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Where are the Primary Care Doctors?

A Look at Michigan's Primary Care Physician Shortage

June 2015

Report 390

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Summary

Primary care as delivered by physicians is an integral part of a quality, accessible, and affordable healthcare system. For decades, stakeholders have reported shortages or impending shortages of these types of physicians. With the enactment of the federal Affordable Care Act, Michigan's decision to expand Medicaid, the aging Baby Boomers, and other policy, demographic, and cultural factors, now is a good time to reexamine the existing network of primary care physicians in Michigan.

Primary care physicians include physicians that serve as the first contact for patients and provide continuous and comprehensive treatment of all types of health conditions. Primary care physicians often take responsibility for the health of their patients even if they are further referred to specialists and may coordinate care for their patients on an ongoing basis. Primary care physicians typically serve in one of the following medical fields: family or general practice, internal medicine, pediatrics, obstetrics and gynecology, general surgery, or psychiatry.

Shortages of primary care services compromise patient access to sufficient and continuous health care and may drive prices for health care services upward. Additionally, the presence of more primary care physicians in a community is associated with a lower mortality rate indicating that quality of care may also be compromised if sufficient primary care is unavailable.[1]

Even though Michigan has seen faster growth over the last decade in its share of primary care physicians relative to the population, many reports still point to existing and impending shortages. For example, because of the effects of the aging population growth, and insurance expansion, Michigan may need 12 percent more primary care physicians by 2030.[2] However, other reports show that Michigan doctors are reporting available capacity for new patients and as few as only 12 percent are too full to accept new patients.[3] These conflicting reports may support another view: that rather than a shortage, physicians are maldistributed nationally and statewide. This assertion proposes that Michigan has a sufficient total number of physicians but they are not distributing in such as way to meet the needs of all residents throughout the state.

The United States Department of Health and Human Services' Health Resources and Services Administration (HRSA) calculates shortage areas to indicate where primary care physician needs are greatest. The designations are based on geography, population characteristics, or facility designations. HRSA estimates that in 2015, Michigan has 299 shortage areas and that Michigan's supply of primary care physicians only met 63.3 percent of need by the covered population. Wayne, Chippewa, and Montcalm counties have the highest number of shortage areas in the state.

To further assess the needs for primary care physicians in Michigan, CRC compared the actual ratio of active primary care physicians by field of practice in each county to a research-based ideal range. This analysis uncovered vast variation across counties in the sufficiency of their supply of primary care physicians. The shortages were not geographically isolated to certain parts of the state, but the northern half of the Lower Peninsula had a greater frequency of shortages. For example, statewide, Michigan has roughly the same share

[1] Starfield, Barbara, Shi, Leiyu, Grover, Atul, and James Macinko. "The Effects of Specialist Supply on Populations' Health: Assessing the Evidence." Health Affairs, W5-97, 2005. content.healthaffairs.org/content/early/2005/03/15/hlthaff.w5.97.citation

[2] Petterson, S.A.; Cai, A.; Moore, M.; Bazemore, A.; *State-level projections of primary care workforce, 2010-2030*. September 2013, Robert Graham Center, Washington, D.C.

[3] Michigan Department of Community Health Survey of Physicians, Survey Findings 2012. Prepared by Public Sector Consultants Inc., January 2013.

of internists as the national average, but within Michigan, these shortages are heavily concentrated in the northern half of the Lower Peninsula and the eastern half of the Upper Peninsula. Similarly, counties where the ratios of pediatricians and general surgeons to the population are below suggested targets are almost exclusively in the northern half of the Lower Peninsula and across the Upper Peninsula. In contrast, Oakland and Washtenaw counties have at least ten times the ideal physician-to-population ratio for pediatricians.

Overall, four counties had actual ratios of physicians-to-population that consistently fell below the recommended ranges for all the primary care fields CRC examined: Cass, Keweenaw, Lake, and Oscoda. Seven counties fell below suggested ranges in every field except family or general medicine: Alcona, Antrim, Gladwin, Kalkaska, Presque Isle, Roscommon, and Schoolcraft. The majority of these counties are located in the northern half of the Lower Peninsula. In contrast, 19 of Michigan's counties had physician-to-population ratios that always fell within or above the suggested ranges.

Primary care physician shortages and maldistribution are caused by a variety of factors, typically stemming from demographic changes, state and federal policy, and the training, professional, and cultural environments for medical students and active physicians. Policies that address Michigan's shortages and maldistribution should be designed to target these causes. The most promising solutions typically seek to either increase the supply of primary care physicians or decrease the demand for their services. Examples of state-level policy options that address primary care physician supply include:

- Addressing Medicaid reimbursement rates and provider payment systems to reduce the compensation differentials between primary care physicians and subspecialist physicians;
- Loan forgiveness programs for physicians who agree to practice primary care in high need areas;
- Working with medical schools to ensure that students more likely to enter primary care are applying and being admitted and developing programs to give medical students exposure to opportunities for practicing primary care and serving in underserved areas;
- Increasing graduate medical education funding and targeting funds to generate more primary care positions for residents; and
- Working with universities and local communities to develop strategies to retain medical students and residents in Michigan post-training.

Policies that alleviate the demand for primary care physicians can also be effective in ensuring Michigan residents receive adequate health services. These options include:

- Increasing the use of medical homes in the state, thereby creating a system where various providers coordinate services and can see more patients effectively;
- Expanding scope of practice requirements to allow non-physician clinicians to practice within the scope of their training to safely deliver healthcare services, as supported by evidence; and
- Investing in public health initiatives to improve the health of Michigan residents and reduce the need and demand for physician care.

Primary care is an integral part of an affordable and effective health care system. Policymakers, in collaboration with health care providers, universities, and other stakeholders can play an important role in coordinating a well-researched and integrated plan to help alleviate the state's primary care physician shortages. The future of our public's health relies on primary care services, provided from a variety of provider types, and needs the support of policymakers and citizens alike to reinstate a sense of value in primary care.

Where are the Primary Care Doctors?
A Look at Michigan's Primary Care Physician Shortage

The role of primary care physicians in the nation's and state's health system is significant and growing. Primary care physicians serve as the entry point to the medical system, are the most affordable first contact for health issues, lower medical spending through treatment and preventative care, provide referrals to appropriate subspecialists, and are an integral part of a quality, low cost healthcare system domestically and across the world. The utilization of primary care providers has been shown to reduce healthcare costs, reduce mortality, and improve population health, even when compared to subspecialist physicians.[1,2]

The number of doctors entering primary care fields is shrinking at the same time that the demand for their services is increasing. An aging population and the expansion of health insurance are just two of the factors increasing demand for primary care physicians. Shortages of primary care physicians are a nationwide phenomenon and while as a state the projected shortages are similar to the national average, parts of the state are feeling the detrimental impacts of reduced access to certain types of primary care physicians. Fortunately for state policymakers, primary care physician shortages may be alleviated by state government policies that address physician compensation, physician education and training, scope of practice restrictions, and public health spending levels. These policies have been demonstrated to effectively address Michigan's primary care physician shortages in regions where they are in greatest need.

What is Primary Care?

The designation of a primary care physician is typically given to physicians providing core health services who have received postgraduate medical training in family medicine, pediatrics, or internal medicine.[3] Some definitions also include physicians in general obstetrics and gynecology, general surgery, and psychiatry.

Perhaps more important than which physicians are classified as primary care is what services primary care physicians provide. The American Academy of Family Physicians defines a primary care physician as, "a generalist physician who provides definitive care to the undifferentiated patient at the point of first contact and takes continuing responsibility for providing the patient's care. Such a physician must be specifically trained to provide primary care services."[4] Similarly, the Michigan Primary Care Consortium classifies primary care physicians as providers that "offer basic health care that is continuous, comprehensive and coordinated, and which optimize health and well-being within the context of the family and community."[5]

In Michigan, 16,199 physicians are classified as primary care physicians across four medical fields (family medicine/general practice, internal medicine, pediatrics, obstetrics and gynecology) representing 47.5 percent of the total physicians in the state (See **Table 1**). The proportion of primary care physicians in Michigan relative to subspecialist physicians is only slightly below the national average of 47.7 percent. With individual states' percentage of primary care physicians ranging from 43.8 percent in the District of Columbia to 53.7 percent in North Dakota, Michigan is one of 14 states and the District of Columbia with

Table 1
Active Primary Care Physicians as a Percent of Total Physicians, Michigan versus United States, 2015

	Share of Primary Care Physicians	Share of Subspecialist Physicians
Michigan	47.5%	52.5%
United States Average	47.7	52.3

Source: The Kaiser Family Foundation. www.statehealthfacts.org

Table 2
Primary Care Physicians (PCPs) by Field, Michigan, 2015

	Number of Active Physicians	Share of Total PCPs	
		Michigan	United States
Internal Medicine	6,574	41%	41%
Family Medicine/General Practice	5,323	33	29
Pediatrics	2,303	14	18
Obstetrics and Gynecology	1,999	12	11
Total Primary Care	16,199	100	100

Source: The Kaiser Family Foundation. www.statehealthfacts.org

rates below the national average.[6]

Among four fields commonly defined as providing primary care, Michigan's distribution of physicians practicing in these specialties varies slightly compared to national averages. While Michigan's share of primary care physicians specializing in internal medicine and obstetrics and gynecology are near the national average, the state has a higher share of family practice or general practice physicians and a smaller share of pediatricians (see **Table 2**).

Issues Arising from Primary Care Physician Shortages

Healthcare provider shortages are often cited as being among the most significant problems facing the healthcare system. If true and actualized, current and future shortages of primary care and specialty physicians, nurses, lab technicians, and a variety of other healthcare practitioners and support staff have the potential to reduce the efficiency of the healthcare system, increase costs, and reduce quality of care.

Access

Primary care physicians, as well as other types of primary care practitioners (e.g. nurse practitioners and physician assistants), are often the first point of contact for patients to proper and continuous health care. A growing number of patients are enrolled in healthcare plans that require that they first visit primary care physicians for medical concerns and any further care outside of the primary care physician's scope of practice or expertise must be accompanied by a referral. The importance of primary care physicians to ensuring insured patients have continuous and quality medical care is great. As the number of physicians in primary care declines relative to the patient population, wait times for appointments grow longer, many practices may restrict appointments to new patients, and overall access to health care is compromised.

Prices

Shortages of healthcare practitioners may drive prices for services upward. This occurs when shortages cause providers, such as hospitals, to compete for a small pool of workers, whereby they must increase wages or other benefits in order to entice workers. If providers are unable to find the physicians, physician assistants, subspecialists, or nurses that they need, they may be forced to reduce the number of patients they accept, which effectively reduces the supply of healthcare providers, as well as patient access to services. As fewer healthcare providers remain in the market, pricing and bargaining power of those that remain increase, allowing them to charge higher prices.

