Independent Market Evaluation and Recommendations for the Development of an Osteopathic Medical School at Xavier University

Prepared by Tripp Umbach
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Tripp Umbach
Turning Ideas Into Action

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Executive Summary

Introduction

Tripp Umbach[1] was retained by Xavier University (Xavier)[2] in January 2023 to analyze and independently assess the feasibility of the development of a four-year osteopathic medical school in Cincinnati, Ohio. Tripp Umbach completed a comprehensive feasibility study process involving analysis of secondary data, stakeholder interviews, a review of the financial model, and economic impact projections (refer to Appendix A for Project Overview). The report represents Tripp Umbach's key findings and recommendations with respect to the feasibility of an osteopathic medical school developed by Xavier.

Tripp Umbach bases our feasibility analysis on five factors when making recommendations for new or expanded osteopathic medical school programs:

1. Physician Shortage – There is a demonstrated need for more physicians within the study region.
2. Community Support – New osteopathic medical schools acquire support from multiple constituents, including a combination of regional, statewide, and internal stakeholders.
3. Institutional Capacity and Readiness – The academic capacity and infrastructure to add a successful osteopathic medical school program without taking resources from other health science programs.
4. Sufficient Clinical Capacity – New osteopathic medical schools develop comprehensive strategies for academic and administrative leaders to develop and foster strong relationships with clinical partners to provide for clerkship (third- and fourth-year undergraduate medical education) as well as residency training (three to seven years of graduate medical education).
5. Financial Resources – New osteopathic medical schools must secure funds for up to four years of schooling in an unencumbered, escrowed account, as well as one year of operational funding.

[1] Tripp Umbach is the nation's most experienced consulting firm in academic medicine, serving national associations, 75 existing medical schools, more than 500 hospital systems, and 200 universities since 1990. Over the past 15 years, Tripp Umbach has been involved in the majority of medical school development and expansion projects in the United States, completing more than 30 similar studies that have led to 12 new medical schools.

[2] Xavier University is a private Jesuit university in Cincinnati and Evanston, Ohio. It is the sixth-oldest Catholic and fourth-oldest Jesuit university in the United States. Xavier has an undergraduate enrollment of 4,860 students and graduate enrollment of 1,269 students. The school's system comprises the main campus in Cincinnati and regional locations for the Accelerated Bachelor of Science in Nursing program in Columbus and Cleveland.

Key Findings

The findings contained herein represent the professional opinions of Tripp Umbach personnel based on assumptions and conditions detailed in this report. In no particular order, Tripp Umbach's analysis completed for Xavier supports the following key findings:

1. Demographics such as population growth and aging continue to be critical drivers of increased physician demand across the nation and in Ohio.

   The need for more primary-care physicians as shown by the Health Resources and Services Administration (HRSA) Health Workforce is significant. As of January 2023, the United States has 8,296 Primary Care Health Professional Shortage Areas (HPSAs), with 99 million people living within these areas. Nationally, 17,067 practitioners would be required to meet primary-care physician needs, based on a population-to-practitioner ratio of 2,000:1. Ohio has 186 primary-care HPSA designations, totaling a population of nearly 2.4 million within the HPSAs. Therefore, the state would need 408 practitioners to remove the designations.

   The national shortage of physicians profoundly affects health-care access, adds to wait times for medical appointments, and causes lengthier travel to see a doctor. The elderly, the poor, and rural residents, who are already medically underserved, will face even greater challenges because of the physician shortage. The country's growing population, particularly those age 65 and older, will inevitably demand more medical care. People in that age group now account for 34% of the demand for physicians and, by 2034, are projected to account for 42% of the demand.[3] In raw numbers, people aged 65 and up will require up to 407,300 physicians by 2034. An aging population requires more complex care and thus greater reliance on specialized care.

   The Robert Graham Center[4] forecasts that by 2030, Ohio will require an additional 681 primary-care physicians (PCPs), an 8% increase compared to the state's 2010 primary-care physician workforce. The 2030 projection stands below the Midwest and nation overall. Components of Ohio's increased need for PCPs include 410 PCPs from increased use because of aging and 218 PCPs caused by a greater insured population following adoption of the Affordable Care Act (ACA). These increases are offset by the lower demand for PCPs (53 PCPs) attributable to the projected decrease in state population.

[3] AAMC, Association of American Medical Colleges, 2021

[4] Robert Graham Center.

Pressures from a growing, aging, increasingly insured population call on Ohio to address current and growing demand for PCPs to adequately meet health-care needs.

Additionally, a significant portion of the physician workforce is nearing age 65. According to the AAMC, more than two of every five active physicians will be 65 or older within the next decade. On top of that, physicians are already suffering high levels of job-related burnout, even before COVID-19 arrived, and the exacerbation of those feelings caused by the pandemic could accelerate plans for retirement.

In 2020, Ohio reported 19.5% of the state's physicians being 39 or younger, while more than one-third (30.5%) were 60 and older. Ohio is ranked number 45 nationally active physicians aged 60 or older, and their retirement within the next few years will leave a significant hole in the state's physician workforce and further impact Ohioans' ability to seek care. For a state already experiencing primary-care physician shortages, an aging physician workforce will pose a greater issue as the number of physicians retiring will increase the need.

2. Osteopathic medicine is one of the fastest-growing health-care professions in the nation.

The osteopathic medical profession is one of the fastest-growing segments of health care, representing more than 11% of all U.S. physicians. In 2022, more than 7,300 new Doctors of Osteopathic Medicine (D.O.) joined the workforce. The pipeline of future D.O.s poised to enter the profession reached an all-time high, with approximately 36,500 osteopathic medical students expected to matriculate during the 2022-23 academic year. Over the last decade, the number of students attending osteopathic medical school has grown by 77%, helping lead to an 81% increase in the number of D.O.s. and osteopathic medical students in the United States.

The profession is on track to play an increasingly important role in ensuring access to care nationwide, including for the most vulnerable populations. Osteopathic medical schools typically train primary-care physicians as part of their mission. With the physician shortage impacting the infrastructure of health care, the osteopathic profession plays a critical role in helping build the workforce and front line of physicians. The profession's strong base in primary care also contributes toward addressing physician shortages in medically underserved regions. In fact, six of the 10 U.S. medical schools that produce the most primary-care residents are osteopathic medical schools, according to U.S. News &

World Report's annual ranking of medical schools for 2022, including campuses in Kentucky, Mississippi, Oklahoma, Pennsylvania, Tennessee, and West Virginia.[5]

Despite the osteopathic profession's strong relationship to primary care, there is also an increase in the number of D.O.s who are pursuing the practice of non-primary care specialties. Aligning with similar trends in the profession, 43.6% of osteopathic medical school graduates who participated in the 2022 NRMP Match landed in non-primary care residency placements across a wide range of specialties, including diagnostic radiology, neurology, neurosurgery, and orthopedic surgery. This allows for osteopathic principles to be further practiced across all areas of medicine.

As more medical students choose to pursue osteopathic medicine, the demographic makeup of the profession continues to evolve. Over the last decade, the proportion of the D.O. population in active practice under age 45 has increased by 16%. In 2022, more than 82,000 D.O.s practicing were younger than 45, representing more than two-thirds of the profession. The number of female D.O.s also continues to trend upward each year, demonstrated by an 18% increase in the proportion of female D.O.s in active practice over the past decade. This number is expected to grow as the number of female osteopathic medical students continues to increase. According to the 2021 AACOM Application Service Applicant and Matriculant Report, 54% of first-year osteopathic medical school matriculants for the 2021-22 academic year were female.

3. Xavier University has a strong foundation for the development of an osteopathic medical school.

Based on experiences of new osteopathic medical schools that have been developed at established universities, the proposed osteopathic medical school will enroll highly qualified students who are diverse across racial, ethnic, sociodemographic, and geographic backgrounds to reflect a variety of student experiences, personal interests, and academic goals. Xavier has successful pipeline relationships through its established health science programs. In addition, the establishment of a D.O. program at Xavier is likely to increase enrollment throughout the university in other areas, especially in the health sciences as students may matriculate into programs at the undergraduate or master's level with the intention of continuing their studies in osteopathic medicine.

Besides the ability to provide learning experiences with the other colleges, the new medical school will have access to Xavier's resources and infrastructure such as library resources, shared faculty

[5] AACOM, Annual Osteopathic Medical School Questionnaires, 1976-1977 through 2019-20 academic years

resources, research labs, and shared space, allowing the medical education program to be provided much more cost effectively than other new medical schools. Existing education and resources in place at Xavier will be an important component of the new medical school and will contribute to the development of innovative ways to teach and deliver cost-effective, high-quality healthcare.

Xavier University brings together faculty with knowledge and expertise in a wide range of areas including nursing, health sciences, and business, with a culture of interprofessional engagement. The proposed osteopathic medical school faculty will engage in interdisciplinary, collaborative research projects, and novel teaching approaches much more effectively than would be possible in a larger, more traditionally structured institution.

4. Clinical support exists for further exploration of an osteopathic medical school at Xavier University.

Overall, clinical stakeholders supported the need for additional primary care and specialty care physicians. They also shared a high-level of interest in partnering with Xavier to provide clinical training. The stakeholders believe that the development of the proposed osteopathic medical school is in the very best interest of everyone involved. The benefits are visible, as well as recognized, and each hospital representative offer this initiative full support. Interviewees were virtually unanimous in their view that Xavier has the resources required to develop an osteopathic medical school in collaboration with health systems, community health organizations, research directed at understanding best practices for population health improvement.

Stakeholders believe the proposed osteopathic medical school will have the capability to enhance collaborative efforts of multiple clinical partners within the region. The area is home to multiple hospitals, and all would benefit from a partnership with an osteopathic medical school. Stakeholders also mentioned that the community's potential for increased economic activity would be an indirect effect of the development of the proposed osteopathic medical school, attracting businesses and drawing more people into the region to spend money.

The only concern among stakeholders is the limited number of residency programs in the region to accommodate medical students from Xavier.

5. An osteopathic medical school at Xavier University would generate significant economic and social impacts to the Cincinnati region.

The opening of the proposed osteopathic medical school in Cincinnati will bring significant "fresh dollars" to the state and is likely to inspire additional economic development through the potential expansion of other health science education programs and clinical and research partnerships with nearby community hospitals and private business expansions that may be developed.

Tripp Umbach estimates that Xavier will invest approximately **$65 million** in facilities and equipment. Over the construction period, the capital project will generate **$125.5 million** in economic impact, support **742 jobs**, and produce **$3.2 million** in state and local tax impact. By 2033, the osteopathic medical school will directly and indirectly support **351 jobs** in the region, generate **$48.5 million** in total economic impact per year (direct, indirect, and induced impacts), and will add **$1.7 million** in state and local tax revenue.

The proposed osteopathic medical school will graduate 150 physicians annually, and an additional **$198.0 million** will be added to the state economy every year if 60% of the students complete residencies and stay in Ohio to practice. If the school can increase the retention with the pipeline programs and retain more physicians for GME and beyond, this impact will increase as the retention increases. Assuming that 25% of graduates from the school practice in underserved communities, Tripp Umbach estimates that by 2035 these new primary-care physicians will also yield real savings, as emergency room utilization declines and quality of care improves. These savings are expected to total **$127.5 million** annually by 2035.[6]

A new osteopathic medical school will also:

- Expand health-care access for underserved populations.
- Address workforce needs by expanding numbers of highly qualified doctors who have regional connections and interests.
- Accelerate expansion of an innovation economy whereby biomedical companies are launched in and attracted to the region; new jobs are created; and research sparks technology transfer,

[6] Based on Tripp Umbach's estimates each primary-care physician who serves in underserved area generates $3.4 million in health-care cost savings.

commercialization, and economic value through improvements in prevention, treatment, and practice.

- Focus the health-care delivery system on underserved populations. As a result, the quality of life for community residents improves as well as the ability to leverage health-care cost savings.

Consultant Recommendations

1. Xavier University should move forward with Applicant Status with the Commission on Osteopathic College Accreditation (COCA).
2. Xavier University should begin the search process to hire a Founding Dean.
3. Xavier University leadership should work closely with TriHealth, The Christ Hospital, St. Elizabeth, and other clinical partners to establish a clinical training plan at both the UME and GME levels.

