

**The Future Supply and
Demand for Physicians
in Michigan**

**Prepared for
Michigan State Medical Society**

Prepared by:

Public Policy Associates, Incorporated

119 Pere Marquette Drive

Lansing, MI 48912-1231

(517) 485-4477

Fax: 485-4488

June 2005

Table of Contents

Executive Summary	1
Profile of Michigan Physicians.....	1
Physician Forecasting Methods and Assumptions.....	2
Physician Supply and Demand Forecasts	4
Introduction.....	7
A Profile of Michigan Physicians	11
Michigan Physician Data	11
Michigan Physician Demographics	13
Geographic Distribution.....	17
Training and Residency	20
Physician Professional Activities.....	25
Specialty.....	28
Board Certification	29
Michigan Physicians' Profile Summary	30
Physician Forecasts.....	33
Forecasting Methods: Physician Supply.....	33
Forecasting Methods: Physician Demand.....	37
Forecasting Physicians: Supply and Demand Scenarios	38
Age and Gender	45
Geographical Distribution.....	47
Physician Specialization	50
Discussion.....	53
Bibliography	55
Sources Used in the Profile of Michigan Physicians	56
Definition of Terms.....	Appendix A
Geographic Distribution of Physicians in Michigan.....	Appendix B

Executive Summary

After more than a decade in which the health care community anticipated a physician surplus, there is widespread recognition that this pattern may be reversing and that there may be growth in the demand for physicians services that will not be fully met by practicing physicians or by the addition of new physicians as they finish their medical education. The aging baby boom generation, the anticipated retirement of older physicians, and the changing demographics and practice patterns of physicians across the nation are all contributing towards this expectation.

Despite growing recognition of a potential shortfall in the physician workforce in the United States over the next decade, the actual number of physicians that will be needed is not well defined. In addition, the anticipated need for family physicians versus specialists is not entirely clear.

An adequate supply of physicians of all types is central to the overall health and stability of Michigan's health care system, and there are a number of health care policy issues that may be addressed more fully and accurately with an accounting of the future supply and demand for physicians in the state. In response to this challenge, the Michigan State Medical Society asked Public Policy Associates, Incorporated to compile a detailed analysis of Michigan's current physician supply and to forecast the supply and demand for physicians in Michigan out to the year 2020.

Profile of Michigan Physicians

Michigan currently has almost 30,000 allopathic (82.0%) and osteopathic (18.0%) physicians actively engaged in the practice of medicine or in a closely related activity such as medical research, medical administration, or medical teaching. Approximately one-third of all Michigan physicians provide primary care services as family practitioners, internists, pediatricians, and OBGYNs. More than 50% provide more specialized medical services; five percent serve as medical faculty, medical researchers, or administrators; and ten percent did not report their principal activities. These physicians are located in every Michigan county and, typically, the

larger the county, the greater the number of active physicians. Wayne and Oakland Counties have the largest number of physicians. Washtenaw County has the largest concentration of physicians (1,025 physicians per 100,000 residents), followed by Oakland, Emmet (Petoskey), Grand Traverse (Traverse City), and Ingham Counties.

The average age of actively practicing physicians in Michigan is 45, and 29.0% of all currently active Michigan physicians are women. A large proportion of Michigan physicians (approximately one in three) are graduates of Michigan's four medical schools. The remainder were educated throughout the United States and other nations. Forty percent of Michigan physicians, including residents and fellows, are international medical graduates. Michigan physicians practice a broad spectrum of specialties and sub-specialties, and more than half of them received their postgraduate training in Michigan hospitals and health systems. More than 17,000 Michigan physicians indicated that they are board certified in practice areas as broad as internal medicine and as specialized as addiction psychiatry and vascular surgery.

Physician Forecasting Methods and Assumptions

Projected supply and demand for physicians in Michigan were prepared separately and then compared to determine what future trends and options might look like in the years 2010, 2015, and 2020. Both sets of forecasts incorporate broad economic and cultural assumptions: (1) there will be no significant change in the overall economic structure and reimbursement environment of American medicine during the next 15 years; (2) there will be no dramatic change in the availability, size, scope, and mission of medical education in the United States, including little or no change in the number of student enrollments in American colleges of medicine; and (3) postgraduate medical education will continue to recruit international medical graduates to fill approximately 20% of the residencies available in Michigan each year.

Physician supply was forecasted using a trend model that tracks cohorts of physicians over time, adding in new residents each year, subtracting out expected retirees and deaths each year, and testing various changes in work effort that are anticipated as younger physicians complete their residencies and move into private practice. Factors held constant in this model include the

number of medical school graduates and the number of residency and fellowship positions that are filled each year in Michigan hospitals and medical centers. It is assumed that there will be no significant increases in medical school graduates in this country and, thus, there will be no significant increase in medical graduates educated in the United States available for postgraduate medical training positions. This approach also assumes no new medical schools are established in the United States between now and 2020 and that any expansion of existing medical school enrollments will be kept to a minimum. Other assumptions of the supply model are:

- Approximately 3,900 residency and fellowship positions available in Michigan hospitals and medical centers are held constant for each year of the forecast.
- U.S. medical school graduates will fill approximately 80% of these positions; the rest will be filled by international medical graduates (IMGs).
- As 54% of all Michigan physicians completed their residencies and/or fellowships in Michigan and stayed to practice, this model assumes that 50% of all residents and fellows will remain in Michigan after completing their postgraduate training.
- The number of medical administrators, full-time medical school faculty, and medical researchers in Michigan will remain constant between now and 2020.

The future demand for physicians in Michigan is based on current physician-to-population ratios. Ratios of physicians to the overall population and, separately, to the population aged 65 and older are used in these calculations. Given that Michigan's total population growth over the next 15 years will be among the slowest in the nation, physician demand based on overall growth alone implies very little increase in demand. Alternatively, it is well documented that the older population generates a disproportionate demand for medical services, and the aging of the baby-boom generation implies that demand for service will likely reflect the expanding numbers of people in this age group over the next 10 to 15 years. Demand calculations based on the 65-and-older population is an attempt to reflect this.

The most important assumptions about physician-to-population ratios incorporated into this are:

- No ideal ratio of physicians per 100,000 residents has been identified, and the demand forecast presented here is not an attempt to identify an ideal ratio of physicians per 100,000 residents.

- The ratios used in this forecast reflect current demand for physician services and are held constant.
- The demand for physician services is greater among those aged 65 and older than for those below age 65 or for the population at large, regardless of age.

Physician Supply and Demand Forecasts

A total of five supply scenarios and four demand scenarios were devised to provide a range of possible outcomes that reflect both extreme and more modest likelihoods. Five supply scenarios are based on varying assumptions concerning reductions in work effort.

- 5% reduction in work effort among all female physicians after 2005
- 10% reduction in work effort among all female physicians after 2005 and 5% work effort reduction among younger male physicians phased in after 2005
- 5% reduction in work effort for all physicians after 2005
- 10% reduction in work effort for all physicians after 2005
- No reduction in work effort among physicians

The demand scenarios in this report are based on the simple premise that if all present economic and social conditions remain the same, the most important dynamic factors associated with the demand for physician services are demographic ones (e.g., the number of physicians per 100,000 Michigan residents and the number of physicians per 100,000 residents ages 65 and older). Four scenarios were employed to estimate the future demand for physicians in Michigan:

- Physicians per 100,000 total population, all ages
- Physicians per 100,000 residents aged 65 and older
- Weighted average of 34% demand based on total population and 66% demand based on population aged 65 and older
- Weighted average of 50% demand based on total population and 50% demand based on population aged 65 and older

Twenty different combinations of physician supply and demand were developed, with the most reasonable forecasts of the supply and demand for physicians in Michigan falling between the extremes. There is considerable likelihood that physicians will limit some of their work effort in the near future, but drastic reductions in overall physician activity are not likely. The likelihood of significant numbers of new medical graduates and residents in the near future is equally unlikely. There will also be some help in meeting physician demand from the growing number of non-physician clinicians in Michigan. The scenario that assumes all physicians below retirement age are likely to modestly reduce their work effort between now and 2020 is the most reasonable model of future physician supply. This scenario indicates that Michigan's physician supply will remain relatively flat or even slightly decline over the next 15 years, fluctuating between 30,000 and 30,500 active practitioners across the entire state. The most reasonable scenario for physician demand is one that accounts for but does not overly emphasize the impact of the aging baby boom generation. This assumption produces an estimate of physician demand in Michigan that is expected to grow at a moderate pace as the older population increases, reaching a level that may require as many as 36,200 physicians by 2020.

If correct, these two moderate forecasts foretell a potential difference of as many as 6,000 physicians between what Michigan's population is likely to require and the number of physicians available to meet those demands in Michigan by the year 2020.

Introduction

The number of physicians serving the population of the United States grew steadily during the last several decades of the twentieth century along with significant growth in the size of the population and significant changes in its characteristics. In the mid-1990s, influential health care policy analysts such as Jonathon Weiner and others saw that managed care organizations relied on fewer physicians than was the norm for the population at large. As managed care enrollment was growing at that time and as managed care was projected to continue growing indefinitely, the general consensus was that by 2000 there would be a surplus of as many as 165,000 physicians in the United States.¹ Much of this surplus was anticipated to be among specialists rather than among general practitioners or family physicians.² Since then, however, there have been some dramatic changes that have turned the supply and demand calculations for physicians around by 180 degrees. As Kevin Grumbach noted in a 2002 article, health maintenance organization (HMO) enrollment peaked in 1999 and then started to decline. The Medicare program, which had experienced some success in attracting a number of participants to enroll in Medicare managed care programs during the late 1990s, simultaneously began experiencing an exodus of participation by HMOs from the program. The predicted surplus of physicians never materialized.

¹ Weiner, Jonathon P. "Forecasting the Effects of Health Care Reform on U.S. Physician Workforce Requirement: Evidence from HMO Staffing Patterns." *Journal of the American Medical Association* 272, 3, 1994, 222–230; Gamliel, S. et al. "Managed Care on the March: Will the Physician Workforce Meet the Challenge?" *Health Affairs* Summer 1995, 131–142.

² Miller, R. S., M. R. Dunn, and M. E. Whitcomb. "Initial Employment Status of Resident Physicians Completing Training in 1995." *Journal of the American Medical Association* Vol. 277, No. 21, 1997, 1699–1704.

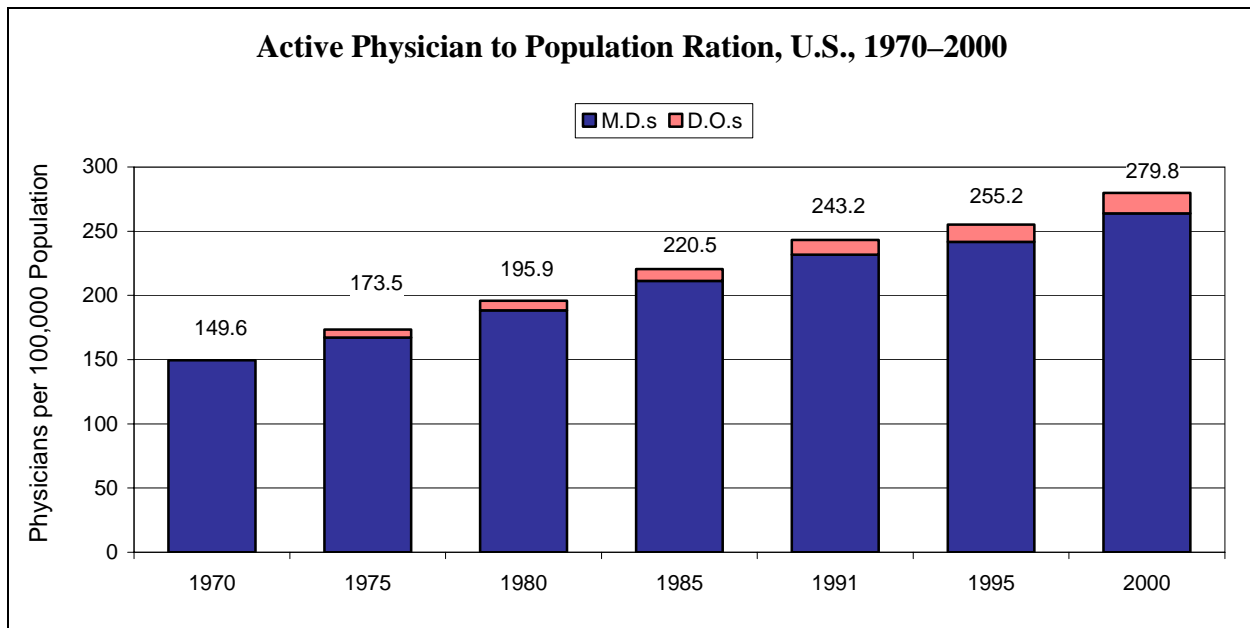


Figure 1

Sources: American Medical Association. *Physician Characteristics and Distribution in the U.S.*, 2002–2003 Edition. Chicago, 2002; American Osteopathic Association. *1992 Yearbook and Directory of Osteopathic Physicians*; American Association of Colleges of Osteopathic Medicine. *2000 Annual Statistical Report* (and prior annual reports). Rockville, MD, 2001; U.S. Bureau of the Census. *Statistical Abstract of the United States*, 2001 edition (and prior annual editions).

Today, the health system in the United States is heading back towards growing demand to increase the overall supply of physicians, and specialty programs are once again on the rise. “The mid-1990s decrease in specialty resident match rates and the increase in primary care match rates were short-lived phenomena. After the peak year of 1997, family practice residency programs experienced a steady decline in the number of first-year residents. Conversely, specialty programs rebounded.”³

In 2004, with the inevitable progress of the baby boom generation towards old age, the anticipated retirement of older physicians, and the changing demographics and practice patterns of physicians across the nation, the consensus is that the United States will actually face a shortage rather than a surplus of physicians within the next five to ten years. Since 2003, for example, both the Council on Graduate Medical Education (COGME) and the American Medical Association (AMA) adopted new positions that indicate we may be on the verge of an under-

³ Pugno, P. et al. “Entry of U.S. Medical School Graduates into Family Practice Residencies: 1999–2000 and Three-Year Summary.” *Family Medicine* Vol. 32, No. 8, 2000, 534–542. Quoted by Kevin Grumbach. “Fighting Hand to Hand Over Physician Workforce Policy.” *Health Affairs* Vol. 21, No. 5, September/October 2002, 13–27.

supply of physicians in the United States.⁴ The dramatic reversal from predictions of oversupply to predictions of physician shortfalls in the near future are illustrated in Figure 2.