Quality of Care

Primary care services include a wide range of continuous health care that has been shown to improve the health of patients and provide a high degree of satisfaction by patients. The presence of more primary care physicians is associated with lower mortality rates; this is not the case for the supply

of subspecialist physicians.[7] Continuous health care provision is important as it can help with early detection of health problems and provide uninterrupted care for existing conditions; the presence of a strong primary care network improves overall population health.[8]

In addition, primary care services typically include routine provision of preventative health services such as vaccinations and immunizations as well as screenings to detect potential health concerns such as diabetes, high cholesterol, and heart disease before they become more severe. Without sufficient access to primary care providers, patients may not receive these services at all or within a time frame that allows them to make significant improvements to their health.

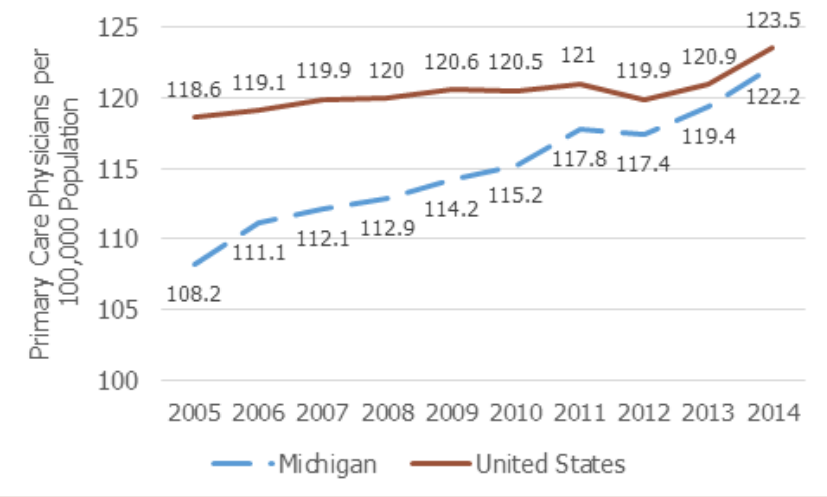
Does the Data Point to a Shortage?

Warnings of an impending primary care physician shortage have been circulating for decades. For many researchers and practitioners the shortage is a forgone conclusion and it is the size of the shortage that is up for debate. National estimates of total future physician shortages range from 55,000 to 200,000, and some projections suggest half of this demand will be for primary care physicians.[9] These estimates are typically based on estimated changes to visits to physicians. Even if provisions in the federal Patient Protection and Affordable Care Act (ACA) and other policy and events increased the annual number of primary care physicians by 20 percent (a very optimistic goal) by 2020, a shortage of 39,000 primary care physicians would still exist based on the American Association of Medical Colleges' prediction that another 45,000 primary care physicians will be needed by 2020.[10]

The United States Department of Health and Human Services' Health Resources and Services Administration (HRSA) assesses needs for primary care physicians and designates health professional shortage areas. HRSA found that as of November 2014, primary care medical shortage areas could be eliminated nationally by introducing 8,102 primary care practitioners into the workforce (allowing all areas to meet population-to-provider ratios established by regulations). HRSA estimates that less than 60 percent of the need for primary care physicians is met by the current supply.[11]

A 2006 report suggested that Michigan could have a shortage of up to 4,445 physicians by 2020. Some of the biggest needs were for family physicians (4-10 percent shortage), general surgeons (11-22 percent shortage), psychiatrists (7-19 percent shortage), and some types of subspecialists.[12] Since then, however, the number of primary care physicians in Michigan relative to the population has been growing at a rate faster than the national average (see **Chart 1**), though this figure does not account for increases in demand for services caused by healthcare expansion through the ACA.[13]

Chart 1
Growth Trends in the Number of Primary Care Physicians per 100,000 Population, Michigan versus United States, 2005-2014



Source: America's Health Rankings, United Health Foundation. www.americashealthrankings.org/ALL/PCP

A more recent report calculated that Michigan will need 12 percent more primary care physicians by 2030 to maintain current rates of utilization that take into account the aging population, population growth, and insurance expansion through the ACA. This report found that most of the increased demand will come from an aging population.[14]

Other voices in this debate argue that Michigan has a sufficient number of physicians statewide, even primary care physicians, but they are disproportionately located in suburban or certain urban areas. This leaves fewer primary care physicians in rural areas and in some underserved urban areas. This maldistribution of primary care physicians may explain why certain areas of Michigan are lacking capacity in primary care even though the total number of primary care physicians throughout the state is roughly equal to the national average. Geographically, Michigan is a predominantly rural state, making access to primary medical care in remote parts of the state a challenge. Research has shown that most physicians locate in regions with an already sufficient or even large supply.[15]

Additional support of maldistribution of primary care physicians rather than an overall shortage come from recent surveys on provider capacity. A 2012 survey by the Center for Healthcare Research & Transformation found that at least three-quarters of the family medicine, internal medicine, and pediatric physicians surveyed in Michigan had the capacity to accept new patients, even those that are enrolled in Medicaid insurance.[16] A 2013 survey by the Michigan Department of Community Health revealed that while 42 percent of active physicians reported their practice as nearly full, another 46 percent reported their practices are far from full, and only 12 percent reported that they are full and unable to accept new patients. This capacity of physicians in providing patient care has not changed much since 2006.[17]

While the sufficiency of the number of primary care physicians is debatable, the reality of the changing marketplace, in terms of a higher demand for services and an impending decrease in the supply of physicians, remains. Whether Michigan needs more primary care physicians or that those already providing care simply need to be redistributed away from areas with sufficient service needs to areas with high needs is explored through the data below.

A Deeper Look at Projected Shortages

The health professional shortage areas (HPSAs) calculated by HRSA are a commonly used criteria for estimating how many more primary care physicians are needed. In order to be defined as a HPSA, a geographic region must have less than one full-time equivalent primary care provider for every 3,500 population. In Michigan, 17 percent of the population lives in a primary care physician HPSA. HRSA estimates that Michigan's supply of primary care providers only meets 63.3 percent of the need for primary care services by the covered population, though this is higher than the national rate of 59.8 percent (see **Table 3**). In 2014, Michigan needed 204 new primary care physicians to remove the HPSA designation, the 11th highest number nationally.[a]

[a] The number of primary care physicians needed to remove the HPSA designation is not adjusted for population. While Michigan has the 11th highest rate nationally, it has the 8th highest population in the country.

Table 3
Primary Care Health Professional Shortage Areas (HPSAs), 2014

	Michigan	United States
Population Living in a Primary Care HPSA	1,680,969	59,474,482
Percent of Need Met	63.3%	59.8%
Total Primary Care Physicians Needed to Remove HPSA Designation*	204	8,102

* The number of additional primary care physicians needed to achieve a population-to-primary care physician ratio of 3,500 to 1 (3,000 to 1 where high needs are indicated) in all designated primary care HPSAs, resulting in their removal from designation. The formula used to designate primary care HPSAs does not take into account the availability of additional primary care services provided by nurse practitioners and physician assistants in an area.

Source: Bureau of Clinician Recruitment and Service, Health Resources and Services Administration (HRSA), U.S. Department of Health & Human Services, November 2014.

Primary Care Health Professional Shortage Areas (HPSAs) Defined

The United States Department of Health and Human Services designates a primary care HPSA by either geographic area, population group, or facility. In order for a geographic region to be defined as a primary care HPSA, there must be less than one full-time equivalent primary care physician for every 3,500 population or, alternatively, the area must have less than one full-time equivalent primary care physician for every 3,000 population and have unusually high needs for primary care services or insufficient capacity of existing primary care providers. The geographic area may be a county, a census track, or some other "rational area" for primary care services.

A population group HPSA designation is given when access barriers prevent a specific population group from receiving primary medical care. These barriers may be economic, linguistic, cultural, or architectural (e.g. wheelchair accessibility), and may include the decision of primary care physicians to not accept certain patients, such as Medicaid recipients. Members of federally recognized Native American tribes are automatically given this designation. A facility HPSA designation is given to a facility that primarily cares for an underserved population. The HPSA designation does not take into consideration the availability of primary care services provided by nurse practitioners and physicians assistants

An HPSA designation expires every three years and must be resubmitted to the Michigan Department of Community Health Primary Care Office (PCO) for evaluation and designation. The PCO has contracted with the Michigan Primary Care Association to collect data for a redesignation. A HPSA designation provides the area, population, or facility with priority federal grant funding and incentives. These often include Medicare bonuses and eligibility for loan forgiveness programs.

According to HRSA, as of April 2015, there were 299 total primary care HPSAs in Michigan, most of which were facility HPSAs.* **Figure A** categorizes these HPSAs for primary care in Michigan.

Figure A
Categorization of Health Professional Shortage Areas in Michigan, 2015

Primary Care Designation Type	Number of HPSAs
Geographical Area	**23**
Population Group	**36**
Facility	
Comprehensive Health Center	36
Correctional Facility	15
Federally Qualified Health Center Look-A-Like	4
Native American Tribal Population	19
Rural Health Clinic	166
Total	**299**

Source: Health Resources and Services Administration. (2015). Find Shortage Areas: HPSA by State & County. Retrieved from U.S. Department of Health and Human Services: www.hpsafind.hrsa.gov/HPSASearch.aspx

Notes: A Federally Qualified Health Center Look-A-Like is a health center that has been identified by HRSA and certified by the Centers for Medicare and Medicaid Services as meeting the definition of "health center" under Section 330 of the PHS Act, although it does not receive grant funding under Section 330 as Federally Qualified Health Centers do.

* Health Resources and Services Administration. (2015). Find Shortage Areas: HPSA by State & County. Retrieved from U.S. Department of Health and Human Services: www.hpsafind.hrsa.gov/HPSASearch.aspx

As of April 2015, there were 299 total primary care HPSAs in Michigan.[18] This includes geographic, population, and facility designations. **Map 1** illustrates the location of these HPSA designations by county in Michigan (see **Appendix A** for a map of Michigan with counties labeled). Wayne, Chippewa, Montcalm, and Van Buren counties have the highest number of shortage areas in the state. A unique, though perhaps unsurprising, observation is that Wayne County has the highest number of shortage areas (16) in the state but borders counties that have only one or two shortage areas; In contrast, Chippewa and Montcalm counties border at least one other county with a relatively high number of shortage areas.

The designation type varies across counties. In Wayne County, roughly one-third of the HPSA designations are geographic high need.[b] Only the Southwest Detroit area has a standard geographic HPSA with a population-to-physician ratio of 3,782 to 1.

Montcalm County's HPSA designations are entirely population or facility designations, as is Chippewa, but with the addition of the Chippewa Correctional Facility and Kinross Correctional Facility as HPSAs.

Map 1
Number of Primary Care Health Professional Shortage Areas by County in Michigan, 2015

Source: Health Resources and Services Administration. (2015). Find Shortage Areas: HPSA by State & County. Retrieved from U.S. Department of Health and Human Services: www.hpsafind.hrsa.gov/HPSASearch.aspx

[b] HRSA determines an unusually high need for primary medical services when the area has more than 100 births per year per 1,000 women aged 15 to 44; the area has more than 20 infant deaths per 1,000 live births; and/or more than 20 percent of the population have incomes below the poverty level. (Source: U.S. Department of Health and Human Services, Health Resources and Services Administration. Primary Medical Care HPSA Designation Criteria webpage. Accessed May 27, 2015. www.bhpr.hrsa.gov/shortage/hpsas/designationcriteria/primarycarehpsacriteria.html)

Primary Care Shortages by County

The ratio of physicians per population is another way to assess a community's access to physicians in general and by type of physician. These types of assessments can be done for hospital medical staff planning, but also on a larger community or regional level. However, considerations must be made for patient demographics, physician demographics, physician practice styles, payment systems, and disease incidence, which vary from region to region.[19] The primary care physician-to-population ratio varies significantly across Michigan counties. Washtenaw County has one primary care physician for every 598 residents while Cass County has one primary care physician for every 7,463 residents — nearly double the federal shortage definition. **Appendix B** provides these ratios for each county as well as their respective statewide ranking.

