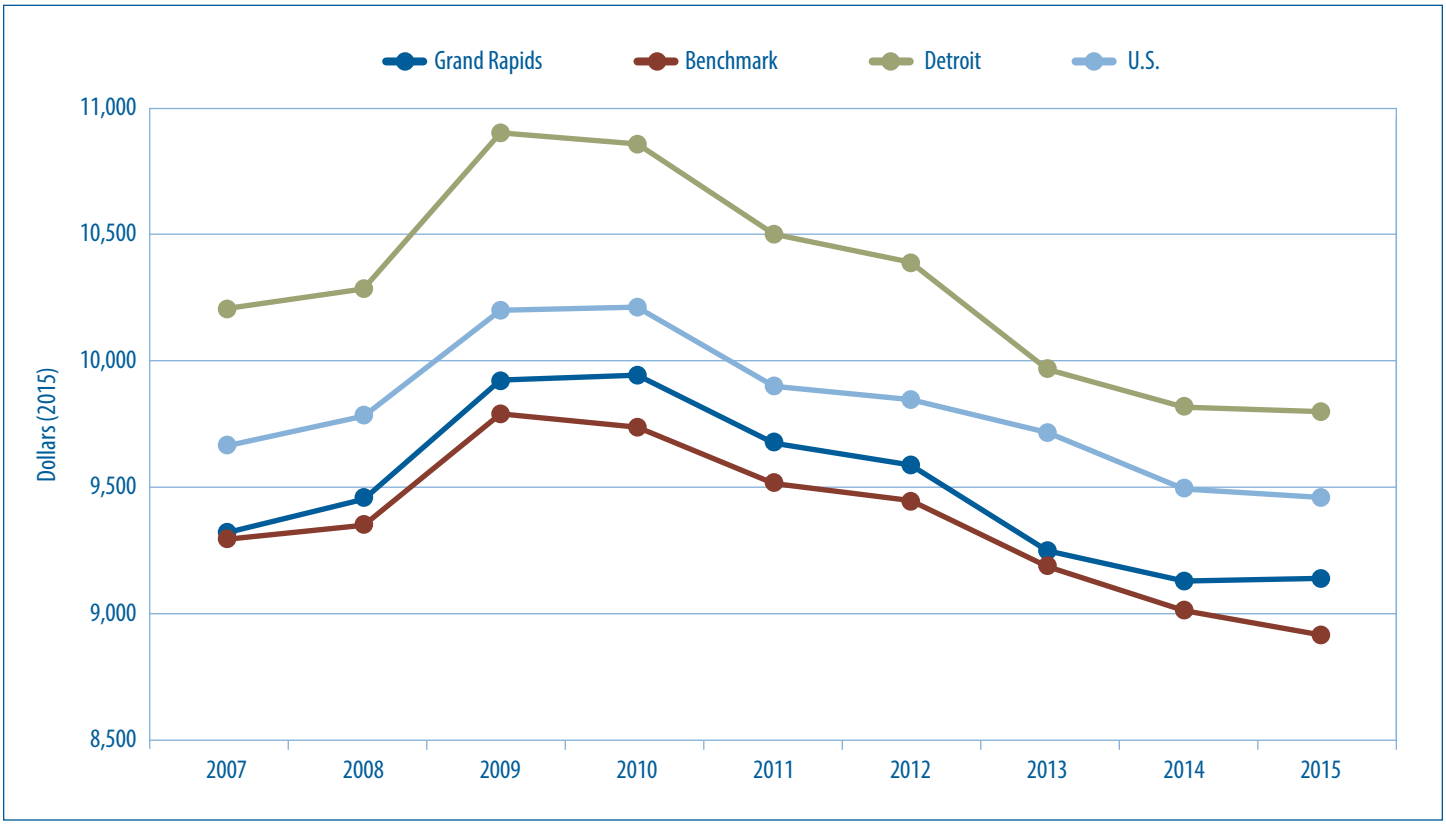
Source: American Hospital Association. *AHA hospital statistics, 2017*

Figure 9: Total Hospital Expenses per Admission



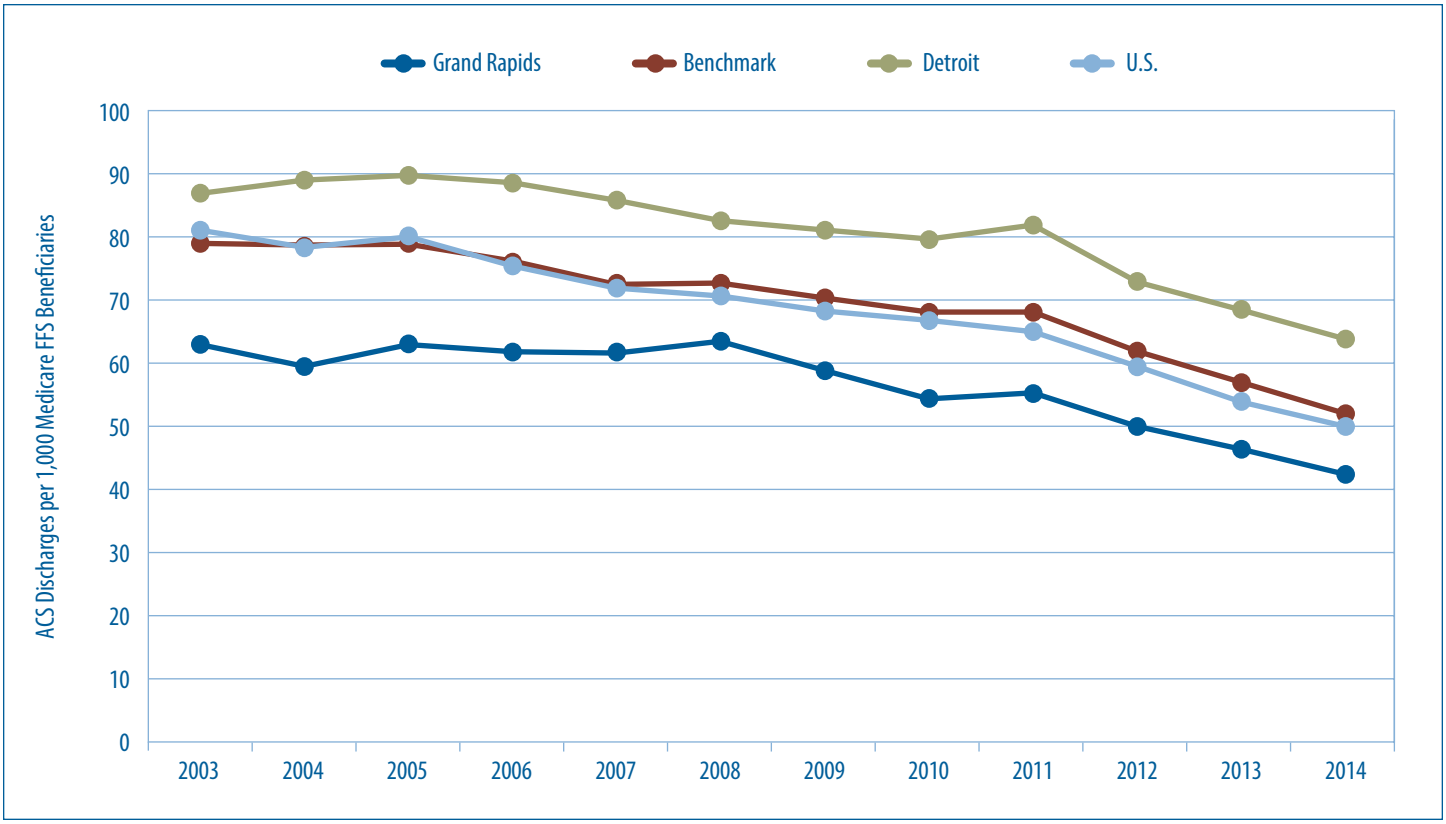
Source: American Hospital Association. *AHA hospital statistics, 2017*

Figure 10: Adjusted Medicare Expenditures per Medicare Enrollee



Sources: CMS Geographic Variation Public Use File; CMS Monthly Enrollment by Contract/Plan/State/County Files; CMS Plan Payment Data Files.

Figure 11: Discharges for Ambulatory Care-Sensitive Conditions per 1,000 Medicare Beneficiaries



Source: Dartmouth Atlas of Health Care. *Discharges for ambulatory care-sensitive conditions.*

Employer Health Insurance Survey

Introduction

This is the second year we are partnering with The Employers Association (TEA)[1] to examine the employer health insurance market in West Michigan. Although the national health care atmosphere is uncertain, employer health insurance has not seen much change over the last year. Nationally, average premiums rose 3 percent, and enrollment in high deductible health plans (HDHPs) saw very minor (1 percent) growth. Preferred Provider Organizations (PPOs) are still the predominant health insurance plan offered, although their numbers have been slowly falling in the last decade (Kaiser Family Foundation [KFF], 2107).

The survey was distributed online to 545 firm members of TEA in February 2017. Seventy-five firms responded to the survey (a response rate of 14 percent), with a total of 138 plans. Eighty-four percent of firms were from Kent County, with the remainder from surrounding counties.[2]

Firm and Industry Characteristics

The percentage of small, mid-size, and large firms this year is similar to last year. One quarter have less than 50 full time employees (FTE), 17 percent have 50–99 FTEs, and 57 percent have 100 or more. Not surprisingly, manufacturing is the dominant industry represented, at 54 percent of firms. Companies in professional industries comprise 14 percent of the sample, with warehouse and distribution firms at 10 percent. Twenty percent reported their industry as "other".[3]

Health Insurance

Number of Plans

All of the firms in our sample offered at least one health insurance plan to their employees. **Figure 1** shows the percentage of firms that offer one plan, two or three plans, or more than three plans. Fifty two percent of firms offer one plan to their firms, down from 66 percent last year. In turn, firms have increased options for workers by offering two or three plans (40 percent) or more than three plans (8 percent).

Premiums and Deductibles

Table 1 reports the average premiums, deductibles, and coinsurance for the sample. We classify a plan as either a high deductible health plan (HDHP), where the deductible is at least $1,300 for single coverage and $2,600 for family coverage, or as a traditional plan, which has a deductible below the $1,300/$2,600 threshold and includes HMO, PPO, and POS plans.

As expected, premiums for HDHPs are lower than for traditional plans, at $441 and $554 per month for single and family coverage, respectively.[4] These values are well in line with national figures, with KFF reporting an average monthly premium for HDHPs of $502 and $560–$588 for traditional plans (KFF, 2017).[5] West Michigan firms also offer plans with deductibles similar to those reported nationally. **Table 1** displays HDHP single coverage annual deductibles at $2,294 and $4,599 for families. A 2017 national survey of employers reported average deductibles of $2,219 for single coverage and $4,437 for family, up 1.9 percent from 2016 (Benefitfocus, 2017).

Employee Share of Premium

This year, we asked firms to tell us the percentage of the premium for which employees are responsible. The results are also shown in **Table 1.** Singles pay an average of 24 percent in traditional plans and 21 percent in HDHPs, while families are responsible for 28 and 25 percent, respectively. These percentages are higher for single coverage (18 percent), but lower for family coverage (31 percent), than data reported by the KFF (2017). These differences could be a result of many factors, including firm size and industry. For example, The Bureau of Labor Statistics found that in goods-producing industries (e.g., manufacturing), employees pay 21 percent of single premiums and 28 percent of family premiums, a number closer to our finding (U.S. Department of Labor, 2017).

Differences in the proportion of employee contributions between single and family coverage is common. Many employers structure worker contributions differently for individuals than they do for families. The contribution for the employee alone is the same for each employee; however workers generally pay a portion of the premium up to the full amount for additional family members, increasing the average employee contribution for families.[6]

Self-funded and Fully-insured Plans

Some firms choose to fund medical expenses themselves, hence taking on the risk of large payouts that are traditionally borne by insurers. This is called self-funding. Large firms with relatively healthy risk pools are more likely to self-fund, as they have the added benefit of avoiding many state insurance laws (e.g., reserve requirements and premium taxes). Other firms still choose the more traditional route by hiring outside insurers for their health plans (fully-insured plan). In 2017, 15 percent of workers were employed in self-funded businesses having 3–199 workers, while 47 percent of employees were employed in self-funded firms having 200–999 workers (Benefitfocus, 2107).

[1] The Employers' Association is a not-for-profit employers' association, incorporated in 1939, serving the West Michigan employer community from its Grand Rapids office. They assist hundreds of member companies maximize employee productivity and minimize employer liability through practical human resources and management advice, training, survey data, and consulting services.

[2] Less than 10 percent are from the following counties: Allegan, Barry, Ionia, Mason, Mecosta, Montcalm, Muskegon, Newaygo, Ottawa, Osceola, and Van Buren.

[3] "Other" industries include: agri-business, construction, education, government, health care, legal services, retail/service, supply chain/logistics, transportation, and technology.

[4] HDHPs trade high deductibles for lower premiums, while traditional plans tend to have lower deductibles but higher premiums.

[5] KFF (2017) reports $588 for traditional HMOs, $580 for traditional PPOs, and $560 for traditional POS plans.

[6] Forty-five percent of small firms and 15 percent of large firms calculate worker contributions this way, while 45 percent of small firms and 75 percent of large firms contribute larger amounts for family coverage. The remaining 10 percent of firms use either a mix of the two methods or an alternate formula (KFF, 2017).

New to the survey this year was a question on whether the firm is self-funded or fully-insured **(Figure 2).** Thirty-three percent of plans are self-funded, while 67 percent are fully-insured. While we were unable to find other current studies that reported self-funded status by plan, we analyzed the status by firm size and found that the larger the firm, the more likely they were to be self-funded, which is the pattern we would expect to see.[7]

Types of Insurance Plans

Figure 3 compares the percentages of firms that offer each type of plan, for both last year and this year's surveys. Last year, 14 percent of firms offered a traditional HMO, 40 percent a traditional PPO, and 3 percent a traditional POS. Sixty-eight percent of firms offered an HDHP. This year, we see a shift away from PPO plans, with gains in percentages of HMO, POS, and HDHP coverage. Thirty-six percent of firms now offer a PPO, 19 percent offer HMOs, and 7 percent a POS. HDHP offerings increased by 7 percentage points to 75 percent.

Why the shift away from PPO plans? Since 1999, PPO plans have dominated the health insurance landscape. Coverage peaked in 2005, with 61 percent of all covered workers in PPO plans; the current coverage is 48 percent (KFF, 2017). Although it is still the most popular plan with employers, deductibles for PPO plans have been rising at a much faster rate than for other plans, even compared to HDHP plans. From 2016 to 2017 alone, PPO individual deductibles increased an average of 8.4 percent, versus a 1.9 percent increase in HDHP deductibles (Benefitfocus, 2017). Given that PPO premiums are traditionally higher than those for HDHPs, these plans may be losing their attractiveness to employers and employees alike.

Firms are still looking to HDHPs to keep costs contained. Increasing cost-sharing has been a common way for firms to keep health insurance affordable. Fifty seven percent of large employers said that offering an HDHP as an option, or often offering it as their only plan, was a primary tactic in controlling costs. In fact, 35 percent of these employers only offered an HDHP, up from 33 percent in 2016 (National Business Group on Health (NBGH), 2017). We compared last year's results to this year's and found the percentage of West Michigan firms offering only an HDHP type plan holding steady at 42 percent **(Figure 4).**

HSAs, HRAs and Flexible Spending Accounts

With deductibles on the rise and more and more firms offering at least one HDHP, it is vital that employees have a means to save for higher out-of-pocket expenses. Health Savings Accounts (HSAs) can only be partnered with a qualified HDHP and can be funded through employee and/or employer contributions. Flexible Spending Accounts (FSAs) can also be funded by employees and employers, but they are not tied to any specific type of health insurance plans. Health Reimbursement Accounts (HRAs), another account that is not tied to a specific type of plan, can only be funded by employers.

Figure 5 reports the percentage of West Michigan firms that offer each type of account, for both last year's and this year's survey. The percentage of firms offering HSAs increased only slightly, from 54 percent to 55 percent. However, more firms this year are contributing to workers' HSAs than did last year **(Figure 6).** Sixty-four percent are contributing this year, a 10 percentage point increase from last year. West Michigan employers contribute to a higher degree than do firms nationally, with only 53 percent of firms making contributions in 2017 (KFF, 2017).

While HSA growth is small, HRAs and FSAs increased by a more substantial degree this year **(Figure 5).** Last year only 4 percent of firms offered an HRA, while 12 percent offered HRAs this year. More companies are also offering FSAs, with 60 percent doing so this year, up from 53 percent. Why might we see growth in non-HSA vehicles? HRA and FSA accounts are not tied to any specific plan design, so workers without HDHPs can take part in them. And, with the growth we are seeing in traditional (non-HDHP) plan deductibles, employers would like to give workers options for managing up-front expenses.

Overall, West Michigan firms have seen minor changes in the health insurance landscape over the last year. HDHP plans continue to grow, as have HSA offerings, but by a much smaller percentage than last year. However, the percentage of firms contributing to employee HSAs has increased, indicating an increased willingness for firms to increase health insurance affordability for their employees.

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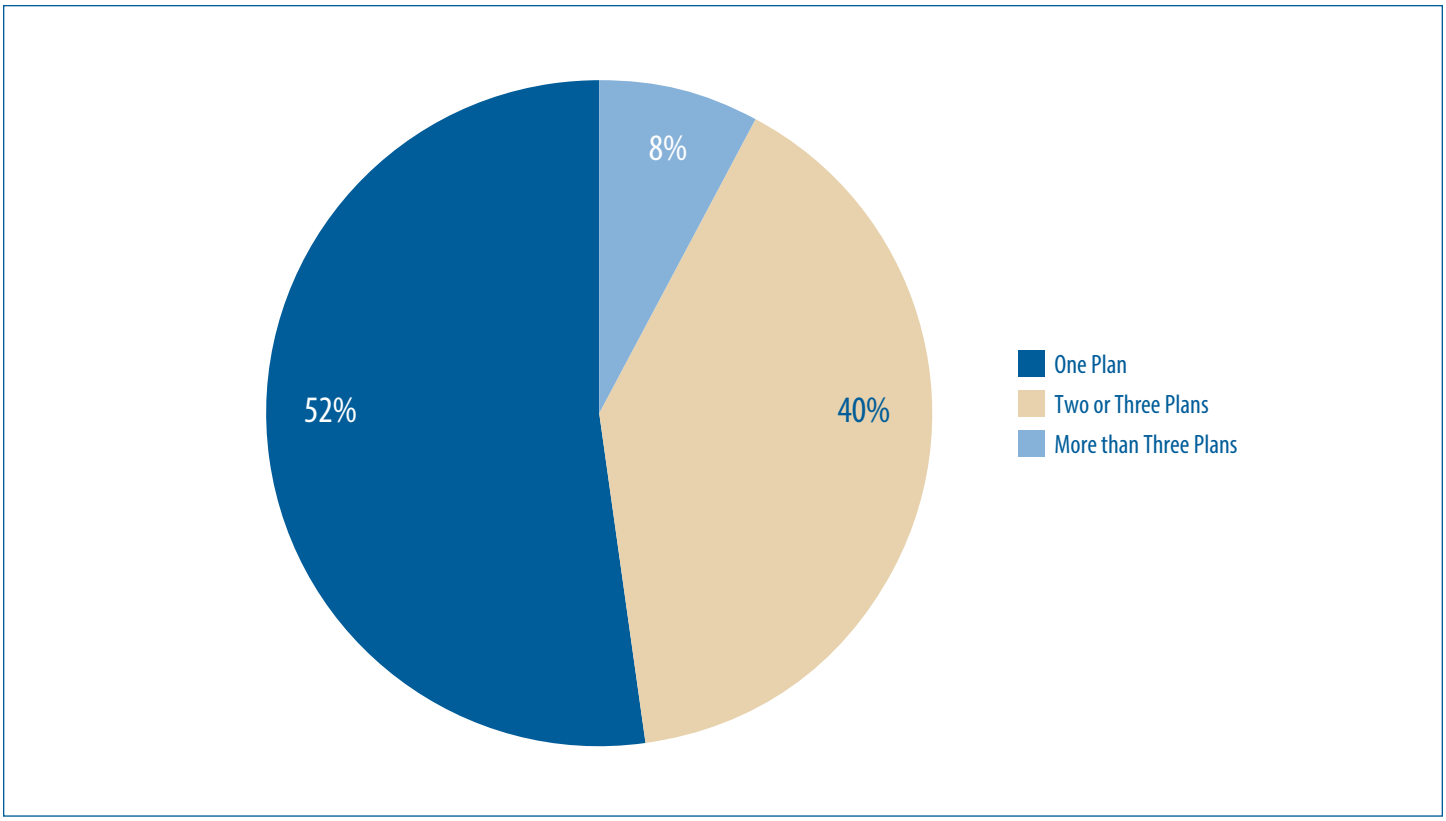
United States Department of Labor, Bureau of Labor Statistics. (2017). Retrieved October 11, 2017 from https://www.bls.gov/news.release/

[7] A logit regression of firm size on being fully insured showed that firms with under 50 FTEs have a 35 percent greater likelihood of being fully insured than firms with more than 100 FTEs, statistically significant at p=.01.