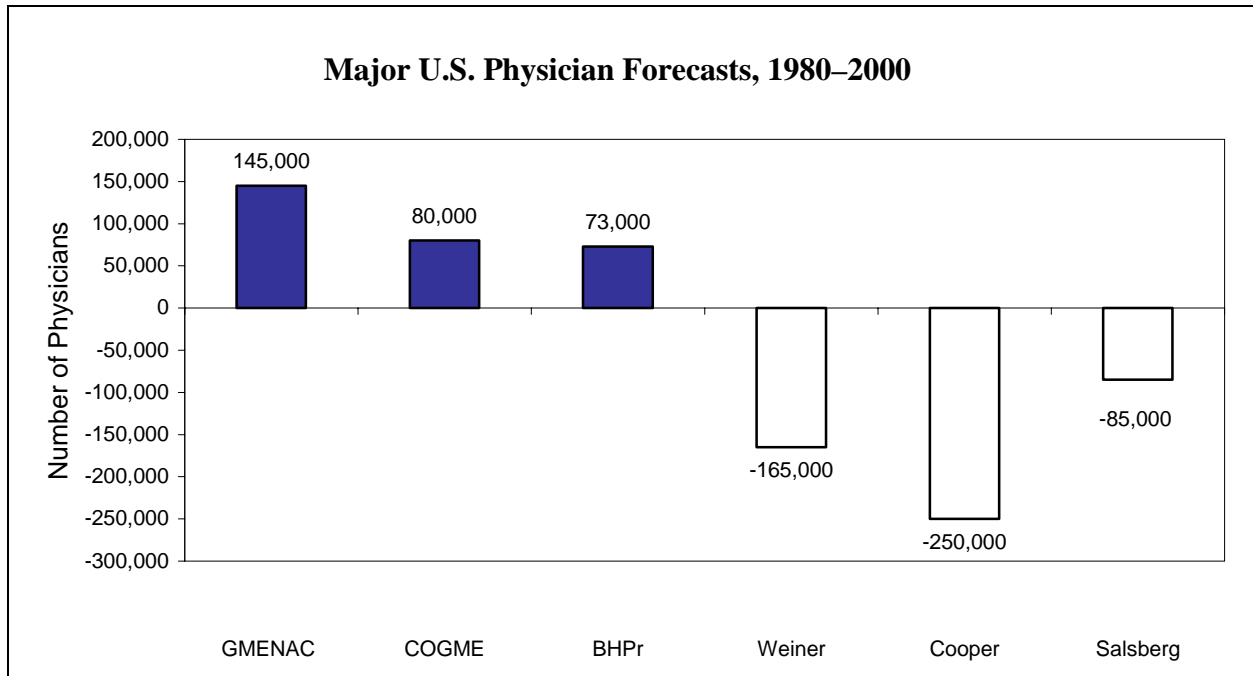


Figure 2

Despite this reversal of course in prognostications about the size of the physician workforce in the United States, the actual number of physicians that will be needed in the future is not well defined, the anticipated need for family physicians versus specialists is not entirely clear, and the need for physicians at the local level has not been carefully examined. In 2002, a forecast of the future supply and demand of physicians in Michigan was prepared for the Michigan Health Council, and this forecast indicated that as a result of demographic changes and increasing demand for services coupled with relatively flat growth among Michigan physicians, a shortage of physicians would become evident in Michigan as early as 2010.⁵ Unlike more complicated econometric models of physician trends, this forecast addressed supply and demand for physicians in Michigan using an iterative cohort-component model that examined such basic

⁴ American Medical Association. “AMA Revising Policy to Address Continued Demand for Physicians.” Dec. 9, 2003. Quoted by Cooper, Richard A., Thomas E. Getzen, Heather J. McKee, and Prakash Laud. “Economic and Demographic Trends Signal an Impending Physician Shortage.” *Health Affairs* Vol. 21, No. 1, 140–154; Council on Graduate Medical Education. *Reassessing Physician Policy Guidelines for the U.S. 2000–2020*, Washington, D.C.: U.S. Department of Health and Human Services, 2003.

⁵ Rosen, Laurence S. *The Future of Health Professions in the U.S., Michigan, and Selected States*. Report prepared for the Michigan Health Council, October 2002.

factors as the increase in physician supply through graduate medical education, the gender composition and work patterns of new physicians entering the workforce, patterns of physician retirement, and the demand for physicians as indicated by demographic changes, especially changes in the older population where empirical evidence shows that demand for services is likely to be the greatest.

The physician forecasts for Michigan that were prepared in 2002 only extended through the year 2010, and no attempt was made to forecast physicians by geographic location in Michigan or by specialty. This earlier forecast was, for all intents and purposes, a preliminary forecast of physician supply and demand in Michigan in the near future.

As an adequate supply of physicians is central to the overall health and stability of Michigan's health care system, and as there are a number of health care policy issues that may be addressed more fully and accurately with an accounting of the future supply and demand for physicians in Michigan, the Michigan State Medical Society recognized that an analysis of the supply and demand for physicians in Michigan was needed in order to understand current trends and to anticipate the needs of our health care system in the future.

In response, Public Policy Associates, Incorporated—a Michigan-based public policy research and development firm—was hired in 2004 to compile a detailed analysis of Michigan's current physician supply (both M.D.s and D.O.s), and to forecast the supply and demand for physicians in Michigan out to the year 2020. This report presents the findings of that research, including a current profile of Michigan physicians that is used as the basis for the forecasts that were conducted, a description of the methodology and assumptions employed to forecast anticipated supply and demand for Michigan physicians, several forecast scenarios that incorporate a number of relevant but varying scenarios regarding future supply and demand in Michigan, some details regarding the characteristics of the forecasted physicians, and a brief discussion of some of the implications of these forecasts.

A Profile of Michigan Physicians

There were a total of 32,709 licensed physicians in Michigan as of November, 2004. Of these, 29,906 were actively engaged in the practice of medicine or they worked in a closely related activity such as medical research or teaching. All Michigan physician data presented throughout this report reflect a base of 29,906 active physicians as of November 2004.

Michigan Physician Data

The data presented in this profile are drawn from the American Medical Association's (AMA's) Physician Masterfile compiled in late 2004. This file includes information on:

. . . all physicians, including AMA members and nonmembers, and graduates of foreign medical schools who reside in the United States and who have met the educational and credentialing requirements necessary for recognition as a physician. Data on international medical graduates (IMGs), comprising graduates of foreign medical schools residing in the United States, are included in the AMA Physician Masterfile . . .⁶

A record in the Masterfile is created whenever an individual enters an accredited medical school in the United States or when an IMG enters a residency program that is accredited by the Accreditation Council for Graduate Medical Education. Once entered, physician records are never removed from the AMA Masterfile.⁷

The file used for this report consists of 29,906 records of federal and nonfederal allopathic and osteopathic physicians who are currently active in the state of Michigan. These records were drawn from a larger file with a total of 32,709 Michigan physicians that includes inactive and deceased physicians. The 2,803 physicians who are not included in the "active" Michigan physician file are excluded due to self-reporting that they are retired, semi-retired, working part

⁶ Medical Marketing Service, Inc. *American Medical Association Physicians' Professional Data*, documentation accompanying *AMA Masterfile*, 2004.

⁷ The purpose of maintaining the records of deceased physicians in this file is to allow credentialing organizations to identify individuals who may try to assume the identity of a deceased physician. (www.ama-assn.org/ama/pub/category/print/2673.html)

time, temporarily not in practice, or not active for some other reason. The 29,906 physicians categorized as “active” are engaged in the practice of medicine or a closely related activity as indicated by the Major Professional Activity and Primary Present Employment field, including teaching in a medical school, medical administration, or medical research.

The total number of physicians in this file (32,709) compares reasonably well with the 32,115 licensed physicians in Michigan that were reported by the Michigan Health Council (MHC) in 2004, but is somewhat lower than the 33,608 physicians licensed to practice in the state of Michigan in 2004, according to the Michigan Department of Community Health (MDCH). The licensure data include 25,501 physicians with a Michigan home address, 7,716 licensed in Michigan but who reside in another state, and 391 licensed Michigan physicians with a non-United States home address.

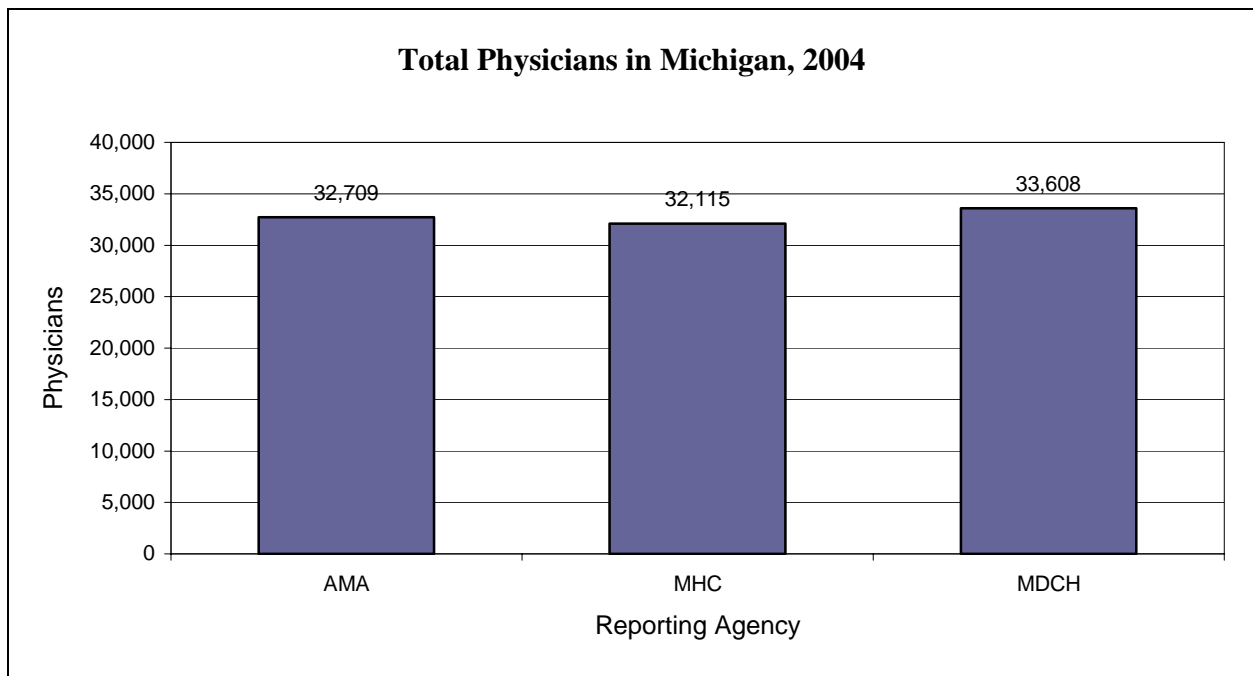


Figure 3

The consistency among these three independent figures supports the overall reasonableness of the data drawn from the AMA Physician Masterfile that are being used for this profile and as the baseline data to forecast the supply of physicians in Michigan over the next 15 years.

The specific file acquired from the AMA Physicians' Professional Data file (commonly known as the AMA Physician Masterfile) was provided by Medical Marketing Services, Inc., of Wood Dale, Illinois. This firm is an authorized distributor of these data on behalf of the AMA.

Among approximately 853,000 currently active physicians in the United States,⁸ Michigan's 29,906 active physicians represent 3.50% of all currently active United States physicians. This percentage is slightly greater than Michigan's share of the entire United States population at 3.44% as of July 1, 2004.⁹

Michigan Physician Demographics

Of the 29,906 active physicians in Michigan, 24,626 or 82% are allopathic physicians; the remaining 18% are osteopathic physicians.

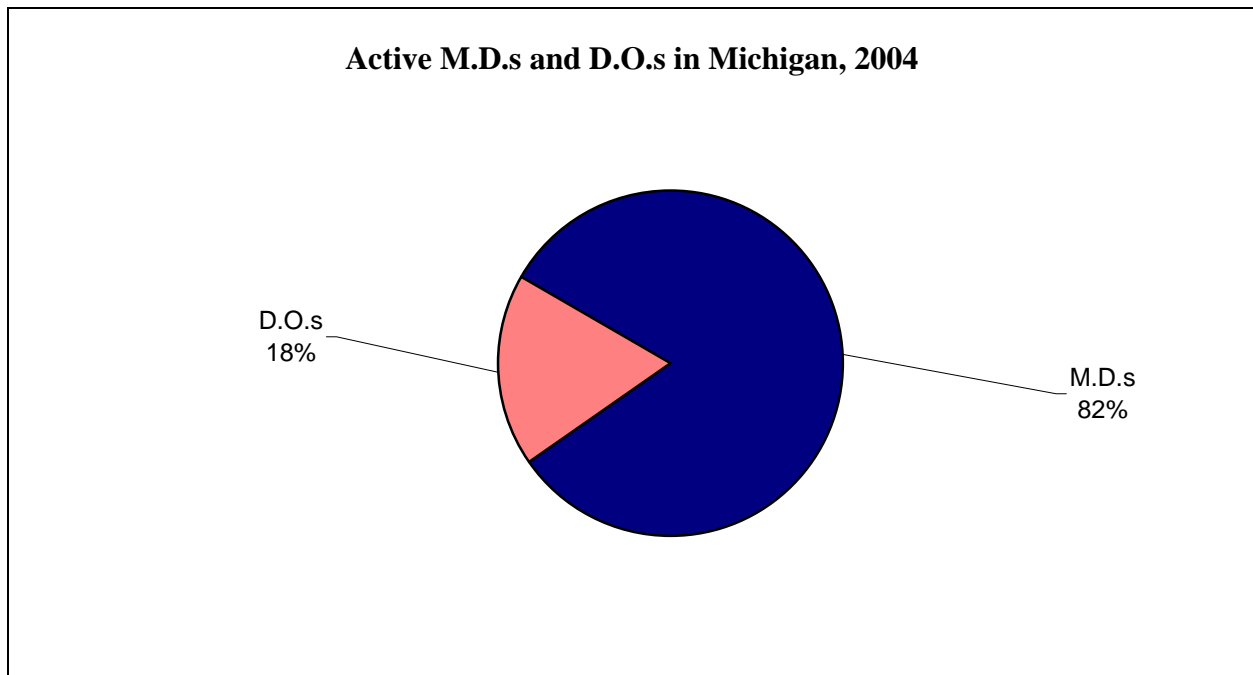


Figure 4

⁸ Nationwide data from the AMA *Masterfile* provided by Medical Marketing Services, Inc., 2004.

⁹ U.S. Census Bureau, 2004.

As the number of medical school seats in the United States has not grown significantly over the past few decades, and as the number of available residencies in Michigan hospitals have remained fairly constant, there is relatively little variation in the age distribution of physicians between 30 and 54 years of age. More than half of Michigan's 29,906 physicians are in the 30- to 49-year-old age category, and these numbers taper off starting at age 50, reflecting both smaller cohorts who were trained before 1975 and the attrition of physicians who have retired or who are deceased. Nonetheless, almost 40% of Michigan physicians are age 50 or older. This is comparable to 38% of all United States physicians who are 50 or older. These figures, however, raise the looming specter of future shortages of physicians in Michigan as older, experienced physicians may decide to retire early, reduce their direct-care responsibilities, or find employment in medicine that does not involve direct, hands-on patient care.