In addition to assessing local or county physician-to-population ratios it is helpful to have a basis to compare the actual with the ideal or sufficient. Over the years, several models have emerged and evolved to estimate the ideal or sufficient ratio for each physician specialty. These ratios can provide a general framework for hospitals, healthcare providers, and health planners in determining physician need in their service areas.

For the purposes of this report, CRC compared the actual physician-to-population ratios reported by HRSA in Michigan counties with two suggested ratios, which combined create an ideal range for the ratio of physicians by primary care specialty per 100,000 population. The two suggested ratios were identified by comparing three recognized national ratios (Graduate Medical Education National Advisory Committee (GMNEAC); Hicks and Glenn; and Solucient) and selecting the largest and smallest ratios among the three as a point of reference to create a range in each category (see **Table 4**). Of the three suggested ratios, no specific ratio is more highly regarded in health planning relative to the other two (see **BOX**).

Looking at recommended physician ratios by county and specialty may help to determine whether or not an overall shortage exists in Michigan or whether there is a maldistribution of physicians across the state. These results can help identify areas with the most critical needs. Considerations should be made for varying population needs across the counties. For example, in counties with older populations, the need for pediatricians is much lower than in counties with younger populations. These ratios do not take these types of factors into consideration.

More about Suggested Physician Ratios

The Graduate Medical Education National Advisory Committee (GMNEAC) was an ad hoc committee of healthcare experts convened by Congress to assess healthcare workforce needs and in 1980, GMENAC issued estimated ratios on the number of physicians needed per 100,000 population by specialty types. This has been the only government-sponsored estimate since that year.

The Hicks and Glenn ratio is based on a 1989 article from the *Journal of Health Care Management*, which projected ratios based on the current rate of patient visits to particular specialists, as found in a Department of Health and Human Services' National Ambulatory Healthcare Administration report. The estimated ratios were found by dividing the number of patient visits by the number of patient visits that physicians can typically handle, as determined by the Medical Group Management Association.

Lastly, the Solucient ratio estimates are the most recent estimates having been based on a 2003 study by the Solucient healthcare consulting firm (now Thomas Healthcare). Solucient's methodology was similar to Hicks and Glenn in that they used National Ambulatory Health Care Administration patient-physician visits data, Medical Group Management Association productivity data, as well as private and public claims data to find patient-physician visit rates by age.

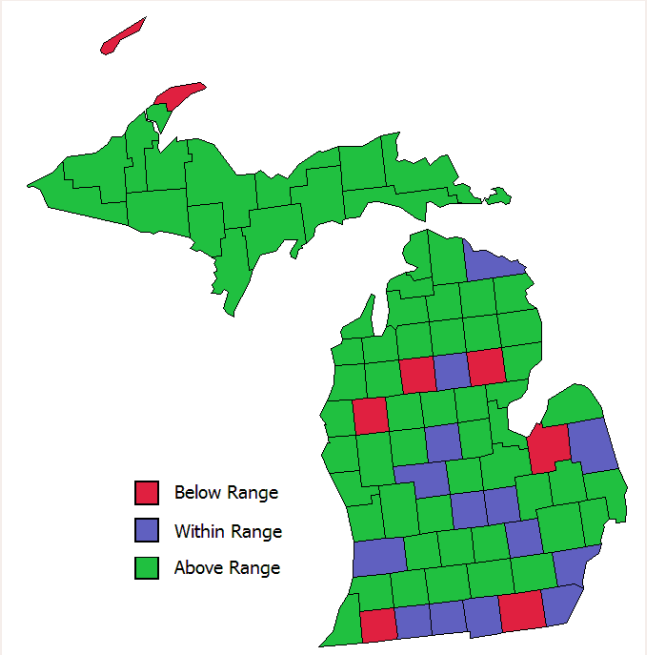
Table 4
Suggested Physician Ratios and Ranges per 100,000 Population

	GMENAC	Hicks and Glenn	Solucient (National)	Range Established
Family Practice	**25.2**	**16.2**	22.5	16.2 - 25.2
Internal Medicine	**28.8**	**11.3**	19.0	11.3 - 28.8
Pediatrics	12.8	**7.6**	**13.9**	7.6 - 13.9
General Surgery	**9.7**	**4.1**	6.0	4.1 - 9.7
OB/GYN	9.9	**8.0**	**10.2**	8 - 10.2
Psychiatry	**15.9**	**3.9**	5.7	3.9 - 15.9

Note: Ratios in **bold** indicate that these figures were chosen to establish the range because they are either the highest or lowest ratio of the specialty.

Ratios Source: Merrit Hawkins. (2012). A Review of Physician-to-Population Ratios. Retrieved from Merritt Hawkins: an AMN Healthcare Company: www.merritthawkins.com

Map 2
Comparison of Actual versus Suggested Physician-to-Population Ratios per 100,000 for General and Family Medicine Physicians, 2011



Source: Health Resources and Services Administration. (2011). State Health Resources Comparison Tool. Retrieved from U.S. Department of Health and Human Services: www.arf.hrsa.gov/arfdashboard/HRCTstate.aspx

General and Family Medicine Physicians

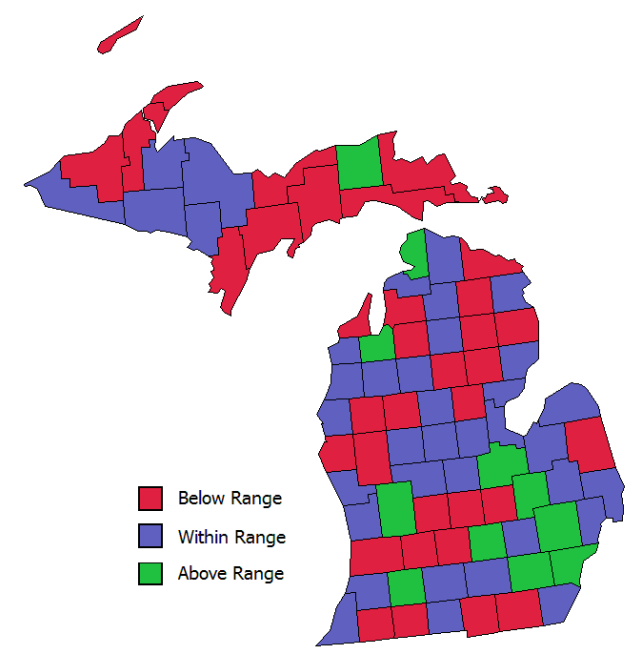
Overall, the majority of Michigan counties had ratios for general and family medicine physicians per 100,000 population that exceeded ideal ratios, as demonstrated by the green counties in **Map 2**. Seven counties had physician to population ratios that fell below the ranges, which suggests shortages based on even the lowest of the three recommended ratios. Keweenaw and Oscoda counties had fewer than one general and family physician per 100,000 population while Baraga County had the most at 90.8 general and family physicians per 100,000 population. Other counties that fell below ideal targets were Missaukee, Lake, Tuscola, Cass, and Lenawee counties.

Internal Medicine Physicians

The majority of Michigan counties were either below or within the estimated ideal range for the ratio of internal medicine physicians per 100,000 population, as demonstrated by the red and blue counties in **Map 3**. Michigan had 34 counties below the range (red), 38 counties within the range (blue), and 11 counties above the range (green). Ten counties had fewer than one internal medicine physician per 100,000 population, and eight had half or fewer of the ideal ratio of physicians-to-population. On the high end, Luce and Washtenaw counties had 76 and 79 internists per 100,000 population, respectively. The data suggest many counties may already be experiencing shortages in internal medicine physicians.

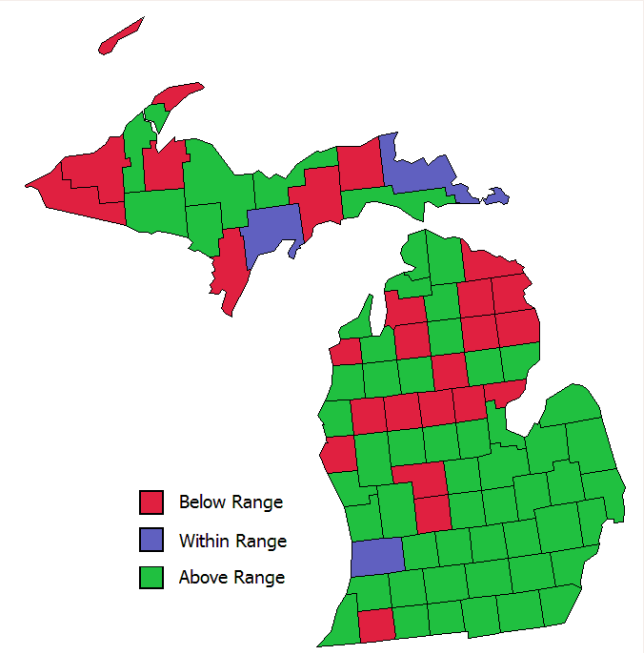
Looking at individual county shortages, the problem appears to be more pervasive in the northern half of the Lower Peninsula and in the Upper Peninsula. For example, fewer than one-third of counties below the ideal range are in the southern half of the Lower Peninsula. Only Emmet, Grand Traverse, and Luce counties had a number of physicians that exceeded the ideal range and were located in the Upper Peninsula or the northern half of the Lower Peninsula.

Map 3
Comparison of Actual versus Suggested Physician-to-Population Ratios per 100,000 for Internal Medicine Physicians, 2011



Source: Health Resources and Services Administration. (2011). State Health Resources Comparison Tool. Retrieved from U.S. Department of Health and Human Services: www.arf.hrsa.gov/arfdashboard/HRCTstate.aspx

Map 4
Comparison of Actual versus Suggested Physician-to-Population Ratios per 100,000 for Pediatric Physicians, 2011



Source: Health Resources and Services Administration. (2011). State Health Resources Comparison Tool. Retrieved from U.S. Department of Health and Human Services: www.arf.hrsa.gov/arfdashboard/HRCTstate.aspx

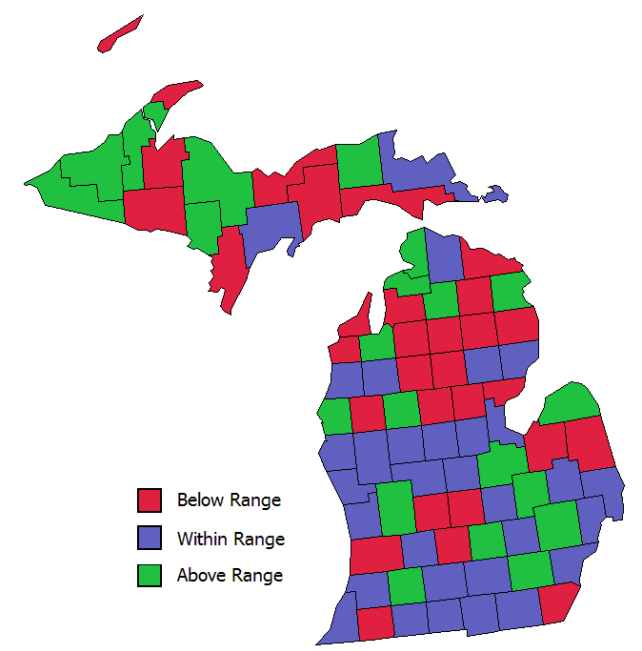
Of particular concern are areas where contiguous counties fall below the ideal physician-to-population ranges. This means that residents must often travel farther than the next county to receive appropriate care. These areas include the eastern half of the Upper Peninsula and some regions in the Lower Peninsula.