Figure 1: Number of Plans Offered



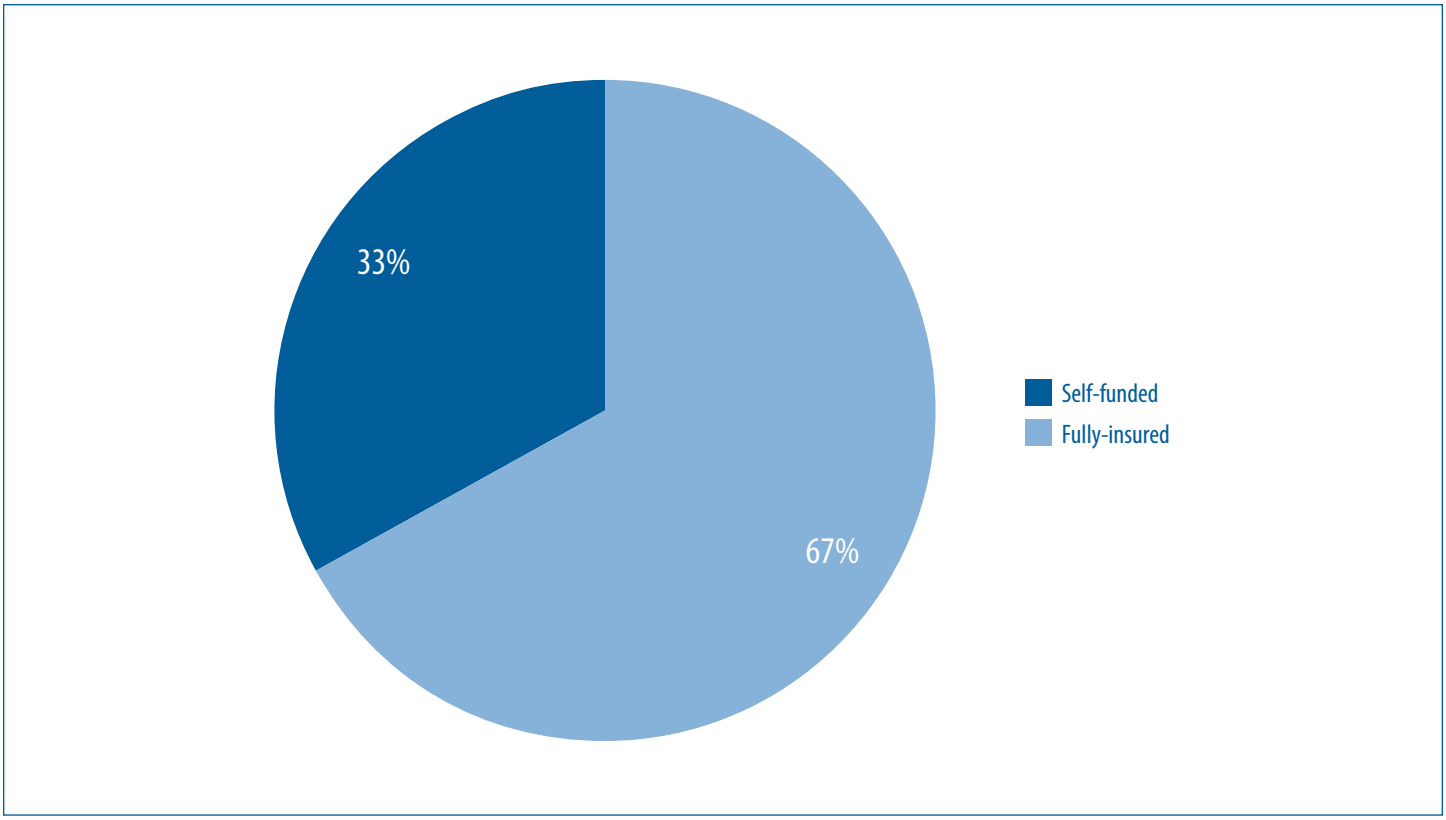
Number of observations: 75
Source: Author's calculations

Table 1: Average Premiums, Deductibles, Co-insurance, and Employee Share: High Deductible and Traditional Plans

	Traditional Plans	High Deductible Plans
Monthly Premium, Single ($)	544	441
Monthly Premium, Family ($)	1,518	1,242
Deductible, Single ($)	687	2,294
Deductible, Family ($)	1,422	4,599
Coinsurance (%)	18	18
Employee share of premium, Single (%)	24	21
Employee share of premium, Family (%)	28	25
Number of observations	61	77

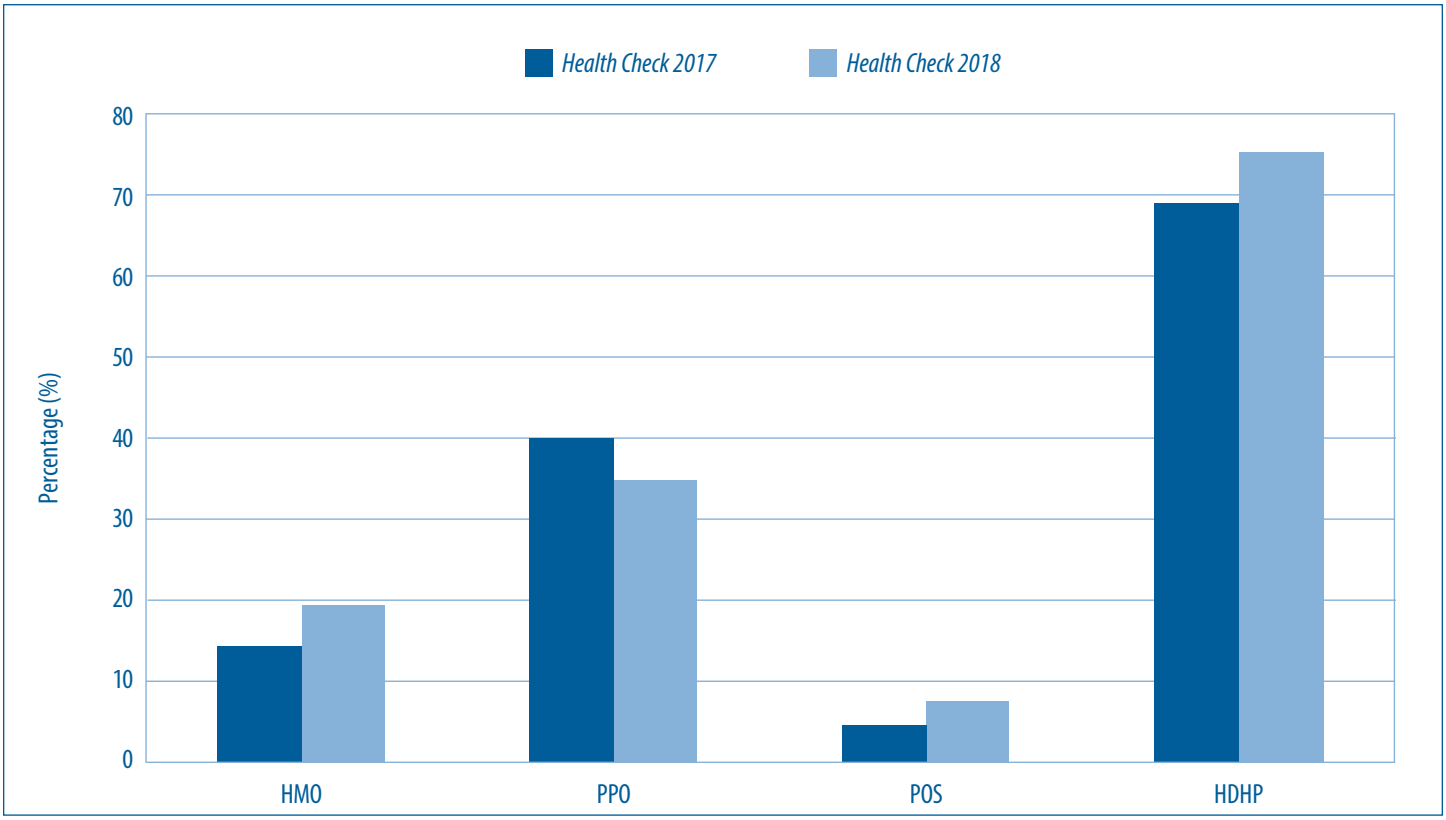
Note: Total number plans = 138. Number of plans is greater than total number of firms in the sample due to some firms offering more than one plan.
Source: Authors' calculations

Figure 2: Self-funded and Fully-insured Plans



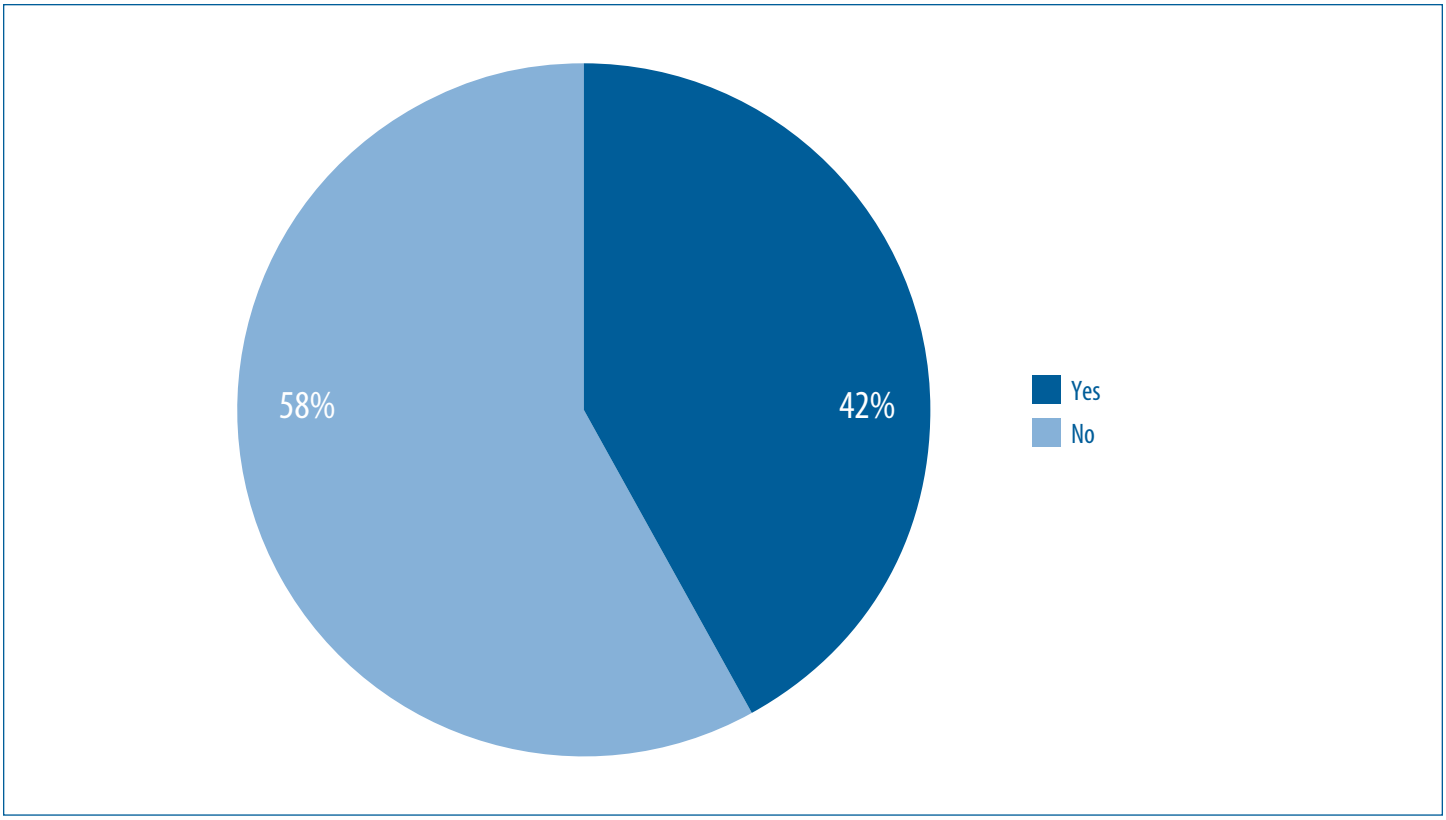
Number of observations: 138
Source: Author's calculations

Figure 3: Percentage of Firms Offering Each Type of Plan



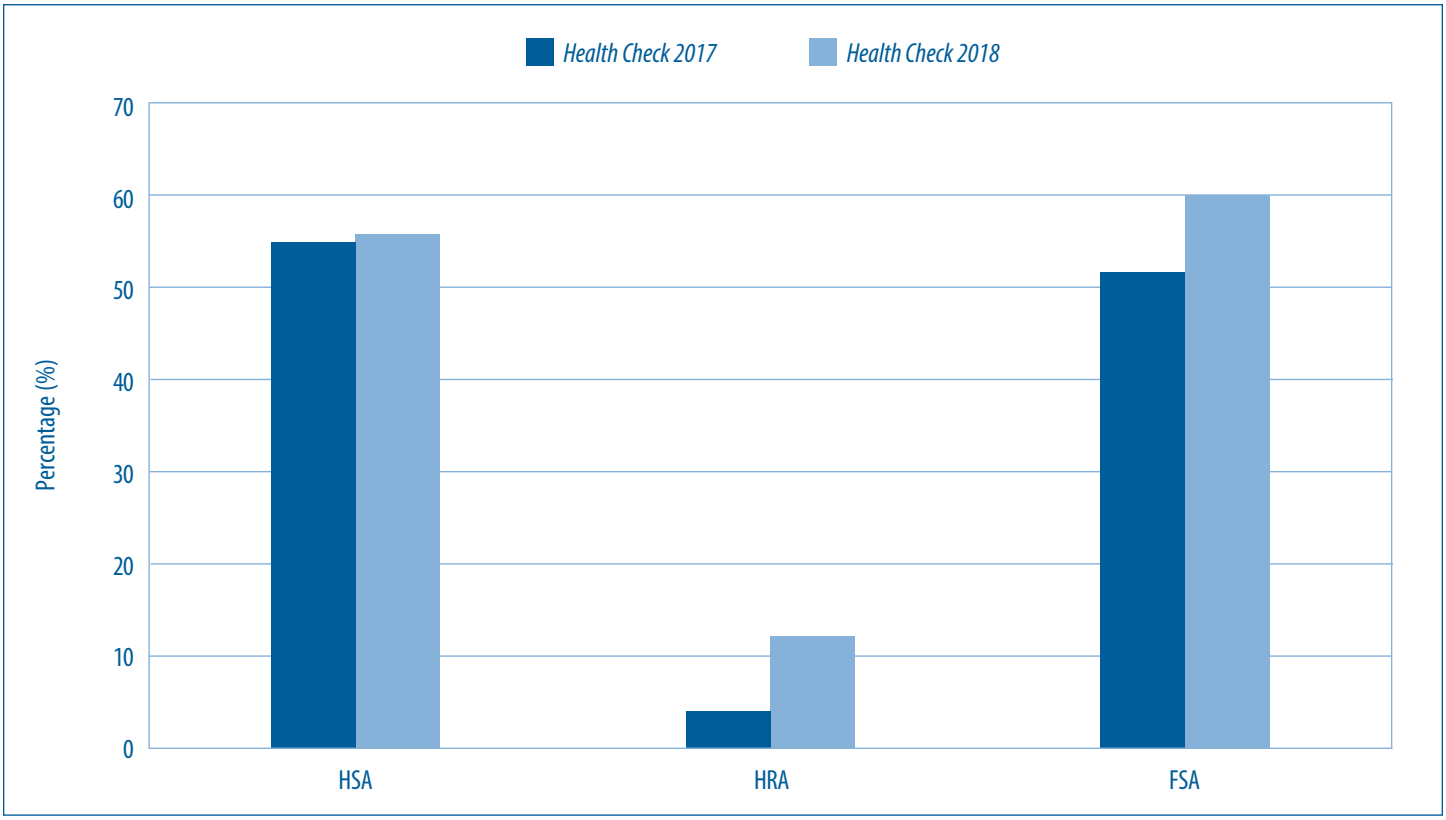
Number of observations: *Health Check 2018* (75), *Health Check 2017* (77)
Source: Author's calculations from *Health Check 2018* and *Health Check 2017*

Figure 4: Percentage of Firms Offering Only a High Deductible Plan



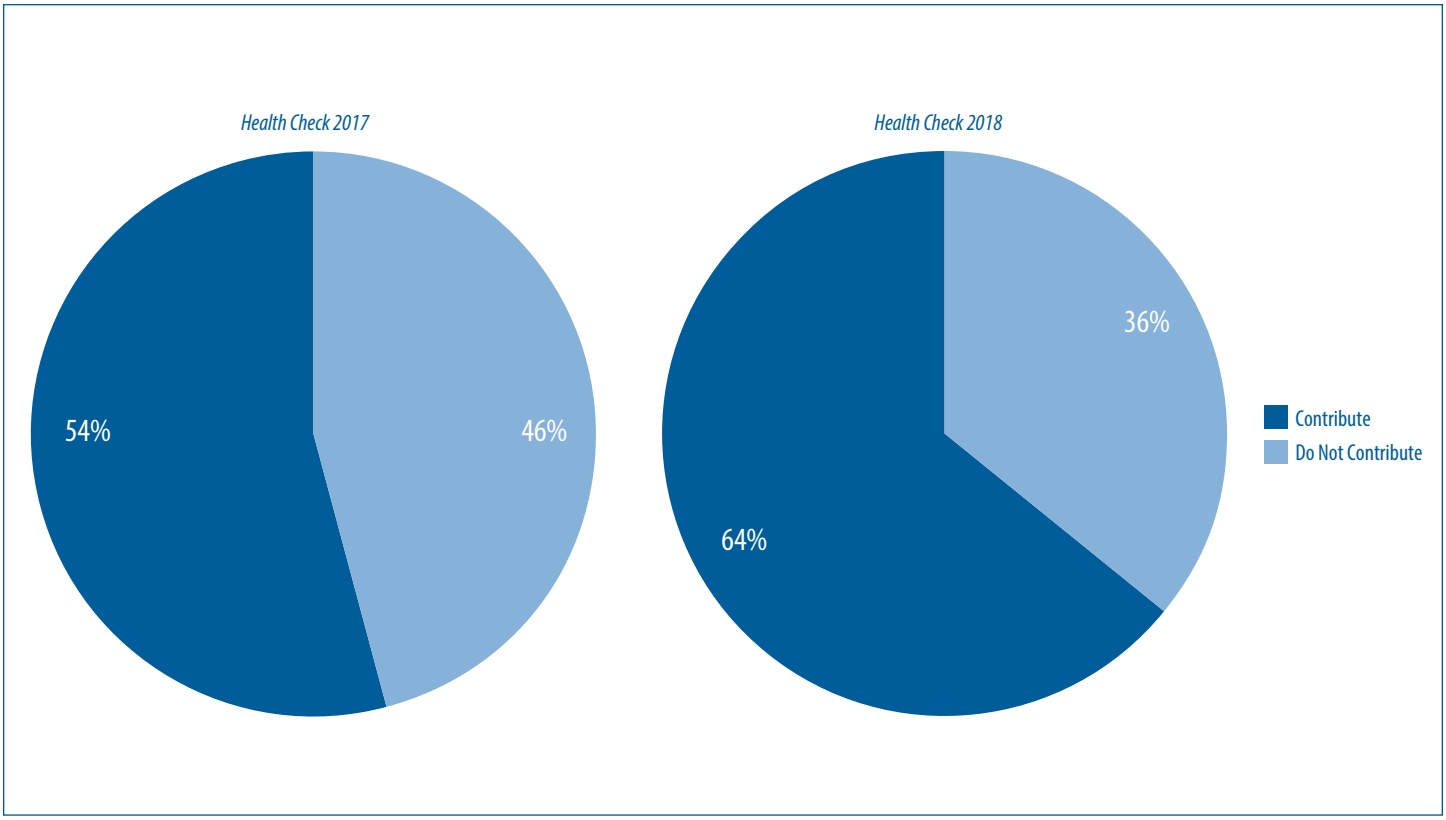
Number of observations: 72
Source: Author's calculations