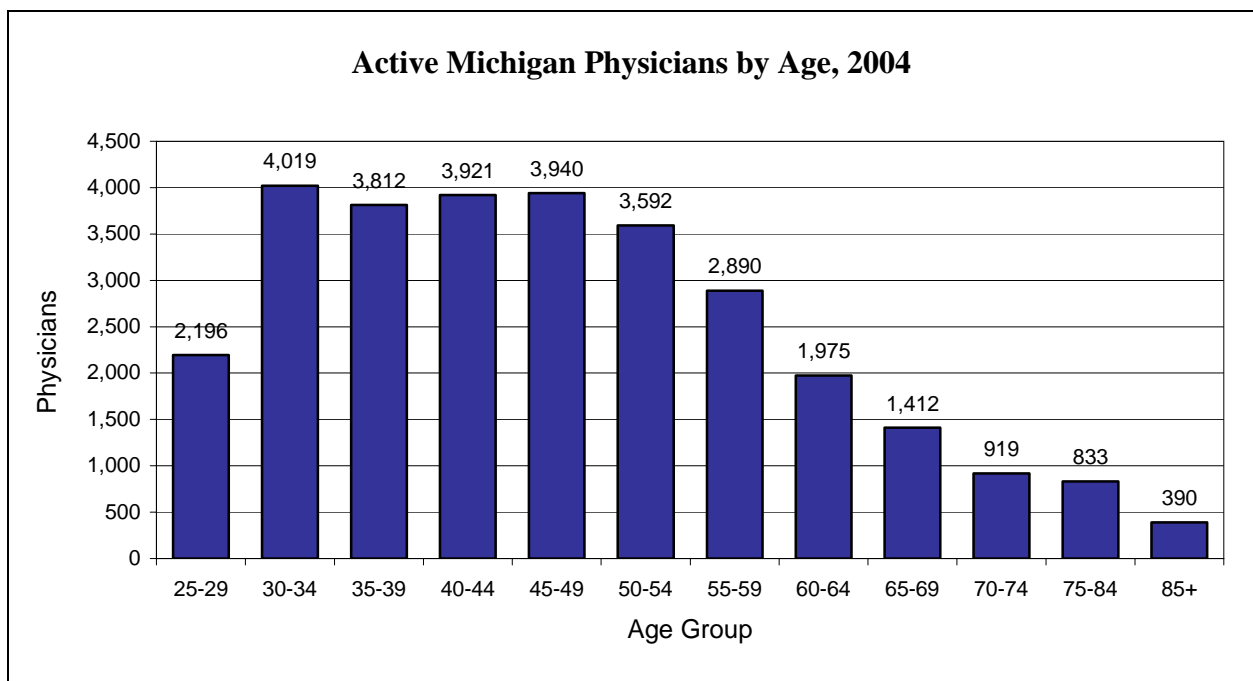


Figure 5

Currently, 29% of all physicians in Michigan are women, and the proportion of female physicians in Michigan will increase in years to come as women now represent approximately half of all United States medical school graduates. In 2003–2004 women represented a majority of United States medical school applicants, according to the Association of American Medical

Colleges.¹⁰ The current distribution of male and female physicians by age in Michigan is illustrated in Table 1, below.

Age	Female	Male	Total	Percentage
75-84	56	777	833	2.8
70-74	63	856	919	3.1
65-69	161	1,251	1,412	4.7
60-64	315	1,660	1,975	6.6
55-59	514	2,376	2,890	9.7
50-54	871	2,721	3,592	12.0
45-49	1,102	2,838	3,940	13.2
40-44	1,277	2,644	3,921	13.1
35-39	1,461	2,351	3,812	12.7
30-34	1,691	2,328	4,019	13.4
25-29	957	1,239	2,196	7.3
20-24	4	3	7	0.0
Unknown	130	260	390	1.3
Total	8,602	21,304	29,906	99.9

Source: American Medical Association, *Masterfile*, 2004.
 Percentages do not sum exactly 100% due to rounding.

¹⁰ Adams, Damon. "Generation gripe: Young doctors less dedicated, hardworking?" February 2, 2004, accessed June 2, 2005. <www.ama-assn.org/amednews/>.

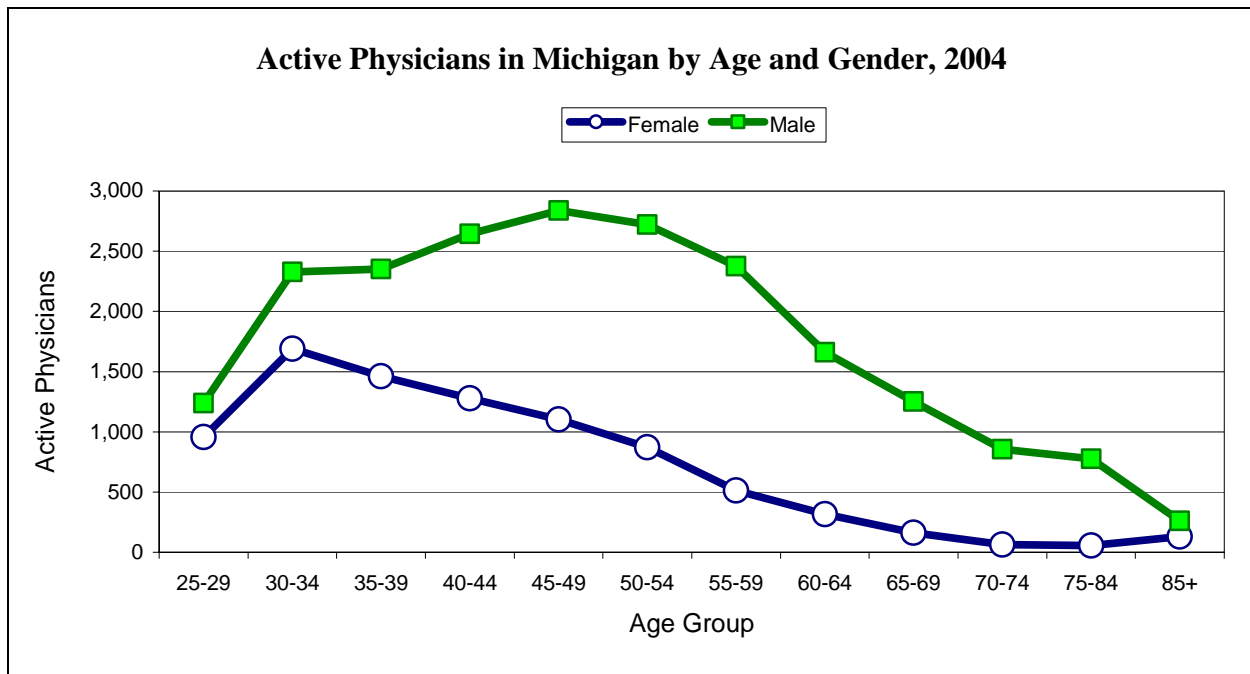


Figure 6

The current distribution of Michigan physicians by gender and by age is also illustrated in Figure 6. The age distribution of male physicians is somewhat reminiscent of a bell or normal curve that peaks in the middle with physicians in the 40-to-59-year-old age categories. The distribution for female physicians, however, peaks among the more recently minted physicians ages 30 to 34 and tails off dramatically for older physicians. Seen from a different perspective, these data indicate that females have been a growing part of medicine in Michigan for the past fifty years, and they will continue to be a growing segment of all physicians in years to come.

The growing proportion of females among medical students and physicians may eventually add to the growing pressures on the physician workforce in Michigan and across the nation. In addition to anecdotal reports of female physicians choosing areas of practice with lighter work demand or leaving practice to have and raise children, there is some statistical evidence that female physicians may work up to 18% fewer hours per week than their male counterparts.¹¹ If this finding is correct, a future in which up to 50% of all new physicians are women could result

¹¹ Merrit, James, Joseph Hawkins, and Phillip Miller. *Will the Last Physician in America Please Turn Off the Lights? A Look at America's Looming Doctor Shortage*. Irving, TX: MHA Group, 2004.

in much lower physician capacity than we have today despite producing the same number of United States medical school graduates.

Geographic Distribution

There is at least one active physician in every Michigan county. Even Michigan's smallest county—Keweenaw County, with a population of only 2,200 residents as of 2003—has a physician. All told, there are 29,794 physicians residing in Michigan's 83 counties. In addition, there are 77 physicians who are active in Michigan but who reside in adjacent locations in Ohio (56), Indiana (7), and Wisconsin (14). There are also 35 other Michigan physicians who report a non-United States residence, including several in Canada.

The geographic distribution of Michigan physicians closely matches the distribution of the population at large. Ninety percent of Michigan's physicians reside and/or practice in only 20 of the state's 83 counties.¹² The largest number of physicians are located in the largest counties. This relationship, however, is not a perfect one as Oakland County, with 1.2 million residents has 7,514 physicians while Wayne County's 2 million residents are served by only 5,291 physicians. The majority of the remaining 18 counties with the largest number of physicians are characterized by large medical centers and/or medical training facilities. The relationship between population size and number of physicians by county is illustrated below.

¹² All tabulations of Michigan physicians by county are drawn from the preferred address reported to the AMA. These locations may be the county of residence or the county in which the physician's practice or position is located. A secondary address is available, which, if different from the preferred address, is always the location of the physician's practice. However, the only data available within this variable is the preferred address by state.

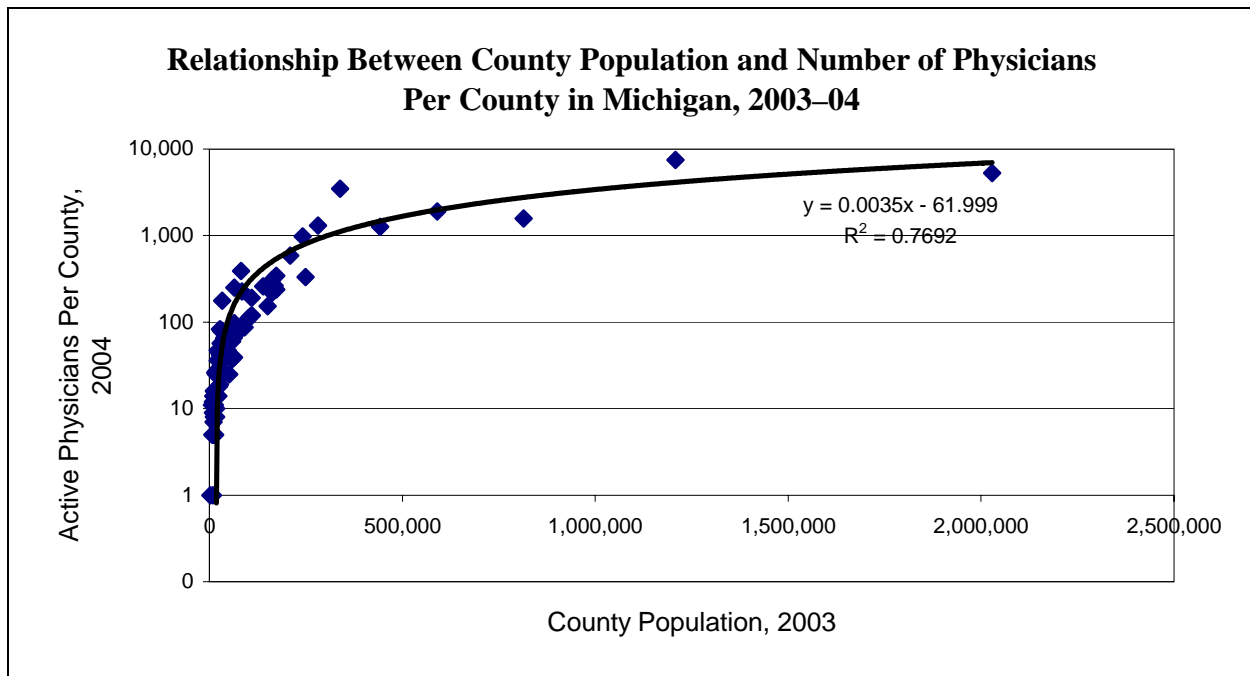


Figure 7

The relative concentration of physicians, however, does not follow this same pattern. Table 2, below, identifies those counties with the greatest and smallest concentrations of physicians in Michigan as of 2004. Washtenaw County—home to the University of Michigan Medical Center, University of Michigan Medical School, a Veterans Administration Hospital, and St. Joseph Mercy Hospital—leads the state with one physician for every 1,000 county residents. Oakland, Emmet, Grand Traverse, and Ingham Counties follow with approximately 450 to 600 physicians per 100,000 residents each. Oakland County is largely a middle- and upper-middle-income suburb of Detroit with an extensive network of critical-care centers and physician offices. Emmet (Petoskey) and Grand Traverse (Traverse City) Counties are popular resort areas that attract large seasonal populations as well as substantial numbers of retirees. Both counties also have well-regarded medical facilities, including a tertiary-care facility in Traverse City. Ingham County has a relatively large concentration of physicians as it is the location of the Michigan State University Colleges of Human Medicine and Osteopathic Medicine as well as the location of two relatively large medical centers.

Table 2: Michigan Counties With the Greatest and Smallest Number of Active Physicians Per 100,000 Population, 2004

Rank	County	Population Estimate, July 1, 2003	Physicians per 100,000 Residents, November 2004
1	Washtenaw County	338,562	1025.5
2	Oakland County	1,207,869	622.1
3	Emmet County	32,741	537.6
4	Grand Traverse County	82,011	474.3
5	Ingham County	282,030	462.4
6	Kalamazoo County	242,110	403.5
7	Marquette County	64,616	386.9
8	Kent County	590,417	322.1
9	Dickinson County	27,186	305.3
10	Genesee County	442,250	286.5
<hr/>			
74	Tuscola County	58,382	63.4
75	Ionia County	63,573	61.3
76	Osceola County	23,509	59.6
77	Arenac County	17,309	57.8
78	Cass County	51,385	48.7
79	Kalkaska County	17,177	46.6
80	Keweenaw County	2,227	44.9
81	Lake County	11,795	42.4
82	Missaukee County	15,189	32.9
83	Oscoda County	9,461	10.6
	Michigan	10,079,985	296.7

Source: American Medical Association, *Masterfile*, 2004

Counties with the smallest physician-to-population ratio are typically rural counties that lack any major medical facility. Ionia County is one exception, but that county is located between Lansing and Grand Rapids, both of which have large tertiary-care facilities and significant numbers of physicians and other health care facilities and professionals that are easily accessed by a short drive. Oscoda County in northeastern Lower Michigan and Keweenaw County in the Upper Peninsula (Michigan's smallest county) have only one physician each. Oscoda County has the equivalent of only one physician for every 10,000 individuals. Table 2 illustrates those counties with the greatest and smallest cadres of physicians per 100,000 residents. The number of active physicians for all Michigan counties as of November 2004 is provided in Appendix B.

Training and Residency

Although Michigan's four medical schools play an important role in educating and training a large number of physicians who practice here, a significant number of Michigan physicians were educated at medical schools across the United States and throughout the world. Some key points about the most common sources of medical education among Michigan physicians include the following:

- More than one-third of all currently active Michigan physicians are graduates of Michigan's four medical schools.
- Approximately 60% of currently active Michigan physicians are graduates of the 30 medical schools identified in Table 3.
- Five of the top ten medical schools for Michigan-based graduates are colleges of osteopathic medicine.
- In addition to Michigan's four medical schools, other major educators of physicians who currently practice in Michigan are Midwestern institutions such as Indiana University, University of Illinois, Ohio State University, Northwestern University, University of Iowa, and the University of Cincinnati.
- Foreign-born and foreign-trained physicians in Michigan come mainly from India and the Middle East.

**Table 3: Principal Medical Schools Attended by
Current Michigan Physicians, 2004**

Medical School	Number	Percentage of Total
Wayne State University School of Medicine	4,619	15.4
University of Michigan Medical School	2,970	9.9
Michigan State University College of Osteopathic Medicine	2,020	6.8
Michigan State University College of Human Medicine	1,383	4.6
University of Osteopathic Medicine & Health Sciences, College of Osteopathic Medicine	789	2.6
Kirksville College of Osteopathic Medicine	625	2.1
Midwestern University-Chicago College of Osteopathic Medicine	596	2.0
University of Health Sciences College of Osteopathic Medicine	483	1.6
University of Damascus (Syria)	346	1.2
Indiana University School of Medicine	341	1.1
University of Illinois College of Medicine	313	1.0
American University of the Caribbean	298	1.0
University of Santo Tomas (Philippines)	284	0.9
Ohio State University College of Medicine	250	0.8
Medical College of Ohio	232	0.8
Philadelphia College of Osteopathic Medicine	193	0.6
Government Medical College (India)	189	0.6
Northwestern University School of Medicine	186	0.6
Dow Medical College (Pakistan)	178	0.6
University of Cincinnati College of Medicine	166	0.6
University of Iowa College of Medicine	162	0.5
Loyola University of Chicago, Stritch School of Medicine	160	0.5
Grant Medical College (India)	141	0.5
Medical College of Wisconsin	140	0.5
Guntur Medical College (India)	132	0.4
Case Western Reserve University School of Medicine	131	0.4
St. George's University (Granada)	129	0.4
University of Minnesota Medical School—Minneapolis	127	0.4
University of Baghdad (Iraq)	126	0.4
Osmania Medical College (India)	123	0.4

Source: American Medical Association, *Masterfile*, 2004.