Key Factors for Success

The ultimate yardstick for measuring the success of a medical school is the ability for the school to graduate medical students who pass national tests, matriculate into residency training programs, and become quality physicians. The COCA that accredits osteopathic medical schools in the United States awarding the D.O. degree has multiple standards that must be met and maintained. The success of the new osteopathic medical school will be based upon having the following in place:

- Clear mission and areas of focus that distinguish the new osteopathic medical school at Xavier in curriculum, research, and community service.
- The recruitment of an effective Founding Dean alongside high-quality faculty and students.
- Deeply rooted clinical education partnerships with hospitals and other clinical partners.
- Integrated GME programs with clinical partners.
- The development of appropriate facilities to deliver the medical education program.
- Facilities and technology that support student achievement.
- Ongoing development of community health improvement programs.
- Ongoing demonstration of economic impact and return on investment.

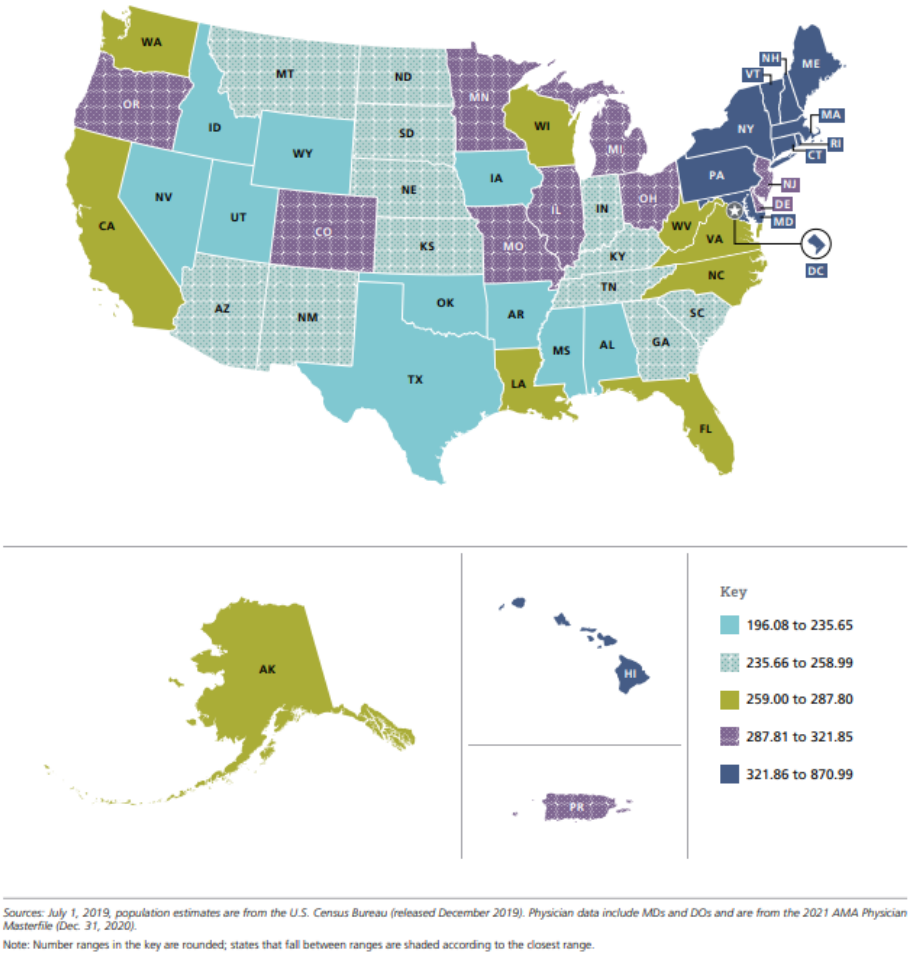
Environmental Scan – National Outlook

The Supply and Demand Imbalance for Physicians Across the United States

The United States is facing a serious shortage of physicians, largely because of the growth and aging of the population and the impending retirements of older physicians. Even though medical schools have increased enrollment by 31% since 2002, new data from the Association of American Medical Colleges (AAMC) predicts that the United States will face a shortage of 37,800 to 124,000 physicians by 2034, with a shortfall of 17,800 to 48,000 primary-care physicians. At the same time, a shortage in non-primary-care specialties will total 21,000 to 77,100 physicians.[7]

In 2020, there were 286.5 active physicians per 100,000 population in the United States, ranging from a high of 466.0 in Massachusetts to a low of 196.1 in Idaho. The states with the highest number of physicians per 100,000 population are concentrated in the Northeast (see Figure 1).[8]

Figure 1: Active Physicians per 100,000 Population, 2020



Sources: July 1, 2019, population estimates are from the U.S. Census Bureau (released December 2019). Physician data include MDs and DOs and are from the 2021 AMA Physician Masterfile (Dec. 31, 2020).

Note: Number ranges in the key are rounded; states that fall between ranges are shaded according to the closest range.

[7] "New AAMC Report Confirms Growing Physician Shortage." AAMC News, June. 2021

[8] AAMC, 2021 State Physician Workforce Data Book

The Increased Effect of COVID-19 on Physician Shortages Across the United States

The 2020 AAMC physician workforce projections were prepared before the pandemic, and the AAMC stated that COVID-19 is likely to have short- and long-term consequences for the nation's physician workforce, including changes in the specialties physicians choose, the educational pipeline, licensure, reimbursement regulations, how medicine is practiced, and workforce exit patterns. The COVID-19 pandemic has already highlighted shortages in specialty physicians, especially those with hospital-based specialties such as critical care, pulmonary care, and emergency medicine.[9]

As a result of COVID-19 and its profound disruption, The Physicians Foundation redirected the focus of its survey exclusively to the pandemic. The survey found that 8% of physicians had closed their practices.[10] With more than 200,000 medical practices in the United States, that means about 16,000 had closed. Another 4% of doctors planned to close shop within 12 months. The closing of practices and burnout raise the specter of an even greater doctor shortage than is already expected.[11]

Addressing the shortage will require a multipronged approach, including innovation in care delivery; greater use of technology; improved, efficient use of all health professionals on the care team; and an increase in federal support for residency training.[12] The magnitude of the projected shortfalls is significant enough that no single solution will be sufficient to resolve physician shortages. Because physician training can take up to a decade, a physician shortage in 2034 is a problem that needs to be addressed now.[13]

Current and Future Physician Workforce Shortages

The U.S. Department of Health and Human Services Health Resources and Services Administration (HRSA) develops shortage designation criteria and uses them to decide whether a geographic area, population group, or facility is a Health Professional Shortage Area (HPSA) or a Medically Underserved Area or Population (MUA/P). HPSAs may be designated as having a shortage of primary medical care, dental, or mental health providers.

As of January 2023, across the United States there were:[14]

[9] AAMC Physician Supply and Demand — A 15-Year Outlook: Key Findings

[10] Ibid.

[11] The Physicians Foundation Survey.

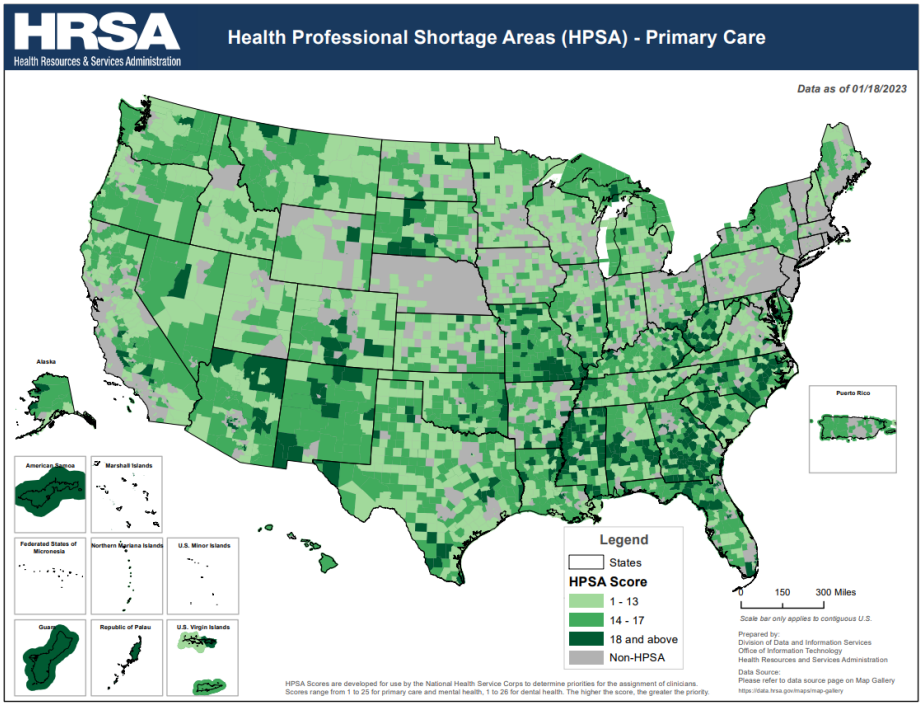
[12] Ibid.

[13] Ibid.

[14] https://data.hrsa.gov/topics/health-workforce/shortage-areas

- 8,294 Primary Care HPSAs, with 99 million people living within these areas. Nationally, 17,065 practitioners would be required to meet primary-care physician needs, based on a population-to-practitioner ratio of 2,000:1.
- 6,599 Mental Health HPSAs totaling a population of 158 million. It would take 7,957 practitioners to meet their need for mental health providers (a population-to-practitioner ratio of 30,000:1).

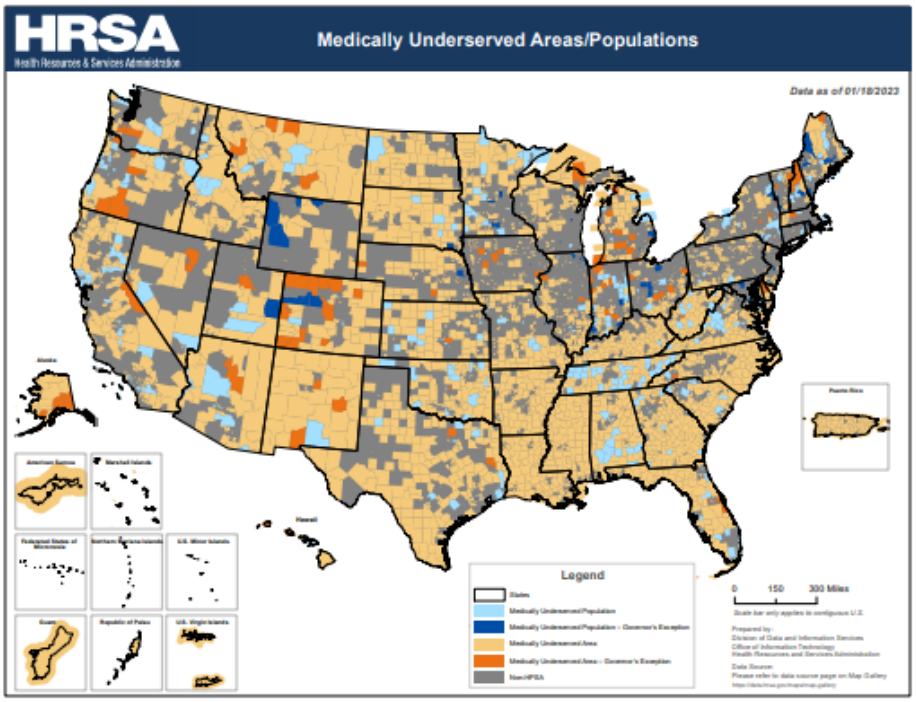
Figure 2: Primary Health HPSA Designated Type.[15]



Medically Underserved Areas (MUA) can be a whole county or a group of contiguous counties, a group of counties or civil divisions, or a group of urban census tracts in which residents have a shortage of personal health services. Medically Underserved Populations (MUPs) may include groups of persons who face economic, cultural, or linguistic barriers to health care.