Pediatric Physicians

The majority of Michigan counties were above the range for the ratio of pediatric physicians per 100,000 population, as demonstrated by green counties in **Map 4**. Twenty-five counties were below the range (red), 3 counties were within the range (blue), and 55 counties were above the range (green). It should be noted that there was extreme variability in the data; all 25 counties below the ideal range had fewer than one pediatrician per 100,000 population while Oakland and Washtenaw counties have 115 and 161 pediatricians per 100,000 population, respectively; at least ten times the ideal physician-to-population ratio. Only Allegan, Chippewa, and Delta counties fell within the ideal physician-to-population ratio.

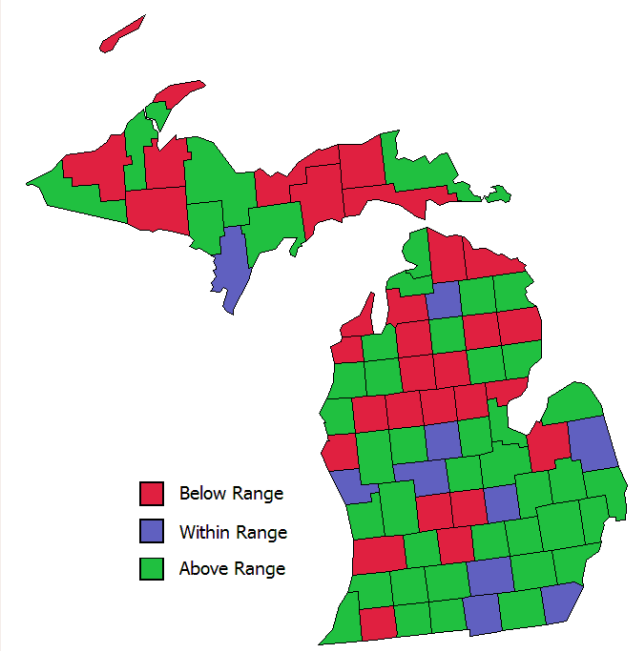
The location of children's hospitals and larger hospital systems in Oakland, Washtenaw, Wayne, and other counties in the lower half of the Lower Peninsula likely contributes to the high number of pediatricians relative to the population. Because of the limited population that seeks services from pediatricians, the recommended physician-to-population ratio is lower than other primary care specialties and also indicates that residents likely travel to major hospitals rather than seeking services from nearby providers. For example, the C.S. Mott Children's Hospital in Ann Arbor draws patients from all over the state.

Map 5
Comparison of Actual versus Suggested Physician-to-Population Ratios per 100,000 for General Surgery Physicians, 2011



Source: Health Resources and Services Administration. (2011). State Health Resources Comparison Tool. Retrieved from U.S. Department of Health and Human Services: www.arf.hrsa.gov/arfdashboard/HRCTstate.aspx

Map 6
Comparison of Actual versus Suggested Physician-to-Population Ratios per 100,000 for Obstetrics and Gynecology, 2011



Source: Health Resources and Services Administration. (2011). State Health Resources Comparison Tool. Retrieved from U.S. Department of Health and Human Services: www.arf.hrsa.gov/arfdashboard/HRCTstate.aspx

General Surgery Physicians

A small majority of Michigan counties were within the ideal range for the ratio of general surgery physicians per 100,000 population, as demonstrated by the blue counties in **Map 5**. Thirty-one counties were below the range (red), 33 counties were within the range (blue), and 19 counties were above the range (green). Again, a large number of counties (22) had fewer than one general surgeon per 100,000 population, while four counties had more than twice the top end of the recommended range. The location of counties with a high number of general surgery physicians above the range were spread across Michigan. More counties within the range fell in the lower half of the Lower Peninsula, while more counties below the range were located in the northern half of the Lower Peninsula or in the Upper Peninsula. A large block of contiguous counties in the northern half of the Lower Peninsula is experiencing a shortage of general surgery physicians, which puts strain on residents needing emergency services or who lack consistent transportation.

Obstetrics and Gynecology Physicians

The majority of Michigan counties were above the ideal range for the ratio of obstetrics and gynecology physicians per 100,000 population, as demonstrated by the green counties on **Map 6**. Thirty counties were below the range (red), 10 counties were within the range (blue), and 43 counties were above the range (green). Twenty-four counties had fewer than one obstetrics and gynecology physician per 100,000 population, while Emmet, Iosco, Washtenaw, and Oakland counties had at least four times the sufficient ratio. Though the majority of counties exceeded the ideal ratio, there were also 30 counties that were not meeting these ratios and could be experiencing shortages of this primary care specialty. This

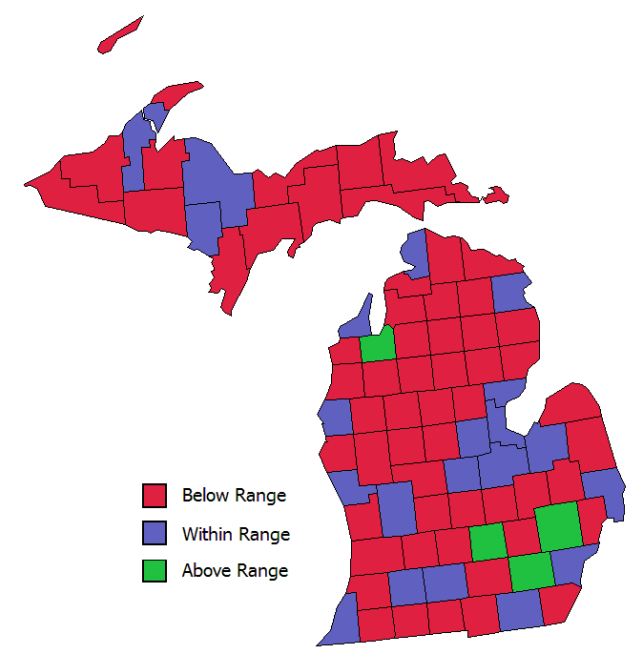
includes a block of counties in the northern half of the Lower Peninsula and one in the Upper Peninsula where women seeking services, including those for child delivery, may need to drive long distances to find a properly trained physician.

Psychiatry Physicians

Compared to the ideal range, psychiatrists-to-population ratios reveal shortages across most parts of Michigan. Fifty-eight counties were below the range (red), 21 counties were within the range (blue), and only four counties (Ingham, Oakland, Grand Traverse, and Washtenaw) were above the range (green), as demonstrated in **Map 7**. Thirty-seven counties (44.5 percent) had fewer than one psychiatrist per 100,000, demonstrating a severe shortage of this specialty in Michigan. A recent profile of Michigan's physician workforce revealed that nearly half of all active physicians practicing psychiatry are age 60 or older as of 2012, indicating that the shortage of psychiatrists will be even more severe in the future as psychiatrists begin to retire.[20]

The state operates five psychiatric hospitals that are located in Kalamazoo, Tuscola, Washtenaw, and Wayne Counties. With the exception of Washtenaw, whose ratio is above the recommended range, these counties all have physician-to-population ratios within the ideal range.

Map 7
Comparison of Actual versus Suggested Physician-to-Population Ratios per 100,000 for Psychiatry Physicians, 2011



Source: Health Resources and Services Administration. (2011). State Health Resources Comparison Tool. Retrieved from U.S. Department of Health and Human Services: www.arf.hrsa.gov/arfdashboard/HRCTstate.aspx

Summary of Findings

The findings from these analyses demonstrate that shortages vary geographically and by primary care specialty across Michigan. Overall, four counties fell below the suggested physician-to-population range in every category of primary care physician CRC examined: Cass, Keweenaw, Lake, and Oscoda. Keweenaw and Oscoda had fewer than one doctor relative to the population in every category CRC examined. Additionally, seven counties fell below suggested ranges in their supply of physicians in every specialty except family medicine: Alcona, Antrim, Gladwin, Kalkaska, Presque Isle, Roscommon, and Schoolcraft. The majority of these counties are located in the northern half of the Lower Peninsula. And finally, only 19 of Michigan's 83 counties fell within or above the ideal ranges for each of the six specialties CRC examined.

While shortages were more prevalent in the northern half of the Lower Peninsula, they touched every corner of the state. However, more populated counties did have fewer incidences of shortages. For example Wayne, Oakland, Kent, and Washtenaw counties had physician-to-population ratios that were always at least within the ideal ranges. Of the primary care physicians CRC examined, Oakland and Washtenaw counties always had ratios that were above the ideal range.

Factors Contributing to Primary Care Physician Shortages

A variety of factors contribute to primary care physician shortages in general and in specific areas across the state. At the same time that the demand for primary care services is increasing due to demographic changes and the implementation of the ACA, changes in the policy, professional, and cultural environments of the healthcare industry both in general, and for primary care specifically, are making the field less desirable to potential physicians. Furthermore, factors contributing to shortages in Southeast Michigan differ from factors contributing to shortages in Michigan's rural communities.

The primary care shortage is a complex problem. Even factors outside the direct scope of primary care significantly influence physician supply and demand. For example, advances in medical and non-medical technology are driving demand for more medical services. Yet, because of the heavy emphasis on human contact, technology has not increased productivity in health care at the same rate as it has in other industries. The discussion below explores the explanatory factors most likely contributing to both shortages and maldistribution of primary care physicians in Michigan.

Demographics

Population Growth

An increase in the nation's population is one important factor driving primary care shortages. One study found that population growth was the largest driver in increasing primary care demand.[21] The study calculated the projected need for primary care physicians in 2025 based on the number of visits per physician in 2010 and estimated that 32,852 additional primary care physicians will be needed to meet demand due to population growth alone by 2025, without accounting for any changes to efficiency in service delivery or changes to demand from factors such as an increase in high-deductible health plans. According to this study, population growth contributes to 64.4 percent of the projected primary care physician need.

Michigan's population fell in the first decade of this century, despite a nationwide one percent annual growth over the period. However, since 2012, the state's population has shown stability. As the economy continues to improve, encouraging population growth and in-migration, it is likely that Michigan's population will generate increased demand for primary care going forward.