Approximately 59% of active Michigan physicians were born in the United States and about 1% are Canadian. Almost 5,000 Michigan physicians were born in nations other than the United

States or Canada, and the country of birth was not available for the remaining 7,500 active Michigan physicians in the AMA Masterfile. Cross-tabulations of physicians' medical schools with their nation of birth, however, indicate that almost all physicians for whom nation of birth is unavailable are graduates of medical schools that typically enroll few, if any, United States or Canadian medical students (see Table 4, below). As some foreign-born physicians are educated in United States medical schools, these figures are consistent with an estimate that approximately 40% of all Michigan physicians are IMGs.

A number of IMGs also come from the United States. As noted in Table 4, below, some off-shore medical schools cater mainly to prospective physicians from North America, including the American University of the Caribbean, which boasts approximately 83% United States and Canadian enrollment. Other medical schools outside the United States that attract relatively large numbers of United States and Canadian students include St. George's University in Granada (82% United States and Canadian enrollment), the University of Guadalajara, Mexico (83% United States and Canada), and Ross University in Dominica (51% United States and Canada).

Table 4: Country of Origin of Students Graduating From the Top Ten Off-Shore Educators of Michigan Physicians, 2004

Medical School Outside the U.S.	Country of Birth*	
	North American	Not North American
University of Damascus (Syria)	0.6%	99.4%
American University of the Caribbean	82.7%	17.3%
University of Santo Tomas (Philippines)	2.3%	97.7%
Dow Medical College (Pakistan)	0.0%	100.0%
Grant Medical College (India)	0.0%	100.0%
Medical College (India)	1.8%	98.2%
Guntur Medical College (India)	0.0%	100.0%
St. George's University (Granada)	82.4%	17.6%
University of Baghdad (Iraq)	3.3%	96.7%
Osmania Medical College (India)	2.3%	97.7%

Source: American Medical Association, *Masterfile*, 2004.

* Of those reporting both medical school and country of birth.

In fall 2004, 3,895 physicians in Michigan indicated that they were currently engaged in postgraduate medical training. Most (2,761 or 71%) were in the first through third years of their postgraduate training, and another 596 (15%) reported that they were in their fourth year of postgraduate training. The remainder were in their fifth year or beyond in their postgraduate education. Almost 90% of all physicians who are still enrolled in postgraduate medical education in Michigan are serving as residents or fellows in one of the twenty institutions listed in Table 5, below. Nineteen percent are training at the University of Michigan Hospital and its related clinical centers, 17% are training at Henry Ford Hospital, and 11% are training at the Detroit Medical Center. The rest are serving mainly in residencies or fellowships at Michigan's larger hospitals or at training programs in one of Michigan's larger cities.

**Table 5: Current Postgraduate Medical Education
Among Active Michigan Physicians, 2004**

Residency	Frequency	Percentage
University of Michigan Hospitals & Health Centers	756	19.4
Henry Ford Hospital	669	17.2
Wayne State University-Detroit Medical Center	427	11.0
William Beaumont Hospital	289	7.4
Grand Rapids Medical Education and Research Center	222	5.7
St. John Hospital & Medical Center	172	4.4
MSU-Kalamazoo Center	140	3.6
Providence Hospital Medical Centers	119	3.1
MSU-College of Human Medicine	94	2.4
Oakwood Hospital	90	2.3
St. Joseph Mercy Health System	77	2.0
Hurley Medical Center	69	1.8
Saginaw Co-Op Hospitals, Inc.	69	1.8
Edward W. Sparrow Hospital	66	1.7
McLaren Regional Medical Center	59	1.5
St. Joseph Mercy-Oakland	55	1.4
North Oakland Medical Center	36	0.9
Genesys Regional Medical Center	24	0.6
Bon Secours-Cottage Health System	23	0.6
All others	439	11.3
Total	3,895	100.1

Source: American Medical Association, *Masterfile*, 2004.
Percentages do not sum exactly 100% due to rounding.

Among Michigan’s 26,011 active physicians who have completed their postgraduate medical education, a majority—more than 14,000 (54.3%)—report that they received this portion of their medical education in Michigan. As illustrated in Table 6, below, the 20 most common sites for postgraduate medical education among active Michigan physicians are all found in the state of Michigan. Among the remaining physicians, 7,700 received their postgraduate medical education at various locations outside of Michigan. The rest of the currently active physicians who have already completed their postgraduate medical education did not specify where they received their postgraduate training. If every member of this latter group received his or her postgraduate medical education outside of Michigan, however, the majority of currently active Michigan physicians would still have completed their residencies and/or fellowships in this state.

Table 6: Postgraduate Medical Education Among Active Michigan Physicians Not Currently in Training, 2004

Residency	Number	Percentage
University of Michigan Hospitals & Health Centers	2,025	7.8
Henry Ford Hospital	1,513	5.8
Wayne State University-Detroit Medical Center	1,484	5.7
William Beaumont Hospital	1,041	4.0
Wayne State University Affiliated Hospitals	753	2.9
Sinai-Grace Hospital/Sinai Hospital	512	2.0
Providence Hospital Medical Centers	450	1.7
St. John Hospital & Medical Centers	448	1.7
Oakwood Hospital	367	1.4
Spectrum Health-Butterworth Campus	344	1.3
Hurley Medical Center	279	1.1
Detroit Receiving Hospital-University Health Center	254	1.0
St. Joseph Mercy-Oakland	247	0.9
St. Joseph Mercy Health System	241	0.9
Sinai-Grace Hospital/Grace Hospital	235	0.9
MSU-Kalamazoo Center	231	0.9
Saginaw Co-Op Hospitals, Inc.	223	0.9
Grand Rapids Medical Education and Research Center	207	0.8
Edward W. Sparrow Hospital	205	0.8
Spectrum Health-Blodgett Campus	191	0.7
All others	10,548	40.6
Not identified	4,213	16.2
Total	26,011	100.0

Source: American Medical Association, *Masterfile*, 2004.

Physician Professional Activities

Three key variables that are included in the AMA Masterfile are among the most important in profiling the activities of contemporary physicians: major professional activity, type of practice, and primary present employment.

Major professional activities consist of two distinct categories: (1) direct patient care and (2) non-patient-care activities. Patient care activities are those in which physicians directly see patients or indirectly provide services to patients such as laboratory or radiology services. Physicians in the patient-care category are either identified as having office-based practices or hospital-based practices. Hospital-based physicians include full-time members of hospital staffs, residents, and clinical fellows^{13,14} Non-patient-care activities include administration, medical education, medical research, and other medical activities.

- Administration refers to physicians who are salaried as an executive or administrative staff member of a hospital or other health facility, clinic, group practice, or organization. This category excludes direct patient care, record keeping, or administration of a physician's own practice.
- Medical education refers to physicians who have teaching appointments in medical schools, hospitals, or other educational organizations and who conduct didactic education or grand rounds.
- Medical research typically refers to physicians engaged in activities that are designed to develop new medical knowledge, whether funded or unfunded.
- Other activities include physicians who are employed by insurance companies, pharmaceutical companies, medical societies, and so on. Activities may include credentialing, audit boards, lecturing, etc.¹⁵

As of November 10, 2004, 25,500 of 29,906 physicians in Michigan (85.3%) were principally engaged in patient-care activities, and most of these physicians are in office-based practices. Approximately 1,400 physicians (4.7%) are primarily involved in non-patient-care activities such as teaching, research, and administration. Major professional activity information for the

¹³ Clinical fellows are not broken out separately; they are counted as residents.

¹⁴ Medical Marketing Services, Inc., 2004.

¹⁵ Ibid.

remaining 10.0% was not available. These figures are reasonably similar to professional activity data available for active physicians across the nation. A slightly larger proportion of physicians are engaged in patient care nationally than in Michigan, and this difference is largely found in the percentages of physicians in Michigan and around the nation, respectively, who are engaged in office-based practices. The percentages engaged in non-patient-care activities in Michigan are quite similar to the figures for physicians across the nation, although a slightly higher proportion of physicians across the nation (1.6%) than in Michigan (1.3%) are engaged in medical research.

Table 7: Major Professional Activity

Activity	Michigan		United States	
	Number	Percentage	Number	Percentage
Office-based practice	18,264	61.1	552,736	67.4
Resident	3,631	12.1	94,337	11.5
Hospital staff	2,334	7.8	47,587	5.8
Last-year resident	1,269	4.2	28,617	3.5
Locum tenens	24	0.1	741	0.1
Total patient-care activities	25,522	85.3	724,018	88.3
Administration	534	1.8	14,157	1.7
Research	388	1.3	13,104	1.6
Medical teaching	369	1.2	9,883	1.2
Other	107	0.4	3,748	0.5
Total non-patient-care activities	1,398	4.7	40,892	5.0
Total reported	26,920	90.0	764,910	93.3
Not classified	2,986	10.0	55,059	6.7
All physicians	29,906	100.0	819,969	100.0

Source: American Medical Association, *Masterfile*, 2004.

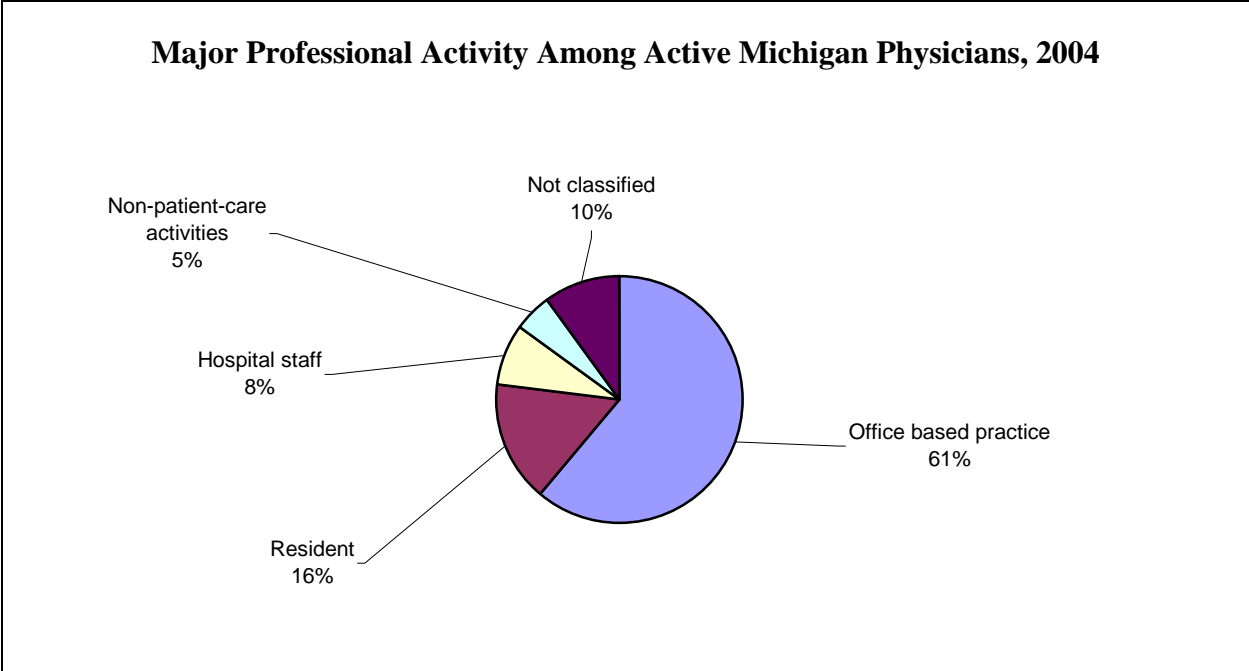


Figure 8

Among the 20,500 physicians in Michigan for whom a place of employment was recorded, the greatest percentage of physicians are employed in private practice (55.2% of reported employment), including those in medical groups (6,623), solo practices (3,614), or two-physician practices (1,053). Another 33.3% found employment in nongovernmental hospitals. These include positions as hospital staff as well as residents and fellows. The remaining 11.5% of reported physician employment covers medical school, city, county, or state government employment, and employment by the armed forces (mainly armed forces hospitals). Tabulations of employment within these categories are in Table 8, below.

Table 8: Primary Present Employment

Employment	Number	Percentage of Total	Percentage of Reported
Practice (group/solo/two physician)	11,290	37.8	55.2
Nongovernmental hospital	6,810	22.8	33.3
Medical school	829	2.8	4.1
City/county/state (hospital/other)	644	2.2	3.1
Other care (patient/non-patient)	419	1.4	2.0
Veteran Administration (federal government)	212	0.7	1.0
Armed forces	99	0.3	0.5
HMO	80	0.3	0.4
Locum tenens	26	0.1	0.1
Federal government hospital/other	24	0.1	0.1
U.S. Public Health Services (federal government)	21	0.1	0.1
Total reported	20,454	68.6	99.9

Source: American Medical Association, *Masterfile*, 2004.

Total percentages to not sum exactly 68.4% and 100.0%, respectively, due to rounding.

Specialty

Virtually all Michigan physicians have identified one or more areas of specialization in which they practice. As noted below, primary-care specialties such as family practice, internal medicine, obstetrics and gynecology (OBGYN), and pediatrics (excluding pediatric specialties such as pediatric cardiology or pediatric neurology) are most common. They represent almost 43% of physicians throughout the state.

**Table 9: Medical and Surgical Specialties
Reported by Michigan Physicians, 2004**

Specialty	Number	Percentage	Specialty	Number	Percentage
Family practice	4,548	15.2	Cardiology	783	2.6
Internal medicine	4,519	15.1	Pathology	675	2.3
Pediatrics	2,097	7.0	Oncology	540	1.8
Pediatric subspecialties	687	2.3	Neurology	410	1.4
OBGYN	1,563	5.2	Urology	348	1.2
Psychiatry	1,314	4.4	Gastroenterology	311	1.0
Radiology	1,272	4.3	Pulmonology	289	1.0
General surgery	1,257	4.2	Otolaryngology	288	1.0
Surgical subspecialties	788	2.6	All other specialties	4,450	14.9
Anesthesiology	1,148	3.8	Unspecified	1,691	5.7
Orthopedics	816	2.7	Transitional year	112	0.4
			Total	29,906	101.0

Source: American Medical Association, *Masterfile*, 2004.
Percentages do not sum exactly 100% due to rounding.

Board Certification

**Table 10: Principal Board Certification
Reported by Michigan Physicians, 2004**

Specialty Board	Number	Percentage	Specialty Board	Number	Percentage
Internal medicine	4,982	16.7	Anatomic Pathology & Clinical Pathology	405	1.4
Family practice	2,296	7.7	Physical Medicine & Rehabilitation	277	0.9
Pediatrics	1,630	5.5	Urology	256	0.9
OBGYN	1,036	3.5	Neurology	239	0.8
Surgery	971	3.2	Dermatology	222	0.7
Psychiatry	837	2.8	Otolaryngology	205	0.7
Anesthesiology	707	2.4	Radiology	162	0.5
Diagnostic radiology	696	2.3	Allergy & Immunology	141	0.5
Emergency medicine	647	2.2	Plastic Surgery	141	0.5
Ophthalmology	481	1.6	All others	625	2.1
Orthopedic surgery	456	1.5	None specified	12,494	41.8
			Total	29,906	100.0

Source: American Medical Association, *Masterfile*, 2004.