Figure 5: Percentage of Firms Offering Each Type of Savings Account



Number of observations: *Health Check 2018* (75), *Health Check 2017* (78)
Source: Author's calculations from *Health Check 2018* and *Health Check 2017*

Figure 6: Percentage of Firms that Contribute to their Employee's HSA Account, Given an Account is Offered



Number of observations: 52 (2017), 42 (2018)
Source: Author's calculations

Community Survey on Health Insurance, Health Care Affordability, and Barriers to Health Care

Introduction

The recent health care climate is uncertain, at best. While the national uninsured rate has fallen nearly eight percentage points since 2013, and health care costs have been moderating in recent years, many health care consumers are feeling the strain of increased cost sharing in their insurance plans. Rising premiums in the ACA Marketplace have caused some younger individuals to forego insurance and pay the penalty (Auter, 2017), while others have cut back on necessities like food and clothing to pay high deductibles and coinsurance (Kaiser Family Foundation [KFF], 2017). The Commonwealth Fund labels those who have high out of pocket costs and deductibles, relative to their income, the *underinsured*. In 2016, this group comprised 28 percent of those who had insurance coverage year-round, an increase from 23 percent in 2014 (Collins, Gunja, & Doty, 2017).

A survey was conducted to examine health insurance coverage, health care affordability and barriers to getting health care in Kent County. This year, we were fortunate enough to expand the size of our sample and breadth of our questions by collaborating with the Johnson Center for Philanthropy at Grand Valley State University in using the data from their annual 2017 VoiceKent (formerly VoiceGR) survey.[1,2] Our sample consists of 2,383 adults, answering questions both online and in-person around Kent County. Surveys were conducted during the summer and fall of 2017.

Demographics

Table 1 reports the demographics of survey respondents. About half (54 percent) of individuals are in the age categories of 20–39, with a mean age of 40 (not shown in table). The racial mix includes 56 percent white, non-Hispanic; 18 percent black, non-Hispanic; and 17 percent Hispanic. Seventy-two percent of respondents are female, 62 percent are married or in a committed relationship, 6 percent are divorced or separated, 2 percent are widowed, and 28 percent are single. Furthermore, 69 percent have annual incomes under $60,000, while 13 percent make $100,000 or more each year.

Insurance Status and Type of Insurance

We report the types of health insurance in **Figure 1**. Twenty-nine percent of respondents get their insurance from their employer, 23 percent from Medicaid, 10 percent from Medicare, 6 percent from their parents' insurance plan, and 7 percent from the ACA marketplace. Two percent were enrolled in Healthy Michigan, the ACA expanded portion of Medicaid. Eight percent of the sample was uninsured.

Figure 2 shows the percentage of the sample that had either no insurance in the last year or insurance for only part of the last year. Eight percent were uninsured for the full year, while 8 percent were uninsured for a portion of the year. **Figure 3** reports current insurance status for those who were not insured for the full year in **Figure 2.** Fifty-two percent of respondents were still uninsured, while 23 percent gained coverage through Medicaid and 6 percent through Medicare.

Primary Care

The primary care provider (PCP) is an individual's first contact with the health care system and, hence, a very important one. In fact, one PCP per 10,000 people can decrease hospital admissions by 5.5 percent, emergency room visits by 11 percent, and surgeries by 7 percent (Macinko, Starfield, & Shi, 2007) **Figures 4 and 5** report the percentage of respondents who have a PCP and where they are most likely to go if they need medical attention.

Figure 4 shows that a large majority of respondents (83 percent) have a PCP. Although most people have one, not all use their PCP as a first resource when sick. The total column of **Figure 5** shows that only 74 percent go to their doctor when ill, while 12 percent go to urgent care and 6 percent go to the ER. As we would expect, the rate of doctor utilization is much lower for the uninsured (32 percent) than for the insured (75 percent), and the uninsured also are more likely to go to the ER (15 percent) than are the insured (6 percent).

[1] VoiceKent (formerly VoiceGR) is an evolving community survey designed to assess Kent County residents' perceptions and experiences on a variety of topics, including ability to meet basic needs, access to health care, neighborhood safety, employment, education, and racism. The primary goal of VoiceKent is to provide open, accessible, and objective community data to residents, nonprofits, governments, businesses, and other local decision-makers.

[2] At the time of this writing, VoiceKent had just finished surveying in the field. Because there is a short lag between this time and when we needed the data for our analysis, we are not using the full 2017 sample for our analysis.

Health Care Affordability

Despite the fact that the U.S. is seeing an all-time high in the number of people covered by insurance, many people still struggle with paying medical bills. KFF (2017) reports that 29 percent of individuals had problems paying their medical bills in the past year. Because of this, 73 percent cut back spending on basic items like food and clothing. In addition, 61 percent used up all or most of their savings to pay the bills, while 58 percent took an extra job or worked extra hours. In addition, 21 percent of individuals were "very worried" about being able to afford prescriptions.

It appears that affordability is also an issue in Kent County. **Figure 6** reports the percentage of individuals and their ability to afford prescriptions and health care, respectively. Twenty percent of respondents said they could either afford prescription drugs "not at all" or "not very well", while 23 percent responded similarly about health care.

With such a high percentage of the population covered by insurance, why are so many people still struggling to pay for health care? It is not just the matter of being insured, but the degree of cost-sharing involved as well. A recent KFF survey showed that 62 percent of those with medical bill problems were insured at the time the bills were incurred. Furthermore, of those who were insured at the time, 75 percent said that their financial troubles were due to their deductible, co-pay, or co-insurance being more than they could afford (KFF, 2016).

Barriers to Health Care

In **Figure 7** we report the reasons individuals do not get health care. While survey respondents said that cost is a major barrier (59 percent), reasons such as the inability to leave work (25 percent), lack of transportation (22 percent), and mistrust of the health care system (21 percent) were cited as well. The inability to find childcare (17 percent) and not knowing who to call (17 percent) were also factors preventing them from seeking care.

How might health care providers aid in eliminating some of these barriers? It has been suggested that PCP offices that offer extended hours — often in the evening, when individuals are done with work or a spouse is home to care for the children — not only can accommodate more patients, but also are associated with lower health care costs (Jerant et al., 2009).[3] This could be because individuals who would otherwise forego care are able to get care, leading to lower ER visits and hospitalizations.

Increasing the degree to which telemedicine is used is another option. Online visits with the physician can be done from the home or workplace, eliminating the need for transportation or childcare. A 2013 study of health care consumers reported that 74 percent prioritized access to health care over a face-to-face visit with a practitioner, while 60 percent of physicians said they were willing to conduct a video visit with their patients. Furthermore, scientific studies have shown the same clinical outcomes regardless of whether the visit was via phone, video, or in-person (Frist, 2015).

Conclusion

Kent County's uninsured rate is low, at 3 percent, compared to Michigan and the nation as a whole. However, a sizable portion of residents — even those with insurance — have health care and prescription costs above what they see as affordable. Twenty-three percent of respondents do not feel that they can afford to get health care, while 20 percent do not have enough money for prescription drugs. Besides costs, other barriers to care, such as lack of transportation, lack of childcare, and the inability to leave work, result in fewer visits to primary care providers. Suggestions on how to improve access include extended primary care facility hours and the use of telemedicine, both of which have also been shown to be associated with lower health care costs.

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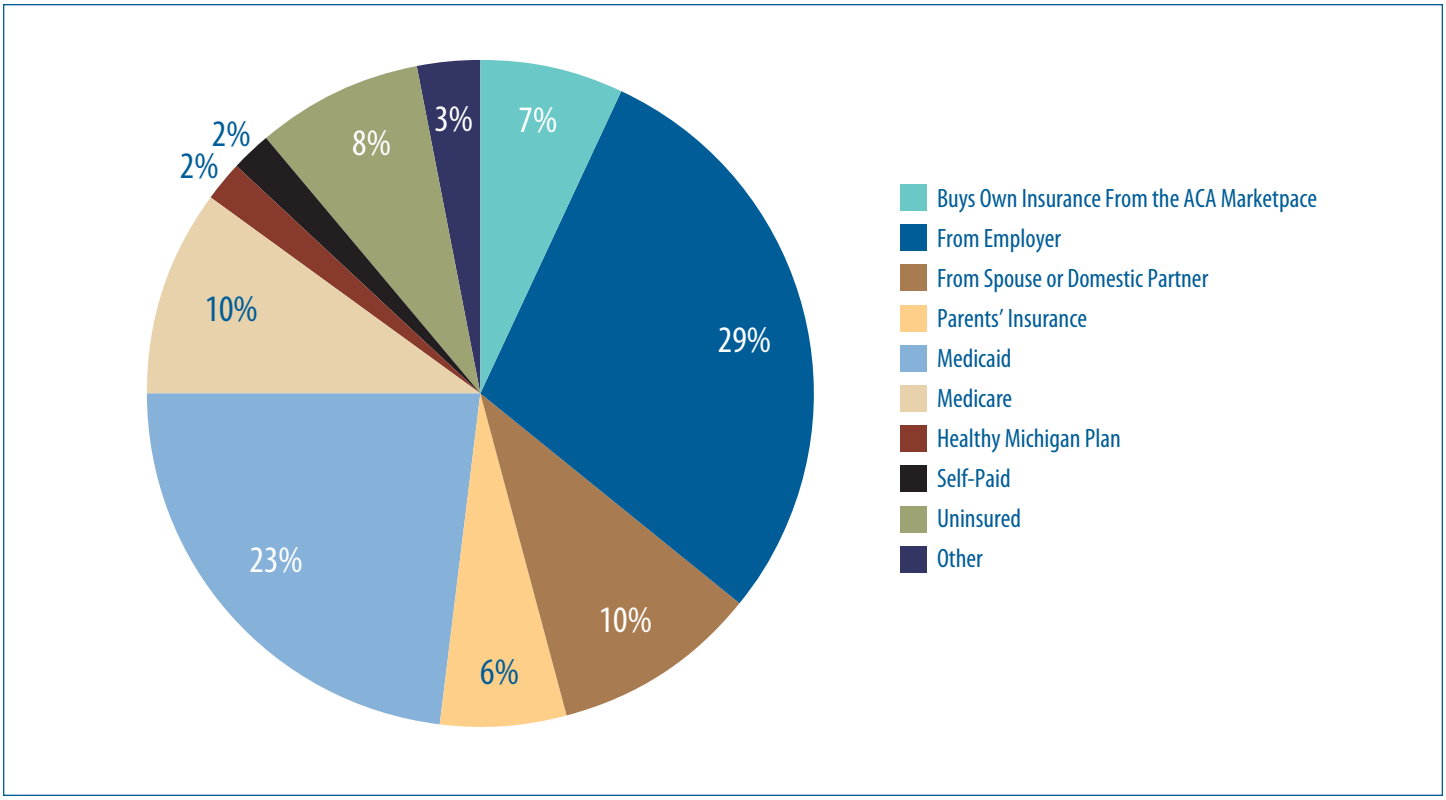
[3] The authors emphasize that the study did not show that offering extended hours was the cause of lower health care costs. Another explanation for this correlation could be that practices that offer extended hours also have other characteristics that make them better at controlling costs.

Table 1: Demographics

	Percentage
Age	
20-29	28%
30-39	26%
40-49	16%
50-59	15%
60-64	6%
65+	8%
Race	
White, Non-Hispanic	56%
Black, Non-Hispanic	18%
Hispanic	17%
Multiracial	8%
Other	1%
Gender	
Female	72.6%
Male	26.5%
Other	0.9%
Marital Status	
Married	44%
In a Committed Relationship	18%
Divorced/Separated	6%
Single	28%
Widowed	2%
Other	2%
Annual Income	
$0 - $30,000	44%
$30,000 - $60,000	25%
$60,000 - $100,000	18%
$100,000 +	13%

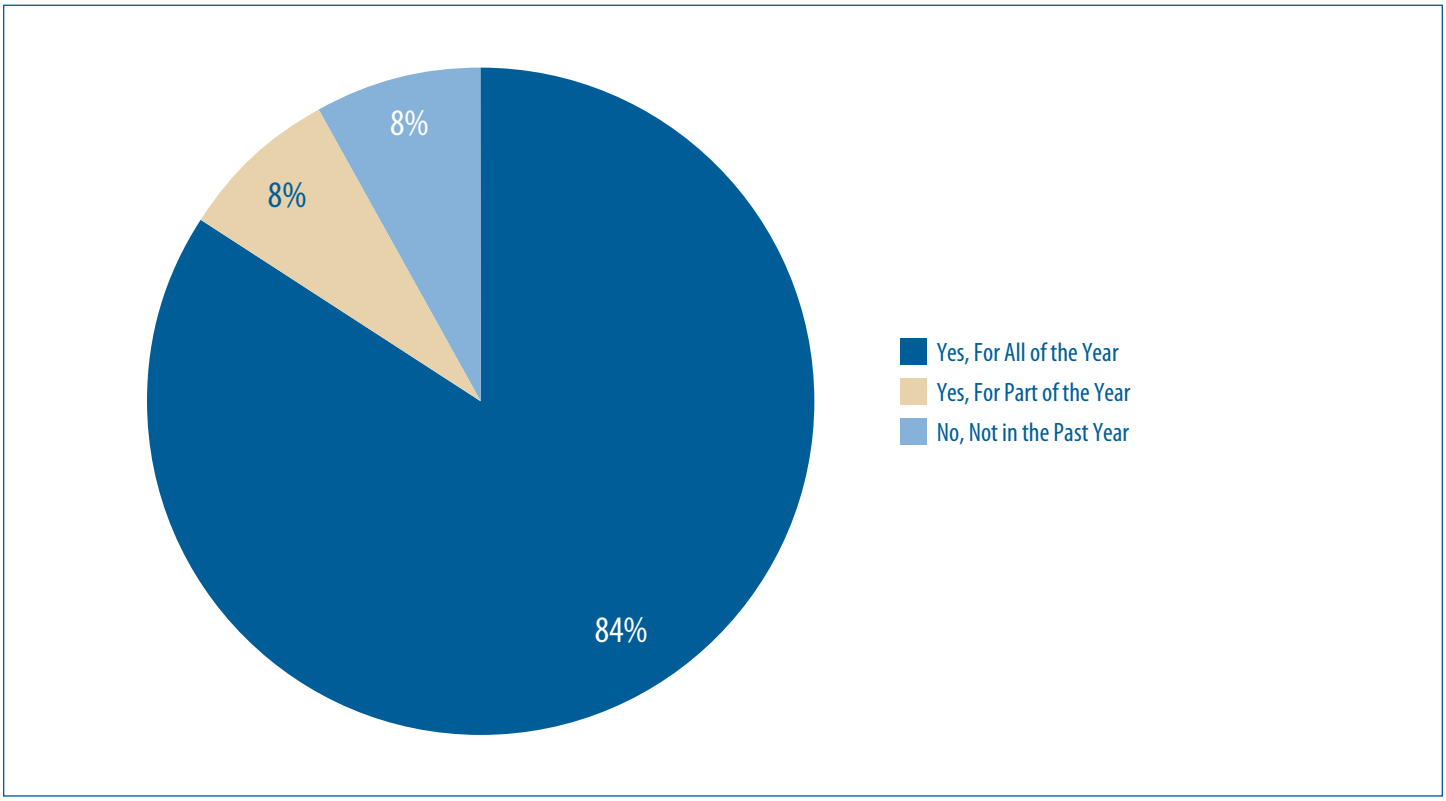
Number of observations: 2,339
Source: Author's Calculations from VoiceKent 2017
"Other" race includes: Indian Alaskan, Asian, Pacific Islander, and Middle Eastern
"Other" marital status applies to those who gave multiple responses, and it was unclear as to which of the categories they belonged.

Figure 1: Health Insurance Source (Corrected)



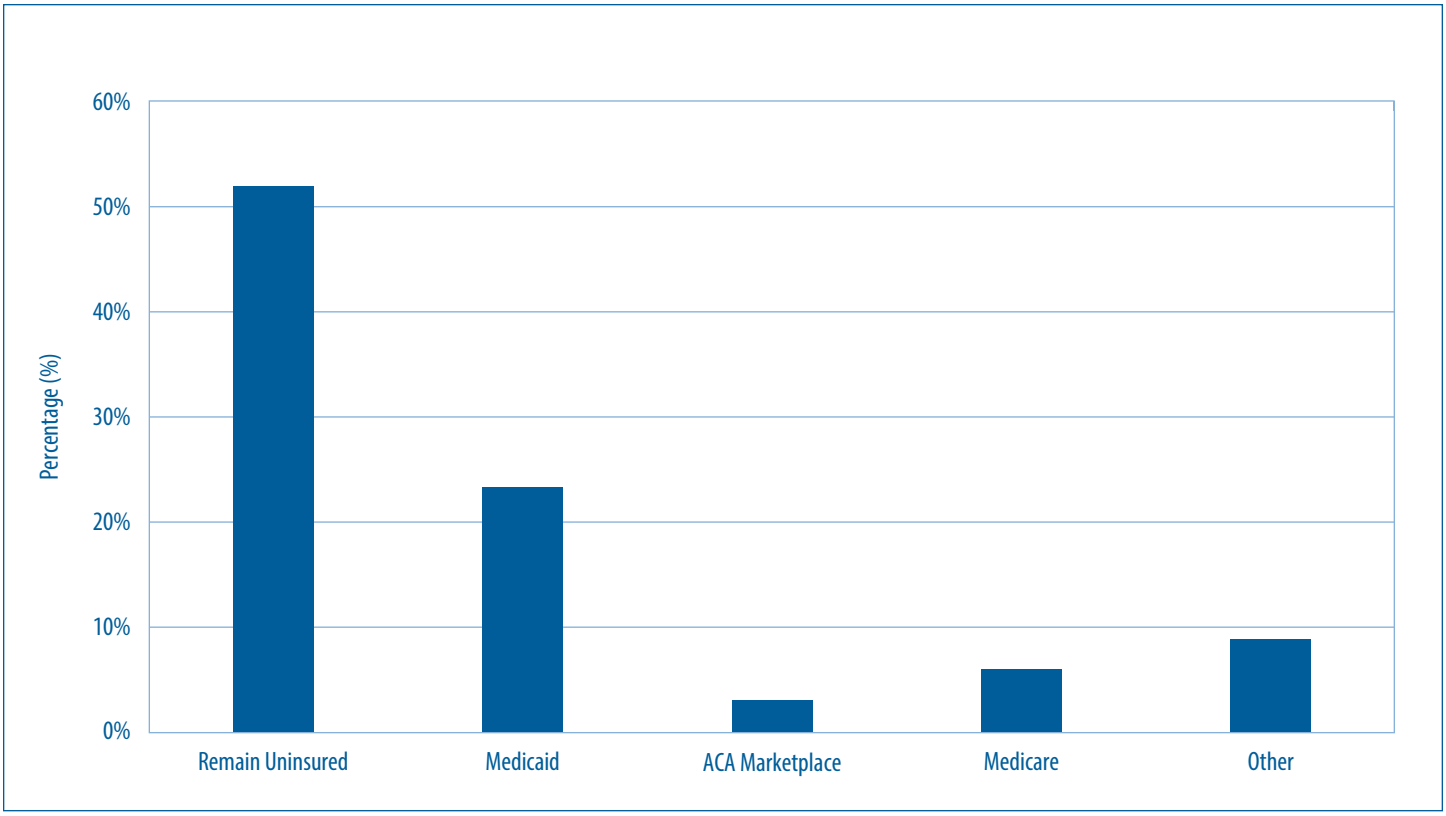
Number of Observations: 2,172
Number of Responses: 2,694
Source: Author's calculations from Health Check 2018
Note: Survey respondents could select more than one source of insurance (if applicable).