[15] https://data.hrsa.gov/ExportedMaps/MapGallery/HPSAPC.pdf

Figure 3: MUAs and MUPs Designated Type.[16]



Besides the number of providers required to meet the demand in the HPSAs, the United States would need an additional 95,900 doctors immediately if use of health care were equalized across race, insurance coverage, and geographic location. [17]

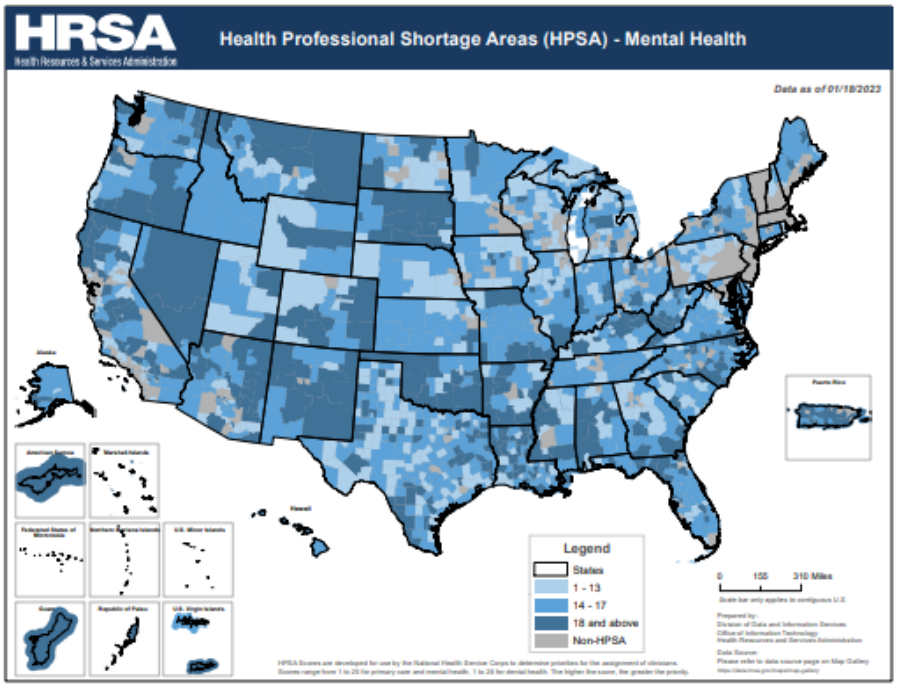
[16] Ibid.

[17] New Findings Confirm Predictions on Physician Shortage | AAMC

Physician Workforce Shortages in Mental Health

While the shortage of primary-care physicians has been well-documented, the shortage of psychiatrists is an escalating crisis of more severity than shortages faced in nearly any other medical specialty. One in four older adults experiences some mental health disorder including depression, anxiety disorders, and dementia. This number is expected to double to 15 million by 2030.[18] As stated above, the United States reported 6,599 HPSA mental health-care designations, resulting in the need of an additional 7,957 practitioners to remove the HPSA designation label across the nation.[19]

Figure 4: Mental Health HPSA Designated Type.[20]



Two-thirds of older adults with mental health problems do not receive the treatment they need. Current preventative services for this population are extremely limited. Untreated substance abuse and mental health problems among older adults are associated with poor health outcomes, higher health-care utilization, increased complexity of the course and prognosis of many illnesses, increased disability, and impairment, compromised quality of life, increased caregiver stress, increased mortality, and higher risk of suicide.

[18] National Council on Aging.

[19] Data.hrsa.gov. November 2020.

[20] Ibid.

The Mental Health America released its annual report, which includes a spotlight on the impact of COVID-19 on mental health, using the more than 1.5 million people who have undergone MHA Screening from January to September 2020.[21]

Key findings from the State of Mental Health of America 2023:

- In 2019-2020, 20.78% of adults, or more than 50 million Americans, were experiencing a mental illness.
- The vast majority of individuals with a substance use disorder are not receiving treatment. A total of 15.35% of adults had a substance-use disorder in the past year. Of those, 93.5% received no treatment.
- Millions of adults experience serious thoughts of suicide, with the highest rate among multiracial individuals. The percentage of adults reporting serious thoughts of suicide is 4.84%, or 12.1 million individuals. A total of 11% of adults who identified with two or more races reported serious thoughts of suicide in 2020 – 6% higher than the average among all adults.
- More than one in 10 youth experience depression that is severely impairing their ability to function at school or work, at home, with family, or in their social life. A total of 16.39% of youth (age 12-17) report suffering from at least one major depressive episode (MDE) in the past year, with 11.5% of youth (more than 2.7 million) experiencing severe major depression.
- More than half (54.7%) of adults, or 28 million, with a mental illness do not receive treatment. In Montana, ranked No. 1, more than four in 10 adults with a mental illness did not receive care.
- Almost a third (28.2%) of all adults with a mental illness reported that they were not able to receive the treatment they needed. A total of 42% of adults with AMI reported they were unable to receive necessary care because they could not afford it.
- A total of 10.8% (more than 5.5 million) of adults with a mental illness are uninsured. Hispanic adults with AMI were least likely to have health insurance, with 19% reporting they were not covered by insurance.
- A total of 6.34% of youth reported a substance-use disorder in the past year. That is equivalent to more than 1.5 million youth who meet the criteria for an illicit-drug or alcohol-use disorder.

[21] https://www.mhanational.org/issues/state-mental-health-america

- A total of 22.87% of adults report experiencing 14 or more mentally unhealthy days each month were not able to see a doctor because of costs. In Georgia (ranked 51), more than one-third of adults experiencing frequent mental distress are unable to afford a doctor's visit.
- A total of 59.8% of youth with major depression do not receive any mental health treatment. Asian youth with major depression were least likely to receive specialty mental health care, with 78% reporting they did not receive mental health services in the past year. In South Carolina, the lowest-ranking state, nearly eight in 10 youth with depression do not receive care.
- Nationally, only 28% of youth with severe depression receive some consistent treatment (7-25+ visits in a year). Most (57.3%) youth with severe depression do not receive any care.
- Nationally, one in 10 youth who are covered under private insurance do not have coverage for mental or emotional difficulties – totaling more than 1.2 million youth. In Arkansas (ranked 51), nearly one-quarter of youth with private insurance do not have coverage for mental health care.
- Only .718 percent of students are identified with emotional disturbance for an individualized education program (IEP). IEPs, with sufficient resources for schools and teachers, are critical for ensuring that youth with disabilities can receive the individualized services, supports, and accommodations to succeed in a school setting.
- The United States has an estimated 350 individuals for every mental health provider. However, these figures could overestimate the number of active mental health professionals, as it may include providers who are no longer practicing or accepting new patients.

The National Alliance on Mental Health estimates that untreated mental illness costs the country up to $300 billion every year because of losses in productivity. As more people survive to older ages, mental disorders, such as dementia, become increasingly prevalent and are likely to drive spending on mental disorders even higher.[22] Psychiatrists are the third-oldest type of physicians in the nation. The current workforce is retiring, with 60% of active psychiatrists aged 55 or older and 46% who are 65 or older. Workforce projections show an estimated shortage of at least 21,000 psychiatrists nationwide by 2030. The retirement of these physicians will create a premium on increasing psychiatrist supply through graduate medical education.[23]

[22] Ibid.

[23] 7 Things to Know About the Psychiatrist Shortage - Healthgrades

Population Growth

The U.S. population is projected to increase by 81 million people in the next four decades, from about 336 million in 2020 to 417 million by 2060.[24] This corresponds to an average increase of 2 million people per year.[25] The population is projected to cross the 400 million mark in 2060.[26]

An Aging Population

The nation's 65-and-older population is projected to nearly double in size in coming decades, from 49 million in 2016 to 95 million people in 2060.[27] Additionally, the aging population will affect physician supply, since as of 2020 one-third of all currently active doctors are older than 60.[28] Approximately 80% of older adults have at least one chronic disease, and 77% have at least two. Four chronic diseases — heart disease, cancer, stroke, and diabetes — cause almost two-thirds of all deaths each year.[29]

- Chronic diseases account for 75% of the money our nation spends on health care, yet only 1% of health dollars is spent on public efforts to improve overall health.
- Diabetes affects 12.2 million Americans aged 60 and older, or 23% of the older population. Another 57 million Americans aged 20 and older have pre-diabetes, which increases a person's risk of developing Type 2 diabetes, heart disease, and stroke. In a 2007 Centers for Disease Control and Prevention program for people at high risk for developing diabetes, lifestyle intervention reduced risk by 71% among those 60 and older.
- A total of 90% of Americans 55 and older are at risk for hypertension, or high blood pressure. Women are more likely than men to develop hypertension, with half of women 60 and older and 77% of women 75 and older having this condition. Hypertension affects 64% of men aged 75 and older.
- Specialist physicians are, in general, older on average than are primary-care physicians, and they will be retiring in proportionately higher numbers.[30] Physician retirement could have the greatest impact on supply.

[24] Projected Population Size for the United States. 2015-2060 U.S. Census Bureau, Population Division

[25] Ibid.

[26] Ibid.

[27] Ibid.

[28] AAMC 2021 State Physician Workforce Data Report.

[29] https://www.ncoa.org/news/resources-for-reporters/get-the-facts/healthy-aging-facts/

[30] Physician Supply Considerations: The Emerging Shortage of Medical Specialists: Merritt Hawkins, 2017

The longevity associated with improved population health would also raise demand for physicians by 2034. Although achieving population health goals, such as reducing excess body weight; improving control of blood pressure, cholesterol, and blood glucose levels; and reducing smoking prevalence will likely reduce demand for some specialties, the demand for other specialties, like geriatric medicine, will increase as people live longer.[31]

The Aging Physician

Another issue tied to physician shortages that is often overlooked is the fact that physicians retire. Not only is there currently a national shortage of physicians, but many physicians leave the field every year. Across the United States, there are approximately 936,511 active physicians. Of these physicians, 16.3% are under the age of 40, 50.0% are aged 40-59, and 33.7% are aged 60 or older.[32] This equates to more than 315,452 physicians across the country who will be retiring in the next few years. Maine had the highest percentage of physicians 60 and older (39.3%), while Utah had the lowest percentage (28.3%).[33]

Shifts in retirement patterns over that time could have large implications for the supply of physicians to meet health-care demands. Also, growing concerns about physician burnout suggest physicians will be more likely to accelerate than delay retirement. Specifically, COVID-19 has changed the landscape of medicine in profound ways, prompting some physicians to retire before they had planned and others to close their practices because so many of their patients stopped going to the doctor once the pandemic began.[34] The doctor shortage could lead to longer wait times and farther travel, especially for people in rural areas.[35]

[31] The Complexities of Physician Supply and Demand: Projections from 2017 to 2032, AAMC, April 2019

[32] AAMC 2021 State Physician Workforce Data Book

[33] Ibid.

[34] http://physiciansfoundation.org/wp-content/uploads/2020/08/20-1278-Merritt-Hawkins-2020-Physicians-Foundation-Survey.6.pdf

[35] https://www.usnews.com/news/health-news/articles/2020-10-13/pandemic-dangers-drive-some-doctors-to-switch-jobs-retire-early

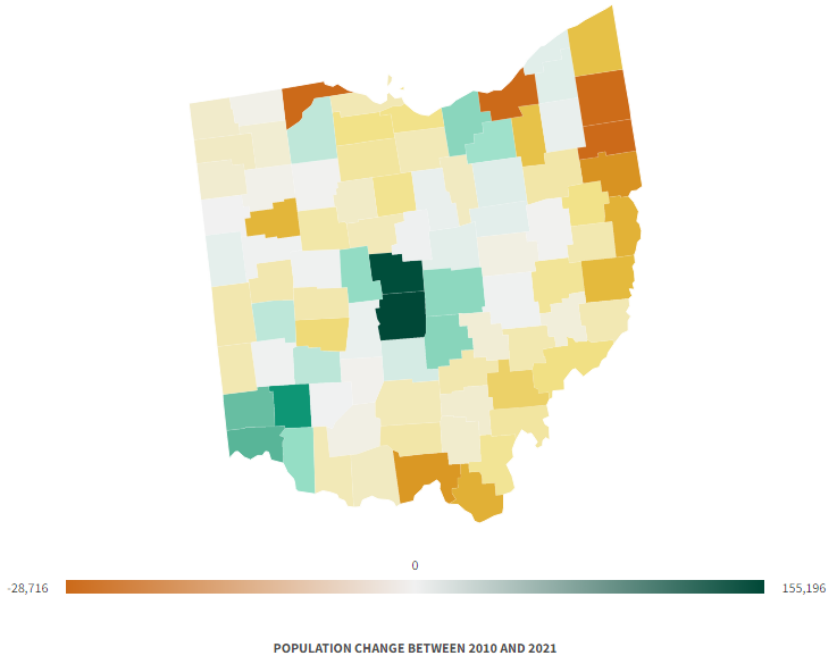
Environmental Scan – State of Ohio

Population Data

According to the U.S. Census Bureau, whiles Ohio's growth is slow, it's still ahead of the rest of the country. According to recent data from the U.S. Census Bureau, Ohio's population was estimated at 11.8 million as of April 2020, an increase of 262,944 since 2010. The state saw a 2.3% rate of population growth from 2010 to 2020 and is now the seventh-most populous state. Ohio's population is shifting in several ways that have important implications for the state's health-care workforce.