As illustrated in Table 10, above, there is reasonable consistency between board certification reported by Michigan physicians and the actual specialties and subspecialties practiced. Again,

the most common board certified specialties include internal medicine, family practice, pediatrics, OBGYN, and surgery. Of note, however, is the fact that slightly more than 40% of Michigan's 29,906 active physicians do not report any board certification, and there is no means of determining if these physicians have chosen not to report their board certification on the AMA *Masterfile* or if they are not board certified. On the other hand, 843 Michigan physicians have identified a second board certification and another 186 have identified a third board certification. In addition, almost 4,000 Michigan physicians identified at least one subspecialty certification ranging from addiction psychiatry to vascular surgery. Among the most common of these are cardiovascular disease, gastroenterology, geriatric medicine, medical oncology, and pulmonary disease. These categories are consistent with the specialties reported in Table 9.

Michigan Physicians' Profile Summary

Michigan has almost 30,000 allopathic and osteopathic physicians actively engaged in patient care, medical education, medical research, medical administration, and related activities. These physicians represent the broadest spectrum of specialization and subspecialization, and they are located in every one of Michigan's 83 counties. Approximately three in ten currently active Michigan physicians are female, and this proportion is expected to grow in the future.

Approximately four in ten Michigan physicians are IMGs. Assuming that there is no change in the annual number of medical school graduates in the United States over the next decade, and also assuming that the demand for residents will continue to exceed the availability of United States medical school graduates and that number of IMGs allowed into the United States does not decline, the proportion of IMGs among United States and Michigan physicians is likely to grow.

One-third of Michigan's physicians are graduates of the four medical schools located in Michigan. Moreover, more than half of Michigan's active physicians received their postgraduate medical education in Michigan and have since decided to practice in Michigan. This is consistent with the generally accepted notion that physicians tend to practice in or near the locations where they were residents or fellows. Approximately 85% of all Michigan physicians

are engaged in patient care, and one-third of all currently active Michigan physicians provide primary care services as family practitioners, internists, pediatricians, and OBGYNs.

Physician Forecasts

Calculations of the projected supply and demand for physicians in Michigan were prepared separately and then compared to determine what future trends and options might look like in the years 2010, 2015, and 2020. Both sets of forecasts incorporate broad economic and cultural assumptions that (1) there will be no significant change in the overall economic structure and reimbursement environment of American medicine during the next 15 years and that (2) there will be no dramatic change in the availability, size, scope, and mission of medical education in the United States, including little or no change in the number of student enrollments in American colleges of medicine and that postgraduate medical education will continue to provide approximately 20% more slots than can be filled by graduates of United States medical schools. Establishment of a single-payer system or other changes in the structure and operation of American medicine, and any substantial changes in medical school or residency training policies would dramatically affect both the future supply and demand for physicians and would likely invalidate the forecasts undertaken for this study.

Forecasting Methods: Physician Supply

Three principal methodological approaches have been used to estimate the future supply and demand for physicians: managed care staffing patterns, clinical need, and economic demand.¹⁶ Managed care staffing patterns in which primary care physicians provide frontline services to plan members and serve as gatekeepers to more specialized care along with research that attempted to quantify an appropriate or “good” level of patient care were the main sources of data for the forecasts of physician surpluses that came from the Council on Graduate Medical

¹⁶ Weiner, Jonathon P. “Prepaid Group Practice Staffing and U.S. Physician Supply: Lessons for Workforce Policy.” *Health Affairs*, Web exclusive, Vol. 43, No. 1, February 4, 2004, accessed May 30, 2005. <<http://content.healthaffairs.org/cgi/content/full/hlthaff.w4.43v1/DC1>>.

Education (COGME) in the 1990s.¹⁷ The third approach, based mainly on economic and demographic factors, has proven much more useful in recent years and is employed as the basis for the forecasts developed for this report.

This approach uses the broad macroeconomic and demographic trends that are readily evident over time. Labeled a “Trend Model” by Richard Cooper,¹⁸ trends in economic growth, population growth, work effort among physicians, and the use of non-physician clinicians (NPCs) such as nurse practitioners and physician assistants (PAs) are much more indicative of the changing supply of physicians than are complex analyses of patient volumes and time spent per patient. The actual model used here is a demographic or “cohort-component” model that tracks cohorts of physicians over time, adding in new residents each year, subtracting out expected retirees and deaths each year, and testing various changes in work effort that are anticipated as younger physicians complete their residencies and move into private practice.

Several assumptions about both the dynamic factors and constant factors related to physician supply are built into this model. Factors that are held constant in this model include the number of medical school graduates and the number of residency and fellowship positions that are filled each year in Michigan hospitals and medical centers. Although medical school graduates are not actually calculated within this model, it is assumed that there will be no significant increases in medical school graduates in this country and, thus, there will be no significant increase in medical graduates educated in the United States available for postgraduate medical training positions. This assumes no new medical schools are established in the United States between now and 2020 and that any expansion of existing medical school enrollments will be kept to a minimum between now and 2020.

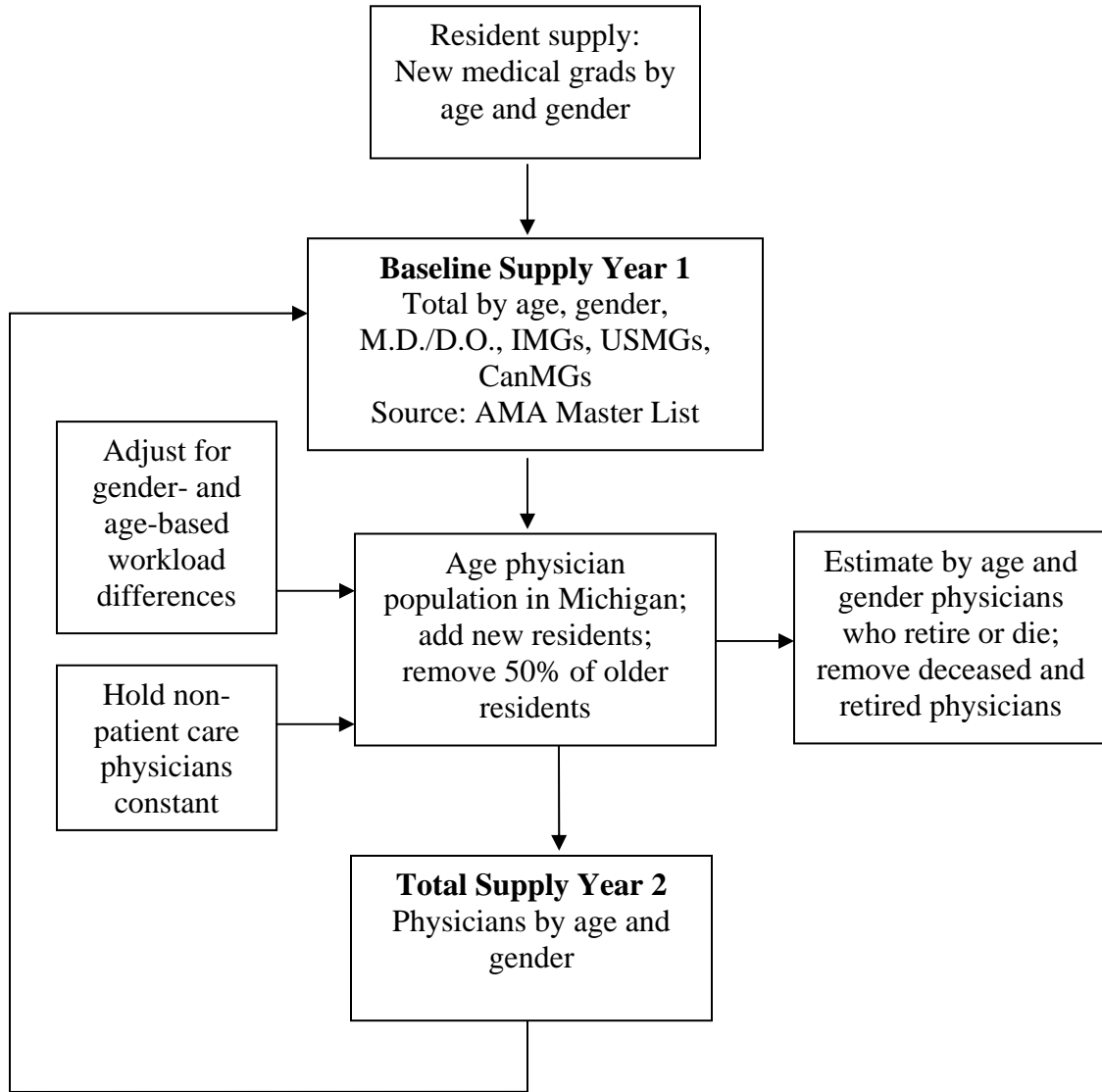
¹⁷ Studies included Weiner, J. P., 1994; Gamliel, et al., 1995; Politzer, R. M., S. Gamliel, J. Coultice, and E. S. Sekscenski. “Physician Workforce Projections: Too Many or Just Right?” *Journal of the American Medical Association*, Vol. 275, 685–686, 1996; Greenberg L. and J. M. Cultice. “Forecasting the Need for Physicians in the United States: The Health Resources and Services Administration’s Physician Requirements Model.” *Health Services Research*, Vol. 31, No. 6, 723–737, 1997.

¹⁸ Cooper, Richard A., Thomas E. Getzen, Heather J. McKee, and Prakash Laud. “Economic and Demographic Trends Signal an Impending Physician Shortage.” *Health Affairs*, Vol. 21, No. 1, 140–154.

Other assumptions:

- There are approximately 3,900 residency and fellowship positions available in Michigan hospitals and medical centers; this is held constant for each year of the model.
- American medical school graduates fill approximately 80% of these positions; the rest are filled by international medical graduates (IMGs); this is held constant for each year of the model.
- Current American Medical Association (AMA) data indicate that approximately 54% of all Michigan physicians completed their residencies and/or fellowships in Michigan and stayed to practice; this model assumes that 50% of all residents and fellows remain in Michigan after completing their postgraduate training.
- This model assumes that the numbers of medical administrators, full-time medical school faculty, and medical researchers in Michigan remain constant between now and 2020.

Figure 9: General Physician Supply Forecast Model



Forecasting Methods: Physician Demand

The future demand for physicians in Michigan involves a much more straightforward calculation. Referring back to Cooper's discussion of economic and demographic trends as some of the most significant drivers of physician demand and workforce trends, forecasted demands for physicians in Michigan are based on current physician-to-population ratios. Ratios of physicians to the overall population and, separately, to the population aged 65 and older are used in these calculations.

Given the expectation that Michigan's total population growth over the next 15 years will be among the slowest in the nation, physician demand based on overall growth alone implies very little increase in demand. Alternatively, it is well documented that the older population generates a disproportionate demand for medical services, and the aging of the baby-boom generation implies that demand for service will likely reflect the expanding numbers of people in this age group over the next 10 to 15 years. Demand calculations based on the 65-and-older population is an attempt to reflect this.

The following assumptions about physician-to-population ratios are incorporated into this methodological choice:

- No ideal ratio of physicians per 100,000 residents has been identified, and the demand forecast presented here is not an attempt to identify an ideal ratio of physicians per 100,000 residents.
- Although the ratio of physicians per 100,000 residents has been steadily increasing since the 1970s, the ratios used in this forecast reflect current demand for physician services and are held constant. These ratios are applied to the projected size of Michigan's future population.
- It is assumed that the demand for health care services and, in particular, for physician services is greater among those aged 65 and older than for those below age 65 or for the population at large regardless of age.

Prior to estimating the future demand for physicians based on the size of the total population and the population aged 65 and older, Regression analysis was conducted to determine whether any

difference or bias existed in the current relationship of physicians to the total population or to the population aged 65 and over within Michigan Counties.

Table 11: Correlation of Population and Physicians in Michigan Counties, 2003–2004

	r	r²
Total population	0.87704	0.7692
Population 65+	0.85417	0.7296

As illustrated in Table 11, population size is highly correlated with the number of physicians by county in Michigan, but there is little difference in the relationship of population size by geographical area and the number of physicians to serve those individuals whether these calculations are based on total population of the counties or the 65-and-older population of the counties. The conclusion is that either total population or 65-and-older population may legitimately be used to generate estimated demand for physicians based on future population size.

Forecasting Physicians: Supply and Demand Scenarios

A total of five supply scenarios and four demand scenarios were devised as part of this project in order to provide a range of possible outcomes that reflect both the extreme and the more modest likelihoods.

In addition to restrictions on the weekly work hours of residents, there is a considerable amount of anecdotal and indirect evidence that, alternatively, younger female physicians, younger physicians of either gender, and even older physicians are reducing their work hours in an attempt to create a better balance between their work, their families, and other interests. The five supply scenarios used here are based on varying assumptions concerning reductions in work effort, as follows:

- All female physicians, 5% reduction in work effort after 2005.
- All female physicians, 10% reduction in work effort after 2005; younger male physicians, 5% reduction in work effort phased in by cohorts after 2005.¹⁹
- All physicians, 5% reduction in work effort after 2005.
- All physicians, 10% reduction in work effort after 2005.
- All physicians, no reduction in work effort.

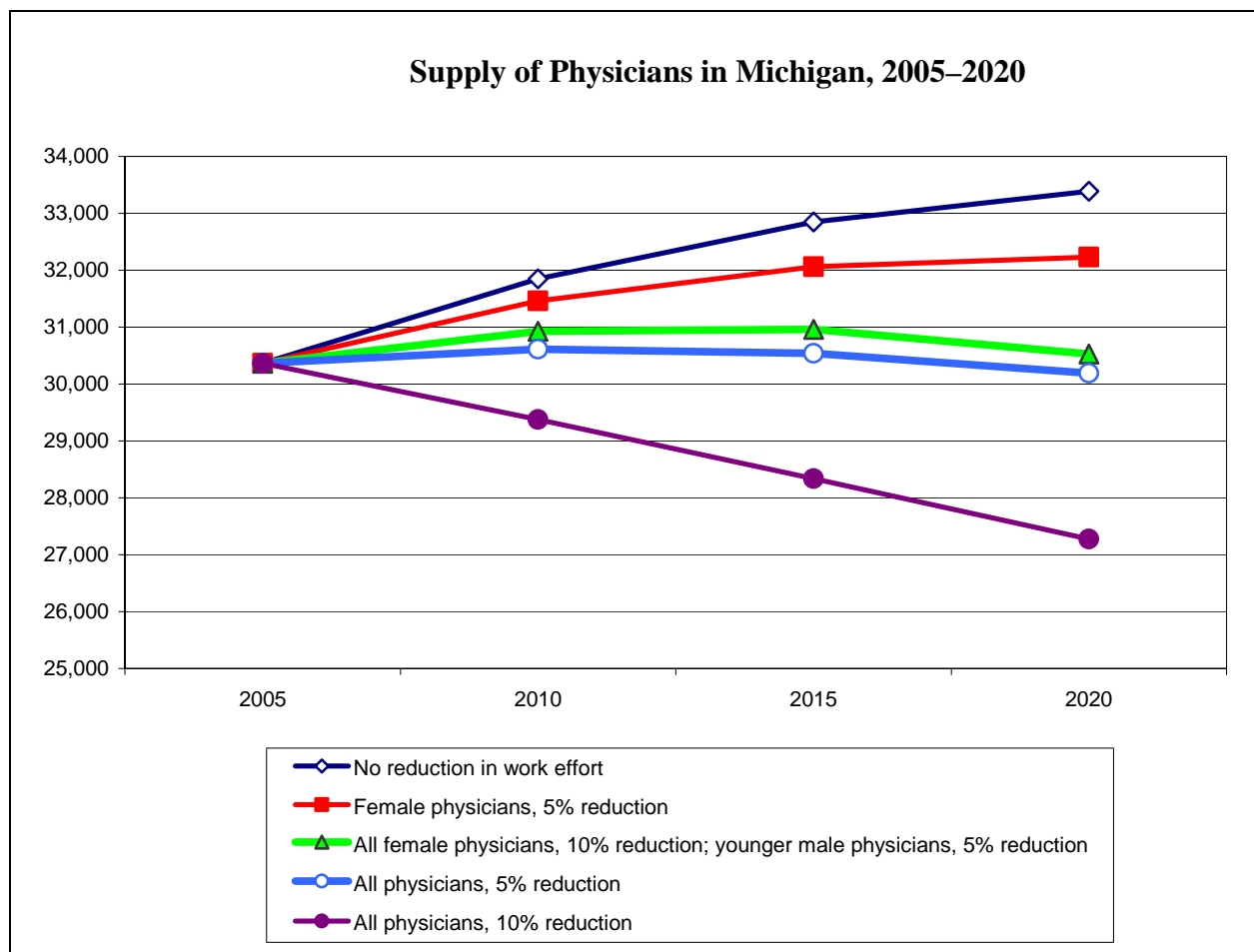


Figure 10

The resulting supply forecast scenarios range from one in which there is no future reduction in work effort at all and the anticipated supply of physicians increases by 3,000, to one in which both male and female physicians reduce their work effort by 10% and physician supply declines