Figure 2: Health Insurance Coverage in the Last Year



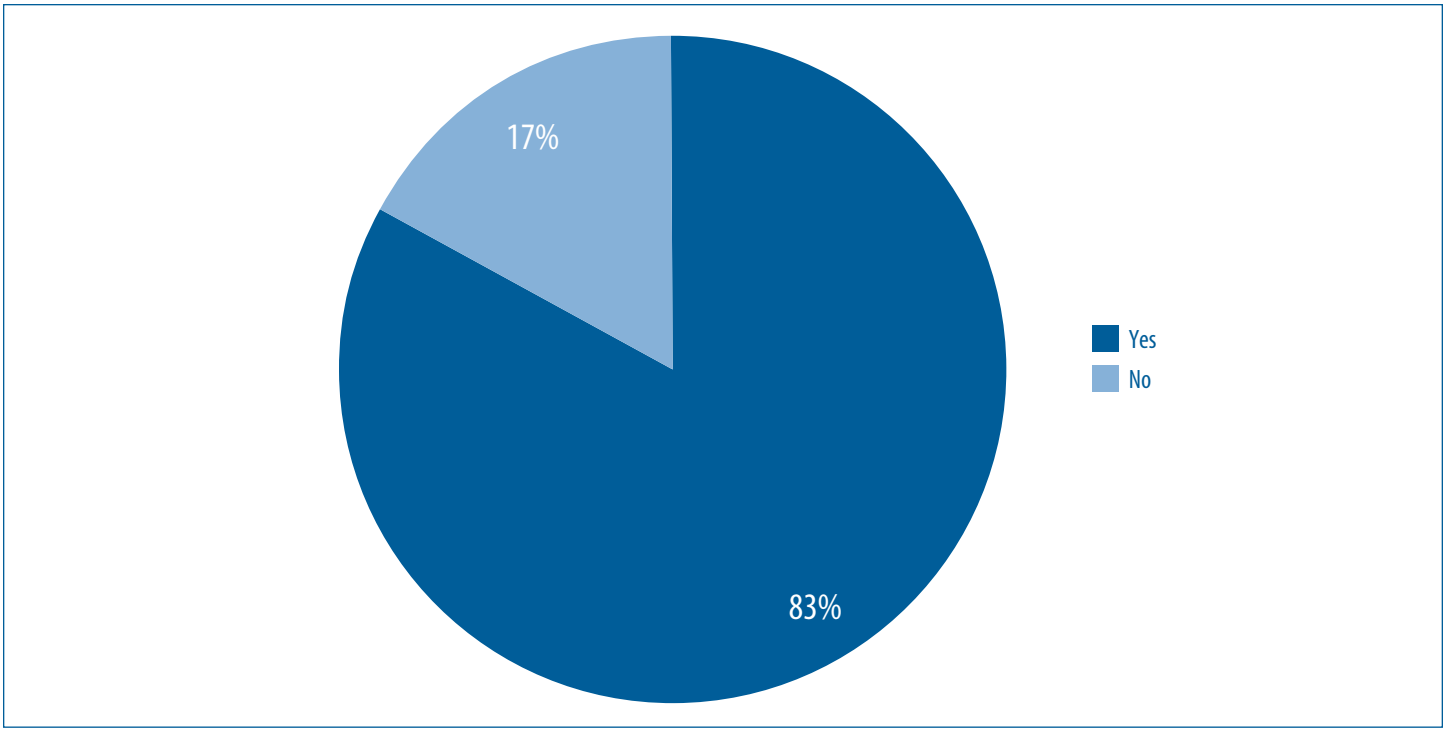
Number of Observations: 2,204
Source: Author's calculations from VoiceKent 2017

Figure 3: Current Health Insurance Status for Those Uninsured at Some Point in the Last Year



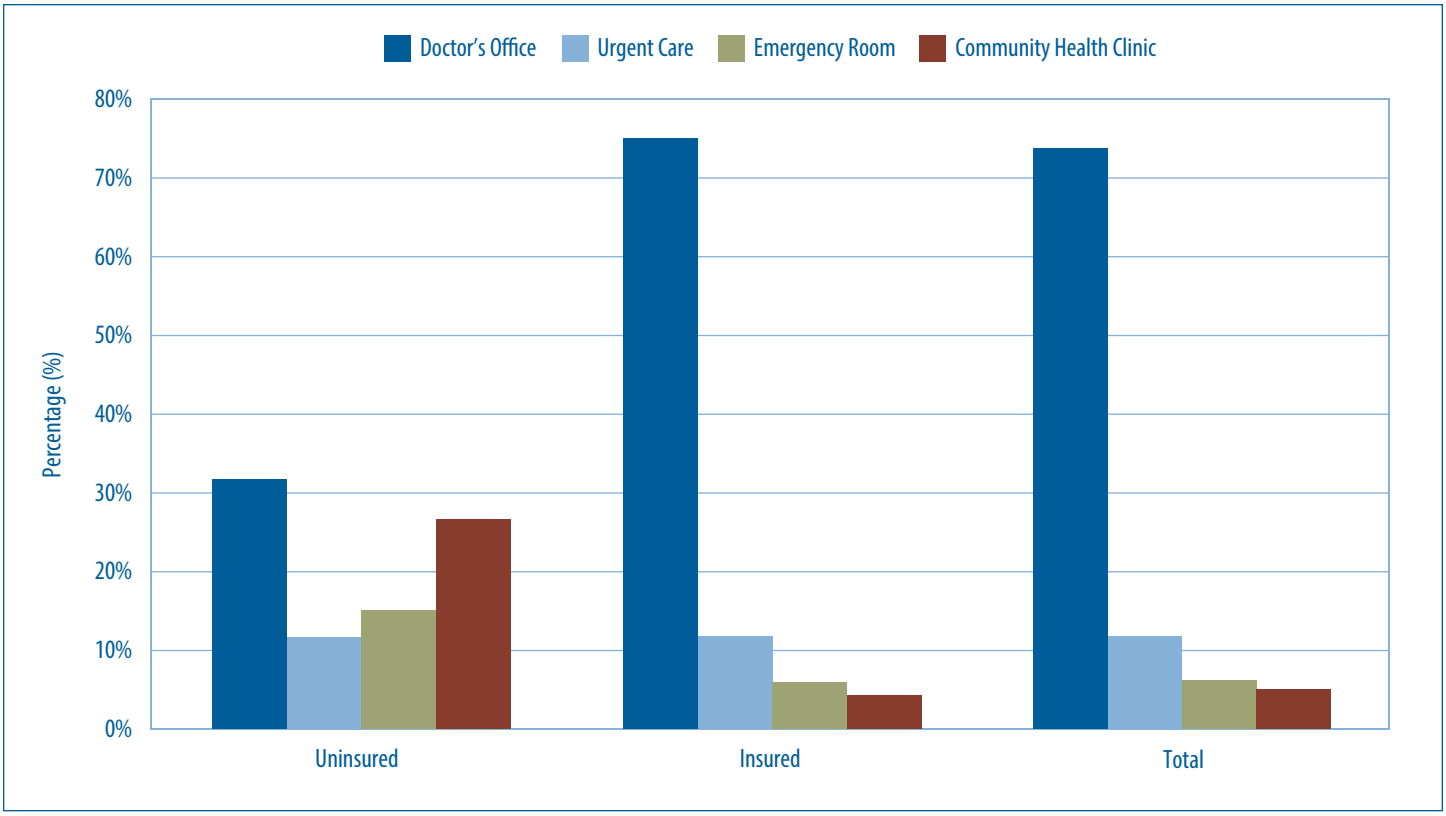
Source: Author's calculations from VoiceKent 2017
Note: Other sources for healthcare 2018 include: Employer insurance (2 percent), Spouse insurance (2 percent), Healthy Michigan plan (2 percent), Parents' insurance (1 percent), and Self-Paid insurance (1 percent). Survey respondents could select more than one source of insurance (if applicable).

Figure 4: Percentage of Individuals with a Primary Care Physician



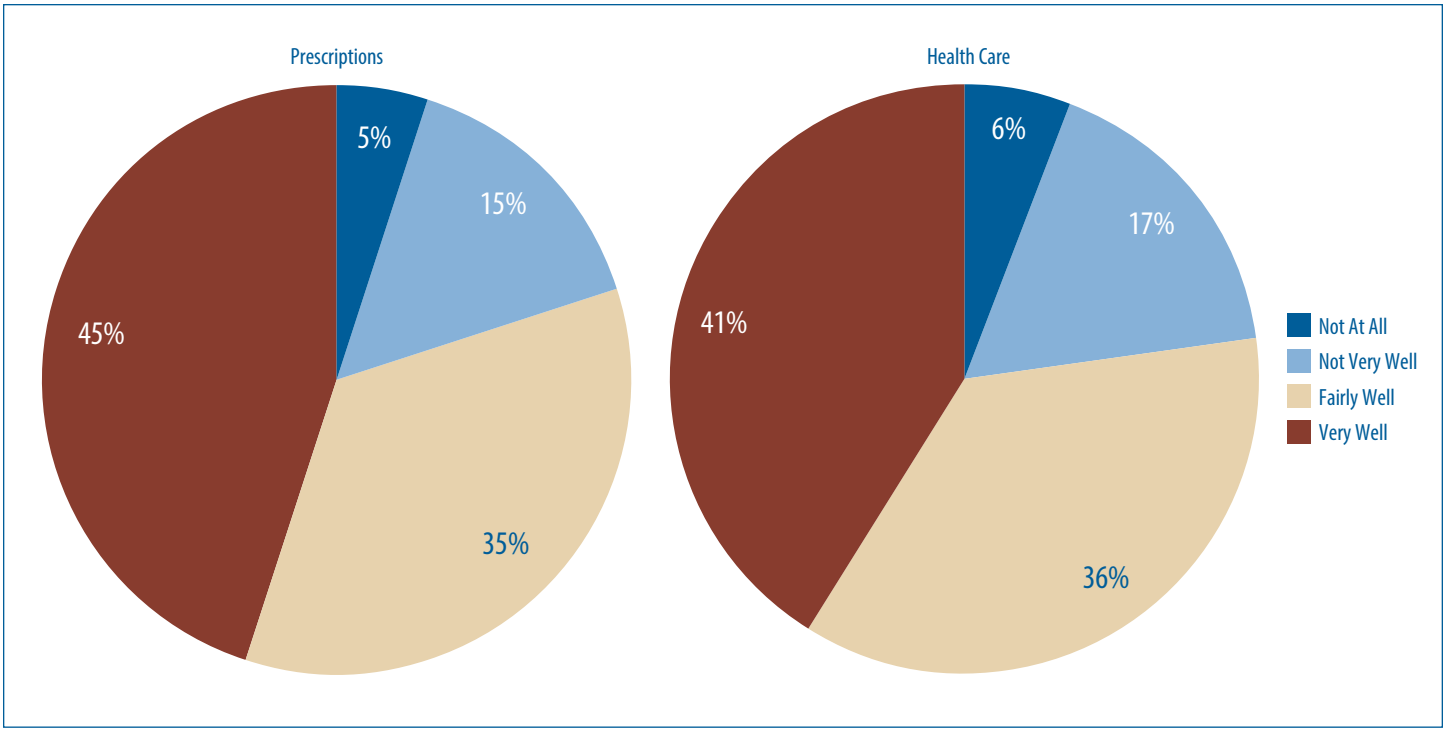
Number of Observations: 2,015
Source: Author's calculations from VoiceKent 2017

Figure 5: Health Care Providers Used When Sick



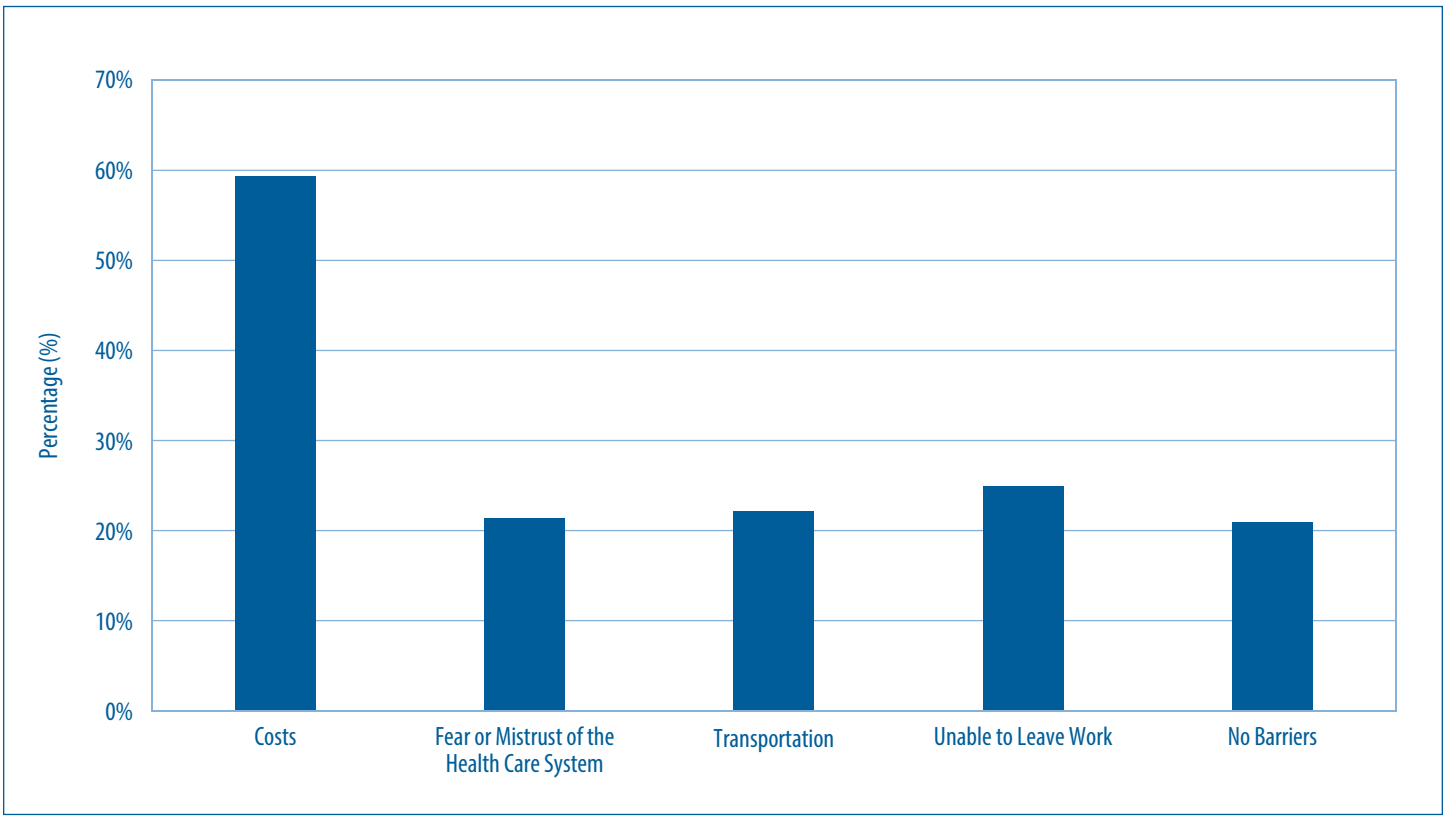
Number of Observations: 1,887
Source: Author's calculations from VoiceKent 2017
Note: 4% of the sample answered "Health Department" or "Other". "Other" responses include the VA and do not go to any medical facilities.

Figure 6: Ability to Afford Prescriptions and Health Care



Number of Observations: 2,022 (Prescriptions), 2,032 (Health Care)
Source: Author's calculations from VoiceKent 2017

Figure 7: Barriers to Getting Physical Health Care



Number of Observations: 1,914
Source: Author's calculations from VoiceKent 2017
Note: Other responses include: Did not know who to call (17%), Unable to find childcare (17%), Location of health care services (15%), Felt embarrassed/shame (12%), Too much paperwork (10%), Cultural beliefs about mental health (9%), Language (7%), Other (5%).

Major Medical Conditions: Expenditure Analysis

This analysis provides general cost information about some of the most prevalent and expensive medical conditions to assist with focusing resources to improve community health. The long-term goal of this analysis is to identify and track trends in health care expenditures for selected chronic health conditions and to examine geographic differences in the cost of care.

The data presented in this section are average annual member expenditures, including prescription medication expenditures, for those enrolled in private health insurance plans administered by Blue Care Network (BCN), Blue Cross Blue Shield of Michigan (BCBSM), and Priority Health (PH) for the years 2012–2016. The following factors should be considered when interpreting analyses in this section:

- **Differences in benefit structures and enrollment.** Both BCN and PH offer primarily HMO products, while BCBSM members are predominantly enrolled in PPO plans. HMOs tend to operate through selective contracting and provider referrals, utilizing networks in order to achieve cost savings. PPOs tend to have fewer restrictions on members seeking care and, therefore, usually require additional member cost-sharing in the form of higher premiums, higher coinsurance rates, or higher co-pays. Because of these differences in benefit structures, evidence suggests that HMO plans are more attractive to enrollees who are healthier, who have less complex medical needs, or who have no longstanding ties to particular providers (Ji & Liu, 2007; Nicholson et al., 2004; Tchernis et al., 2006). However, some research has failed to find a substantial difference in health status for those enrolling in HMO plans (Schaefer & Reschovsky, 2002). Furthermore, enrollment changes can alter the underlying disease burden of the payer mix resulting in changes in utilization and expenditures.

- **Disease selection.** The health status and, thus, the expenditures for members with specific conditions might vary due to differences in demographics and health behaviors. In other words, patients in some counties insured by one payer may be sicker than patients in other counties who are insured by a different payer.

- **Expenditures beyond disease.** In each case, the average patient expenditure data is for services not only related to the specific disease in question but also for other unrelated medical costs the member may have incurred during the year. Differences in expenditures or treatment intensity for these unrelated health issues can result in additional variation in average patient expenditure estimates.

Expenditure estimates from each insurer can vary considerably because of these factors. Thus we average the data for all three insurers to arrive at a more robust estimate of member expenditures.