While the nation's population grew only 7.4% over the last decade, Ohio saw nearly 2.3% growth. Ohio's population is spread throughout the state with many major cities. Columbus, the capital, has the highest population with 850,000 residents, followed by Cleveland (388,072), Cincinnati (298,550), Toledo (298,550) and Akron (197,542).[36] In 2021, Ohio was more diverse than it was in 2010. In 2021, the white (non-Hispanic) group made up 77.7% of the population compared with 81.2% in 2010. From 2010 to 2021, the share of the population that is Hispanic/Latino grew the most, increasing 1.2 percentage points to 4.3%. The white (non-Hispanic) population had the largest decrease dropping 3.5 percentage points to 77.7%.[37]

Figure 5: Population Change From 2010 to 2021



[36] https://worldpopulationreview.com/states/ohio-population

[37] Ohio population by year, county, race, & more | USA Facts

Cincinnati, the seat of Hamilton County in southwestern Ohio, is home to Xavier. Cincinnati lies along the Ohio River 15 miles east of the Indiana border and about 50 miles southwest of Dayton. Cincinnati is Ohio's third-largest city, after Columbus and Cleveland.

Diverse Population

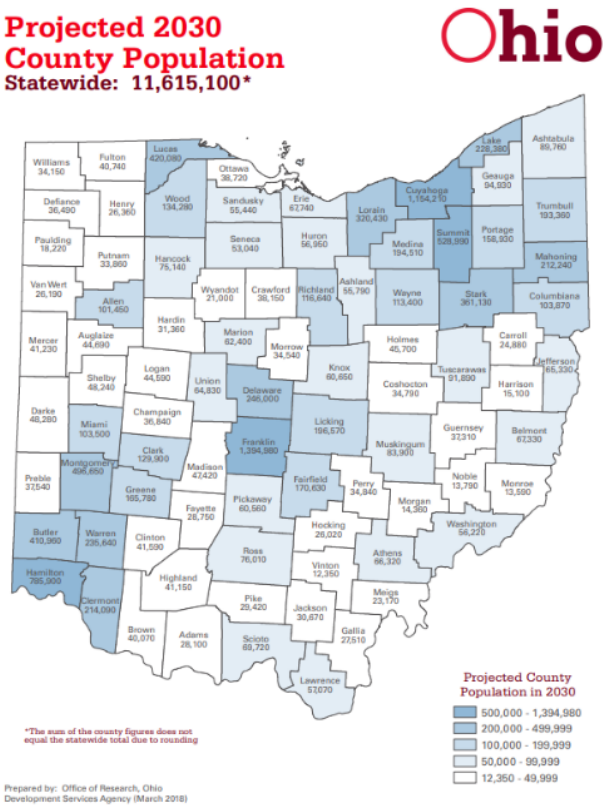
Equally remarkable has been the population's increasing diversity. According to the most recent American Community Survey (ACS), the racial composition of Ohio was 80.47% white, 12.36% Black or African American, 3.56% two or more races, 2.30% Asian, 1.11% other race, 0.18% Native American, and 0.03% Native Hawaiian or Pacific Islander. Ohio has one of the lowest Hispanic populations in the country based on percentages. Most of Ohio's Hispanic residents are Mexican American and live in the Columbus and Toledo areas. Ohio ranks among the bottom 10 states when it comes to the percentage of Hispanics compared to the state population. Ohio is ranked 17th of 50 states for its African American population, which primarily reside in major metropolitan areas. Approximately 4.1% of the state's residents are foreign-born.[38]

While growth is still expected to occur within Ohio, from 2010 to 2021 Franklin County had the largest growth with 155,196 more residents. Cuyahoga County experienced the largest decline, 28,716 people.[39] The highest population increase, 10.2, was recorded in the central county of Delaware. Neighboring Franklin County, south of Delaware County, grew at the next-highest rate of 7.32%, followed by the southwestern county of Warren at 5.13%. Other counties, including Woods, Holmes, Union, and Miami, saw smaller growth rates.

[38] https://worldpopulationreview.com/states/ohio-population

[39] Ohio population by year, county, race, & more | USA Facts

Figure 6: Projected Population Change



Aging Population

In 2021, 17.8% of Ohioans were age 65 and older. [40]From 2010 to 2015, Ohio's growth in its 65-and-older population was 15.9% higher than the United States at 14.9%. The state expects a lot of growth in its older population. In 10 years, the population composition of the state is shifting older: by 2025, more than one in four Ohioans will be age 60 and older. From 2010 to 2030, the number of Ohioans aged 60 and older is projected to increase by 33.4%.[41] Ohio is in the top 20 states with growing population of people over 65.[42] The American Geriatrics Society has found that by 2030, the state will need an additional 1,010 geriatricians for a population of 2.36 million Ohioans 65 and older.[43]

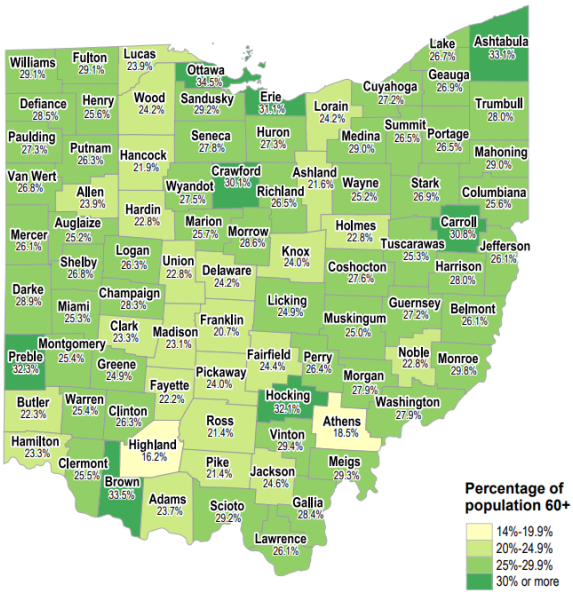
[40] Ohio Population Research - Miami University (miamioh.edu)

[41] Ohio Department of Aging

[42] Population Over 65 by State (2023) | Consumer Affairs

[43] American Geriatrics Society

Figure 7: Ohio 60+, Population by County, 2040



Data source: *Population projections by age and sex, 2015 to 2050*, Ohio Developmental Service Agency, Office of Research (April 2018).

Changes in Ohio's aging population also have important implications for the health-care workforce. The state's elderly population likely will be the major recipients of health care in the future as seniors consume the most health-care services when compared to other age groups for multiple reasons. This growth in the number of elderly Ohioans is expected to have an unprecedented impact on the overall demand for health-care services.

Current and Future Physician Workforce Shortages

Ohio has 35,330 active physicians, of which 11,131 are PCPs.[44] Ohio ranked 25th nationally in active PCPs per 100,000 population. Ohio demonstrates high needs for physicians, reflected in the number of counties in the state that are full or partial HPSAs for primary-care physicians. Ohio has 186 primary-care HPSA designations, totaling a population of 2.4 million within the HPSAs and resulting in the need of an additional 408 practitioners to remove the HPSA designation label. Only 47.87% of the state's need is met.

Table 1: Primary-Care Health Professional Shortage Areas (HPSAs)[45]

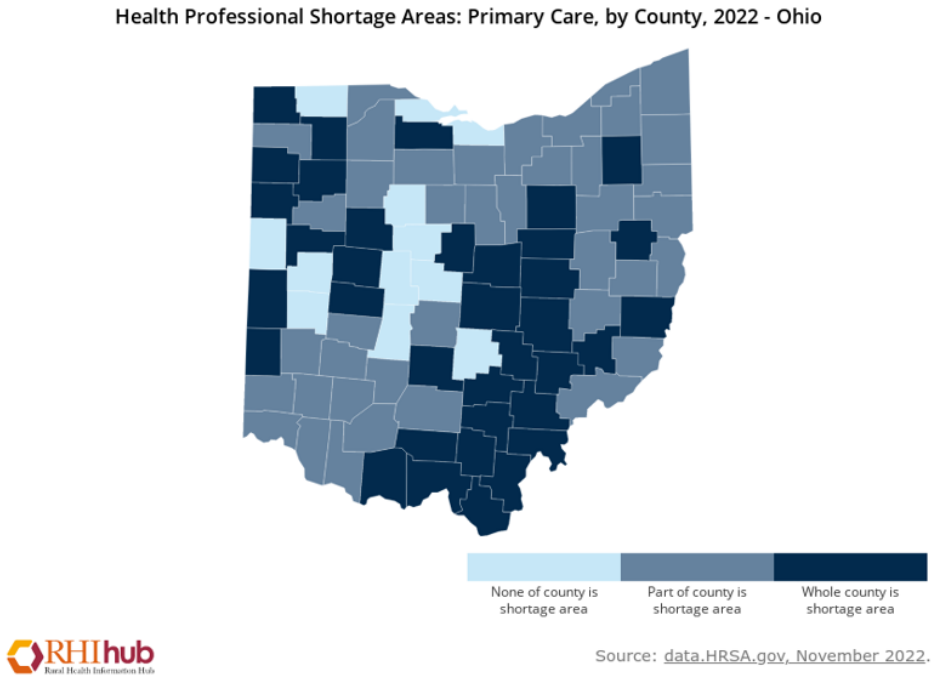
	Total Primary-Care HPSA Designations	Population of Designated HPSAs	Percent of Need Met	Practitioners Needed to Remove HPSA Designation
United States	8,294	98,537,257	47.3%	17,065
Ohio	186	2,387,038	47.9%	408

[44] AAMC. 2021 State Physician Workforce Data Report and Robert Graham Center.

[45] Bureau of Health Workforce Resources and Services Administration (HRSA) U.S. Department of Health & Human Services

Primary-care providers (including physicians, nurse practitioners, physician assistants, and certified nurse midwives) can develop sustained relationships with patients and practice in the context of family and community. Having a usual primary-care provider is associated with a higher likelihood of receiving appropriate care and lower mortality. Having greater access to primary-care providers of all kinds can save lives. Figure 8 shows the significant primary-care health-care shortage areas throughout Ohio.

Figure 8: Primary-Care Health Professional Shortage Areas in Ohio[46]



Although insurance provides access to care, it does not ensure that everyone receives appropriate or high-quality care at the right time. The shortage of health professionals impacts access to care, causing a significant delay in obtaining timely health services and resulting in barriers that negatively affect health outcomes. Access to comprehensive and quality health-care services is important for physical, social, mental health, and overall quality of life. Access to care also promotes preventative measures, managing disease, and reducing unnecessary disability and premature death.

Aging Physicians

In 2020, Ohio reported 19.5% of the state's physicians as younger than 40, while nearly one-third (30.5%) were 60 and older. Ohio shows the 45th across the country of active physicians aged 60 or older, and their retirement within the next few years will leave a significant hole in the state's physician workforce and

[46] Data.HRSA.gov, 2021

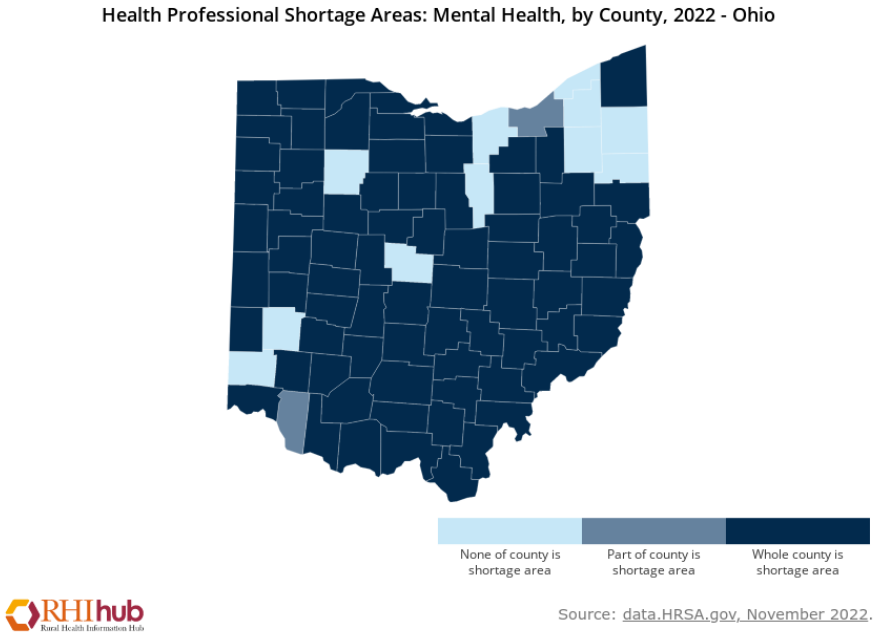
further impact Ohioans' ability to seek care. For a state with existing health-care issues and concerns, an aging workforce will pose significant problems for its community residents.