¹⁹ Younger male physician is defined as aged 34–44 in 2010, aged 35–49 in 2015, and aged 35–54 in 2020.

by 3,000 over the next 15 years. The most realistic scenario resides between these extremes, reflecting an environment in which younger male and female physicians are likely to reduce their work effort—but not drastically—in an attempt to balance work, family life, and other interests. Given the anticipated demand for physicians and the small likelihood that there will be significantly greater numbers of medical school graduates (United States or international) available in the near future, there will also likely be some countervailing pressure on physicians not to reduce their work effort extensively or, alternatively, to find opportunities to delegate some of their activities to NPCs. PAs, nurse practitioners, and certified registered nurse anesthetists are still relatively few in number when compared to active physicians, but their numbers are growing and they are “extending” physicians’ efforts to see more patients.²⁰ According to the American Academy of Physician Assistants, there were 950 physician assistants in clinical practice in Michigan in 2004, and more than half of them were employed in family care, urgent care, emergency care, or internal medicine settings. With higher-than-average growth predicted for PAs and a relatively short turnaround time for training, PAs in Michigan could easily double over the next 15 years and reduce some of the diminished supply of physicians that is currently anticipated. Nurse practitioners could also serve the same purpose, but given the current shortage of nurses and the aging of the nursing workforce, net increases to Michigan’s 3,000 nurse practitioners are not likely to be as substantial over the next 10 to 15 years.

The demand scenarios in this report are based on the simple premise that if all present economic and social conditions remain the same, the most important dynamic factors associated with the demand for physician services are demographic ones. Regardless of insurance availability or reimbursement policies, a larger population will, on average, require more physician services than a smaller one. In addition, as older people require more health care and physician services than younger people, and as both the number of older people in this nation is growing and the population is experiencing greater longevity than ever before, the demand for physician services will reflect these patterns. There may, in addition, be a growing demand for physician services

²⁰ Data reported by the U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions indicated that there were approximately 42,000 active PAs in the United States as of 2002, compared with approximately 741,000 active M.D.s and D.O.s. Approximately 48% of all PAs work in primary care. The U.S. Department of Labor’s Occupational Outlook Handbook for 2004–2005 predicts faster-than-average employment growth for PA’s, over the next five years.

that reflects greater awareness of and interest in health care as a result of television, the Internet, and other media outlets combined with changes in lifestyle and, as noted above, greater longevity. While possibly significant, lifestyle and cultural factors have not been taken into account in addressing Michigan's future demand for physicians.

Given the relatively short period of time for which demand forecasts are being made, the forecasts presented here are based entirely on calculations of the number of physicians per 100,000 Michigan residents. As noted earlier, Michigan's overall population is projected to grow at a very slow pace over the next fifteen years. Michigan is expected to add less than 600,000 new residents between 2005 and 2020, bringing the total population up to approximately 10,700,000 by 2020.²¹ This translates to growth of only 5.9% over the next 15 years. Most of this growth will be among those aged 65 and older and reflect the entrance of the baby-boom generation into that traditional retirement age. This age group will increase from 1.25 million in 2005 to 1.71 million in 2020, an increase of 460,000 or more than 37%. By 2020, those aged 65 and over will grow from 12% of the total population of Michigan to 16% of the total population. Although small in number, the very old—those aged 85 and older—will increase at an even faster rate due, among other things, to the success of medical science in keeping people alive and active longer than ever before.

A total of four population-based scenarios were developed to estimate the future demand for physicians in Michigan:

- Physicians per 100,000 total population, all ages.
- Physicians per 100,000 population aged 65 and older.
- Weighted average of 34% demand based on total population and 66% demand based on population aged 65 and older.
- Weighted average of 50% demand based on total population and 50% demand based on population aged 65 and older.

²¹ U.S. Census Bureau, Interim State Population Projections, 2005.

Given that total Michigan population growth over the next 15 years will be among the slowest in the nation,²² slow growth in physician demand based entirely on overall population growth trends would be reasonable. This scenario produces very little growth among physicians, from 30,400 active physicians in 2005 to no more than about 32,000 in 2020. At the other extreme, a scenario based entirely on the aging of the baby-boom generation and its growing demand for services anticipates a statewide need for physicians that could exceed 41,000 by 2020—an increase of approximately one-third. The first of these two scenarios appears to be unrealistically low, and the second appears to be unrealistically high. As a result, a meaningful balance between these extremes was sought, and two weighted forecasts that take both trends into account were tested. The first assumes that two-thirds of future physician demand in Michigan will be based on growth of the older population (weighted demand 1), and only one-third will be related to overall population growth. The second scenario assumes half of future physician demand will be based on growth among those aged 65 and over (weighted demand 2) and half will be based on the much slower growth of the population overall. The first of these two midrange scenarios generates a forecasted demand of 38,000 physicians by 2020. Employing the second and the more conservative of these two forecasts, it is anticipated that Michigan's 2020 population will likely require approximately 36,200 physicians, a 19% increase over the next 15 years.

²² Ibid.

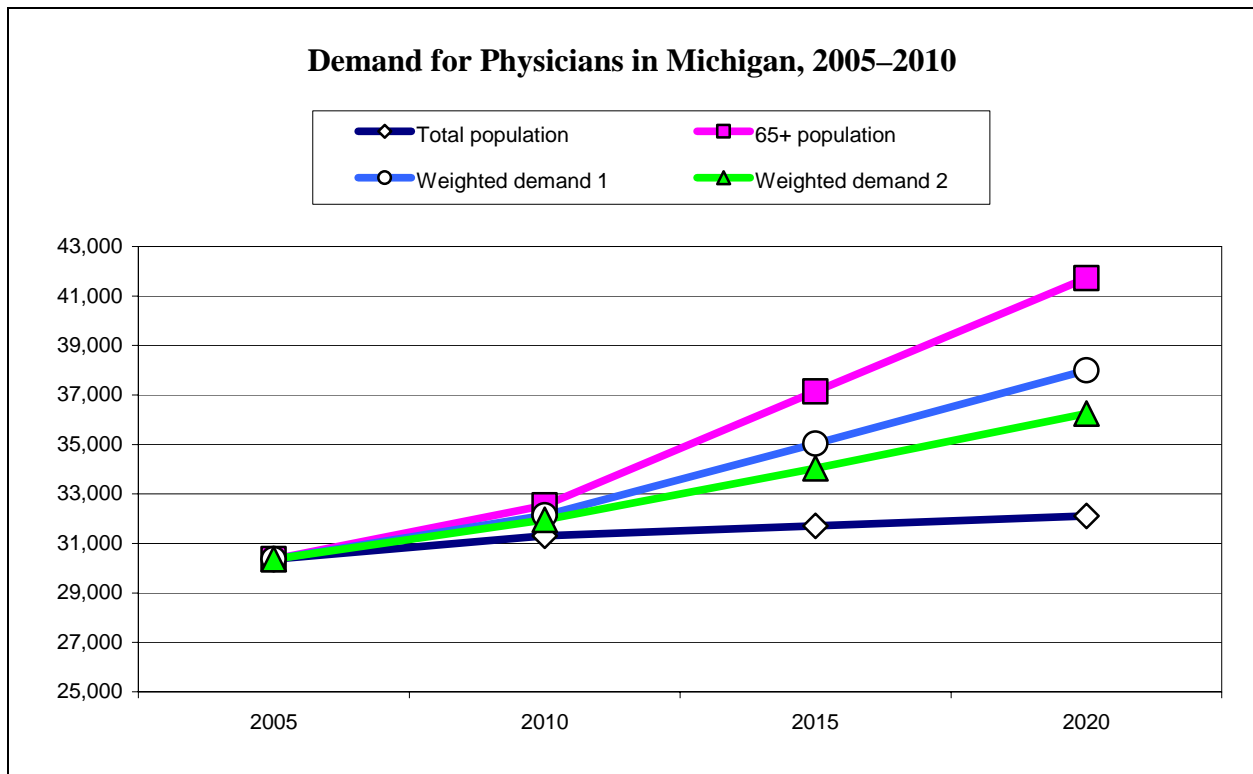


Figure 11

Twenty different combinations of physician supply and demand are possible based on the forecasts compiled for this report. The most likely forecasts of the supply and demand for physicians in Michigan fall between the extremes. As noted earlier, there is considerable likelihood that physicians will limit some of their work effort in the near future, but wholesale reductions in physician medical activities is not likely at all. However, as noted earlier, the likelihood of significant numbers of new medical graduates and residents in the near future is equally unlikely. There will also be some help in meeting physician demand from the growing number of NPCs in Michigan. Given these factors, supply scenario 4 (see Table 12), which assumes that all physicians below retirement age are likely to modestly reduce their work effort between now and 2020, is the most reasonable of the supply scenarios presented. This scenario indicates that Michigan’s physician supply will remain relatively flat or even slightly decline over the next 15 years, fluctuating between 30,000 and 30,500 active practitioners across the entire state. The most reasonable scenario for physician demand is one that accounts for but does not overly emphasize the impact of the baby-boom generation. Demand scenario 4 (see Table 12) reflects this assumption and generates an estimate of physician demand that is

expected to grow at a moderate pace as the older population increases, reaching a level that may require as many as 36,200 physicians by 2020.

Table 12: Forecasted Physician Supply and Demand

Forecasted Physician Demand				
	2005	2010	2015	2020
Scenario 1	30,366	31,310	31,708	32,112
Scenario 2	30,366	32,535	37,136	41,726
Scenario 3	30,366	31,142	35,031	37,998
Scenario 4	30,366	31,957	34,041	36,244
Forecasted Physician Supply				
	2005	2010	2015	2020
Scenario 1	30,366	31,850	32,851	33,385
Scenario 2	30,366	31,460	32,064	32,228
Scenario 3	30,366	30,929	30,961	30,528
Scenario 4	30,366	30,612	30,537	30,189
Scenario 5	30,366	29,378	28,335	27,275

If correct, these two moderate forecasts foretell a potential difference of as many as 6,000 physicians between what Michigan's population is likely to require and the number of physicians available to meet those demands in Michigan by the year 2020. As startling as this may be, even the most conservative demand scenario in which the growth of physician services responds only to the slow pace of total population growth will result in an inadequate supply of physicians in all but the two most conservative supply scenarios. In other words, the only likelihoods in which Michigan will not face an inadequate supply of physicians as early as 2010 are those cases where no reduction in work effort is evident among active physicians or where reductions are found exclusively among female physicians and these reductions average only 5% among all female physicians.

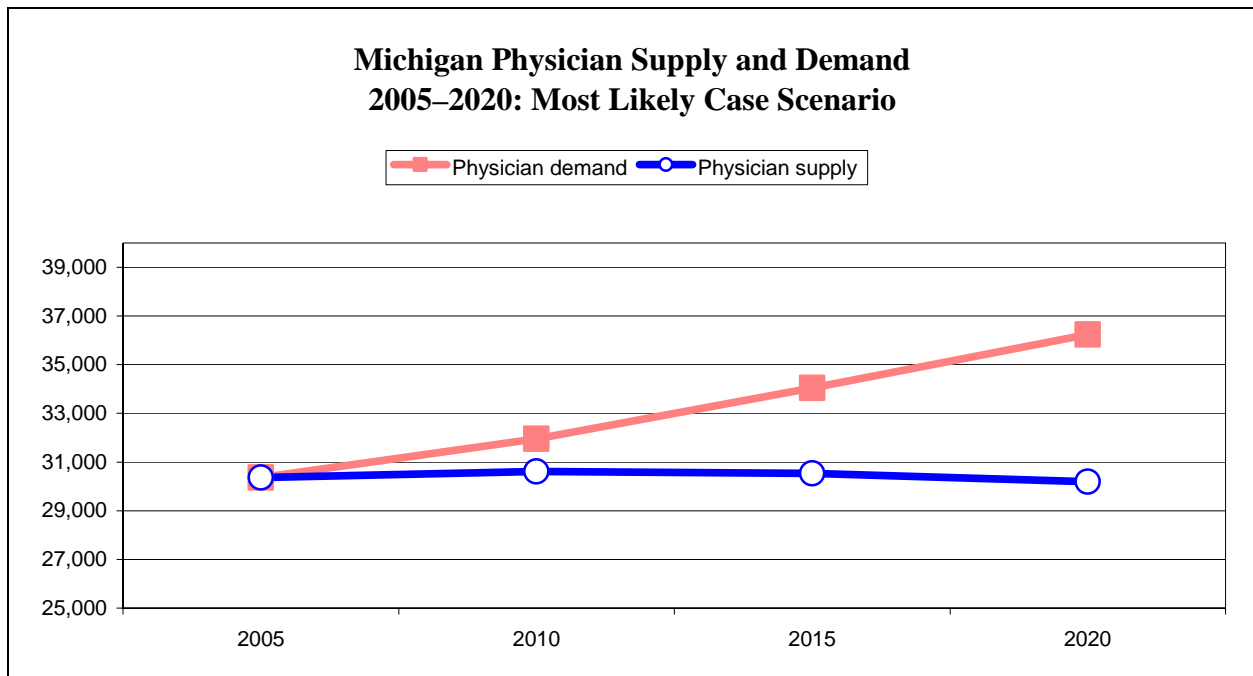


Figure 12

Age and Gender

The two most evident demographic changes among Michigan physicians that will occur over the next 15 years will be the aging of the physician workforce and a growing proportion of female physicians in the workforce. Despite the desire by many currently active physicians to retire or change profession in response to a variety of stress factors in the practice of medicine, the number of new physicians entering the profession is not expected to grow substantially in the near future and enough older physicians will continue to practice into their 60's and 70's, resulting in an aging physician workforce in Michigan and elsewhere. Based on the forecasts prepared for this report, the median age of Michigan physicians will be creeping upward over the next ten years and then will increase more dramatically between 2015 and 2020, paralleling the aging of the population in general.