One additional caveat is the change from the 9th revision to the 10th revision of the International Classification of Diseases (ICD) codes for the 2015 and 2016 data. This change impacts the categorization of specific medical conditions and, therefore, could lead to additional differences in expenditures between 2015–2016 and the previous years included in the analysis.

KOMA Expenditures

As we have done in previous versions of this publication, we chose to focus on six chronic conditions that are associated with high prevalence rates and high levels of resource utilization: asthma, coronary artery disease (CAD), depression, diabetes, hyperlipidemia, and low back pain. For comparison, we also include healthy members, which we define as those between the ages of 30 and 39 who have not been diagnosed with any of the six chronic conditions listed above and who have total annual expenditures below $450,000. **Figure 1** provides the average annual expenditures per member for each of these conditions in Kent, Ottawa, Muskegon, and Allegan (KOMA) counties in 2012 through 2016. Caution must be used when interpreting trends between 2013 and 2014 due to the presence of Affordable Care Act exchange enrollment beginning in 2014. Preliminary studies found that exchange enrollees have higher utilization than those with private insurance coverage through non-exchange plans, and this compositional change could explain some of the expenditure difference between 2013 and 2014 (Express Scripts, 2014; Truven, 2015). Therefore, **Figure 1** distinguishes between the pre-exchange years of 2012–2013 and the post-exchange years of 2014–2016. **Figures 2–4** include only data on post-exchange periods. In most cases, we identified members in each disease category according to specifications defined by the Healthcare Effectiveness Data and Information Set (HEDIS). We excluded Medicaid and Medicare enrollees from our expenditure estimates. Finally, all expenditure estimates in **Figure 1** are reported in 2016 dollars.

We note that, even after adjusting for inflation, **Figure 1** indicates that expenditures for nearly every condition increased from 2015 to 2016. The lone exception is expenditures for low back pain, which fell from $5,178 per year in 2015 to $5,119 per year in 2016. Last year, we highlighted a large increase in expenditures on CAD patients in the KOMA region from 2014 to 2015. Once again, we see that average annual expenditures for this group have continued to increase and are now $28,597 per year compared to $20,909 pear year just two years before. This represents a two-year expenditure increase of nearly 37 percent. The largest increase in expenditures from 2015 to 2016 occurred for those suffering from hyperlipidemia. Inflation-adjusted average annual expenditures for a KOMA patient diagnosed with hyperlipidemia rose by more than 10 percent from 2015 to 2016: $9,114 to $10,095. Average annual expenditures for a healthy member remained fairly stable at $2,992 and has actually fallen in real terms since 2014.

Figure 2 separates the disease-specific expenditure figures for 2016 in **Figure 1** into medical and prescription drug components. The prescription drug share of total spending ranges from 17 percent for members with low back pain to 38 percent for those diagnosed with asthma. We include this information in order to establish a baseline with which to track expenditures on prescription drugs moving forward.

Differences in Average Annual Expenditures between KOMA and the Detroit Region

Figure 3 compares average annual per member expenditures in both the KOMA and Detroit regions. We define the Detroit region as Oakland, Macomb, and Wayne counties. **Figure 3** indicates that, with the exception of CAD and healthy members, expenditures on all other conditions are higher in the Detroit region than in KOMA. If we consider CAD spending estimates from the previous three Health Check publications, this marks the fourth consecutive year of higher CAD spending in KOMA compared to the Detroit region making it unlikely that these spending differences are due to random variation. Higher CAD spending on the west side of the state would appear to indicate higher prices for cardiac care, greater use of medical services/technologies, or a more severely ill CAD population.

Figure 3a plots the percentage change in expenditures for each condition from 2015 to 2016. So, while **Figure 3** provides differences in spending levels between the two regions, **Figure 3a** presents a more dynamic look at how those spending levels changed in the past year. Growth in expenditures was higher in the Detroit region for healthy members, members with low back pain, and members with diabetes. Expenditure growth rates were higher in KOMA for members with hyperlipidemia, CAD, and asthma. CAD spending growth continues to be an issue for both KOMA and the Detroit region, with annual growth rates at more than 8 percent in both areas. Detroit experienced a large decrease in average annual expenditures for healthy members between 2014 and 2015, while expenditures for this group rose by more than 4 percent in the Detroit region from 2015 to 2016. Finally, members diagnosed with low back pain in KOMA are the only group to show a reduction in expenditures from 2015 to 2016.

Health Services Use

Figures 4a through 4c examine regional difference in health care utilization for each of the six target conditions. This is the first year that we have been able to include utilization data in our analysis, and this brings us closer to identifying the causes behind the documented expenditure growth.

Figure 4a displays the average number of annual inpatient visits for a member in KOMA or the Detroit region in 2016. It is clear from this figure that hospitalization rates tend to be higher on the east side of the state than the west. For example, members with CAD in Koma experience an average of 0.508 inpatient admissions each year, while those with CAD in Detroit have an average of 0.566 hospital visits per year. Even more striking is the hospitalization rate for those diagnosed with diabetes. Compared to people with diabetes in KOMA, those in Detroit experience approximately 50 percent more hospitalizations per year (0.196 visits per year in KOMA and 0.299 visits per year in Detroit).

Figure 4b extends the utilization analysis to emergency department (ED) use. With the exception of those diagnosed with CAD, ED use is higher in the Detroit region than in KOMA. For example, those with a low back pain diagnosis average 0.651 ED visits per year in Detroit compared to 0.499 ED visits per year in KOMA. We note that data on ED use in the Benchmarking Communities section of this book suggests that ED use has been increasing in both Detroit and the Grand Rapids region over the past decade.

Our last utilization metric, prescription drug fills, are presented in **Figure 4c.** Again, we find evidence of higher use rates in the Detroit region than in the KOMA region. The average member with diabetes in KOMA had 44.67 prescription fills in 2016 compared to 68.1 for people with diabetes in the Detroit region. Assuming that each member filled a prescription 12 times throughout the year, then this would represent an average of 3.72 distinct prescriptions for a person with diabetes in KOMA and 5.68 distinct prescriptions for a person with diabetes in Detroit.

Comorbidities

In this section, we take a closer look at expenditures associated with diabetes and depression by examining the impact of additional diagnoses. Joint diagnoses and the presence of multiple comorbidities can lead to higher resource utilization and higher levels of spending. Importantly, we are not examining clinical linkages between these conditions; we are only focusing on expenditure differences associated with multiple diagnoses. **Figure 5a** plots average annual member expenditures for those with only a diagnosis of diabetes and those with diagnoses of diabetes and asthma, diabetes and hypertension, diabetes and depression, and diabetes and CAD. According to **Figure 5a,** the addition of comorbidities greatly impacts the average expenditures associated with a diagnosis of diabetes. For example, expenditures in KOMA for a member diagnosed with diabetes and depression compared to a diagnosis of diabetes alone adds nearly $18,000 to the annual expenditure estimate. Conditional on a diagnosis of diabetes, a member with asthma or CAD saw higher annual expenditures in KOMA than in the Detroit Region in 2016. The opposite was true for those diagnosed with diabetes and hyperlipidemia or diabetes and depression.

Figure 5b displays the results of a similar analysis that focuses on depression. We find that for depression alone and depression with asthma, hyperlipidemia, or diabetes, average annual expenditures per member are lower in KOMA than in the Detroit region. Average annual expenditures for depression with CAD are higher in KOMA than in the Detroit region for the second year in a row.

Geographic Variation in Expenditures

In **Figures 6–7,** we plot expenditure estimates by zip code in order to examine the degree to which expenditures and utilization for chronic conditions vary over relatively small geographic areas. For each condition analyzed in this section, we limit our analysis to zip codes with at least 30 members distributed across at least two of the three payers supplying member data. We also adjusted our expenditure estimates for differences in zip code level population age, income, and education[1]. Therefore, estimates can be

Note: [1] Zipcode, age, income, and education measures are calculated for the entire population and are not representative of the under-65, privately insured population.

interpreted as a comparison of expenditures for individuals at the same age, with the same income, and the same level of education across different zip codes. On average, over the conditions that we examined, age, income, and education can explain approximately 15 percent of the variation in expenditures at the zip code level. The remaining variation could be attributed to some combination of underlying differences in population health, physician practice styles, or prices for health care services. We choose to focus on the two most expensive conditions in these figures: CAD and diabetes.

Expenditures for CAD are divided into five quantiles and mapped by zip code in **Figure 6a.** Those in the lowest quantile have average annual expenditures between $16,051 and $23,223, while those in the highest quantile have average annual expenditures between $30,446 and $42,153. For the past three years, we have noted that areas to the north and southwest of Grand Rapids experience the highest average annual expenditures for members with a CAD diagnosis and tend to have higher expenditure levels for each condition we analyzed. Additionally, for the last two years, we have seen zip codes in the city of Grand Rapids included in the top CAD spending quantile. Together with the other evidence presented in this section, it is clear that CAD spending has increased significantly in the Grand Rapids region over the past few years. For members with CAD and living in the city of Detroit, expenditures tend to be quite high compared to those living in more suburban zip codes.

Figure 6b follows the same methodology in order to map the average number of inpatient visits in 2016 for members with CAD. Those in the lowest quantile of the distribution experienced between 0.218 and 0.408 inpatient visits in 2016, while those in the highest quantile had between 0.702 and 1.260 inpatient visits. As we noted earlier, the Detroit region tends to have a greater reliance on inpatient care than West Michigan, and that is evident in **Figure 6b.** Zip codes in the city of Grand Rapids tend to be on the higher side of the distribution, but are generally not included in the top quantile.

Figure 6c repeats the analysis with the average number of ED visits in 2016 for those diagnosed with CAD by zip code. The lowest quantile of the distribution represents between 0.247 and 0.529 ED visits, on average, in 2016, while the highest quantile includes 0.954 visits to 1.612 visits on average. On the west side of the state, ED use is particularly high for CAD members living on the east and southeast sides of Grand Rapids; zip codes farther to the north and southwest of the city also experience high ED use. Those in the city of Detroit have significantly higher rates of ED use than those living in suburban Detroit.

Average prescription drug fills for CAD members in 2016 are mapped in **Figure 6d.** Here an interesting pattern emerges that will be repeated for members with diabetes (discussed below): West Michigan has far fewer prescription fills, on average, than the Detroit region. Only one zip code on the west side of the state is included in the top quantile of the distribution, and many of the zip codes in the region are in the lowest quantile of prescription fills.

Figures 7a through 7d repeat the same analyses focusing on members with a diagnosis of diabetes. In this case, those in the lowest quantile have expenditures ranging from $13,703 to $16,044, while expenditures for those in the highest quantile are between $17,750 and $21,701. Here, we see that the Detroit region contains a greater proportion of high expenditure zip codes than Grand Rapids and its surrounding areas. We also note that on the west side of the state, members with diabetes in zip codes to the north and southwest of the city of Grand Rapids tend to experience relatively higher expenditures.

Figure 7b indicates that inpatient visits for people with diabetes in West Michigan tend to be lower, on average, than for those in the Detroit region. The 49503 zip code that makes up downtown and much of the northeast portion of the city of Grand Rapids was among the zip codes in the top quantile of the inpatient visit distribution, while much of the rest of the city was in the middle of the overall distribution.

Figure 7c maps ED use by zip code and suggests that several West Michigan zip codes are in the top two quantiles of the ED visit distribution. Consistent with the pattern that has prevailed for annual expenditures, zip codes to the north and southwest of Grand Rapids tend to have high levels of ED use. In addition, the city of Grand Rapids has especially high ED use for people with diabetes. Notably, we see the same discrepancy in ED use between zip codes in the city and suburbs of Detroit with much higher use documented in the city and much lower use in the suburbs.

Lastly, **Figure 7d** presents data on the number of prescription fills for a member diagnosed with diabetes by zip code. As was the case with CAD medications, we find a much lower reliance on prescription medication for people with diabetes on the west side of the state than on the east side. Every zip code in the immediate vicinity of Grand Rapids is in the lowest quantile of the prescription fill distribution, while much of the Detroit suburbs have relatively high levels of prescription drug use.

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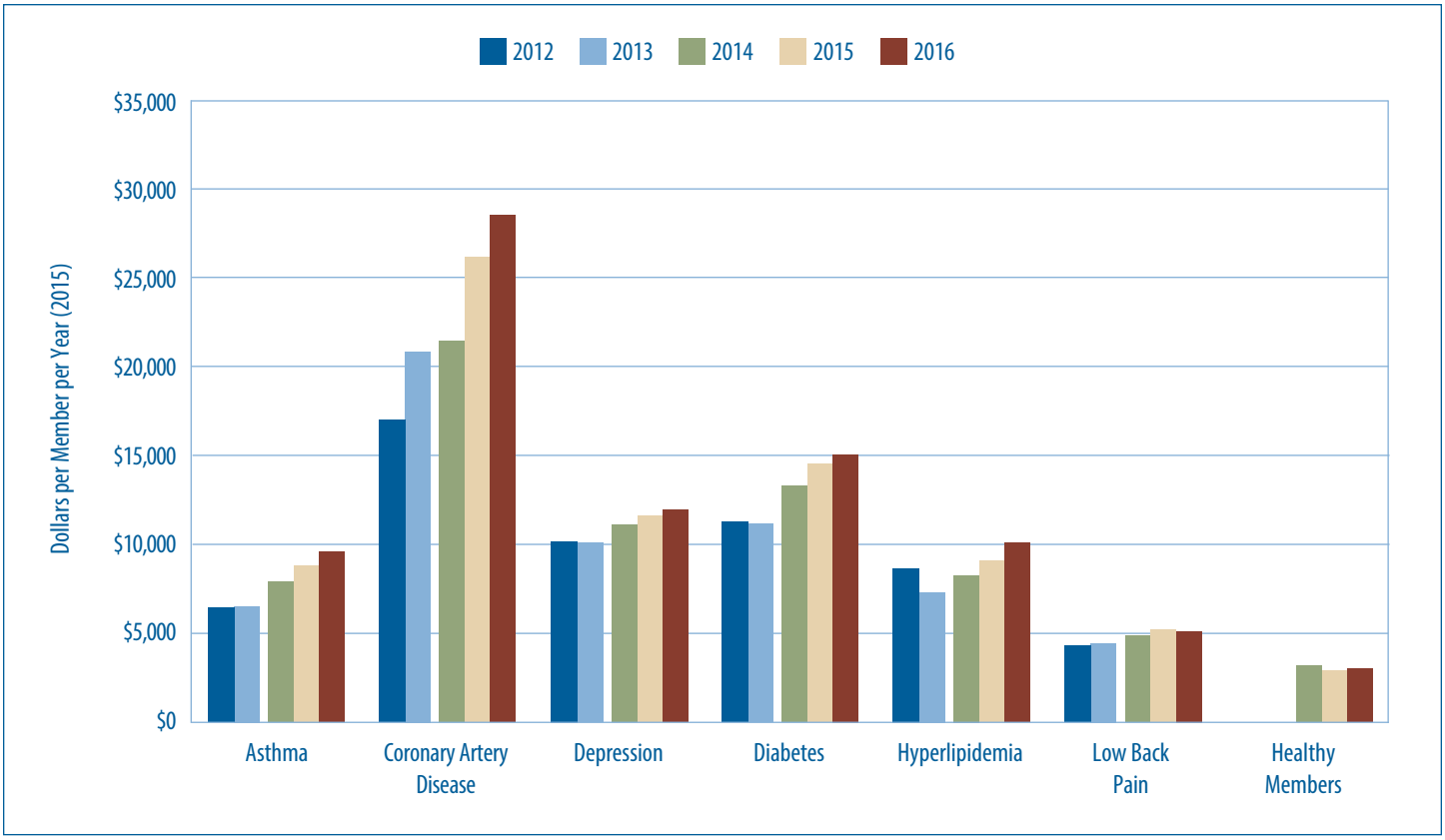
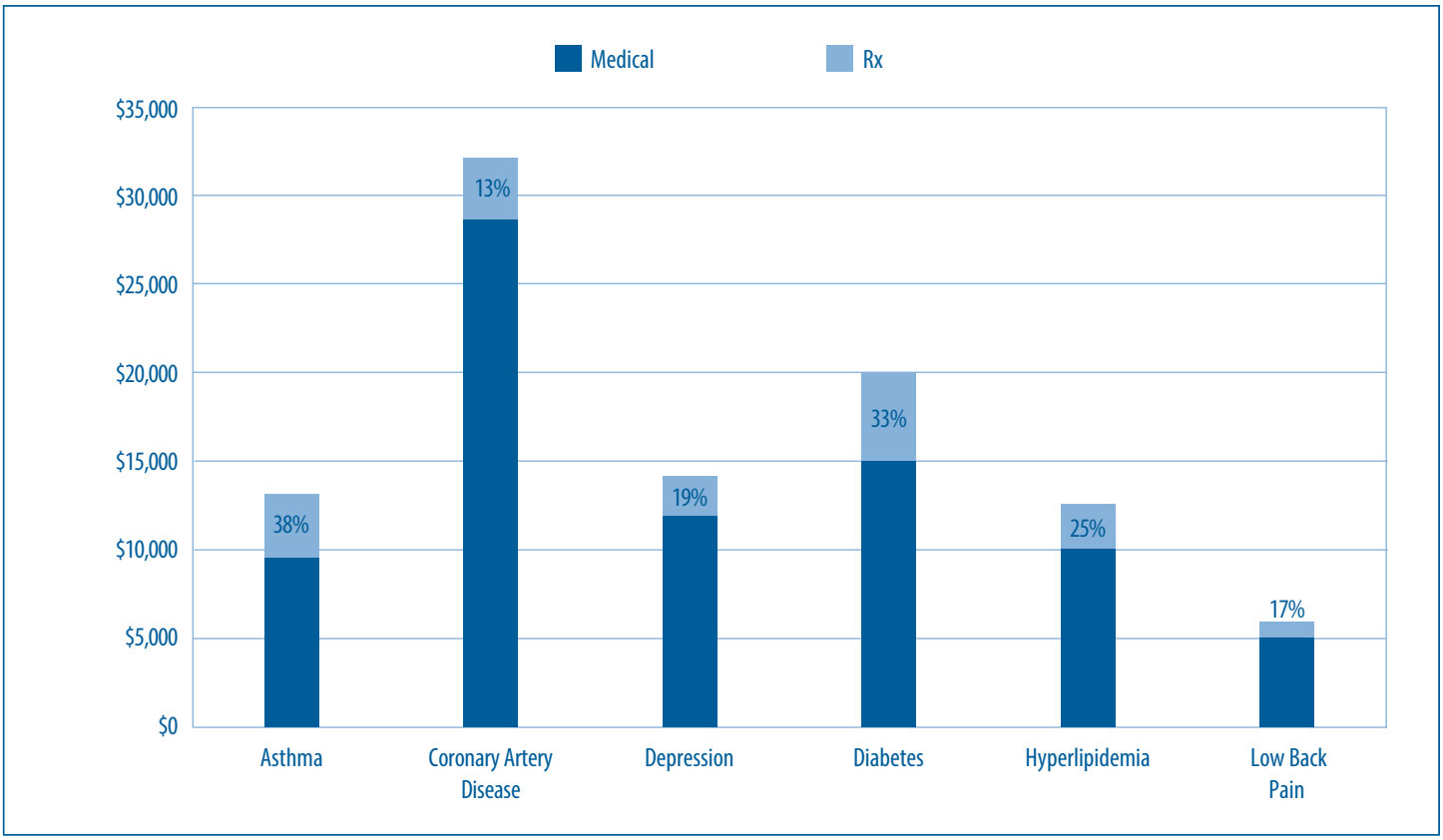
Figure 1: Average Expenditures per Member in KOMA, 2012–2016