The Robert Graham Center[47] forecasts that by 2030, Ohio will need an additional 681 primary-care physicians, an 8% increase compared to the state's 2010 PCP workforce. Components of Ohio's increased need for PCPs include 410 PCPs from increased utilization because of aging and 218 PCPs because of a greater insured population following adoption of the Affordable Care Act (ACA). These increases are offset by the lower demand for PCPs (53 PCPs) attributable to the projected decrease in state population.

Current Mental Health Shortages

As of December 2022, Ohio reported 139 mental health-care HPSA designations, resulting in the need of an additional 237 practitioners to remove the HPSA designation label.[48] Figure 8 shows the significant mental health-care shortage areas throughout Ohio.

Figure 9: Mental Health-Care Health Professional Shortage Areas in Ohio



Poor mental well-being affects thousands of Ohioans. Mental illnesses can be acute or chronic and are diagnosable conditions that affect an individual's emotional, psychological, and social well-being and often their behavior. These conditions include depression, anxiety, schizophrenia, and mood or

[47] Robert Graham Center.

[48] Bureau of Health Workforce; Health Resources and Services Administration; U.S. Department of Health and Human Services. Fourth Quarter of Fiscal Year 2021, Designated HPSA Quarterly Summary.

personality disorders, among others. According to the Kaiser Family Foundation (KFF) in 2018-2019, the share of adults in Ohio with any mental illness was 23.6%; the U.S. rate totaled 19.9%.[49]

Mental health issues have increased during the COVID-19 pandemic. According to the Kaiser Family Foundation, average biweekly data for June 2022 found that 33.9% of adults in Ohio reported symptoms of anxiety and/or depressive disorder, compared to 32.8% of adults in the United States. Among those adults in Ohio in March 2022 who reported experiencing symptoms of anxiety and/or depressive disorder, 36.7% reported needing counseling or therapy but not receiving it in the prior four weeks, compared to the U.S. average of 28.5%.[50]

According to Mental Health America, Ohio is ranked No. 37 of the 50 states and District of Columbia for higher prevalence of mental illness and lower rates of access to care. In 2021, 14.4% of Ohio adult residents reported frequent mental distress with 14 or more days of poor mental or emotional health within 30 days. Suicide continues to affect every Ohio community. In 2020, the suicide rate per 100,000 individuals in Ohio was 13.8.[51]

Access to Care

It is crucial that an adequate number of physicians and physician specialists can serve the health-care needs of individuals within geographic areas; however, simply injecting more physicians into an area is not a health-care panacea. Access to health care is also influenced by other factors including economic. National surveys reveal that those who have health insurance have better access to health care than those who are uninsured, make better use of preventive services, and have better health outcomes.[52]

Nationally, in 2021, 5.4% of Ohio's population was uninsured. Compound this with the fact that almost 2.4 million Ohioans live in an HPSA, and serious barriers limit access to care for a substantial number of residents. Ohio also has a rural population, with more than 2,310,238 living in rural regions.[53] Living in a rural region and being poor or unemployed are overwhelming challenges; in addition, residing in a region that is often overlooked compounds these accessibility issues. Rural areas tend to coincide with the HPSAs as well; physicians are less likely to practice in rural areas of the country.

[49] Kaiser Family Foundation.

[50] Ibid

[51] Ibid.

[52] Ibid.

[53] https://www.ruralhealthinfo.org/states/ohio

Rural Health

Ohio needs more doctors, specifically in underserved areas. A statewide focus is needed for the redistribution of doctors to rural areas. For Ohioans living in rural areas, access to primary care is much more limited than that of their counterparts in urban centers. Particularly, residents living in rural areas face greater health challenges, as distance from health providers often creates disparities that are difficult to overcome. Access issues — such as lack of health insurance, lack of available providers, and health-care affordability — all lead to an increased risk of illness or death. Additionally, people who live in rural areas are more likely to be dependent on Medicaid. More than 11.0% of the adults in Ohio reported not having a personal doctor in 2021.[54]

The closure of rural hospitals also makes it much more challenging for residents to obtain care, forcing residents to travel even farther in times of emergencies. A new report from the Chartis Center for Rural Health puts the situation in dire terms: 2019 was the worst year for rural hospital closures in the decade, with 19 hospitals in rural America shutting their doors. Nearly one of every four open rural hospitals has early warning signs that indicate they are also at risk of closing in the near future.[55] Since 2010, 135 rural hospitals have closed, according to University of North Carolina researchers. And today, 453 of the 1,844 rural hospitals still operating across the country should be considered vulnerable for closure.[56] Another concern is that rural hospitals also serve as one of the largest employers and economic contributors in their communities.

Ohio has 33 identified as Critical Access Hospitals, which are designed to reduce the financial weakness of rural hospitals and improve access to health care by keeping essential services in rural communities. The increased accessibility to such services provides a medical home to populations who otherwise would not be able to obtain health-care services. Ohio has 60 Rural Health Clinics and 163 FQHCs along with 49 short-term hospitals that provide services outside of urbanized areas.[57] Figure 10 below reveals the concentrated regions of health-care facilities in Ohio.

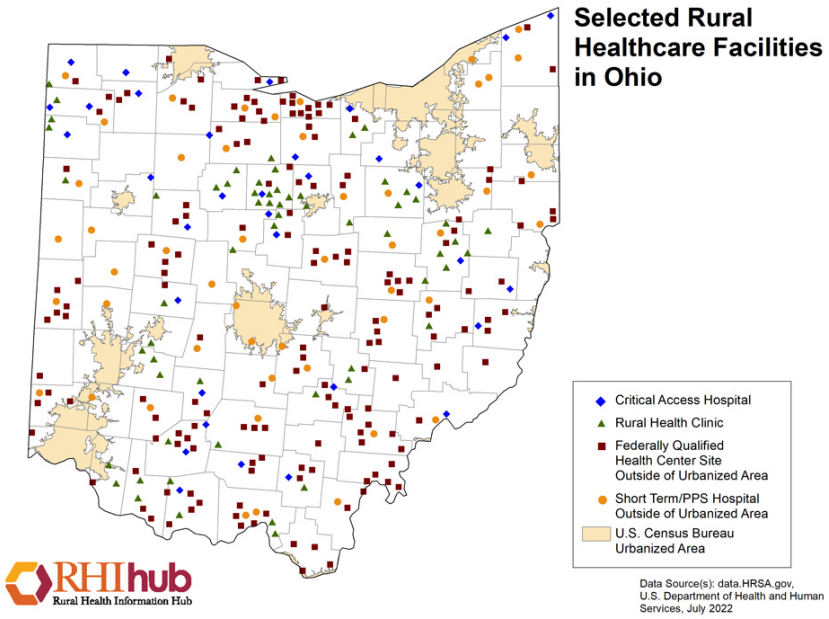
[54] Kaiser Family Foundation.

[55] Chartis Center for Rural Health.

[56] Ibid.

[57] Rural health for Ohio Overview - Rural Health Information Hub

Figure 10: Rural Health-Care Facilities in Ohio



One of the most effective strategies to recruit and retain physicians in rural areas is to expand existing and create new undergraduate medical education and GME training sites in these locations.[58] Osteopathic medical schools developed over the past 20 years have done an outstanding job attracting local students who were unable to matriculate into established medical schools. More than 60% of students at peer rural D.O. programs are from their home state and remain in the state to practice after graduation.

Poverty Status

In 2020, about 13.63% of Ohio's population lived below the poverty line.[59] As of January 2021, Ohio had an estimated 5,020 experiencing homelessness on any given day, as reported by Continuums of Care to the U.S. Department of Housing and Urban Development (HUD). Research shows that economic conditions have a significant impact on population health and on differences in health among various groups.[60] Studies have shown that low household income is often associated with poor physical and mental health status, less social support, more behavioral-risk factors, higher rates of obesity and uncontrolled blood pressure, and poor medical diagnoses. Health disparities emerge when some groups of people have more access to opportunities and resources over their lifetime and across generations. Further, strong evidence suggests that poverty in childhood has long-lasting effects, limiting life

[58] Preparing Physicians for Rural-Based Primary Care Practice. http://jaoa.org/article.aspx?articleid=2625269

[59] U.S. Census Bureau.

[60] Office of Policy Development and Research- PIT Estimates of Homelessness in the U.S. | HUD USER

expectancy and worsening health for the rest of the child's life, even if social conditions subsequently improve.[61]

Health Status

Healthy eating, an active lifestyle, not engaging in overall unhealthy behaviors (smoking, drinking, drug use, etc.), and seeing a physician when sick influence our health. The conditions in which one lives are significant contributors to a person's overall health status. A person's social and financial state also add to the health status of why some Americans are healthier than others. Access to affordable, quality health care is critical to a healthy mind and body. Health insurance helps individuals access needed primary care; however, physicians must be available to treat patients and be relatively close to a patient population.

The United Health Foundation's Health Rankings depict how Ohio compares to other states in a variety of health measures. A ranking of No. 50 represents the worst state for residents reporting the highest levels of disparities in health status, income gap, underemployment rate, and unemployed rate. Overall, Ohio ranks No. 28 for social and economic factors, No. 40 for physical environment, No. 25 for clinical care, No. 40 in behaviors, and No. 40 in health outcomes. The report highlighted that Ohio has the following challenges: 1) high prevalence of frequent mental distress; 2) high prevalence of multiple chronic conditions; and 3) high prevalence of cigarette smoking. It is important to note that Ohio ranked 37 out of 50 for the number of primary-care physicians. Please refer to Table 2.

If underserved populations were to experience the same health-care use patterns as populations with fewer barriers to access, current demand could rise by an additional 74,100 to 145,500 physicians.[62] This analysis underscores the systematic differences in annual use of health-care services by insured and uninsured individuals, individuals in urban and rural locations, and individuals of differing races and ethnicities.[63] These estimates, which are separate from the shortage-projection ranges, help illuminate the magnitude of current barriers to care and provide an additional reference point when gauging the adequacy of physician workforce supply.[64]

[61] Ratcliffe, C., and McKernan, S.M. *Childhood Poverty Persistence: Facts and Consequences.* Washington, D.C. The Urban Institute, Brief 14, June 2010.

[62] AAMC.

[63] Ibid.

[64] Ibid.

Table 2: Health Rankings in Ohio, 2022[65]

Topic	OH Rank	State Ranked No. 1	State Ranked No. 50
Overall State Ranking	37	New Hampshire	Louisiana
Behaviors			
Drug Deaths	47	South Dakota	West Virginia
Excessive Drinking	34	Utah	Wisconsin
High School Graduation	39	Alabama	New Mexico
Obesity	41	Hawaii	West Virginia
Nutrition and Physical Activity	36	Vermont	Mississippi
Smoking	43	Utah	West Virginia
Community & Environment			
Air Pollution	41	Hawaii	California
Severe Housing Problems	11	West Virginia	Hawaii
Chlamydia	35	Vermont	Mississippi
Occupational Fatalities	10	New York	Wyoming
Violent Crime	18	Maine	Alaska
Policy			
Childhood Immunizations	40	Connecticut	Alaska
HPV Immunizations	26	Rhode Island	Mississippi
Public Health Funding	47	Alaska	Nevada, Wisconsin
Uninsured	20	Massachusetts	Texas
Clinical Care			
Dentists	34	Alaska	Delaware
Low Birthweight	31	Oregon	Mississippi
Mental Health Providers	21	Massachusetts	Alabama
Preventable Hospitalizations	39	Hawaii	West Virginia
Primary-Care Physicians	19	Massachusetts	Nevada
Outcomes			
Cancer	47	California	Maine
Cardiovascular Diseases	41	Colorado	West Virginia
Diabetes	39	Colorado	West Virginia
High Health Status	33	Utah	Mississippi
Frequent Mental Distress	38	Hawaii	West Virginia
Frequent Physical Distress	37	Hawaii	West Virginia
Premature Death	38	Hawaii	West Virginia

[65] America's Health Rankings, United Health Foundation: www.americashealthrankings.org

County Health Rankings[66]

The Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute collaborate to conduct the County Health Rankings & Roadmaps program. The goals of the program are to:

- Build awareness of the multiple factors that influence health;
- Provide a reliable, sustainable source of local data to communities to help them identify opportunities to improve their health;
- Engage and activate local leaders from many sectors in creating sustainable community change; and
- Connect and empower community leaders working to improve health.