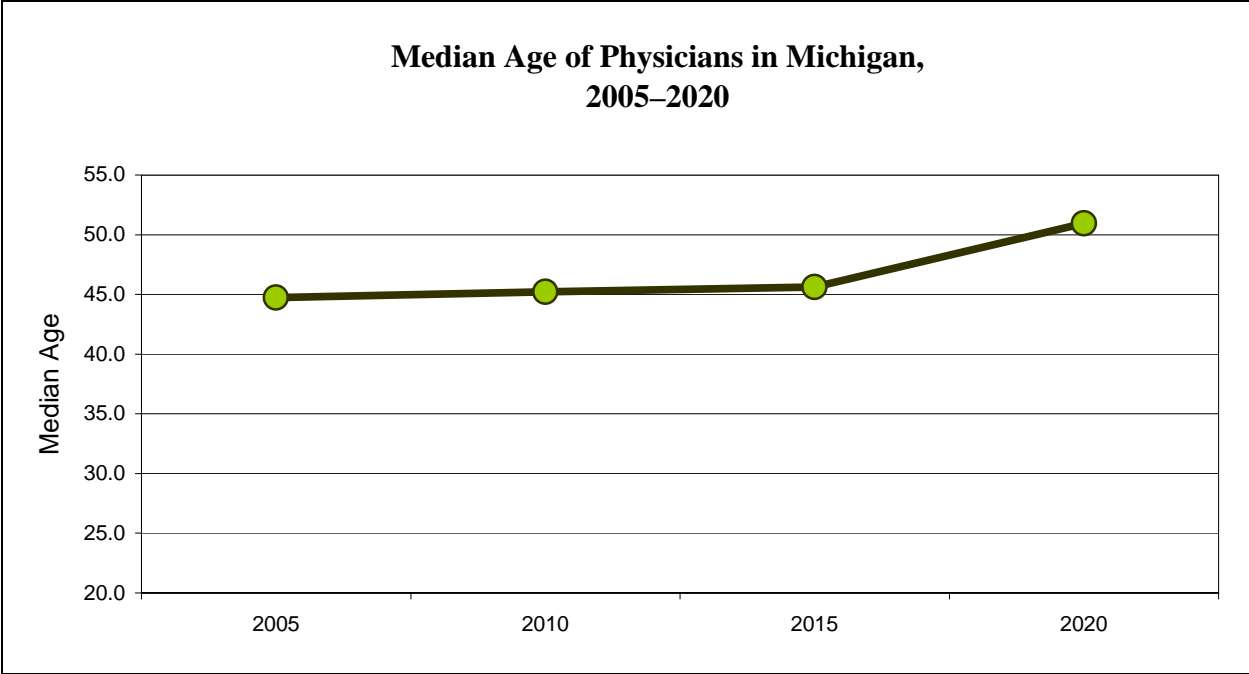


Figure 13

The proportion of physicians who are female will increasingly reflect the growing enrollment of females in medical schools in Michigan and elsewhere, growing from less than 30% of all physicians at the present time to approximately one of every three physicians in Michigan by 2020.

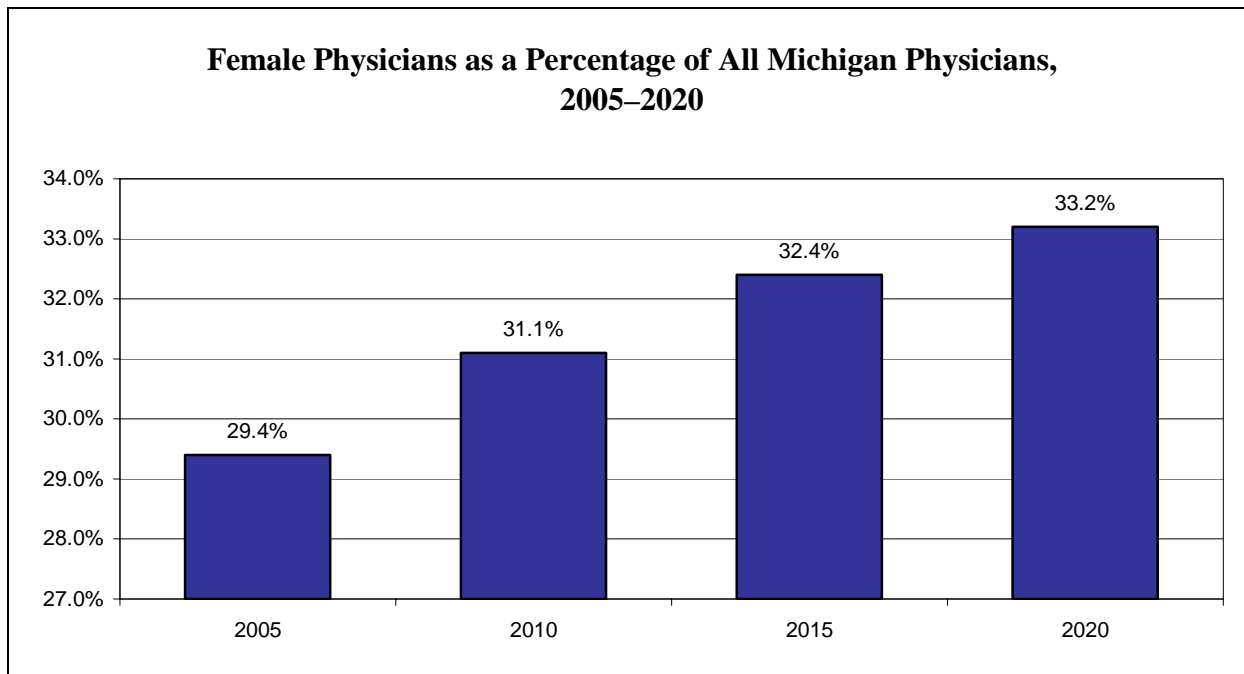


Figure 14

Geographical Distribution

As noted in the physician profile section of this report, there is a strong relationship between the population of Michigan’s 83 counties and the number of physicians practicing or living²³ in these counties. The relationship between physicians per county and the population of each county was quantified through regression analysis and the resulting coefficient was applied to the forecasted population of each Michigan county in order to produce a projection of the demand for physicians within each individual county. All physician figures produced through these calculations were controlled to the “most likely” forecasts of both supply and demand that were described earlier.

Forecasts of the supply of physicians within each county, however, could not be produced using the same trends and cohort-component model that was used at the statewide level due to the lack of sufficiently detailed data for each individual county. As an alternative, it was assumed that

²³ The physician data file used is based on the principal address provided by physicians. This may be either a practice, residence, or hospital address. The figures presented here, especially for the larger counties, may be skewed as some physicians who practice in Wayne County but who reside in Oakland or Macomb County, for example, may list their home address as their principal address. This will overstate the number of physicians in Oakland or Macomb Counties while understating the number of physicians practicing in Wayne County. The impact of this on the findings presented in this report, however, is believed to be minimal.

the distribution of physicians would not change markedly from current patterns over the next 15 years. That is, it was assumed that given no change in either the structure of American medicine or reimbursement practices, the supply of Michigan physicians would continue to congregate mainly in the more highly populated counties. Using this assumption, the 2020 supply forecast of Michigan physicians was allocated proportionally to each Michigan county and then compared with the corresponding forecast of physician demand.

The continuing relationship between physician supply, physician demand, and county population for 2020 is clearly illustrated in Figure 15, below. Although this approach is illustrative of an assumed continuation of current trends in the distribution of physician supply and demand among Michigan counties into the future, its main shortcoming is that this approach cannot distinguish between geographic locations that may actually have a greater-or-smaller-than-average difference between the forecasted supply and demand of physicians. This is illustrated by the consistent pairing of supply and demand indicators in Figure 15.

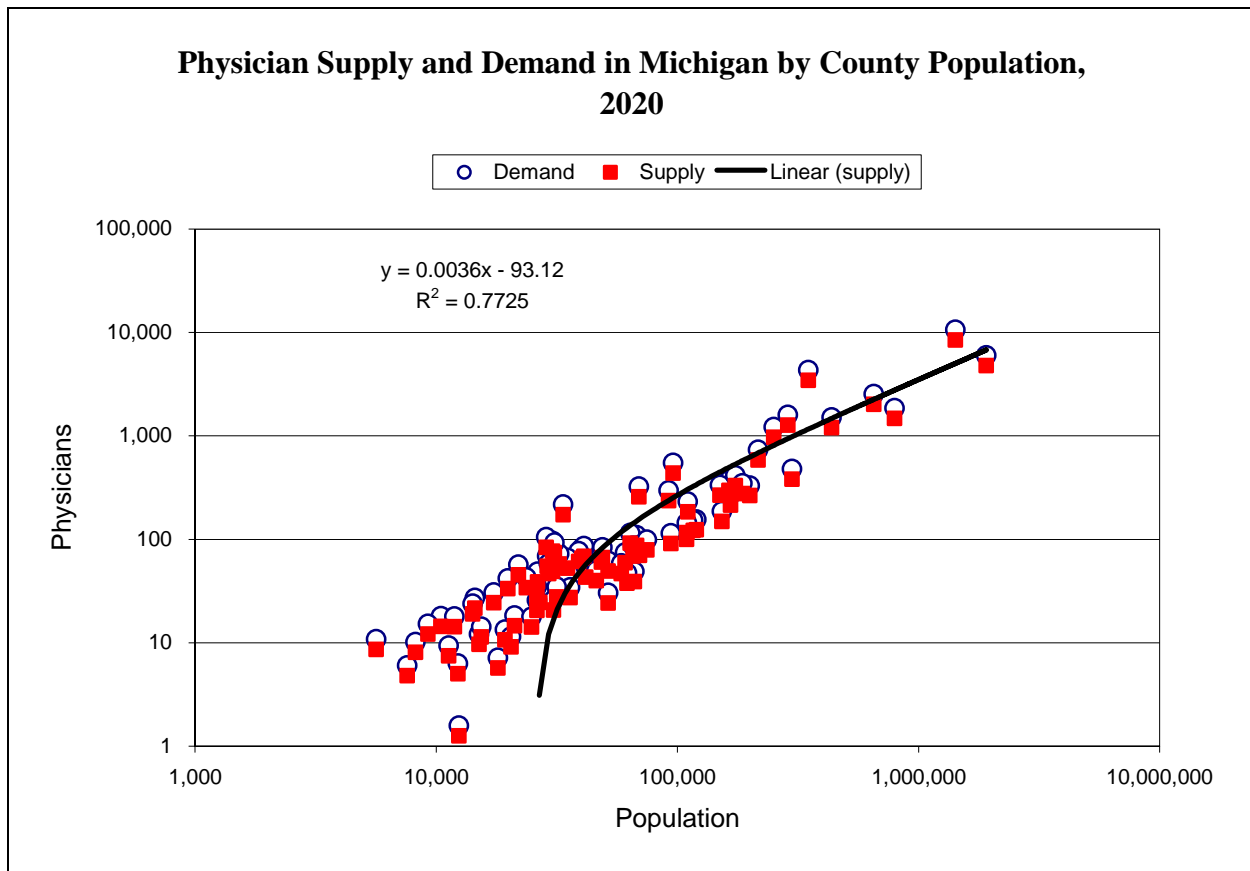


Figure 15

Based on these calculations, each major region in Michigan will exhibit a significant gap between physician supply and demand in 2020. As at least half of Michigan’s population will continue to reside in Southeastern Michigan and as the concentration of physicians in that area exceeds 60% of all Michigan physicians (including both the Detroit and Ann Arbor areas), the shortfall between physician supply and demand will continue to be greatest in that area. Southern lower Michigan’s other metropolitan areas will exhibit shortfalls proportional to their sizes, and both northern lower Michigan and the Upper Peninsula will continue to exhibit shortfalls proportional to their relatively small populations. It should be noted that although northern Lower Michigan has exhibited some relatively high rates of growth in the recent decade or two, the relative size of the population in this region will still not be large enough in the near future to attract significant numbers of new physicians to the area without the special efforts of health systems, independent hospitals, and federally qualified health clinics in this largely rural region. There are two exceptions to this. Both Grand Traverse County and Emmet County are

highly desirable communities in which to live, and both have attracted a larger-than-expected number of physicians than would be warranted by their permanent residents alone.

Table 13: Supply and Demand for Physicians in Michigan Regions, 2020

	Supply	Demand	Difference
Michigan	30,189	36,244	6,055
Southeastern Michigan	18,900	22,700	3,800
Flint Area	1,400	1,600	200
West Michigan	2,800	3,400	600
Southwestern Michigan	1,800	2,100	300
Capital Area	1,500	1,800	300
Tri-City Area	1,000	1,200	200
Northern Lower Michigan	1,300	1,600	300
Upper Peninsula	650	750	100

Physician Specialization

Trends in specialization and the interests of individuals who have not even entered medical school yet are very difficult to predict. During the 1990s when the managed care model appeared to be expanding, not only was the number of physicians expected to exceed demand by the early twenty-first century, but there was an expectation that there would be a need to increase the proportion of primary care physicians to serve as the first point of entry into the health care system for most patients.²⁴ Research is still being presented that argues that more efficient systems of care with lower staffing-to-population ratios and fewer specialists can easily meet the demand for health care services,²⁵ but the consensus today is that growing demand for physician services coupled with an aging population will result in shortages in some areas of specialization over the next decade.

²⁴ Council on Graduate Medical Education. *Fourth Report: Recommendations to Improve Access to Health Care Through Physician Workforce Reform*. Washington, D.C.: U.S. Department of Health and Human Services, 1994.

²⁵ Weiner, Jonathon P., 2004.

Table 14: Physician Specialization in Michigan by Age, 2004

Practice Specialty	Under Age 55		Aged 55 and Older		Total
	Number	Percentage	Number	Percentage	
Internal medicine	3,533	79.3	922	20.7	4,455
Family practice/general practice	3,194	70.6	1,332	29.4	4,526
Pediatrics	1,676	77.1	498	22.9	2,174
Obstetrics & gynecology	1,062	68.3	493	31.7	1,555
Total Primary Care	9,465	74.5	3,245	25.5	12,710
Emergency medicine	1,207	86.0	196	14.0	1,403
Phys. med/rehab	309	84.0	59	16.0	368
Pulmonology	224	77.5	65	22.5	289
Neurology	312	76.1	98	23.9	410
Anesthesiology	847	74.1	296	25.9	1,143
Nephrology	166	72.2	64	27.8	230
Oncology	373	71.6	148	28.4	521
Gastroenterology	219	70.4	92	29.6	311
Dermatology	238	68.6	109	31.4	347
General surgery	844	67.3	410	32.7	1,254
Orthopedic surgery	841	67.1	412	32.9	1,253
Otolaryngology	193	67.0	95	33.0	288
Radiology	777	66.5	392	33.5	1,169
Ophthalmology	426	66.1	218	33.9	644
Plastic surgery	128	63.4	74	36.6	202
Pathology	332	62.4	200	37.6	532
Allergy & immunology	101	62.3	61	37.7	162
Urology	204	58.8	143	41.2	347
Psychiatry	815	55.0	666	45.0	1,481
Public health & general preventative medicine	13	31.7	28	68.3	41
All Specialty and Subspecialty Care	8,569	69.1	3,826	30.9	12,395
All Physicians*	21,481	71.8	8,418	28.2	29,899

*Some physicians did not report any specialty; some physicians may have reported more than one specialty or subspecialty.

Source: American Medical Association, *Physicians' Professional Data*, 2004.

As of November 2004, almost 40% of Michigan physicians were aged 50 or older, and almost 30% were aged 55 or older. If most of these physicians aged 55 and older retire between now and 2020, an examination of the ages of Michigan physicians within specialty practice at the present time may provide some insight into the potential need for physicians by specialty in the near future. Put another way, given our expectation that the demand for physicians in Michigan is likely to exceed the supply of physicians in Michigan by approximately 6,000 over the next 15 years, it is reasonable to assume that those practice specialties that may be overrepresented among physicians aged 55 and older at the present time are likely to be the areas of practice that will be in short supply in the future.

In 2004, 28.2% of all Michigan physicians were aged 55 and older. Among those physicians who indicated that they provided primary care services (internal medicine, family practice, pediatrics, obstetrics and gynecology [OBGYN]), 25.5% were aged 55 and older. OBGYNs and family practice physicians, however, are older than average. This implies that as these physicians exit medicine through retirement or career change, there may be a slight shortage of primary care physicians in the future, especially among OBGYNs and family practice/general practice physicians.