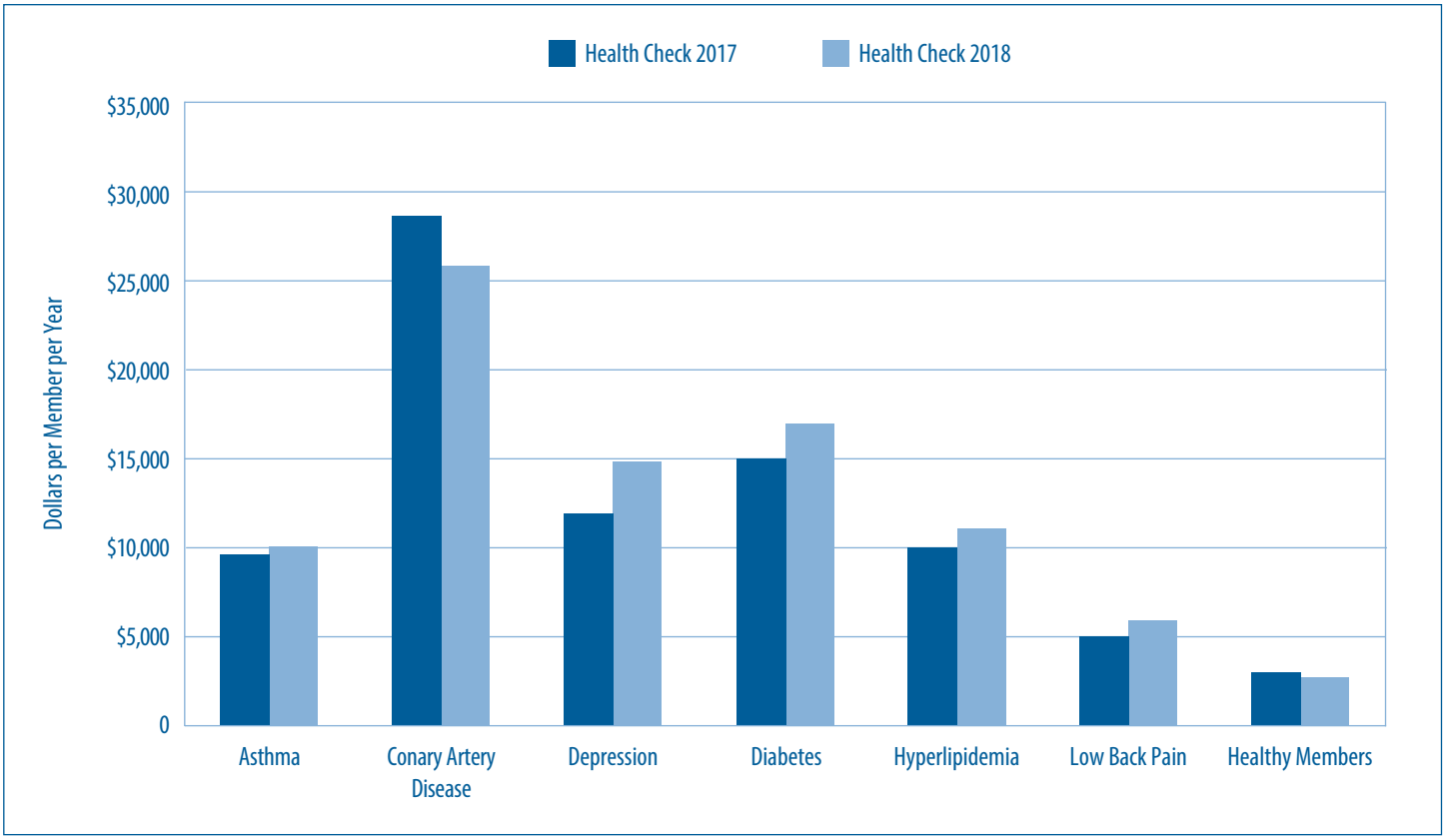
Source: BCBSM, BCN, and Priority Health member data

Figure 2: Rx Share of Average Expenditures per Member in KOMA, 2016



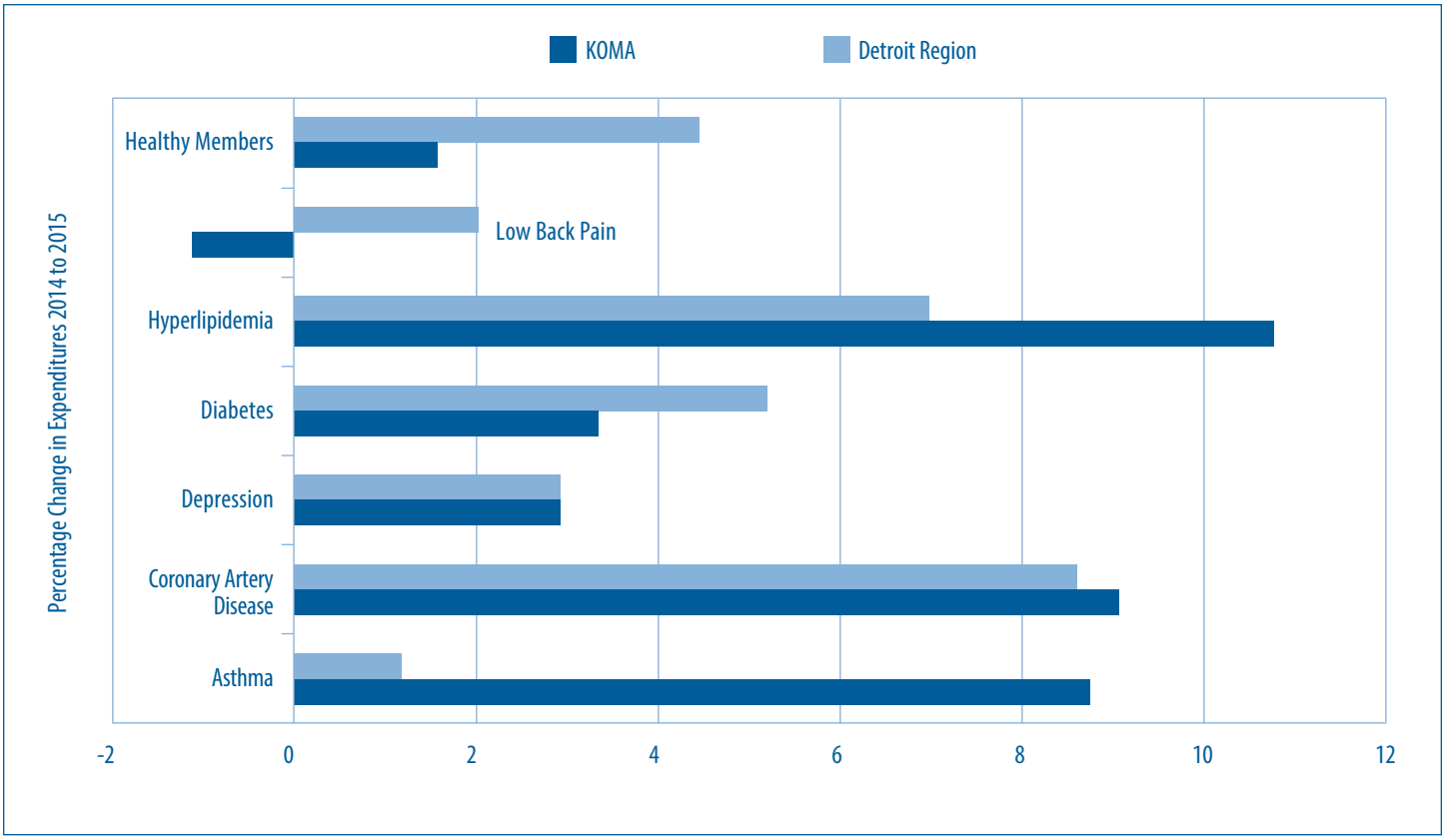
Source: BCBSM, BCN, and Priority Health member data

Figure 3: Average Expenditures per Member, 2016



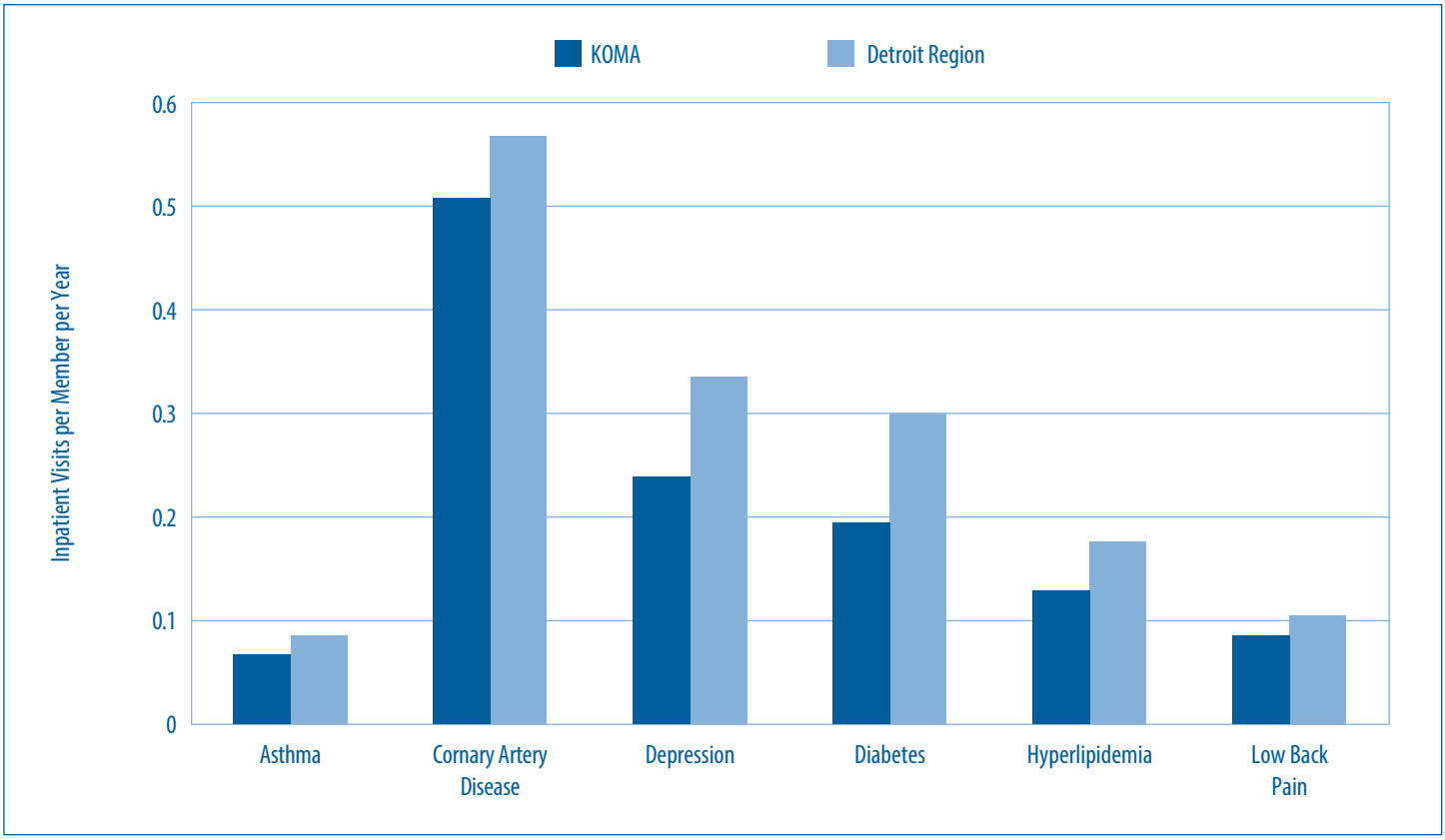
Source: BCBSM, BCN, and Priority Health member data

Figure 3a: 2015–2016 Percentage Change in Average Expenditures per Member



Source: BCBSM, BCN, and Priority Health member data

Figure 4a: Average Annual Inpatient Visits per Member, 2016



Source: BCBSM, BCN, and Priority Health member data

Figure 4b: Average Annual Emergency Department Visits per Member, 2016

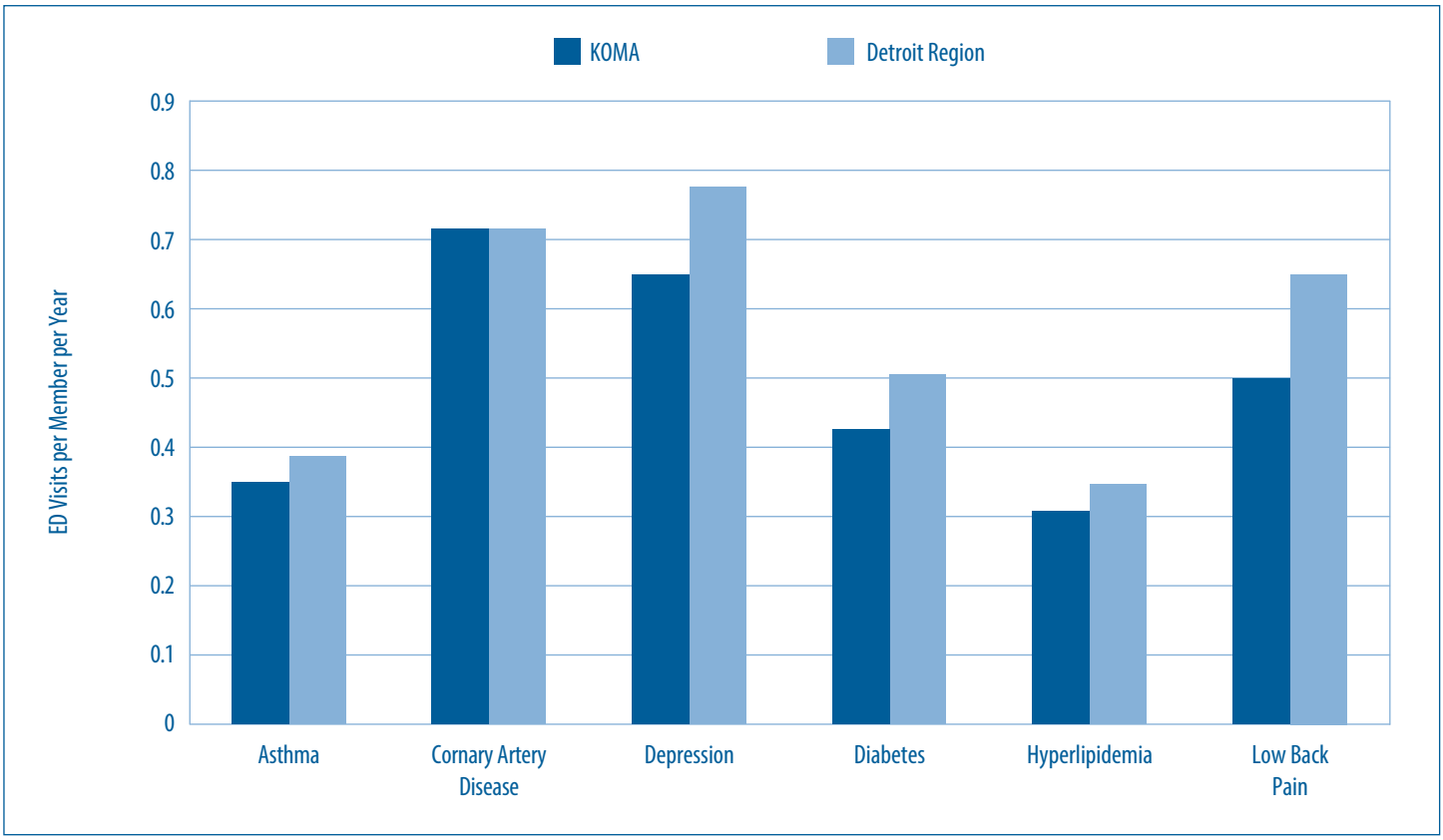
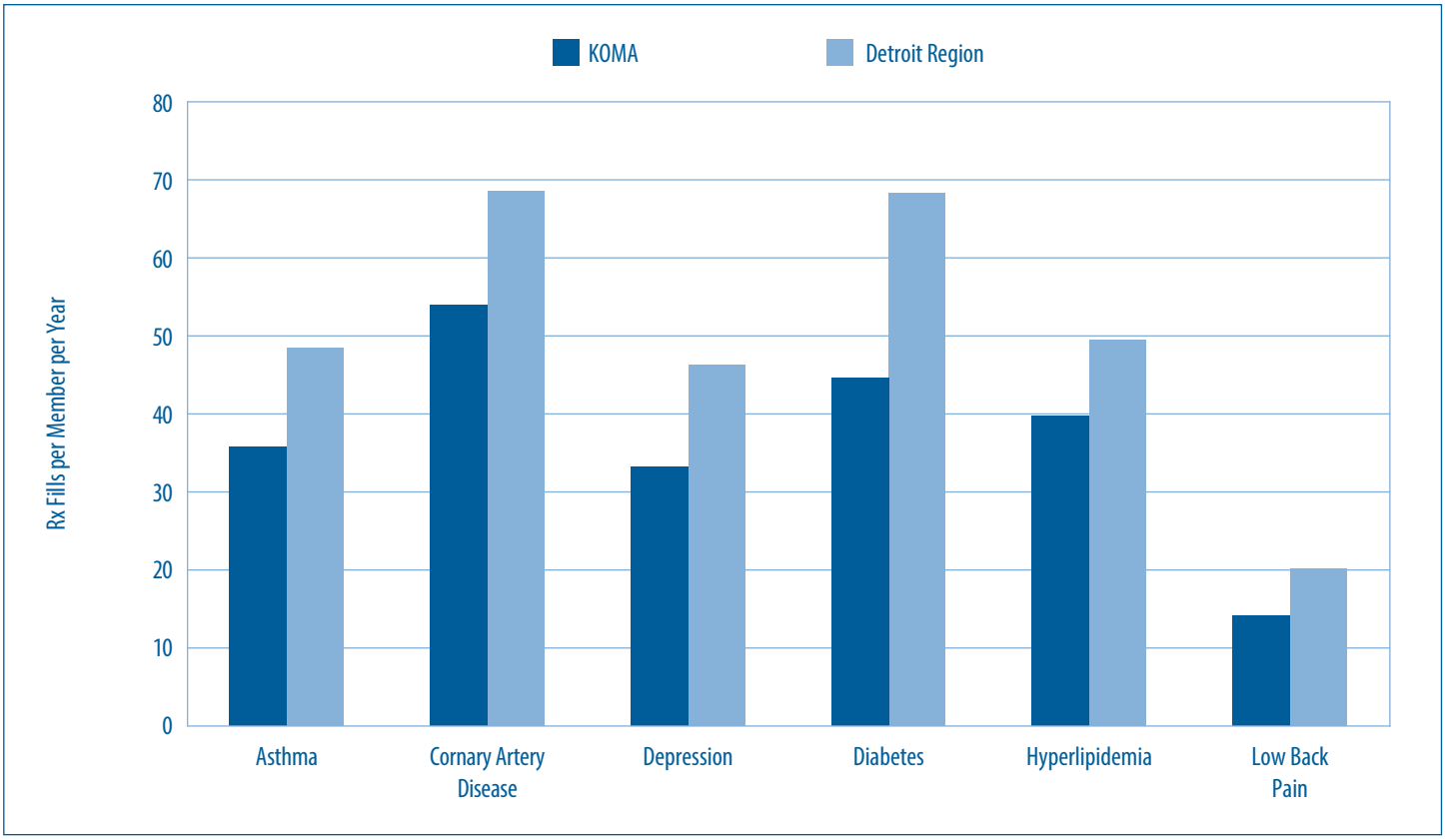
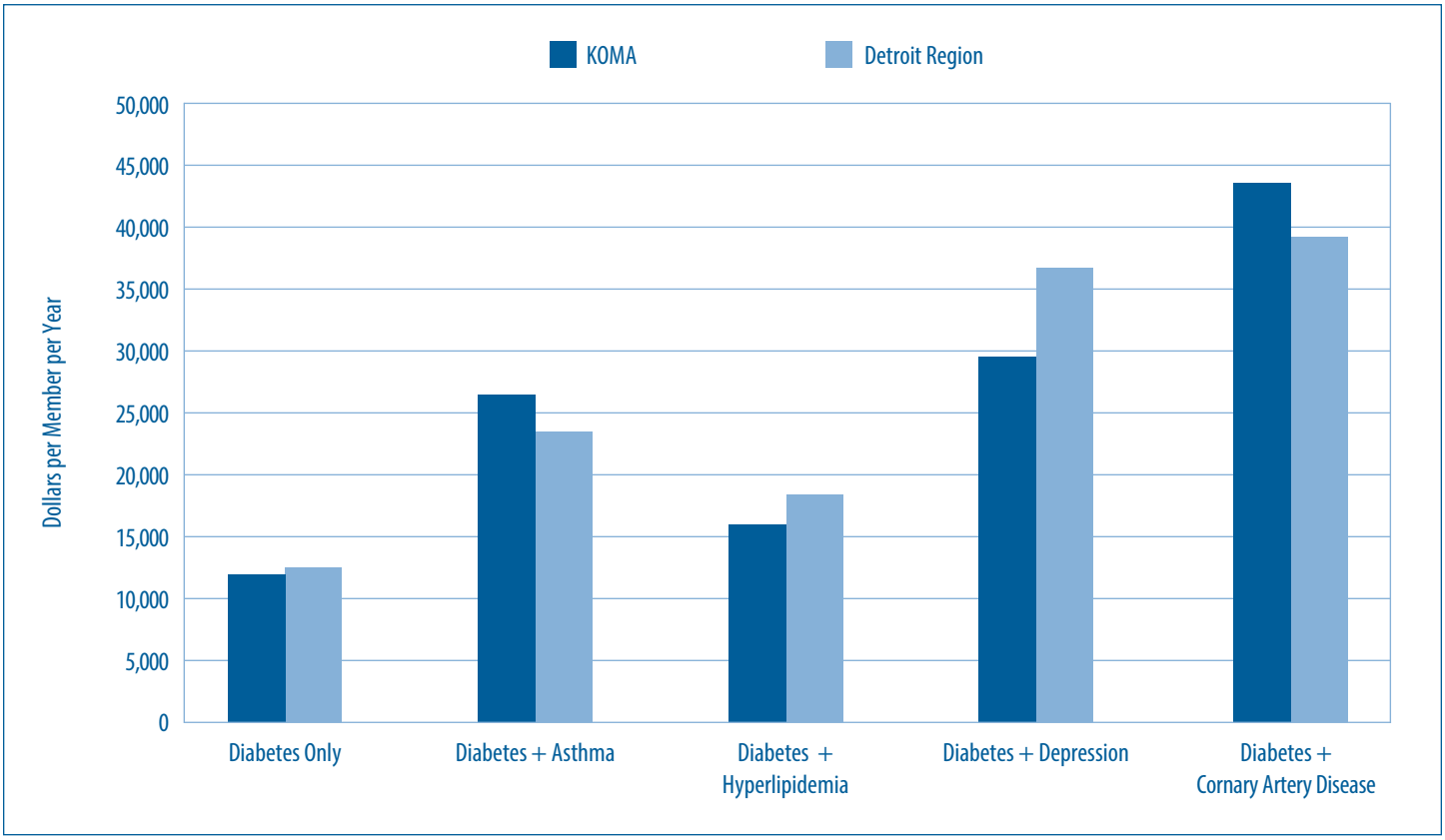