The rankings measure vital health factors in every county in America. They provide a snapshot of how where we live, learn, and work impact our health and offer a starting point for change in communities. Ohio has 88 counties, ranked on a scale from 1 (healthiest) to 88 (least healthy). Counties are ranked relative to the health of other counties in the same state on the following summary measures:

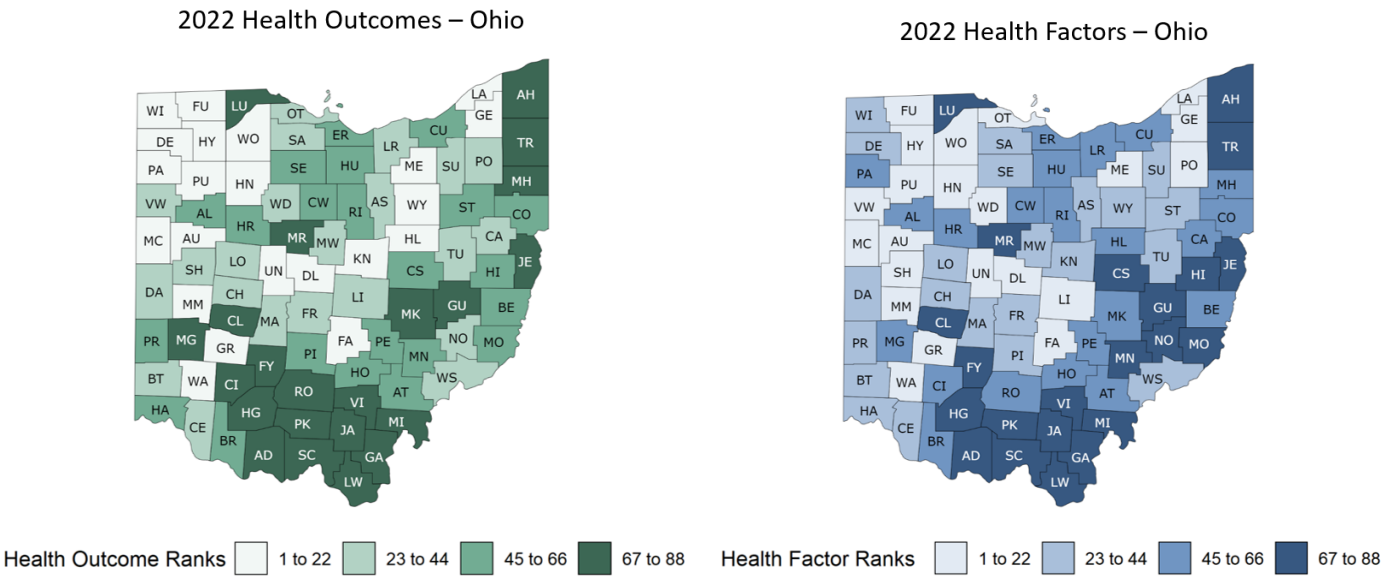
- Health Outcomes: Two types of health outcomes to represent the health of each county: length of life (premature death) and quality of life (physical health, mental health, and low birthweight). These outcomes are the result of a collection of health factors and are influenced by existing programs and policies at the local, state, and federal levels.

- Health Factors: A number of different health factors shape a community's health outcomes. The County Health Rankings are based on weighted scores of four types of factors:
    - Health behaviors (nine measures)
    - Clinical care (seven measures)
    - Social and economic (nine measures)
    - Physical environment (five measures)

[66] County Health Rankings & Roadmaps: www.countyhealthrankings.org

Figure 11 shows the overall health outcomes and the health factors in Ohio. Darker shades indicate areas with poor rankings. As both maps reveal, Ohio represents different clusters of counties with poor health ratings.[67] Reviewing the 2022 County Health Rankings, Hamilton County ranks No. 54 for Health Outcomes and No. 35 in Health Factors.

Figure 11: 2022 Ohio Health Outcomes and Health Factors



[67] County Health Rankings & Roadmaps, 2020, www.countyhealthrankings.org

Medical School Applicants (Demand) Exceed Available Medical School Seats (Supply)

There are 154 accredited medical schools (referred to as M.D. programs) in the United States.[68] In addition to those M.D. programs, 37 colleges of osteopathic medicine teach at 58 locations.[69] Only three states do not have their own medical schools, and those states participate in the WWAMI program: Wyoming, Alaska, and Montana (Rocky Vista University College of Osteopathic Medicine is opening a branch campus in Billings, Montana, while Touro College is planning to build an osteopathic medical school in Great Falls). Those states have medical student representation through this program in a consortium model of medical education.

Every year more students apply to medical school (allopathic or osteopathic). In 2020, medical schools reported the most interest they've seen in more than a decade. According to the AAMC, the number of applications to medical schools across the country increased 18% in 2020. In 2021, the United States had 28,337 medical school graduates. Of those, 20,921 students graduated from an allopathic medical school, and 7,416 students graduated from an osteopathic medical school.[70]

Medical Education Landscape in Ohio

Stepping back to look at the medical education landscape from a broader view, Ohio has seven medical school programs: Cleveland (Case Western Reserve University School of Medicine), Rootstown (Northeast Ohio Medical University), Columbus (Ohio State University College of Medicine), Toledo (University of Toledo College of Medicine), Cincinnati (University of Cincinnati College of Medicine), Dayton (Wright State University Boonshoft School of Medicine), and Athens (Ohio University Heritage College of Osteopathic Medicine). The state's medical education infrastructure does not produce enough physicians to meet current and future community health needs.

In 2021, Ohio had 1,243 medical school graduates. Of those graduates, 1,013 graduated from an allopathic medical school, whereas 230 students graduated from an osteopathic medical school.[71] The map below displays the number of graduates produced from osteopathic medical schools, and the list reflects statistics for Ohio and bordering states.

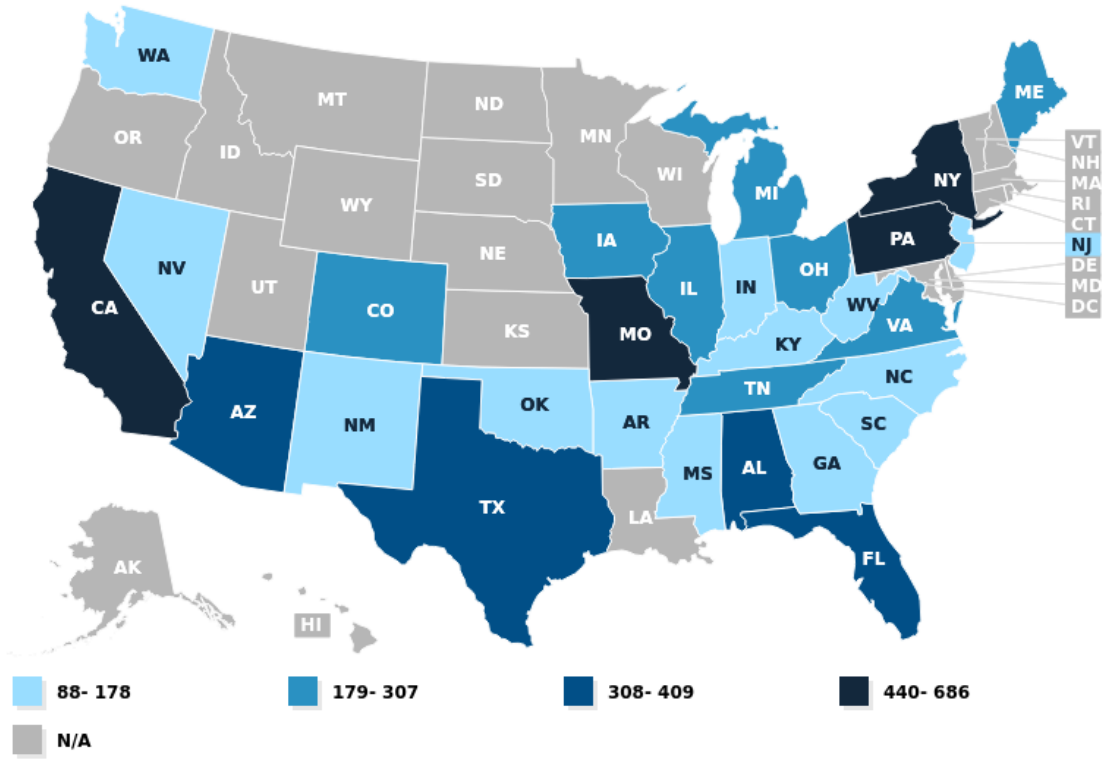
[68] AAMC.

[69] 2020-21 AOA Osteopathic Medical Education Report.

[70] Kaiser Family Foundation, 2021

[71] Ibid.

Figure 12: Total Number of Medical School Graduates: Osteopathic Medical School Graduates, 2021



SOURCE: Kaiser Family Foundation's State Health Facts.

2021	Osteopathic Medical School Graduates
Pennsylvania	634
Michigan	280
Ohio	230
West Virginia	178
Indiana	149
Kentucky	139

Cincinnati is located in the southwestern part of the state with close access to an applicant pipeline from not only Ohio but Indiana and Kentucky. The pipeline created by an osteopathic medical school will inspire and motivate local students to pursue a career in medicine and provide a community choice for those already committed to a medical career while providing an increase in the quality of life for the people of southwestern Ohio. It also should attract people to Ohio from around the United States and other countries who are interested in becoming physicians.

The Fauci Effect

Applicants to Colleges of Medicine (COMs) nationwide come from all 50 states and Puerto Rico. Every year more and more students apply to medical school (allopathic or osteopathic). Particularly, the ongoing coronavirus pandemic has directed a spotlight into the medical community. In 2020, medical schools reported the most interest they've seen in more than a decade. According to the AAMC, the number of applications to medical schools across the country increased 18% compared to the previous year.

Admissions officers and industry professionals believe the surge in applications are because of the example set by medical workers and public health figures such as Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases.[72] Dr. Fauci sees the flood of medical school applicants as a sign that people are thinking about social justice — "that you have responsibility not only to yourself, but as an integral part of society."[73] Increases in the number of applications may also be chalked up to less-stringent requirements this year. Some schools dropped the Medical College Admission Test examination requirement or shifted application deadlines. Whatever the reasoning, ballooning interest in the medical industry could prove vital in countering a growing physician shortage.[74]

Student Data

For the 2021 entering class, 27,277 national applicants applied to osteopathic programs for 8,511 approved seats. There were 3.2 applicants for each COCA-approved seat in the first-year class. Concurrently, for M.D. schools there were 46,758 applicants with only 23,711 matriculating into a program.[75] There were 1.9 applicants for each M.D.-approved seat in the first-year class. Therefore, in 2021 (accounting for applicants across M.D. and D.O.), almost 41,813 students applied and did not enroll into a medical education program for physicians. Those applicants who are not accepted at either an M.D. or D.O. medical school often enroll at offshore medical schools in the Caribbean that are not accredited by the COCA or the Liaison Committee on Medical Education (LCME). These schools often have higher acceptance rates, but they also have higher attrition rates and lower placement results into GME residency programs.[76]

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[72] https://www.forbes.com/sites/jemimamcevoy/2020/12/07/the-fauci-effect-medical-school-applications-jump-18-during-pandemic/?sh=3ebd403263ca

[73] Ibid.

[74] Ibid.

[75] AAMC: https://www.aamc.org/media/57761/download?attachment

[76] https://www.medscape.com/viewarticle/897095

Diverse Student Population

Research shows the importance and the movement of medical schools focusing on diversifying their student body and increasing student interest in caring for the underserved populations. Data has revealed the importance of not only providing affordable educational opportunities to attract and retain high-quality students in the health-care field, but also to retain and secure a diverse student population.