Aging Population

Aging populations demand and require more medical services; people over the age of 65 are twice as likely to seek the services of a primary care practitioner as those in younger age groups.[22] Researchers estimate that by 2025, nearly 10,000 more primary care physicians will be needed nationally to meet physician demand due to an aging population (19.4 percent of the total need).[23] Even if Michigan's population growth is stable, the state is growing older. According to the United States Census Bureau, the median age of Michiganders has increased from 35.5 years old in 2000 to 39.5 years old in 2012. Census Bureau data shows that in 2012 those aged 60 and older made up 18.1 percent of Michigan's population and they expect this age group's share of the population to be 20.1 percent by 2020 and 24.0 percent by 2030.[24] Fifteen percent of Michigan's population is 65 and older, the 25th highest rate among states, whereas the national average is 14 percent.

Physician Retirement

At the same time that the aging population is demanding more primary care services, an increasing number of physicians are retiring due to age. A 2012 survey of active Michigan physicians revealed that 46 percent plan to practice medicine for only one to ten more years. Seventy-five percent of these physicians reported that the factor contributing to their retirement decision is age; 53 percent of active physicians were aged 55 or older and 23 percent were 65 or older. Other reasons cited in active physicians' decisions to retire or reduce patient hours (albeit on a much less frequent basis) included: increasing administrative/regulatory burden, inadequate reimbursement for services, lifestyle changes, and a general lack of job satisfaction.[25]

Gender of Active Physicians

Female physicians are more likely to enter primary care; a 2009 survey revealed that one third of Michigan's primary care physicians are female compared to 25 percent of specialty care physicians.[26] A more recent survey revealed that 31.3 percent of Michigan's active physicians were female, the 23rd highest rate in the country.[27]

On a nationwide basis, a 2014 survey revealed that females made up 54 percent of family medicine residents, 44 percent of internal medicine residents, 73 percent of pediatric residents, and 82 percent of obstetrics and gynecology residents.[28] Research has shown that males are 50 percent less likely to choose primary care in general. However, men were only found to be 13 percent less likely to enter family medicine specifically, demonstrating that when they do enter primary care they are more likely to practice family medicine than some of the other primary care fields.[29] The number of females graduating from medical school has increased significantly over the last 50 years, however, applications from and subsequent graduations of women have been on a slight decline since peaking roughly ten years ago. Women made up 47.5 percent of graduates in 2013-14, but only 46.3 percent of medical school applicants were from women that same year.[30]

Physicians born in a rural location are 2.4 times more likely to practice in a rural area. Physicians born in rural areas were twice as likely to practice family medicine and their odds of choosing primary care were 50 percent higher than non-rural born students.

On the other hand, research shows that male physicians are substantially more likely to work in rural and underserved areas and just as likely as females to work in Federally Qualified Health Centers (which serve underserved areas or populations) post-training.[31]

Birth Location

Physicians born in a rural location are 2.4 times more likely to practice in a rural area. Physicians born in rural areas were twice as likely to practice family medicine and their odds of choosing primary care were 50 percent higher than non-rural born students.[32] Unfortunately, over the last two decades, rural student matriculation has declined.[33] A 2012 survey of active physicians in Michigan reveals that only 25 percent of physicians are from rural areas or small towns.[34]

Policy Environment

Insurance Expansion

A main goal of the ACA was to expand insurance coverage to all Americans. Beginning in 2014, most individuals became required to carry at least a minimum level of health insurance or face a tax penalty. Because primary care physicians are the most common entry point into the health system, there will be a higher need for this specialty. Researchers estimate that 8,279 new primary care physicians will be needed nationally by 2025 to meet the need originating from this expanded coverage.[35] This represents 16.2 percent of the projected additional need.

Limited Focus on High Need Areas

At least some of the reported shortages of primary care physicians in Michigan can be attributed to maldistribution, as was demonstrated in **Maps 2** through **7** above, though this varies by physician specialty. Partially to blame for the maldistribution is that the medical education and training systems do not directly encourage residents to practice in high need areas. Additionally, while individuals from wealthier urban and suburban areas are more likely to go into medicine, they are also less likely to subsequently practice in underserved rural areas following their residency. In contrast, individuals from rural areas are more likely to return to those areas post-residency.[36] A 2014 survey found that 93 percent of residents would prefer to practice in communities with populations of 50,000 or more whereas only 3 percent prefer to practice in communities of 25,000 or less.[37]

Graduate Medical Education

Graduate medical education (GME) funding through the Medicare and Medicaid programs is acting as

a two-pronged cap on the number and location of training physicians. GME funds residency or training positions for graduated medical students, and training must be completed before students can begin independent, licensed practice as a physician. The federal government is the largest single funder for GME, but in 2009 more than 40 states also paid $3.8 billion (about 4 percent of total) through Medicaid programs to support GME.[38] Private insurers also help indirectly support GME by typically paying higher prices for services at teaching hospitals. Since 1997, the federal government has imposed a limit on the number of Medicare supported residency slots, which has resulted in limited growth in the number of these positions.

The number of residency positions directly effects the number of new physicians entering the field, regardless of specialty. In a June 2012 article in Bridge Magazine, the president of the Grand Rapids Medical Education and Resource Center predicted that by 2015, Michigan "will have more [medical school] graduates than we have residency positions."[39]

The current GME system also may be encouraging the maldistribution of physicians. Residents tend to practice near where they train and Michigan's teaching hospitals are predominately located in urban areas, making it less likely that residents will practice in rural areas post-training.[40]

Administrative Requirements

Increased administrative requirements limit the capacity of current providers to engage in direct patient care. Twenty percent of a physician's time is typically spent on non-clinical paperwork.[41] Physicians and providers face a large number of state, federal, and public and private insurance requirements that must be met each day, sometimes in direct correlation with the number of patients seen and sometimes not. This leads to a large amount of paperwork, much of which may add little value to health service delivery.

Additionally, these added requirements seem to be causing dissatisfaction among active physicians, where 39 percent of Michigan physicians who plan to retire in the next one to ten years cite increasing administrative/regulatory burdens as a contributing factor.[42] A different survey reveals that primary care physicians are more likely to cite increasing administrative/regulatory burdens as a factor in retiring or reducing patient care hours (43 percent of primary care physicians versus 37 percent of specialty care physicians).[43]

Training, Professional, and Cultural Environment

Fewer Graduates

The number of people entering health professions has varied overtime. During the 1990s, interest in health careers declined significantly.[c] Though enrollment in many health professional education programs is currently rising, across the board enrollment is still considered lower than it was prior to the early 1990s.[44] While the number of medical school graduates grew less than one percent from 2000 to 2005, the number of graduates in 2014 was 13 percent greater than in 2005.[45] From 2002 to 2012, enrollment grew 27.8 percent nationally and 51.2 percent in Michigan (12th highest change). Relative to the population, however, medical school enrollment has remained flat.[46]

Over this time period, new medical schools have opened in Michigan at Oakland University, Central Michigan University, and Western Michigan University, adding to a number of existing, long-established medical schools in the state. Even with these additional schools and the associated impending medical school graduates in Michigan, the Center for Health Workforce Studies projects a shortage of 4,400 doctors by 2020.[47] Over the next decade, Michigan will be able to increase the number of medical school graduates by 1,250 per year; however, because more than a quarter of physicians currently practicing are over the age of 60, there will be a great need to replace retirees, which will limit the net gains realized through adding new graduates.[48]

Of greater concern to primary care is the dropping rates of medical students graduating with an intention of entering primary care practice. Over the

[c] One theory as to why the number of professionals entering health fields declined over this period is the lure of the "more lucrative technology and business careers." (Millbank Memorial Fund. *Making Sense of the System: How states can use health workforce policies to increase access and improve quality of care.* September 2003.)

course of the last decade, the proportion of primary care providers graduating from the medical education system fell from almost a third to less than a fourth of all graduates.[49,50] Additionally, only about 50 percent of family medicine residency positions are filled by United States medical graduates and most students in internal medicine residencies go on to specialize rather than practice primary care.[51]

On a more positive note, family medicine had a 96 percent residency fill rate in 2014 and the number of medical school graduates entering a family medicine residency has grown every year from 2009 to 2014. However, this numeric growth may not be keeping up with the number of students who choose to specialize.[52]

Compensation

Compensation is an important consideration weighed by those entering most professional fields and medicine is no exception. Lower compensation may impact both the number of physicians entering the primary care and those staying in the field. Because of the exceptionally high student debt carried by most medical school graduates, entering primary care, which pays significantly less than other specialties, may be seen as a poor financial investment.[53] The average student debt for medical school graduates in 2014 was roughly $176,000 and students are expected to start repaying loans during their residency, which lasts four years and pays considerably less than what they expect to make once they finish. However, research has not definitively demonstrated a positive correlation between low student debt and primary care specialty choice.[54]

While research does not support that lower student debt would incentivize students to enter primary care, there is evidence that students are not entering primary care because of lower compensation.

While research does not support that lower student debt would incentivize students to enter primary care, there is evidence that students are not entering primary care because of lower compensation. The income gap between primary care and other specialty medical fields is a significant and substantial factor in students' choices of practice specialty and location. In fact, the pay gap between primary care and other specialties was found to reduce the likelihood of students entering primary care or family medicine by almost half and reduce the odds of working in a Federally Qualified Health Center or Rural Health Center by 30 percent.[55] Like subspecialists, primary care physicians must complete close to 12 years of combined education and training; however, over a 35 to 40 year career, primary care physicians will earn $3.5 million less than the "midpoint of income for subspecialist physicians."[56]

Lower compensation is influenced by physician salary as well as public and private payment systems. In a fee-for-service payment model, physicians are paid by the number and complexity of services they provide. Therefore, subspecialists are typically paid more for their services. Additionally, primary care physicians spend more time performing non-billable tasks (such as coordinating patient care) and may provide more services billed to Medicaid and Medicare, which have lower reimbursement rates than private insurers. A higher portion of Medicaid and Medicare patients, therefore, typically equates to lower provider compensation. Evidence of the impact of Michigan's low Medicaid reimbursement rates are the number of contiguous counties in the upper part of the lower peninsula that are without obstetrical services (Medicaid and non-Medicaid), despite a 27.1 percent increase in rates between 2003 and 2008. The West Branch Regional Medical Center in Ogemaw County closed its obstetric unit in 2010 citing underfunding of the Medicaid program as forcing "many of the hospitals in Northern Michigan out of the [obstetric care] business and unless something is done, the trend will continue."[57] In a 2012 survey of active Michigan physicians, 28 percent reported inadequate reimbursement for services as a contributing factor in a decision to retire or reduce patient care hours.[58]

Cultural Value of Primary Care

While not directly quantifiable, negative perceptions regarding primary care within the medical profession and particularly among medical students, as compared to specialty medical disciplines, may be pushing students and practitioners away from primary care. While some students may believe in the

mission of primary care and are willing to accept a lower salary to practice a specialty in which they are passionate, others may not be able to overcome a stigma that primary care is not as rigorous, complex, prestigious, or intellectually challenging as specialty medicine.[59] Recent surveys confirm that the primary care culture in medical school (whether or not there are high levels of "badmouthing" of primary care) is a contributing factor in the likelihood that students will go on to practice in that field.[60]

Government's Role in Physician Supply and Demand

While the government has an important funding and general supporting role in educating and training health professionals, our pluralistic healthcare system involves a vast number of groups invested in and influencing the supply of health workers. This includes:

- Government officials at the federal, state, and local levels;
- Health facilities and affiliated associations;
- Universities, colleges, and educational institutions;
- Health professional associations and worker unions;
- Advocacy groups including patients and consumers; and
- The general public.[61]

The supply of and demand for healthcare workers is not directed by policies alone, but is influenced by an array of groups that are interested in the needs of the economy, society, and their own affiliations. However, state-level policy can and does directly influence the healthcare workforce. State government's responsibilities and roles include:

- Licensing and regulating health professionals;
- Regulating health facilities;
- Regulating educational programs;
- Funding state colleges and universities;
- Establishing Medicaid reimbursement policies and regulating private insurance;
- Employment and labor department training programs;
- Employing state health professionals; and
- Data collection and analysis.[62]

In order to ensure a sufficient primary care physician workforce, policies should consider a systematic analysis of factors influencing the supply of primary care providers and evaluate medical students' reasons for choosing primary care or primary practice. Policy's role may also involve rethinking the organization and funding of the health service systems to help increase physician supply and ease the demand placed on the primary care system.