Figure 4c: Average Annual Prescription Fills per Member, 2016



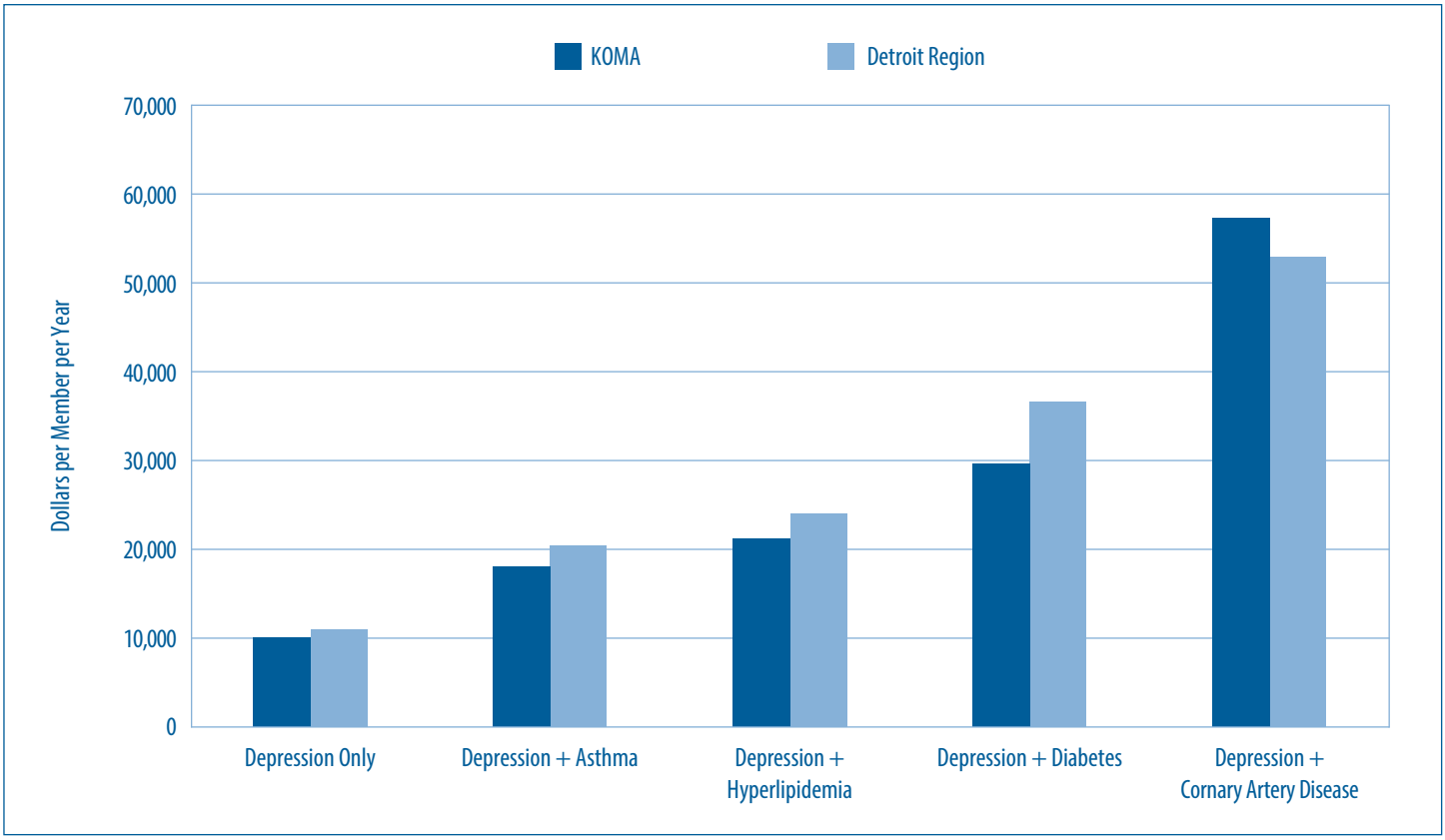
Source: BCBSM, BCN, and Priority Health member data

Figure 5a: Expenditures on Members with Diabetes and Comorbidities, 2016



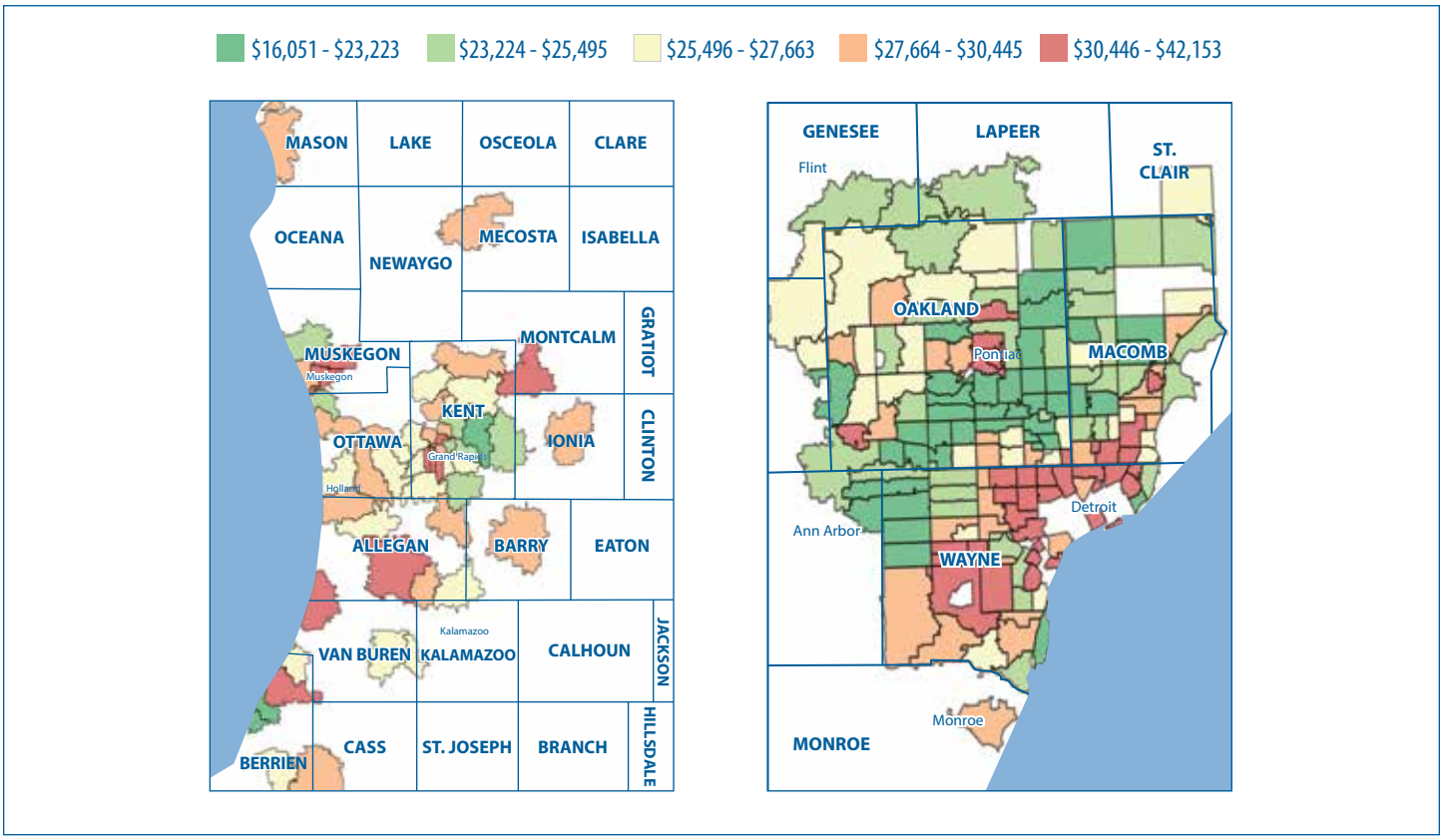
Source: BCBSM, BCN, and Priority Health member data

Figure 5b: Expenditures on Members with Depression and Comorbidities, 2016



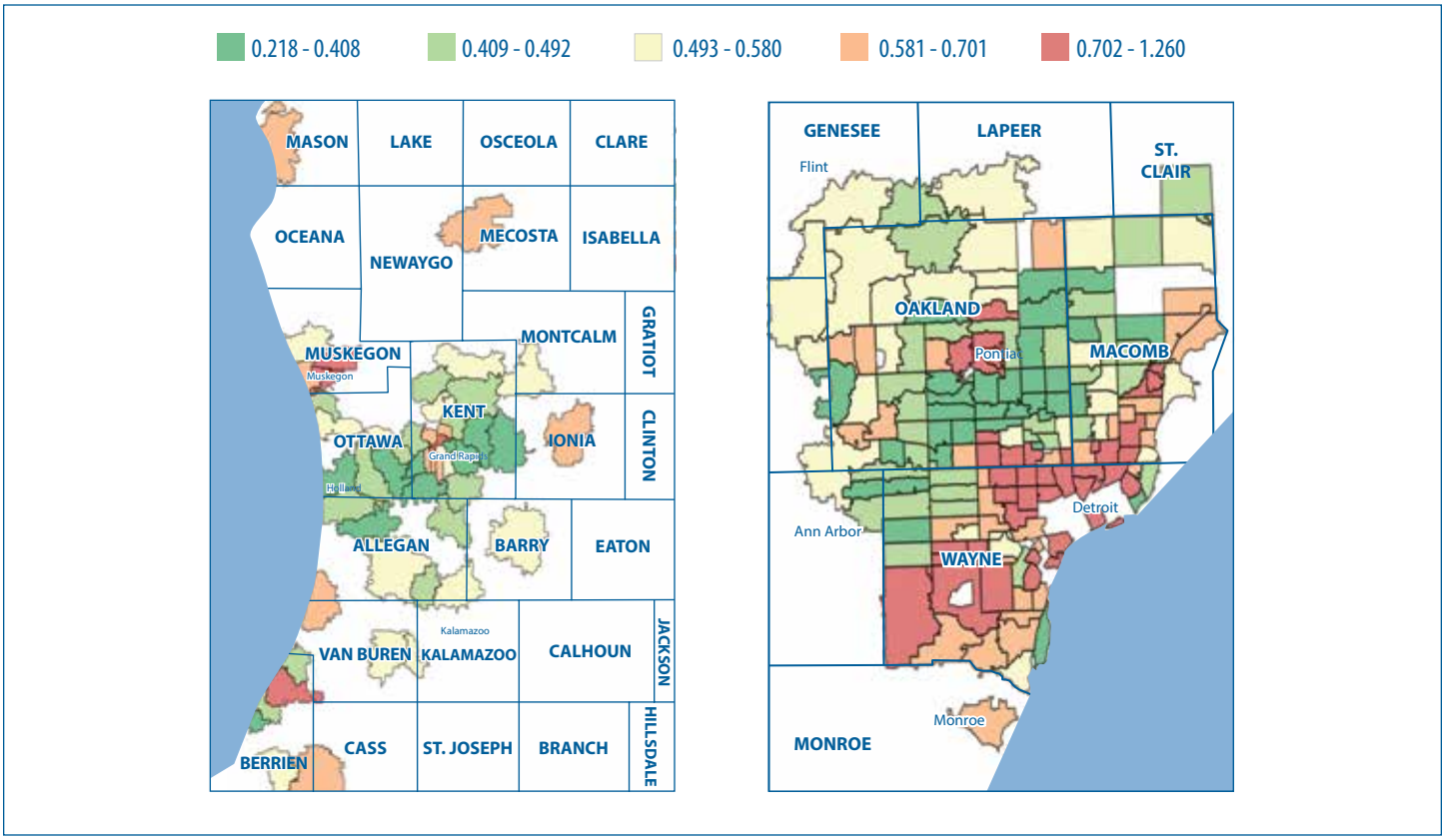
Source: BCBSM, BCN, and Priority Health member data

Figure 6a: Distribution of Average Annual Expenditures per Member with CAD by Zip Code



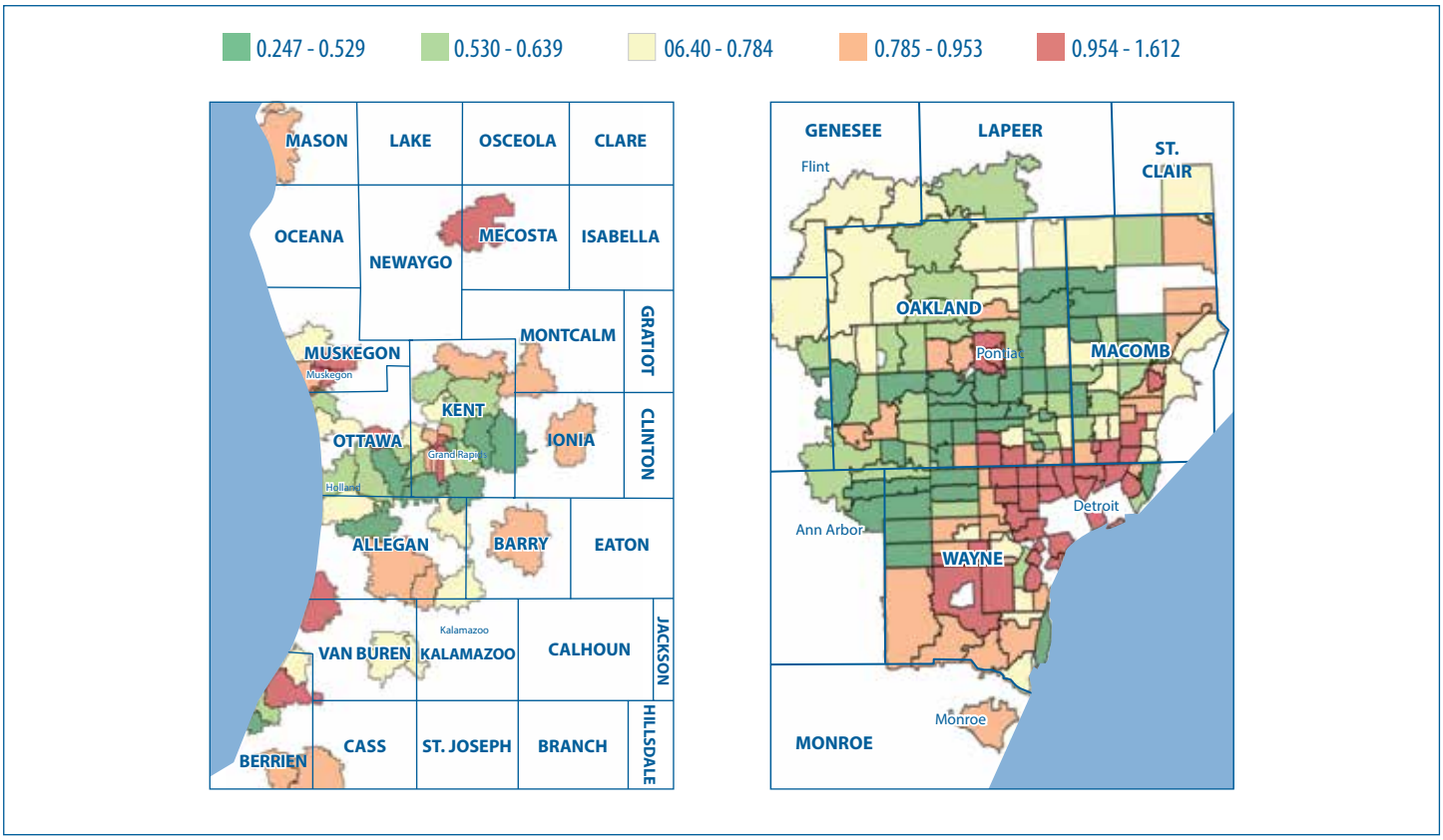
Source: BCBSM, BCN, and Priority Health member data

Figure 6b: Distribution of Average Annual Inpatient Visits per Member with CAD by Zip Code