It is important to have a diverse group of students in each class to promote cultural competency. Having a diverse medical workforce does not mean that every patient needs to see a provider just like them. It's about cultural competence, the awareness and ability of providers to respond to the feelings of patients whose cultures and values may be very different from their own. The idea of cultural competency is critical when thinking about the composition of a medical school class.

An essential tactic to meet Xavier's goals for its medical school in Ohio is to have programs or policies in place to recruit a diverse student body. Policies should focus on underrepresented populations in medicine and students from rural and underserved communities, as well as students from disadvantaged backgrounds. An array of approaches should be utilized, in particular a holistic admissions review process focusing on outreach at high schools and four-year colleges and universities.

Educating Local Physicians is Key to Retention

An essential part of increasing the number of physicians in Ohio is to educate local students. From 2019 to 2020, Ohio ranked No. 22 in the United States in most physicians retained in state from UME (indicating the best of 50). The state also ranked No. 30 on most physicians retained in state from GME. Ohio ranked No. 27 for physicians retained in state from UME and GME combined.

Table 3: Ohio Physician Workforce Profile

Ohio 2019-2020	OH	Rank
Physicians Retained in State from UME	39.7%	22
Physicians Retained in State from Public UME	42.6%	23
Physicians Retained in State from GME	44.0%	30
Physicians Retained in State from UME and GME Combined	67.8%	27
Ohio 2019-2020	**Number**	**Percent**
State Where GME Was Completed for All Active Physicians in State	18,948	60%
Practice Location of Physicians Who Completed GME in State	18,948	44%

The proposed four-year osteopathic medical school campus in Cincinnati would capitalize on these numbers for the future if students and residents are placed in residency slots within the state and, most importantly, regionally. National studies show that the combination of UME and GME in the same region has the greatest impact on future workforce. Specifically, when a student graduates from a local high school, college, and medical school and completes a residency in the same region/state, the likelihood to stay and practice medicine when he or she completes residency training is more than 60% (classic pipeline).

The proposed Xavier osteopathic medical school has an opportunity to enhance both the pipeline and the need for physicians in rural and underserved areas by allowing the physicians to complete clerkships and residencies, which will embed the students into the community, increasing the likeliness of them being retained in the local area. Ultimately, strengthening the recruitment and retention of primary-care providers will increase access to care for at-risk and underserved populations and will provide a broader array of services to patients in regions of need throughout the state.

Clinical Training

Clinical Landscape

Ohio is home to 33 Critical Access Hospitals (2022), 60 Rural Health Clinics (2022), 163 Federally Qualified Health Centers located outside of urbanized areas (2022), and 49 short-term hospitals located outside of urbanized areas (2022).[77]

There are a number of hospitals in and around Cincinnati, which are favorable for clinical partnerships and collaborations locally. Table 11 in Appendix F identify these hospitals and health systems throughout the region. These sites may have potential for additional opportunities for students to obtain clerkships as well as residency training.

Clerkship Planning

An important element in determining the feasibility of a new medical school is the number of clinical encounters at nearby hospitals and within the outpatient environment at private practices and community health centers. The availability of clinical positions is imperative to the success of the school. The feasibility of the school relies on student placement in a clinical setting, and the proposed new osteopathic medical school is well-positioned to establish and arrange formal relationships with community partners. To support the educational training needs of third- and fourth-year medical students and to ensure a feasible project, a high degree of commitment to education must be present among a consortium of all hospitals within the region.

The proposed osteopathic medical school will leverage the strengths of multiple clinical partners throughout the region to train physicians to provide team-based, interprofessional patient care to prevent and treat complex and chronic diseases. Besides the ability to provide learning experiences with clinical partners in Hamilton County, the new medical school will have access to clinical partners throughout the state. Tripp Umbach's analysis of hospitals across Ohio and in contiguous states indicates that clinical activity is adequate to support the education of 150 medical students per class.

GME Planning

Besides clerkship training during medical school, before becoming a board-certified practicing physician, medical students must complete a residency training program after graduating medical school. As the rate of medical school enrollment increases, it is important to also monitor and support GME initiatives

[77] Rural Health Information Hub.

as both components are intertwined. As previously mentioned, individuals are most likely to stay in the area in which they complete their residency training to practice.

Data from the AAMC Medical School Enrollment reported that half of medical schools are concerned about their incoming students' ability to find a residency training position of their choice upon completion of medical school, and federal caps on Medicare-funded residency training positions remain effectively frozen at 1996 levels. In response to these concerns, the AAMC, working with the nation's medical schools, teaching hospitals, and health systems, is undertaking a five-year plan to optimize GME in the United States.[78] To help address the physician shortage, the bipartisan Resident Physician Shortage Reduction Act of 2019 (S. 348, H.R. 1763) was introduced in Congress to provide increased Medicare support for 3,000 new residency positions each year over the next five years.[79]

To meet the demand for residency slots, Xavier's academic leadership team is working with health-care providers to plan and develop additional GME opportunities in Ohio but also into Indiana and Kentucky. The COCA's accreditation Standard 10 specifically addresses GME development by stating that "the faculty of a COM must ensure that the curriculum provides content of sufficient breadth and depth to prepare students for entry into a GME program for the subsequent practice of medicine."[80]

Xavier's ability to work with health-care institutions and organizations for GME is strongly supported. Key stakeholders from well-known health-care establishments say the opportunity to provide training to medical students is available and well-received. Xavier's leadership team will continue to visit hospitals, physician groups, and health-care institutions throughout the state to broaden and deepen a collaboration for medical education.

As the rate of medical school enrollment increases, it is important to also monitor and support GME initiatives as both components are intertwined. The advantages and benefits GME brings to communities are noteworthy. They include recruitment cost savings; revenue generation from increase in physicians and residents; workforce alignment; and community-based training sites that can improve health status, decrease costs, and facilitate inter-professional care.

[78] https://www.aamc.org/news-insights/gme

[79] Ibid.

[80] Accreditation standards for new and developing colleges of osteopathic medicine are available at: https://osteopathic.org/wp-content/uploads/2018/02/com-new-and-developing-accreditation-standards.pdf

Residency Match Rate

In 2022, the overall number of registered applicants was 47,675, the second-highest in the history of the Match. The number of registered non-U.S. citizen IMGs was 10,094, which is 624 fewer than last year. Among all matched U.S. D.O. seniors, 47.7% matched to their first-choice programs (an increase of 5.3% over 2021); 76.7% matched to one of their top three choices (an increase of 4.5% over 2021).[81]

[81] https://www.nrmp.org/wp-content/uploads/2022/11/2022-Main-Match-Results-and-Data-Final-Revised.pdf

Financial Model

Tripp Umbach developed a standard financial pro forma based on the experience of previous successful osteopathic medical education programs. The pro forma was inclusive of all assumptions, operating and capital expenditures, projected revenues, and financing scenarios. Xavier will continue to update the financial pro forma as the Founding Dean finalizes facility plans and other aspects of the medical school. The financial plans will continue to be updated to reflect additional information on construction costs, operating expenses, and COCA requirements related to accreditation.

Construction Budget

Tripp Umbach estimates total physical plant costs including design and construction for the development of an osteopathic medical school will be approximately **$65 million** to accommodate a class size of 150 students per year.

Start-Up Costs

Tripp Umbach estimates that total start-up costs over the planning years (FY23-FY27) and first two years of operations (FY28-FY29) will equal approximately **$27.3 million**.

Operating Budget

Tripp Umbach estimates that an equivalent of approximately **72 full-time employees** will be required at the medical school's full maturity to support an annual class size of 150 students. The annual cost of faculty and staff required to deliver educational programs once the proposed osteopathic medical school is at full maturity[82] in FY33 is estimated to equal approximately **$12.1 million**. The total operating budget for the proposed osteopathic medical school in FY33, including the cost of faculty and staff, will be approximately **$15.9 million** annually.

Cash Operating Margin

Tripp Umbach estimates from previous experience that the annual cash-operating margin (defined as earnings before interest, tax, depreciation, and amortization, or EBITDA) becomes positive in the third year of operations. EBITDA is estimated at **$16.9 million** when all four years are in place. Operating margin grows to **$25.7 million** by FY33.

[82] Tripp Umbach considers full maturity once all four years of 150 students are enrolled.

Escrowed Teach-Out and Operating Reserve Funds

As previously noted in this report, the COCA-required escrowed funds are calculated with the corresponding progressive matriculation (i.e., 50% for Y-1, 75% for Y-2, 100% for Y-3 and Y-4) as it relates to the "tuition multiplied by the approved number of students for the COM multiplied by four years." The reserve is intended to provide the COCA with resources to fund teach-out agreements for the matriculated students in the event that the proposed COM fails during its initial years of operation before graduation of its first class of students. Tripp Umbach estimates that the escrowed teach-out and operating reserve funds will equal approximately **$45 million.**[83]

Summary

Tripp Umbach estimates the total cost to develop the proposed osteopathic medical school is estimated at **$137 million**.

Table 4: Financial Summary

Osteopathic Medical School Budget	Cost
Escrow	**$45,000,000**
Escrow Reserve	$36,000,000
Escrow Operating	$9,000,000
Capital	**$65,000,000**
Facility Capital (100,000 sq ft x $550)	$55,000,000
Equipment/Furnishings	$10,000,000
Start-Up	**$27,000,000**
Total	$137,000,000

[83] Tripp Umbach estimated the annual tuition to equal $60,000.

Economic Impact

Tripp Umbach's national studies estimate that medical schools and teaching hospitals generate more than $600 billion annually in the U.S. economy. Academic medicine is clearly a significant driver of the national, statewide, and local economies.

The proposed osteopathic medical school will bring economic benefits directly and indirectly to the regional and statewide economies. The direct benefits will come from the direct spending of the proposed medical school on capital improvements, goods, and services to businesses in the region; through the hiring of new faculty and staff; and through student spending. The indirect impact is derived from these direct, first-round expenditures, which are received as income by other businesses in the region and state and circulated through the economy in successive rounds of spending.

The proposed osteopathic medical school will provide a large number of new employment opportunities that will also come with benefits (i.e., health insurance coverage). The proportionate rise of employment caused by the presence of the new medical school is expected to greatly increase the number of insured workers. This should remove access barriers for many who are currently underinsured or have no insurance. The development of the medical school will be beneficial to individuals who may be unemployed or uninsured as a means of employment and health coverage.

Economic Impact

Tripp Umbach estimates that Xavier will invest approximately **$65 million** in facilities and equipment. Over the construction period, the capital project will generate **$125.5 million** in economic impact, support **742 jobs**, and produce **$3.2 million** in state and local tax impact. By 2029, the osteopathic medical school will directly and indirectly support **351 jobs** in the region, generate **$48.5 million** in total economic impact per year (direct, indirect, and induced impacts), and will add **$1.7 million** in state and local tax revenue.

Direct Benefits of GME to Hospitals and their Communities

GME is a critical resource for the future of health care in the United States. Studies have shown that increases in the primary health-care delivery model are tied to better health outcomes in patients, lower costs for health providers, and greater equity in health. To increase the primary-care delivery model in both the underserved and rural areas in Ohio, physicians must be trained in primary-care disciplines and select shortage specialties such as family practice, general community-based internal medicine, pediatrics, and psychiatry.

Ohio can increase its primary-care physician pool by expanding and developing new postgraduate residency positions in rural and underserved regions statewide. Throughout the country, as more students are trained in primary-care fields, their impacts on the communities in which they serve can be felt in a multitude of ways.

Hospitals with residency programs are stronger financially, provide significantly more free care, have higher-quality scores, and offer a broader range of services than similarly sized hospitals without residency programs.

- More Doctors: Residency programs can lead to the recruitment of additional sub-specialty physicians who not only train medical students but also provide sub-specialty clinical services that were not available in the community before the formation of the residency program.
- Cost Savings to Taxpayers: The typical hospital with a residency program in internal medicine saves approximately $3 million each year in uncompensated care.
- Strong Hospitals: Hospitals save $75,000 on average in recruitment costs for every resident they hire – allowing these dollars to be invested in patient care and community health programs. Hospitals with primary-care residency programs have lower utilization of emergency departments as a result of clinics that are staffed by residents.
- Patient Care Quality: Outpatient services provided by residency programs include school-based programs, screenings, community-based education programs, nursing home support, medical home health-care support, emergency department follow-up, and support for public health departments.
- Partner Benefits: Academic medical centers benefit from funding associated with primary-care access-related research.
- Resident Benefits: Residents who remain in the community have a strong working knowledge of the local and regional health-care environment and are better able to direct the care for their patients.