State Policy Options to Address Primary Care Shortages and Maldistribution

While federal policy, including reforms associated with the ACA, address primary care physician shortages, state policymakers have access to many levers and tools to create policies that complement and bolster the effects of the ACA, as well as address areas that federal policy does not or cannot. The following state policy options predominately focus on increasing the supply of physicians but also address ways to alleviate the demand for primary care physicians.

Primary Care Physician Supply-Side Policies

Physician Compensation

Research suggests the most significant impediment to students choosing primary care specialties is the income gap between primary care and subspecialty practitioners.[63] One way the state could make an effort to incentivize physicians to enter general practice is by increasing the Medicaid reimbursement rate, which would increase revenues for providers that serve Medicaid patients. Prior to implementation of the ACA, Michigan had the second lowest primary care reimbursement rate of 74 percent of the national average. Through the ACA, the federal government

provided federal dollars to increase the Medicaid reimbursement to primary care physicians to 100 percent of the Medicare reimbursement rate. This federally-funded rate increase expired at the end of 2014, though some states have opted to maintain the higher reimbursement rate by contributing additional state matching funds. According to a Kaiser Family Foundation survey, Michigan planned to fund half of the value of the federal rate enhancement in Fiscal Year 2015.[64]

Another strategy to better balance compensation among physicians regardless of specialty is to move away from a fee-for-service payment system. Global payment systems, capitation payments, and episode-of-care payments are a few examples of alternative payment systems that reimburse providers based on methods other than the number and complexity of services provided (See **BOX**). As a result, physicians are not rewarded in the same way and while specialists may receive less revenue from these changes, primary care physicians may receive more. Medical homes and accountable care organizations are service delivery models that may have similar outcomes.

Loan Forgiveness

Expanding loan forgiveness or repayment programs and other financial incentives for students who commit to work in primary care in underserved areas of the state for a certain period of time may help meet some of Michigan's shortage needs. While these programs are often not effective in recruiting more students into the field, especially those who are financially disadvantaged, they are useful in moving students into rural or underserved areas through service obligations linked to the loan repayment conditions.[65] A study in rural Colorado revealed that loan forgiveness or repayment programs typically benefit providers who would have worked in a rural area regardless of the loan program. However, the loan program appeared to influence the specific rural community in which the physician practiced and showed potential to help retain rural providers.[66] Loan forgiveness programs, therefore, may be better used to augment other policies that incentivize primary care physicians to practice in high need areas.

Michigan currently administers and partially funds the Michigan State Loan Repayment Program. This program is part of a federal, state, and local partnership designed to help employers recruit and retain primary care providers. Providers must meet the

Definitions of Payment Systems

Global payment systems. A global payment system is one where insurers provide a fixed prepayment to a group of health providers, or to a healthcare system, that covers all or most of a group of patients' care during a specified time period. These payments are typically made on a monthly basis and differ from the common fee-for-service model where providers bill insurers for treatment when it is received. Global payments to providers are designed to cover the costs of physician and hospital services, diagnostic tests, hospice care, prescription drugs, and other services. This system is designed to incentivize providers to provide high quality care and encourage preventative care, coordination of treatment among providers (which increases accountability for health outcomes), and chronic care management, while it disincentivizes unnecessary testing and treatment.

Capitation payments. Capitation-based payments are per person payments made by health insurers to providers in, or contracted with, managed care organizations (such as health maintenance organizations) to oversee patients' entire care. The payments are typically made monthly and the contract amount is usually fixed for one year. Capitation rates are actuarially sound, and based on age, eligibility group, and other demographic factors to best estimate actual costs of providing coverage to patients. The capitation payments are made regardless of whether a patient seeks care and is intended to cover, perhaps with some patient cost-sharing, a patient's entire health care for the time period of the contract.

Episode-of-care payments. Episode of care payments reimburse providers for the care a patient receives in the treatment of a specific illness, condition, or medical event (such as a heart attack or hip replacement). The reimbursement for the illness or event is a bundled payment. Providers and payers typically negotiate a total payment for the episode of care that is less than the cost that the fee-for-service payment would have been.

terms of the program's service obligations by providing full-time primary healthcare services at an eligible HPSA practice site for two years, with an opportunity to reapply for another two years. For primary care physicians, the two-year repayment agreement must be for $50,000, unless the provider's debt is a lower amount. Expanding this program using more state funding may help alleviate shortages in Michigan's rural areas.

Working with Universities

State policymakers can collaborate with universities, particularly public universities, to help increase the number of primary care physicians and access to primary care services in the state. Universities' role in generating a primary care physician workforce begins with admissions, and continues with its curriculum and training methods. Research has shown that student characteristics, specialty intention upon entering medical school, and training experiences in medical school are significant predictors of specialty choice.[67]

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Research has found that medical students increasingly come from affluent families, which may influence a chosen career specialty based on income expectations and limited exposure to rural or underserved populations.[68] Therefore, medical students from affluent families are less likely to practice primary care. However, it has also been found that middle class students and/or debt-averse students are not applying to medical school due to the prospect of incurred debt. If middle class students are the ones more likely to enter primary care, then state policymakers can work with and provide financial incentives to help support efforts to better target these students. To target the remaining student population, universities can increase programs that expose medical students to rural and underserved populations and career opportunities.

Admissions criteria for medical schools can go a step further to target students who may eventually work in primary care and in rural areas. Students born in rural areas, those with interest in serving underserved or minority populations, and those that have rural or inner-city training experiences have an increased likelihood of choosing a primary care specialty. While each of these factors individually increase the likelihood of a medical student entering primary care, universities can try to amplify these factors in a way that further increases the primary care workforce. For example, the university can accept more students born in rural or inner-city areas, who demonstrate an intention of serving in underserved areas; they can also provide and encourage training experiences in underserved areas.[69]

Curriculum is also an important component in bolstering the number of students electing to practice primary care and for increasing the number of physicians practicing in underserved areas. Research shows that students with experience or exposure to community settings via community-based clinics or hospitals are more likely to pursue primary care.[70]

Role of Public and Rural Universities. Compared to those who graduate from private universities, a larger percentage of public medical school graduates go into primary care.[71] Michigan has the third highest number of students per 100,000 enrolled in both types of public medical schools (medical or osteopathic) in the country.[72] Students attending rural medical schools, or rural satellite campuses, are also more likely to specialize in primary care.[73]

Considering this data, efforts could be made in Michigan, in collaboration with the appropriate medical school boards, to make a commitment to ensure that all new medical schools in the state are public medical schools and that these schools offer community settings for clinical education. Likewise, existing medical schools could either begin to offer current community settings for clinical education or strengthen current opportunities.

Financial Support. Because fewer rural and low income students are applying to medical schools, academic institutions, with support from state policymakers, can address the primary care physician shortage by

prioritizing financial aid for professionals committed to primary care settings with bonuses to those choosing to practice in rural and underserved areas. This could be in addition to loan forgiveness programs which were discussed previously.

Graduate Medical Education Funding

While the number of GME residency positions is predominantly determined by federal Medicare funding, state funding of GME through Medicaid may be a cost-effective way to train and retain physicians in Michigan. Medicaid dollars contributed to GME are eligible for federal Medicaid matching funds. For every dollar Michigan spends on Medicaid in Fiscal Year 2016, the federal government matches with nearly two dollars. Michigan's funding for GME has been declining in recent years, with the Governor proposing the complete elimination of general fund support within his 2016 Fiscal Year budget recommendation.

To support the training of new medical students, the state can resolve to increase its level of funding for GME. The limited number of residency spots in Michigan is challenging the state's ability to train a sufficient number of primary care physicians. The number of residency positions is important because more than 60 percent of physicians end up working within 100 miles of the location site of their residency.[74] During residency, doctors build connections and a network that they utilize when searching for jobs. It is also important that this funding is consistent and predictable as hospitals commit to training residents for three or more years and should be able to rely on funding from the state throughout the entire agreement with the resident.

GME funding does have its limitations. A Michigan Department of Community Health (DCH) workgroup published a report in 2012 advocating for increases to GME funding but acknowledged that the GME program has little influence in the specialties residents choose. They recommended that the state increase funding to GME while utilizing a loan forgiveness program to incentivize residents to enter primary care and to practice in rural and underserved parts of the state.[75]

Funding to Primary Care Residency Positions. Michigan currently has a pool of GME funds dedicated specifically to primary care residency programs, however, this pool accounts for only 13.1 percent of Michigan's total GME allocation.[76] While the remaining funds do go to both primary and subspecialty physicians, it is unclear whether the current funds specifically dedicated to primary care positions are sufficient to allow students intending to pursue primary care to find a residency spot or incentivize other students to focus on primary care rather than a specialty. The DCH workgroup's report acknowledged that the current structure of the GME program does not effectively incentivize students to enter primary care or work in rural and underserved areas.[77]

More state Medicaid-GME funding could be dedicated specifically to primary care positions, with conditions that currently existing primary care training spots

International Medical Graduates

Declining interest by United States medical school graduates in entering primary care fields has created an increasing reliance on International Medical Graduates (IMGs). Federal H or J work visa programs allow physicians trained in other countries to work in the United States for a set period, which may include residency or fellowship. In 2012, around 30 percent of active physicians in Michigan were IMGs compared to a national median of 18.2 percent (4th highest rate in the country) and 39.4 percent of IMGs in Michigan were in residency programs, compared to a national median rate of 22.4 percent.*

IMGs with a J-1 visa (given to those pursuing a residency or fellowship) may apply for a visa waiver if they practice full-time in a designated HPSA. These federal policies help fill an important gap in Michigan's more vulnerable regions. Changes to this program at the federal level would mean fewer active physicians and increase the need for state policy to increase supply.