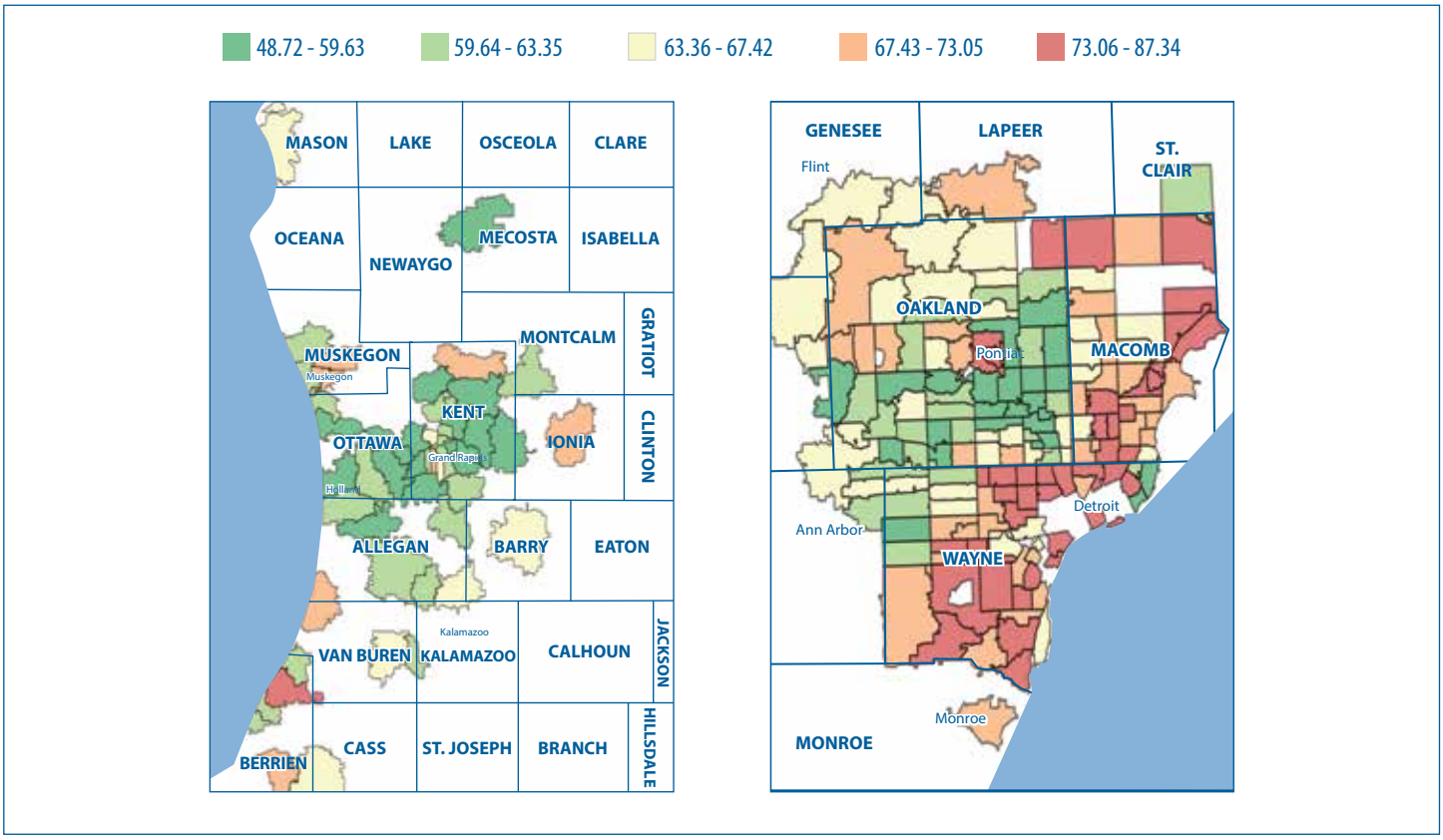
Source: BCBSM, BCN, and Priority Health member data

Figure 6c: Distribution of Average Annual ED Visits per Member with CAD by Zip Code



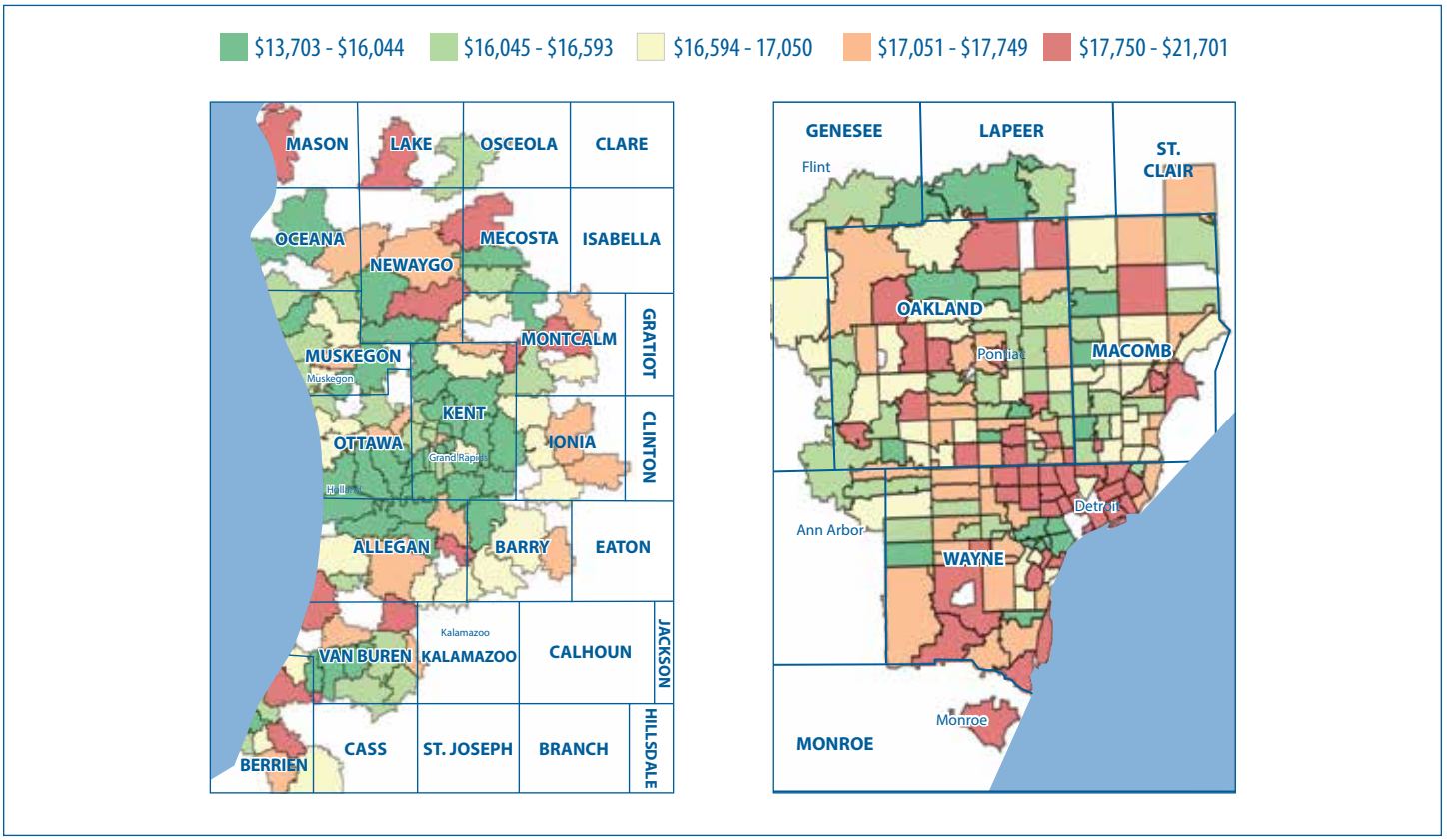
Source: BCBSM, BCN, and Priority Health member data

Figure 6d: Distribution of Average Annual Prescription Fills per Member with CAD by Zip Code



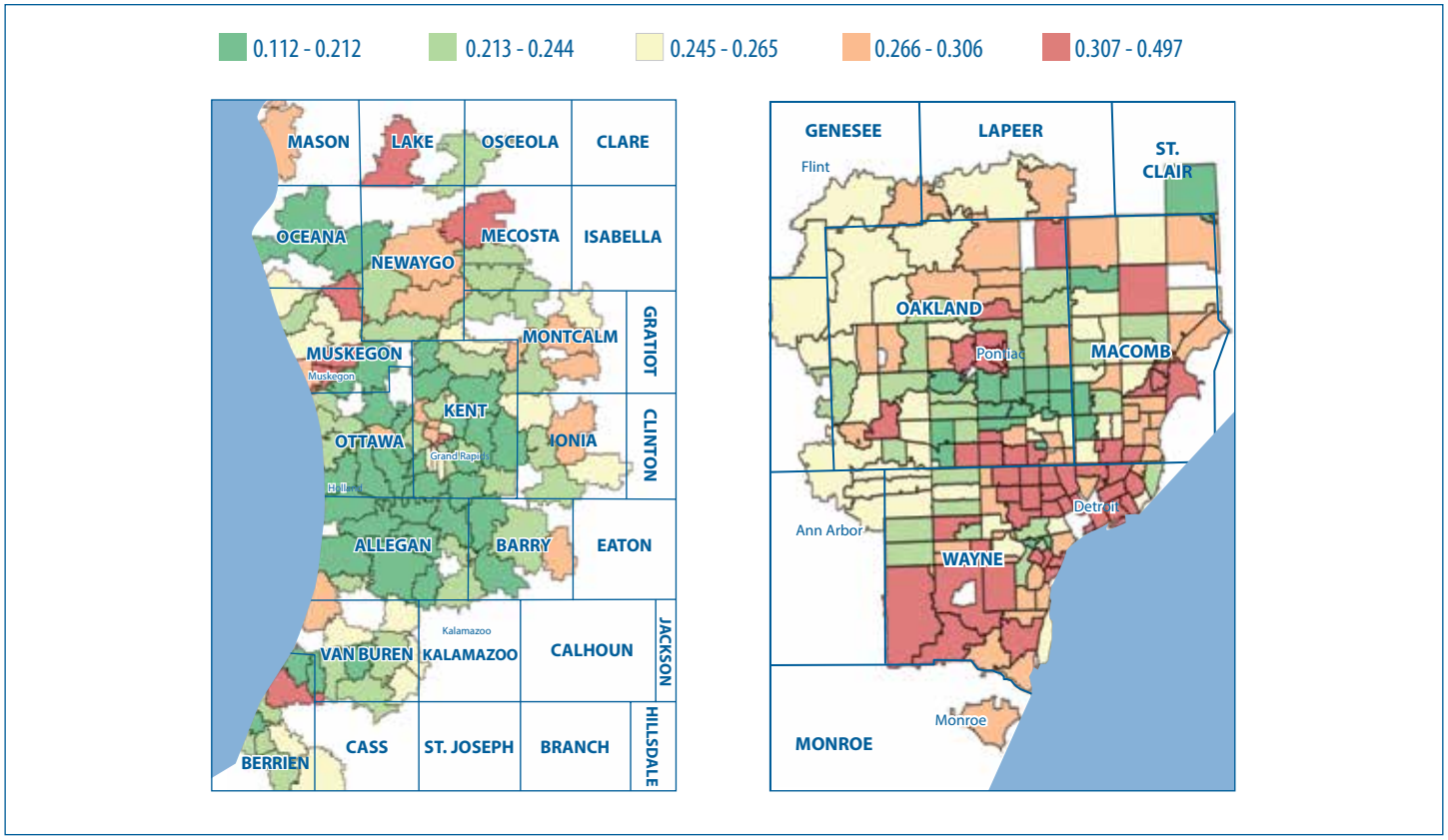
Source: BCBSM, BCN, and Priority Health member data

Figure 7a: Distribution of Average Annual Expenditures per Member with Diabetes by Zip Code



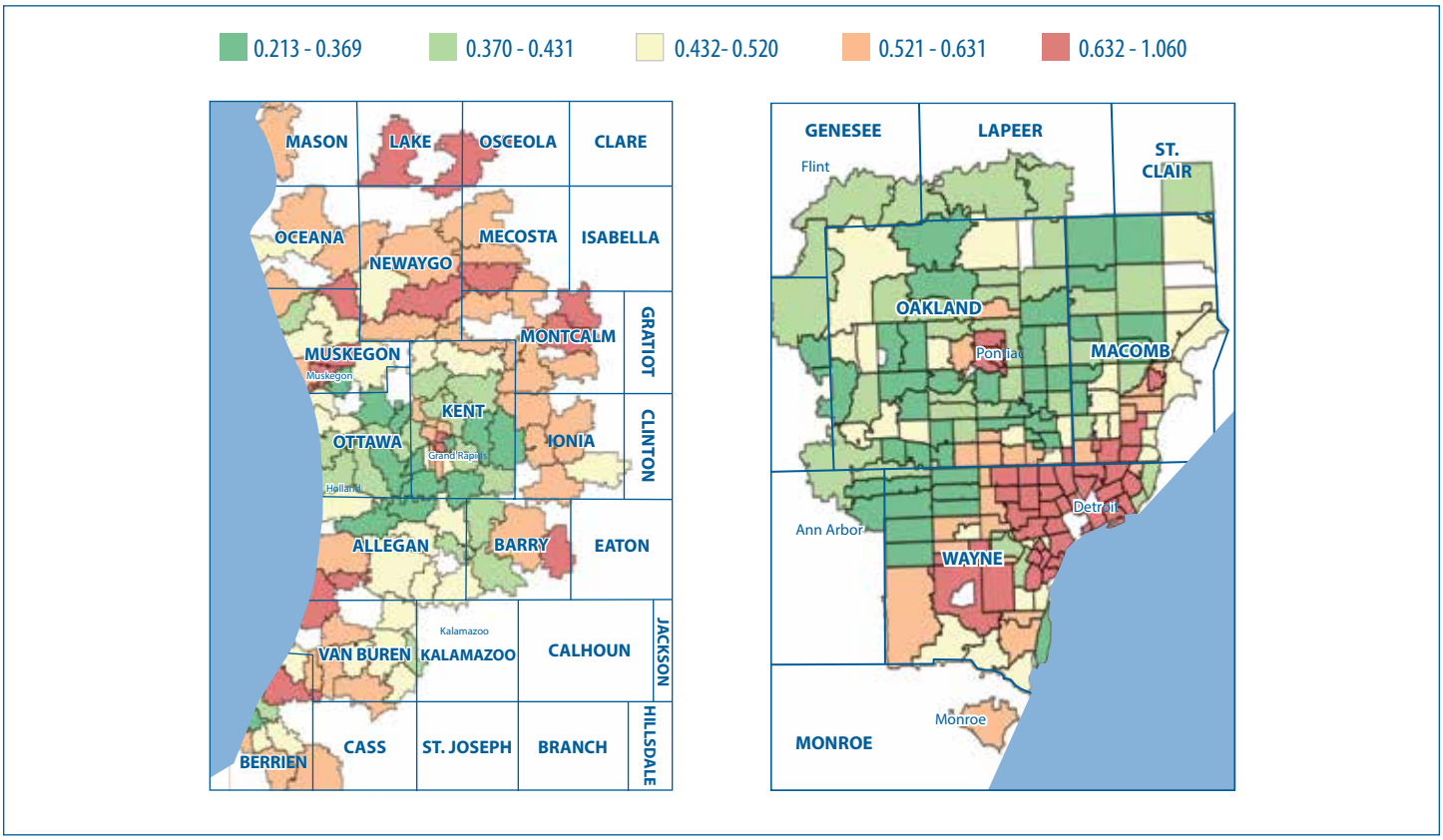
Source: BCBSM, BCN, and Priority Health member data

Figure 7b: Distribution of Average Annual Inpatient Visits per Member with Diabetes by Zip Code



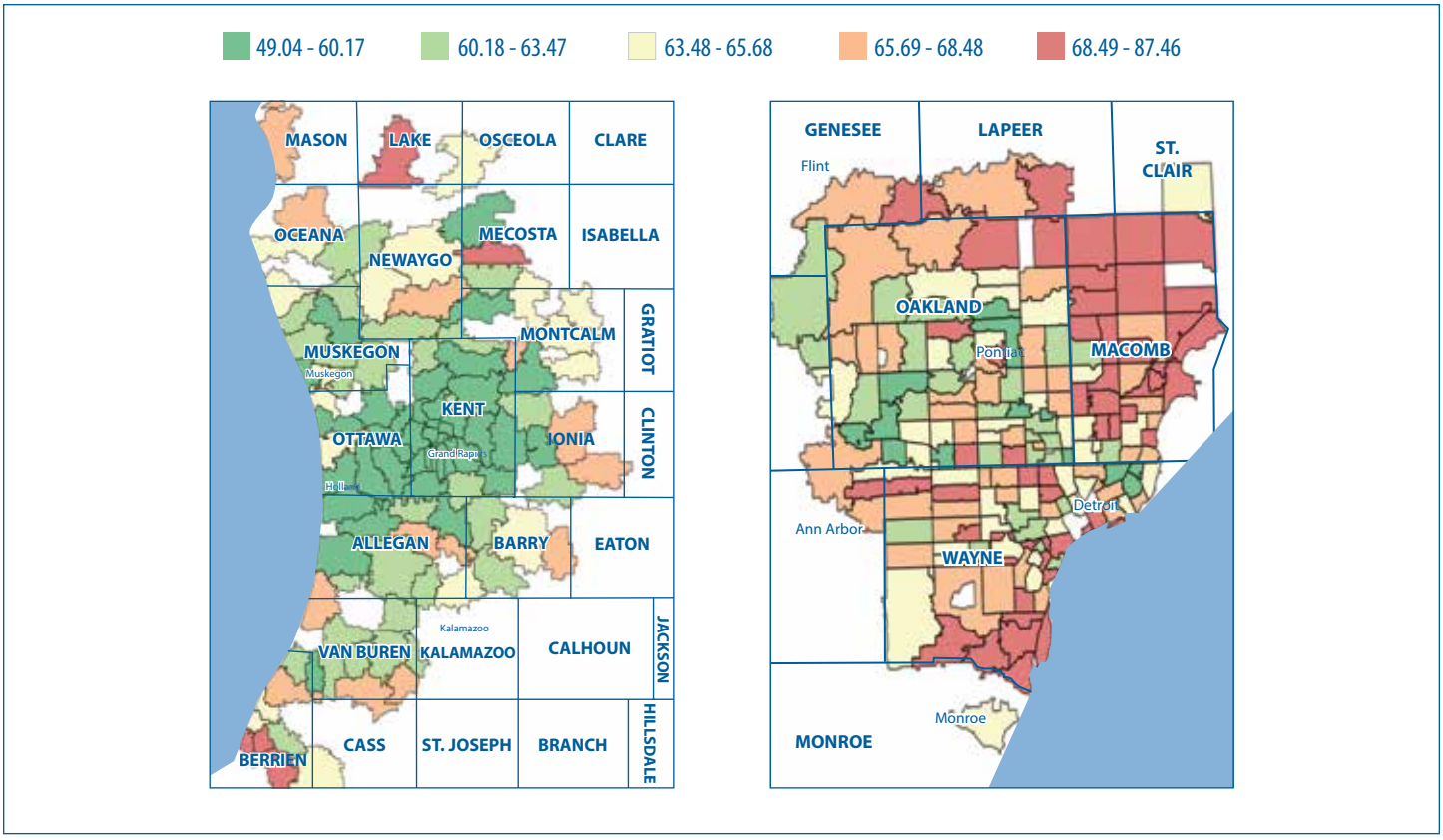
Source: BCBSM, BCN, and Priority Health member data

Figure 7c: Distribution of Average Annual ED Visits per Member with Diabetes by Zip Code



Source: BCBSM, BCN, and Priority Health member data

Figure 7d: Distribution of Average Annual Prescription Fills per Member with Diabetes by Zip Code



Source: BCBSM, BCN, and Priority Health member data

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