Among physicians with more specialized practices, there are several categories where the percentage of physicians aged 55 and older is no greater than the current statewide average among Michigan physicians and, thus, are less likely to be in short supply over the next 10 to 15 years. Among these physicians are emergency medicine specialists, physiatrists (physical medicine and rehabilitation), pulmonologists, neurologists, and anesthesiologists. Small shortages may become evident among oncologists, nephrologists, and gastroenterologists. Of greater concern, however, is the possibility of more significant shortages among general surgeons, radiologists, urologists, otolaryngologists, and ophthalmologists. Shortages among these categories may be of particular concern as a preponderance of patients for some of these practice areas are the elderly.

Two specialty areas that are likely to be in dramatically short supply in the near future are psychiatry and public health medicine. Almost half of all psychiatrists in Michigan are aged 55 and older, and even if only a portion of these physicians retire or reduce their work effort in the next 15 years, shortages in this area could seriously compromise our ability to diagnose and treat individuals with a variety of mental and behavioral problems. Although public health physicians are relatively few in number, they play an important role in protecting the overall health of Michigan's citizens through their work with federal, state, and local health agencies. More than two-thirds of all public health physicians in Michigan are aged 55 or older, and as they age and retire, there are very few replacements on the horizon. This shortage may seriously impede important public health efforts in the future.

Discussion

The predicted imbalance between supply and demand for physicians in Michigan over the next 15 years will not be an isolated phenomenon. Shortages are anticipated throughout the United States, and Michigan has little advantage over other states despite the presence of four medical schools and numerous residency and postgraduate opportunities at a number of Michigan medical facilities. Unfortunately, no quick or easy solutions to this looming problem are at hand. The Council on Graduate Medical Education (COGME) has recommended that by the year 2015 United States medical schools expand the number of graduates by 3,000, and several medical schools in Michigan and across the nation are already exploring ways to increase their enrollments over the next few years. Expanding enrollments, however, will require an additional commitment of public funding at a time when state governments are facing serious financial difficulties and federal agencies are looking to hold the line or even reduce expenditures that supplement medical education. Even if enrollments are expanded, larger medical classes will not solve this problem unless the current graduate medical education cap under Medicare is lifted. If not, these new physicians educated in the United States will mainly serve to replace rather than supplement IMGs who now comprise approximately 20% of residency positions in Michigan hospitals and health systems. Expanding the number of physician extenders will also help but, as noted above, they can only help to lessen the imbalance, not eliminate it.

Barring any new, creative solutions to these issues, an imbalance between physician supply and demand will start to become evident within the next five years as our population—especially our older population—grows. Evidence of this will be manifested in longer waiting times to see physicians as well as in growing difficulty in securing referrals to specialists, especially for some of those specialists whose practices focus on the illnesses and infirmities of old age. We may even find that the anticipated reduction in work hours among physicians, especially younger physicians, in hopes of greater balance between their professional and personal lives, may have to be postponed for a while until we devise some new approaches to this important problem.

Bibliography

American Academy of Physician Assistants. "2004 AAPA Physician Assistant Census Report," accessed June 3, 2005. <<http://www.aapa.org/research/04census-intro.html>>.

American Association of Colleges of Osteopathic Medicine. *2000 Annual Statistical Report* (and prior annual reports). Rockville, MD, 2001.

American Medical Association. *Physician Characteristics and Distribution in the U.S.*, 2002–2003 Edition. Chicago, 2002.

American Medical Association. *Physicians' Professional Data (AMA-PPD)*. Wood Dale, IL: Medical Marketing Service, Inc., 2004.

American Osteopathic Association. *1992 Yearbook and Directory of Osteopathic Physicians*.

Gamliel, S. et al. "Managed Care on the March: Will the Physician Workforce Meet the Challenge?" *Health Affairs* Summer 1995, 131–142.

HHS, Health Resources and Services Administration, Bureau of Health Professions. *HRSA State Health Workforce Profiles: Michigan*. Rockville, MD: U.S. Department of Health and Human Services. 2000.

Merrit, James, Joseph Hawkins, and Philip B. Miller. *Will the Last Physician In American Please Turn Off The Lights? A Look at America's Looming Doctor Shortage*. Irving, TX: MHA Group, 2004.

Pugno, P. et al. "Entry of U.S. Medical School Graduates into Family Practice Residencies: 1999–2000 and Three-Year Summary." *Family Medicine* Vol. 32, No. 8, 2000, 534–542. Quoted by Kevin Grumbach. "Fighting Hand to Hand Over Physician Workforce Policy." *Health Affairs* Vol. 21, No. 5, September/October 2002, 13–27.

Rosen, Laurence S. *The Future of Health Professions in the U.S., Michigan, and Selected States*. Report prepared for the Michigan Health Council, October 2002.

U.S. Census Bureau. *Interim State Population Projections*, 2005.

U.S. Census Bureau. *Statistical Abstract of the United States*, 2001 Edition (and prior annual editions).

Weiner, Jonathon P. "Prepaid Group Practice Staffing and U.S. Physician Supply: Lessons for Workforce Policy." *Health Policy*, Web exclusive, Vol. 43, No. 1, February 2004, accessed May 30, 2005. <<http://content.healthaffairs.org/cgi/content/full/hlthaff.w4.43v1/DC1>>.

Sources Used in the Profile of Michigan Physicians

Adams, Damon. "Generation gripe: Young doctors less dedicated, hardworking?" February 2, 2004, accessed June 2, 2005. <www.ama-assn.org/amednews/>.

American Academy of Physician Assistants. "2004 AAPA Physician Assistant Census Report." Accessed June 7, 2005. <<http://www.aapa.org/research/04census-intro.html>>.

American Medical Association. *AMA Masterfile*, provided by Medical Marketing Service, Inc. Wood Dale, IL, 2004.

American Medical Association. "AMA Revises Policy to Address Continued Demand for Physicians." December 9, 2004, quoted by Richard Cooper in "Weighing the Evidence for Expanding Physician Supply." *Annals of Internal Medicine* Vol. 141, 2004, 705–714.

American Medical Association. *Physicians' Professional Data (AMA-PPD)*. Wood Dale, IL: Medical Marketing Service, Inc., 2004.

Cooper, Richard. "Weighing the Evidence for Expanding Physician Supply." *Annals of Internal Medicine* Vol. 141, 2004, 705–714.

Cooper, Richard A., Thomas E. Getzen, Heather J. McKee, and Prakash Laud. "Economic and Demographic Trends Signal an Impending Physician Shortage." *Health Affairs* Vol. 21, No. 1, January 2002, 140–154.

Council on Graduate Medical Education. *Fourth Report: Recommendations to Improve Access to Health Care Through Physician Workforce Reform*. Washington, D.C.: U.S. Department of Health and Human Services, 1994.

Council on Graduate Medical Education. *Reassessing Physician Workforce Policy Guidelines for the U.S. 2000–2020*. Washington, D.C.: U.S. Department of Health and Human Services, 2003.

Greenberg L. and J. M. Cultice. "Forecasting the Need for Physicians in the United States: The Health Resources and Services Administration's Physician Requirements Model." *Health Services Research*, Vol. 31, No. 6, 723–737, 1997.

HHS, Health Resources and Services Administration, Bureau of Health Professions. *HRSA State Health Workforce Profiles: Michigan*. Rockville, MD: U.S. Department of Health and Human Services, 2000.

Medical Marketing Service, Inc., Health Care Research Data Resource Center. "AMA-PPD Demographic Variables," documentation accompanying *AMA Masterfile*. Wood Dale, IL, 2004.

Merritt, James, Joseph Hawkins, and Philip Miller. *Will the Last Physician In American Please Turn Off The Lights? A Look at America's Looming Doctor Shortage*. Irving, TX: MHA Group, 2004.

Merritt, Hawkins, and Associates. "2004 Survey of Physicians 50 to 65 Years Old: Summary Report" (based on 2003 data). Irving, TX: Merritt, Hawkins & Associates, 2004.

Miller, R. S., M. R. Dunn, and M. E. Whitcomb. "Initial Employment Status of Resident Physicians Completing Training in 1995." *Journal of the American Medical Association* Vol. 277, No. 21, 1997, 1699–1704.

Politzer, R. M., S. Gamliel, J. Coultice, and E. S. Sekscenski. "Physician Workforce Projections: Too Many or Just Right?" *Journal of the American Medical Association*, Vol. 275, 685–686, 1996.

U.S. Census Bureau. "Annual Estimates of the Population for the United States and States, and for Puerto Rico." April 1, 2000 to July 1 2004," accessed June 3, 2005.

<http://www.census.gov/popest/states/tables/NST-EST2004-01.xls>.

Weiner, Jonathon P. "Forecasting the Effects of Health Care Reform on U.S. Physician Workforce Requirement: Evidence from HMO Staffing Patterns." *Journal of the American Medical Association* 272, No. 3, 1994, 222–230.

Appendix A: Definitions of Terms

Table A-1: Definitions of Terms

<p>Preferred Mailing Address</p>	<p>This address is supplied by the physician and may be an office, residence, or other place at which the individual prefers to be contacted. If this is a home address, the physician is also asked to enter an office address. A separate alternate address file is created consisting of (1) the preferred address, <i>if the preferred address is an office address</i>, (2) if the physician provides an alternate address that is an office address, this is copied to the alternate address file, and (3) if neither of the first two conditions are met, the alternate address field is populated with whatever address is provided.</p>
<p>Birth Information</p>	<p>Birth information consists of birth date, city, state, and country of birth.</p>
<p>Major Professional Activity (MPA)</p>	<p>Major professional activity is based on physician answers to the Type of Practice (TOP) and Primary Present Employment (PE) items on the questionnaire. All physicians are included in the MPA categories unless their responses to the TOP and/or PE questions cause them to be excluded.</p> <p>Categories</p> <p><i>Patient Care Activities</i></p> <ul style="list-style-type: none"> Office based Hospital staff Residents Not classified Locum tenens <p><i>Non-Patient Care As Primary Activity</i></p> <ul style="list-style-type: none"> Medical teaching Administration Medical research Other Inactive

Table A-1: Definitions of Terms

Type of Practice (TOP)	Direct patient care Administrative activities Medical education Medical research Other medical activities Resident Retired Semiretired Temporarily not in practice Inactive for other reasons Working part-time
Primary Present Employment (PE)	Self-employed, solo practice Two-physician practice, full or part owner Other—patient care Locum tenens Group practice HMO Medical school Nongovernmental hospital City/county/state government hospital City/county/state other than hospital Federal government hospital, Army Federal government hospital, Navy Federal government hospital, Air Force Federal government hospital, USPHS Veterans Affairs Other federal agency Other non-patient care No classification Locum tenens (part time)
Licensure Data	Up to six states in which the physician is licensed may be provided along with the year in which the physician was originally licensed.

Appendix B: Geographic Distribution of Physicians in Michigan (M.D.s and D.O.s)

Table B-1: Number of Physicians in Each Michigan County, November 10, 2004

County	Number	Percentage	County	Number	Percentage
Alcona	8	0.03	Lapeer	87	0.29
Alger	14	0.05	Leelanau	47	0.16
Allegan	119	0.40	Lenawee	111	0.37
Alpena	81	0.27	Livingston	238	0.80
Antrim	23	0.08	Luce	11	0.04
Arenac	10	0.03	Mackinac	16	0.05
Baraga	9	0.03	Macomb	1,573	5.26
Barry	60	0.20	Manistee	38	0.13
Bay	191	0.64	Marquette	250	0.84
Benzie	25	0.08	Mason	57	0.19
Berrien	307	1.03	Mecosta	45	0.15
Branch	60	0.20	Menominee	18	0.06
Calhoun	258	0.86	Midland	226	0.76
Cass	25	0.08	Missaukee	5	0.02
Charlevoix	45	0.15	Monroe	153	0.51
Cheboygan	42	0.14	Montcalm	66	0.22
Chippewa	55	0.18	Montmorency	7	0.02
Clare	25	0.08	Muskegon	342	1.14
Clinton	91	0.30	Newaygo	41	0.14
Crawford	26	0.09	Oakland	7,514	25.13
Delta	65	0.22	Oceana	23	0.08
Dickinson	83	0.28	Ogemaw	36	0.12
Eaton	116	0.39	Ontonagon	5	0.02
Emmet	176	0.59	Osceola	14	0.05
Genesee	1,267	4.24	Oscoda	1	0.00
Gladwin	19	0.06	Otsego	45	0.15
Gogebic	27	0.09	Ottawa	332	1.11
Grand Traverse	389	1.30	Presque Isle	11	0.04
Gratiot	74	0.25	Roscommon	24	0.08
Hillsdale	47	0.16	Saginaw	589	1.97
Houghton	59	0.20	Sanilac	40	0.13
Huron	55	0.18	Schoolcraft	12	0.04
Ingham	1,304	4.36	Shiawassee	80	0.27
Ionia	39	0.13	St. Clair	263	0.88
Iosco	30	0.10	St. Joseph	69	0.23
Iron	16	0.05	Tuscola	37	0.12
Isabella	97	0.32	Van Buren	79	0.26
Jackson	218	0.73	Washtenaw	3,472	11.61
Kalamazoo	977	3.27	Wayne	5,291	17.69
Kalkaska	8	0.03	Wexford	78	0.26
Kent	1,902	6.36	Out of state	77	0.26
Keweenaw	1	0.00	Other	35	0.12
Lake	5	0.02	Total	29,906	100.00

**Table B-2: Forecasted Number of Physicians
in Each Michigan County, 2020**

County	Number	Percentage	County	Number	Percentage
Alcona	7	0.02	Lake	5	0.02
Alger	14	0.05	Lapeer	99	0.33
Allegan	124	0.41	Leelanau	45	0.15
Alpena	76	0.25	Lenawee	115	0.38
Antrim	25	0.08	Livingston	263	0.87
Arenac	11	0.04	Luce	9	0.03
Baraga	8	0.03	Mackinac	19	0.06
Barry	59	0.20	Macomb	1,470	4.87
Bay	184	0.61	Manistee	34	0.11
Benzie	24	0.08	Marquette	256	0.85
Berrien	295	0.98	Mason	55	0.18
Branch	60	0.20	Mecosta	43	0.14
Calhoun	267	0.88	Menominee	14	0.05
Cass	24	0.08	Midland	235	0.78
Charlevoix	49	0.16	Missaukee	6	0.02
Cheboygan	39	0.13	Monroe	148	0.49
Chippewa	66	0.22	Montcalm	70	0.23
Clare	27	0.09	Montmorency	10	0.03
Clinton	87	0.29	Muskegon	329	1.09
Crawford	33	0.11	Newaygo	47	0.16
Delta	65	0.22	Oakland	8,443	27.97
Dickinson	83	0.27	Oceana	20	0.07
Eaton	121	0.40	Ogemaw	46	0.15
Emmet	173	0.57	Ontonagon	5	0.02
Genesee	1,194	3.96	Osceola	14	0.05
Gladwin	21	0.07	Oscoda	1	0.00
Gogebic	22	0.07	Otsego	57	0.19
Grand Traverse	435	1.44	Ottawa	380	1.26
Gratiot	68	0.23	Presque Isle	11	0.04
Hillsdale	49	0.16	Roscommon	28	0.09
Houghton	61	0.20	Saginaw	582	1.93
Huron	52	0.17	Sanilac	40	0.13
Ingham	1,269	4.20	Schoolcraft	12	0.04
Ionia	39	0.13	Shiawassee	79	0.26
Iosco	28	0.09	St. Clair	276	0.91
Iron	14	0.05	St. Joseph	69	0.23
Isabella	91	0.30	Tuscola	37	0.12
Jackson	213	0.71	Van Buren	91	0.30
Kalamazoo	967	3.20	Washtenaw	3,421	11.33
Kalkaska	9	0.03	Wayne	4,765	15.78
Kent	2,010	6.66	Wexford	75	0.25
Keweenaw	1	0.00	Total	30,188	100.00