* Association of American Medical Colleges. (2013, November). 2013 State Physician Workforce Data Book. AAMC Center for Workforce Studies, 1-61.

remain dedicated to primary care. In opening up the number of training slots for primary care, the state may be encouraging students to practice in this field. For example, a rich source of additional primary care physicians exists in the current internal medicine pipeline because a decreased percentage are choosing to subspecialize.[78] Therefore, for no additional cost, allocating additional funds towards teaching programs for internal medicine could increase the number of internal medicine residents and, likewise, increase the number of primary care physicians.

Accountability Measures. As a basis for distributing Medicaid-funded GME, policymakers can establish a set of accountability measures that focus on the need for primary care physicians and the equitable distribution of providers to meet those needs in all areas of the state. Medicaid-GME could also be directed to encourage relationships between residency programs and safety net organizations to provide training and care delivery in underserved areas.[79] Both actions would directly address populations with unmet needs for primary care physicians while also exposing students to practice in underserved areas.

Map 8
Percentage of Active Physicians Retained from Medical School, 2012

Source: Association of American Medical Colleges. (2013, November). 2013 State Physician Workforce Data Book. AAMC Center for Workforce Studies, 1-61.

Retaining Medical Students and Residents

A strategy to increase the supply of primary care physicians, which may have particular promise in Michigan, is to develop policies and programs focused on increasing matriculation from in-state students into Michigan medical schools and those that seek to retain medical students and residents who complete programs in-state. The Association of American Medical Colleges found that during the 2012-2013 academic year, 32.7 students per 100,000 population were enrolled in medical and osteopathic schools across the U.S. with the highest student-to-population ratios concentrated in the Northeast and Midwest. Michigan was ranked 12th among states for student enrollment in medical and osteopathic schools with 4,197 total students or 42.5 per 100,000 population.[80]

Michigan is also ranked 12th in terms of growth in medical student enrollment, having increased from 2,775 students in 2002-2003 to 4,197 students in 2012-2013, a 51.2 percent increase. Michigan, however, ranks lower in terms of matriculating students of Michigan legal residence into a Michigan medical school. Data show that 71.1 percent of first-year medical students from Michigan during the 2012-2013 academic year matriculated into a Michigan medical school, which places Michigan 20th among all states.[81] West Virginia had the highest in-state matriculation rate at 93.3 percent, meaning that nearly all of the new medical students from West Virginia matriculated to a medical school in West Virginia.

Overall, 38.7 percent of medical and osteopathic students in the United States practice in the same state where they attend medical school.[82] The South retains the greatest number of their medical students once physicians graduate and enter their residency (see **Map 8**); Michigan ranks 17th among states with a 43.9 percent retention rate.

Likewise, following a residency or fellowship pro-

gram, physicians may choose to practice in that same state. In the United States approximately 47.4 percent of active physicians who completed their residency in-state become active physicians in-state. In Michigan, only 44.8 percent of active physicians who completed their residency in Michigan stay in Michigan to practice, a rate below the national average.[83]

Following medical school, physicians are often placed in a residency program in the same state as their medical school. For those students who completed both medical school and their residency in the same state, roughly two-thirds of them remained in-state to practice. This was most common in the South and West. With a rate equal to the national average, Michigan ranked 26th in the number of active physicians who graduated from medical or osteopathic school in-state and completed residency in-state and were active in-state. Hawaii has the highest retention at 85.8 percent and the District of Columbia has the lowest retention rate at 20.1 percent.[84]

Additionally, Michigan has one of the highest numbers of residents and fellows in primary care nationally; therefore, focused retention efforts by the state could have a good return on investment. Nationally, there were 13.6 residents and fellows in accredited primary care programs per 100,000 population in the United States in 2011; in Michigan there were 17.3 per 100,000 population. Michigan ranked 8th among the states with a total of 1,713 total residents in primary care programs in 2011. New York ranked the highest with 32.7 primary care residents per 100,000 population (see **Map 9**).

Recruitment and Retention Programs in Michigan. Michigan administers several federal programs to recruit and retain primary care providers in key geographic areas, but the main program used by the state is the Michigan State Loan Repayment Program (discussed above). Federal programs designed for recruitment and retention administered by Michigan's Department of Community Health include the National Health Services Corps and the J-1 Visa Waiver Program.

Local communities across the state are also implementing a variety of programs and infrastructure improvements to help grow their communities and make them more desirable places to live. These "placemaking" efforts are important in that medical residents identified geographic location, personal time, and lifestyle as their most important considerations in determining where to practice medicine.[85] Efforts by individual communities include enhancing downtown development and making access and enjoyment improvements to natural amenities such as waterfronts or nature trails. The state could work with targeted communities where primary care physicians are needed to coordinate the state and local programs and make sure they are working in concert with each other.

Map 9
Residents and Fellows in Primary Care per 100,000 Population, 2011

Source: Association of American Medical Colleges. (2013, November). 2013 State Physician Workforce Data Book. AAMC Center for Workforce Studies, 1-61.

Primary Care Physician Demand-Side Policies

Evidence-based Scope of Practice Requirements

Expanding the scope of work allowed by alternative primary care providers, or non-physician clinicians, such as nurse practitioners, physician assistants, clinical nurse specialists, and nurse midwives would help to alleviate demand for primary care physicians. Scope of practice refers to the extent to which healthcare providers can perform services and do so independently within the confines of state law, which sets most of these practice parameters.

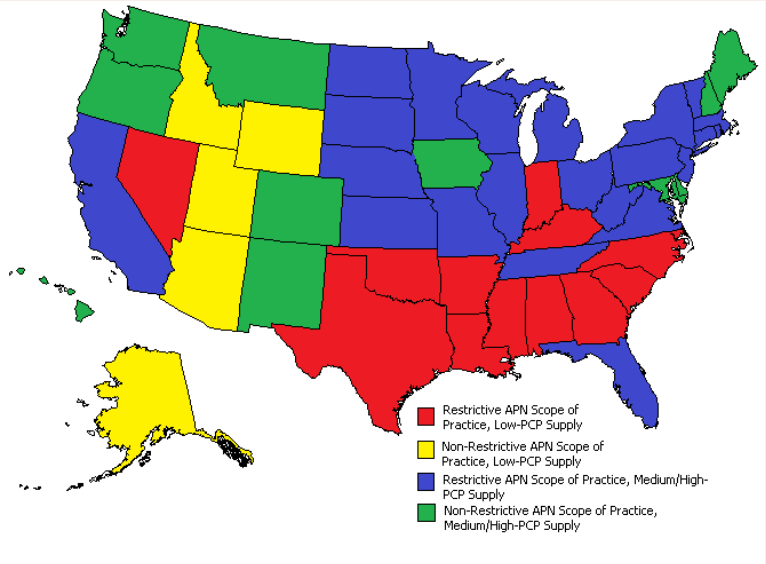
Non-physician clinicians are more likely than physicians to practice in a primary care field; approximately 59 percent of nurse practitioners and 35 percent of physician assistants in the state practice in primary care settings.[86] Expanding the scope of practice allowed for non-physician clinicians can help alleviate the primary care shortage by increasing the number of providers licensed to perform primary care services and expediting patient visits through coordination of physician and non-physician clinicians. In terms of meeting healthcare demand, the Association of American Medical Colleges assumes that for each additional two nurse practitioners and physician assistants, physician demand is reduced by one.[87]

Some health policy stakeholders, including physician groups, are concerned about patient safety when patients are treated by non-physician clinicians without physician oversight. Physicians receive much more training than most other non-physician clinicians, which may aid in accurate and safe diagnosis and treatment, particularly of complex medical conditions.

However, many non-physician clinicians work alongside physicians and can be used to effectively and safely expand the efficiency of health services. Several studies have shown that expanding the tasks that nurse practitioners and physician assistants are able to perform results in at least equally beneficial patient outcomes, while also allowing for a greater number of patients to receive care.[88] One study estimates that a strategy that combines diverting as little as 20 percent of patient demand to non-physician clinicians, partially pooling patients by two or three physicians, and using electronic health records could eliminate the healthcare professional shortage.[89] Other research emphasizes the importance of expanding scope of practice rather than policies that simply increase the supply of non-clinician physicians.[90]

States policies determine the scope of work that is allowed to be performed by nurse practitioners and physician assistants. States may give nurse practitioners authority to practice independently of physicians or any physician supervision requirements; dictate the range of services that can be provided by a nurse practitioner; set educational requirements; and determine whether they can prescribe medication. Physician assistants must practice under the supervision of a physician (the physician doesn't necessarily have to be physically present). They have

Map 10
State Variation in the Projected Need for Primary Care Physicians (PCPs) and Scope of Practice Laws for Advanced Practice Nurses (APNs)



Source: Carrier, E. R., Yee, T., & Stark, L. (2011). Matching Supply to Demand: Addressing the U.S. primary care workforce shortage. Policy Analysis: National Institute for Health Care Reform, 7.

prescribing privileges in all 50 states and are limited only by the scope of practice of the supervising physician and the duties assigned to them.

Map 10 highlights the varying degrees of restrictiveness in scopes of practice found across the states alongside each state's overall supply of primary care physicians. Michigan is one of 21 states that restricts the scope of practice of advanced practice nurses and is considered to have a medium to high supply of primary care physicians.

Map 11 is related specifically to scope of practice laws across the country for nurse practitioners and the degree to which physician oversight is required for nurse practitioners in each state. Michigan is one of seven states that requires physician oversight of nurse practitioners for prescribing medication only. Eighteen states plus Washington, D.C., permit nurse practitioners to diagnose and treat patients and prescribe medications without physician oversight, while 25 states require oversight of nurse practitioners' diagnoses, treatment plans, and prescribing of medications.[91]

Map 11
State Variation in the Projected Need for Primary Care Physicians (PCPs) and Scope of Practice Laws for Nurse Practitioners

Source: Yee, T., Boukus, E. R., Cross, D., & Samuel, D. R. (2013, February). Primary Care Workforce Shortages: Nurse practitioner scope-of-practice laws and payment policies. Retrieved from National Institute for Health Care Reform, NIHCR Research Brief No. 13: www.nihcr.org/PCP-Workforce-NPs

Public Health Investments

Similar to how expanding scope of practice for non-physician clinicians alleviates the demand for physicians, public health and prevention investments can provide more points of care and improve population health, also reducing primary care physician demand. Public health investments steered toward proven, community-based programs, can be highly effective in improving health and preventing the prevalence of disease and injury. For example, for each 10 percent increase in public health and prevention spending, deaths from cardiovascular disease dropped 3.2 percent; this improvement costs local health agencies $312,274 annually, on average. Achieving a similar result through the use of healthcare treatment would have required an additional 27 primary care physicians in the average community. With a median salary of over $200,000 for primary care physicians, this strategy would cost 17 times that of the public health investment.[92]

Health expenditure data from the Census of Governments show that in 2012 the State of Michigan spent 2.1 percent of its total expenditures on health (this does not include spending for hospitals). This was the 36th highest among states where the average was 3 percent. Arizona spent the most, with 6.3 percent of its general expenditures on health and Minnesota the least, with 0.9 percent. Since Minnesota is generally one of the healthier states, the data demonstrate that public health spending is not the only component to having healthy residents. Public policy that prioritizes public health funding may be an important component in a more comprehensive plan to alleviate primary care physician shortages in the state.

Alternative Primary Care Delivery Strategies

Finding alternative ways to deliver primary care, such that it is delivered more efficiently, may also help reduce demand for primary care physicians. Team based care, medical homes, and telemedicine are three examples.

Team Based Care. Team based care is a strategy that utilizes various types of practitioners, such as physicians and nurses, to deliver comprehensive patient care. These teams may both improve patient health and provide primary care to a greater number of patients, thereby reducing shortages of primary care without adding new physicians.[93]

Medical and Health Homes. Medical homes are one team based care model that may successfully accomplish this goal. A medical home is considered a primary care site that offers after-hours appointments, supports patients in managing health conditions and preventing complications, coordinates all care among primary care providers, and seeks to continuously improve upon the quality of care the site provides. Similarly, a health home, a medical home concept from the ACA, strives to coordinate with the public health system while emphasizing the role of advanced practice nurses through teams of healthcare professionals. The team provides services strictly to eligible patients (e.g., Medicaid patients with chronic conditions) and seeks to coordinate care and aid in the transition from hospital to primary care. Health homes also integrate community and social services, family engagement, and information technology in order to optimize services.[94]

Increasing the use of medical and health homes may improve coordination among health providers and utilize a greater number of non-physician clinicians, reducing the demand for primary care physicians. Payment reform or other policies that encourage practitioners to engage in team based care may help ease physician supply constraints by reducing the need for more primary care physicians. For example, capitated payments, episode of care payments, and global payments may encourage providers to work together to provide preventative and ongoing care services since the cost of care now falls on the providers.

A move toward these healthcare models may also help to balance reimbursement rates among different specialties; medical homes are paid for comprehensive care rather than on a procedural basis, a basis that contributes to subspecialties being a more lucrative profession than primary care.

Telemedicine. Telemedicine is a care delivery strategy that allows for various types of practitioners to diagnose and treat patients using communication technology. Telemedicine has potential to increase patient access, a symptom of the primary care physician shortage, by making the distance between patient and doctor irrelevant. Some of Michigan's access and care issues related to the maldistribution of physicians may be alleviated through expanded use of telemedicine, especially in medical fields such as psychiatry where the need for a physical interaction between doctor and patient is not always necessary.

The Michigan Board of Medicine, through authority granted by the Michigan Public Health Code, applies the same standards to telemedicine than in-person care, making the environment to expand telemedicine favorable. However, given Michigan's shortages of certain types of physicians, more lenient standards for out-of-state physicians would improve physician access. Some states are issuing limited licenses to out-of-state physicians that allow them to practice telemedicine only.[95]

The state can further support efforts to increase the use of telemedicine by helping providers obtain the necessary technology and by ensuring that the technology is available to patients in areas with severe primary care physician shortages.

Additional Policy Levers

Data Collection

The state can do more to keep track of the medical workforce that is practicing in Michigan to ensure that policymakers have the data needed to monitor healthcare professional shortages. Using the licensing process to collect and track characteristics of the workforce can help policymakers understand the workforce challenges and the supply needs. These data can be used to design training programs that best meet the needs of the state (and thus maximize the state's investment) both in quantity of students trained and the subspecialties they choose.

Data can also be used to identify the needs in Michigan's rural regions, which tend to be more prone to physician shortages, and the types of professionals that are choosing to work there. Based on these data, programs can be tailored to encourage physicians to work in underserved communities.

Utilizing Opportunities from the ACA

The ACA contains many provisions that may help alleviate the primary care physician shortage if states choose to take advantage of specific opportunities. The ACA leaves it to states to determine appropriate information technology and payment systems in the above-described medical homes and health homes.[96] Instead of identifying best practices or strategies, the ACA has given states the flexibility to experiment for themselves, which can have both advantages and disadvantages. The state could take advantage of this opportunity in electronic health technologies by prioritizing matching fund dollars for new information systems in underserved areas while also utilizing or testing the medical home model for primary care.

Other Strategies

To prevent a physician shortfall in the future, states are also attempting new and/or untried strategies. Legislation introduced in other states includes boosting the number of community health workers; relaxing or removing regulations to allow out-of-state doctors to practice; letting pharmacists administer vaccinations to adults and children; and expanding responsibilities allowed to midwives. Much of this legislation deals with increasing the scope of practice for varying levels of non-physician clinicians or allowing more flexibility on the rules that govern physician practices. With an eye toward maintaining the safety of patients, a review of regulations governing Michigan's healthcare workers, and how these can be altered to safely expand the scope of practice or provide greater incentives (or fewer disincentives)[d] for physicians to enter specific fields of practice, would be beneficial in helping Michigan to avoid any future physician shortages.

Conclusion

Data show that Michigan has shortages and maldistribution of at least some types of primary care physicians in most parts of the state. These shortages limit care access and compromise the overall health of the population, particularly in the state's rural areas and in some parts of Detroit, where shortages are most severe.

Federal policy addresses some of the supply and demand issues surrounding pervasive primary care physician and worker shortages, but states have a number of tools that can be used to effectively target the individual needs of the state. Michigan, being a predominately rural state in terms of geography, may benefit from policies that encourage primary care physicians to practice in these areas. Additionally, the state already has a high number of medical students intending to practice primary care, but they are either not staying in the state to practice after medical school, or they are choosing to practice in lower need areas.

Primary care is an integral part of an affordable and effective healthcare system. While warnings of shortages have come and gone over the last several decades, the confluence of policy, an aging population, and a declining value of primary care in medical schools are stressing a healthcare system that is already under pressure in many parts of Michigan. Policymakers, in collaboration with healthcare providers, universities, and other stakeholders can play an important role in coordinating a well-researched and integrated plan to help alleviate the state's primary care physician shortages. The future of our public's health relies on primary care services, provided from a variety of provider types, and needs the support of policymakers and citizens alike to reinstate a sense of value in primary care.

[d] No caps, or high caps on medical malpractice awards is one such disincentive. Some research has shown that the supply of physicians is growing at a faster rate in states that cap malpractice awards.

Appendix A
Michigan County Map

Appendix B
Number and Ratio of Primary Care Physicians (PCPs) by Michigan County, 2015

Rank	County	# of PCPs	# of PCPs per 100,000 Population	Population to PCP Ratio	Z-Score*
	State of Michigan	7,929	80	1,246:1	
1	Washtenaw	587	167	598:1	-3.32
2	Grand Traverse	134	150	665:1	-2.80
3	Oakland	1,836	150	665:1	-2.80
4	Emmet	44	134	748:1	-2.28
5	Luce	8	123	815:1	-1.93
6	Marquette	78	115	871:1	-1.69
7	Ingham	301	107	936:1	-1.44
8	Baraga	9	104	965:1	-1.34
9	Gogebic	16	99	1,005:1	-1.21
10	Wexford	32	98	1,019:1	-1.17
11	Charlevoix	25	96	1,041:1	-1.11
12	Kalamazoo	243	95	1,048:1	-1.09
13	Midland	78	93	1,075:1	-1.01
14	Genesee	389	93	1,076:1	-1.01
15	Mackinac	10	90	1,114:1	-0.91
16	Kent	551	90	1,115:1	-0.91
17	Berrien	138	88	1,131:1	-0.87
18	Alpena	25	86	1,169:1	-0.78
19	Saginaw	169	85	1,174:1	-0.77
20	Dickinson	22	84	1,192:1	-0.73
21	Crawford	11	79	1,274:1	-0.56
22	Houghton	28	77	1,304:1	-0.50
23	Muskegon	121	71	1,406:1	-0.33
24	Mason	20	70	1,434:1	-0.28
25	Otsego	16	67	1,501:1	-0.19
26	Gratiot	28	67	1,502:1	-0.19
27	Wayne	1,183	66	1,515:1	-0.17
28	Delta	24	65	1,537:1	-0.14
29	Montmorency	6	63	1,579:1	-0.08
30	Cheboygan	16	62	1,615:1	-0.04
31	Chippewa	24	62	1,622:1	-0.03
32	Calhoun	83	61	1,628:1	-0.03
33	Schoolcraft	5	60	1,669:1	0.02
34	Ottawa	160	59	1,682:1	0.04
35	Iosco	15	59	1,690:1	0.05
36	Macomb	499	59	1,698:1	0.05
37	Huron	19	59	1,709:1	0.06
38	Van Buren	43	57	1,755:1	0.11
39	Bay	58	54	1,844:1	0.20
40	Manistee	13	53	1,898:1	0.25
41	Alger	5	52	1,908:1	0.26
42	Iron	6	52	1,931:1	0.27
43	St. Clair	81	50	1,983:1	0.32
44	Isabella	35	50	2,018:1	0.34
45	Oceana	13	49	2,024:1	0.35
46	Mecosta	21	48	2,063:1	0.38

Rank	County	# of PCPs	# of PCPs per 100,000 Population	Population to PCP Ratio	Z-Score*
47	Jackson	77	48	2,082:1	0.39
48	Alcona	5	47	2,127:1	0.42
49	Ogemaw	10	47	2,144:1	0.43
50	Livingston	85	46	2,151:1	0.44
51	Shiawassee	31	45	2,233:1	0.49
52	Branch	19	43	2,309:1	0.54
53	Lapeer	36	41	2,449:1	0.62
54	Clinton	31	41	2,452:1	0.62
55	Montcalm	25	40	2,524:1	0.65
56	Gladwin	10	39	2,548:1	0.67
57	Eaton	42	39	2,572:1	0.68
58	St. Joseph	23	38	2,643:1	0.71
59	Menominee	9	38	2,646:1	0.71
60	Monroe	55	36	2,746:1	0.75
61	Barry	21	36	2,809:1	0.78
62	Sanilac	15	35	2,818:1	0.78
63	Newaygo	17	35	2,821:1	0.78
64	Kalkaska	6	35	2,850:1	0.80
65	Oscoda	3	35	2,864:1	0.80
66	Osceola	8	34	2,910:1	0.82
67	Benzie	6	34	2,911:1	0.82
68	Antrim	8	34	2,926:1	0.82
69	Roscommon	8	33	3,013:1	0.85
70	Clare	10	33	3,075:1	0.88
71	Hillsdale	15	32	3,082:1	0.88
72	Leelanau	7	32	3,087:1	0.88
73	Arenac	5	32	3,095:1	0.88
74	Lenawee	31	31	3,193:1	0.91
75	Ionia	20	31	3,197:1	0.91
76	Ontonagon	2	31	3,207:1	0.92
77	Allegan	31	28	3,614:1	1.03
78	Tuscola	15	27	3,644:1	1.03
79	Missaukee	4	27	3,758:1	1.06
80	Lake	2	17	5,749:1	1.35
81	Presque Isle	2	15	6,565:1	1.41
82	Cass	7	13	7,463:1	1.47
NR	Keweenaw			Not ranked	

* Z-score = ((Measure – Average of counties)/(Standard Deviation))

Source: County Health Rankins & Roadmaps, Robert Wood Johnson Foundation and the University of Wisconsin www.county-healthrankings.org/rankings/data

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