Family physicians are significant generators of economic activity in local communities on top of the health-care services they provide. Family physicians employ staff, purchase goods and services, and generate income to other health-care organizations in their community (e.g., hospitals, nursing homes).

Physician Graduates

- The economic value of a physician is a complex area of study. The economic impact is different within each state and is measured based upon the number of practicing doctors in addition to other factors including the economy of the state, the health-care needs of the individual residents, and the access-to-care conditions. In a national study of the impact of physicians conducted by the AMA, as of 2018, there were 736,873 patient care physicians within the 50 states and District of Columbia. These physicians provided what was measured to be an economic impact of **$2.3 trillion** in direct and indirect economic output. On average, each physician supported **$3.2 million** in economic output and **17.1 additional jobs**. Additionally, on average across the nation, each physician supported **$126,129** in state and local tax revenues.[84]
- According to this same research, Ohio physicians created **$63.5 billion** in economic activity. On average in Ohio, each physician supported **$2.2 million** in economic impact. These physicians also supported **12.9 jobs** throughout the state and on average **$86,452** in additional state and local tax revenue.
- The proposed osteopathic medical school will graduate 150 physicians annually, and an additional **$198.0 million** will be added to the state economy every year if 60% of the students complete residencies and stay in Ohio to practice. If the school can increase the retention with the pipeline programs and retain more physicians for GME and beyond, this impact will increase as the retention increases. These same retained physicians also will create and sustain **1,161 additional jobs** within Ohio and generate **$7.8 million** in state and local tax revenue.
- Assuming that 25% of graduates from the school practice in underserved communities, Tripp Umbach estimates that by 2035 these new primary-care physicians will also yield real savings, as emergency room utilization declines and quality of care improves. These savings are expected to total **$127.5 million** annually by 2035.[85]

[84] https://www.physicianseconomicimpact.org/

[85] Based on Tripp Umbach's estimates each primary-care physician who serves in underserved area generates $3.4 million in health-care cost savings.

Additional Economic and Societal Benefits

Developing a medical school in Cincinnati, could have a positive impact on health care and the regional economy. The proposed osteopathic medical school could be a major driver of the economy, creating jobs and generating millions in annual net impact to the region. The proposed osteopathic medical school could also:

- Expand health-care access for underserved populations.
- Address workforce needs by expanding numbers of highly qualified doctors who have regional connections and interests.
- Accelerate expansion of an innovation economy whereby biomedical companies are launched in and attracted to the region; new jobs are created; and research sparks technology transfer, commercialization, and economic value through improvements in prevention, treatment, and practice.
- Grow the health-care delivery system in Ohio as a priority. As a result, the quality of life for community residents improves as well as the ability to leverage health-care cost savings.

Clinical Support

As part of the feasibility study, Tripp Umbach completed interviews with hospital leadership throughout the region. Tripp Umbach representatives spoke to leadership at TriHealth, The Christ Hospital, and St. Elizabeth Healthcare. Tripp Umbach representatives also completed interviews with Xavier Board members regarding the opportunities and potential challenges for the development of a four-year osteopathic medical school. Interviews were conducted and input and feedback were gathered in January and February 2023.

The information collected provided a better understanding of the vision, mission, and overall impact that the proposed school would have on the university and local community. Xavier is unique in many ways and the potential to create a new medical school is promising; thus, it was imperative to collect regional input related to Xavier's opportunities and challenges regarding the ability to open a new medical school.

Overall, clinical stakeholders supported the need for additional primary care and specialty care physicians. They also shared a high-level of interest in partnering with Xavier to provide clinical training.

Overall Key Findings

1. Strengths:

   The need for a four-year osteopathic medical school was viewed positively by all. Stakeholders believe there is a need for an osteopathic medical education program rooted in strong partnerships to expand access to primary care and improve the health of Ohioans. Stakeholders interviewed by Tripp Umbach believe that Xavier is uniquely positioned to develop an osteopathic medical education program in Cincinnati. Stakeholders interviewed believe that the ability for students to work shoulder-to-shoulder with other health science students at Xavier and faculty to help manage and improve health status of individuals and populations will provide a unique medical education model.

2. Opportunities:

   Stakeholders believe the proposed osteopathic medical school will have the capability to enhance collaborative efforts of multiple clinical partners within the region. The area is home to multiple hospitals, and all would benefit from a partnership with an osteopathic medical school.

   Stakeholders also mentioned that the community's potential for increased economic activity would be an indirect effect of the development of the proposed osteopathic medical school, attracting businesses and drawing more people into the region to spend money.

3. Challenges:

   The only concern among stakeholders is the limited number of residency programs in the region to accommodate medical students from Xavier.

Conclusion

The stakeholders believe that the development of the proposed osteopathic medical school is in the very best interest of everyone involved. The benefits are visible, as well as recognized, and each hospital representative offer this initiative full support. Interviewees were virtually unanimous in their view that Xavier has the resources required to develop an osteopathic medical school in collaboration with health systems, community health organizations, research directed at understanding best practices for population health improvement.

Barriers and Mitigation

All new medical schools under consideration in the feasibility study and implementation phases face barriers that must be overcome. Barriers typically fall within four broad categories: 1) Community support, 2) Institutional capacity and readiness, 3) Sufficient clinical teaching capacity in the region, and 4) Financial resources. The following table provides an overview of Tripp Umbach's understanding of barriers to medical school implementation from prior experience, our evaluation of Xavier's situation, and recommendations on how Xavier will mitigate barriers and achieve its goal of opening a successful and sustainable Osteopathic Medical Education Program.

Barriers from Experience	Tripp Umbach Evaluation of Xavier Position	Recommendations for Mitigation
Community Support - Lack of demonstrated need. - Active pushback from existing schools. - Government pushback. - Cultural pushback.	Community Support - Tripp Umbach sees no issues demonstrating a need for more physicians in the tri-state area and recommends an osteopathic medical school at Xavier University. - We do not anticipate pushback from the existing medical school in Cincinnati, based on work accomplished by the university president in meeting with her counterpoint at the University of Cincinnati. - Ohio University, the only D.O. program in the state, may oppose a new program at Xavier. - Since this is a private medical school, we don't anticipate pushback from state or local government. - Religious issues related to developing a Catholic medical school do not appear to be present.	Community Support - Tripp Umbach recommends that the university president and Tripp Umbach hold a conversation with Ohio University informing leaders of plans, after the feasibility study is completed and before official board action to move forward. - The best way to mitigate issues with competing medical schools is to assure them that none of their medical students who are currently receiving training at clinical teaching sites will be displaced by Xavier medical students.

Institutional Readiness - Lack of regional accreditation to offer graduate degrees. - Conflict from existing nursing and health science programs who fear resources will be taken from these programs.	Institutional Readiness - Tripp Umbach did not uncover any issues related to institutional readiness during the feasibility study specific to conflict or pushback from other academic programs.	Institutional Readiness - It is important to continue engaging leadership from nursing and other health science programs in medical school planning and implementation. - An internal policy that ensures that medical students will not displace other learners at clinical training sites should be developed.
Clinical Teaching Capacity - Lack of hospitals in the region (30 miles) interested in providing clerkship training for third-year and electives for fourth-year students. - Lack of clinical teaching capacity for all required clerkships, especially in pediatrics and psychiatry. - Physicians at hospitals and clinics in the region who are not interested in teaching. - Hospitals that are too small to offer required clerkships.	Clinical Teaching Capacity - Based on interviews with hospitals and health systems in the tri-state region, Tripp Umbach believes that the clinical teaching capacity required to educate 150 third-year and 150 fourth-year students is available.	Clinical Teaching Capacity - Additional clinical teaching rotations may be required outside of the immediate tri-state region. There is no need for action currently. However, the Founding Dean should develop relationships with hospitals in Dayton. - There should be a focus on GME development and expansion to ensure that Xavier University students can complete their training and remain in the region to practice.
Financial Resources - Lack of financial resources in one of three areas: Start-up ($20 million), Escrow ($40 million), and Facilities ($60 million).	Financial Resources - From our review of financial data provided by Xavier University, Tripp Umbach believes that the university can raise the funds required for a successful medical school.	Financial Resources - Longer-term sustainability can be heightened by raising funds from naming rights for both the program and the facility. Every dollar raised during the planning process adds to future margins that can be invested in the school.

Appendix A. Project Overview

In December 2022, Xavier University retained Tripp Umbach to complete a feasibility study to assess the opportunities and benefits of expanding medical education in Ohio, specifically examining the development of an osteopathic medical school in Cincinnati. The Tripp Umbach team gathered feedback from the Xavier leadership team and assessed the primary care and statewide/regional markets to provide key findings and recommendations of the proposed medical school.

To complete the study, Tripp Umbach conducted the following:

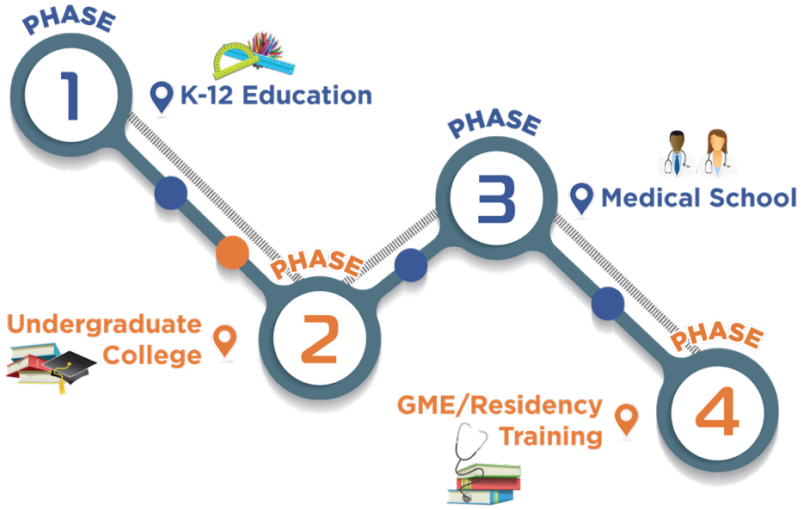
- Project Planning and Ongoing Facilitation: Worked primarily with leadership from Xavier to lay out the goals of the study and to gain an understanding of vision for the proposed medical school. Discussions with leadership allowed the consulting team to identify opportunities and challenges associated with the development of an osteopathic medical school in Ohio.
- Statewide Analysis: Completed all necessary research to assess the need and feasibility of the proposed medical school. Specifically, Tripp Umbach collected and analyzed primary and secondary data as appropriate to evaluate the need and feasibility of the development of an osteopathic medical school in Cincinnati.
- Environmental Scan: Conducted a detailed analysis of demographic, population health, and physician workforce data in the region and throughout the state based on available data. The team conducted a review of community needs and projections of needs within the context of federal health-care reform as necessary.
- Key Stakeholder Interviews: Completed interviews with local and regional key stakeholders identified by Xavier and recommended by Tripp Umbach. Stakeholders included representatives of health-care, economic development, education, and business organizations across Ohio. The interviews determined unique aspects of the market that need to be considered in developing a new medical school, suggested potential opportunities, and identified potential issues impacting market feasibility.
- Budget Review: Reviewed budgets identifying projected expenses and revenues for the start-up years and the first full years of operation of the proposed medical school, identifying all costs for both start-up funding and ongoing operations.
- Economic Impact Statement: Completed economic impact analyses for the proposed medical school. The analyses provide quantified findings of the potential economic impact attributed to the development of a new medical school.
- Development of Final Report and Recommendations: The consulting team developed a final independent report to be used by Xavier to guide further evaluation and planning efforts. The final report includes recommendations to continue to explore the development of an osteopathic medical school.

Appendix B. Overview of Osteopathic Medicine

Medical Education Overview

The typical path to become a physician, both allopathic and osteopathic, is to complete a traditional four-year undergraduate degree, preferably in one of the sciences (i.e., life, social, physical, pre-med, etc.). Because of the nature of a focused undergraduate degree in the sciences, for those entering the medical field, this degree is designated as the UME. The student must then apply and be accepted to medical school. The student then attends the first two years of medical school in a classroom setting. Years three and four of medical school are typically spent conducting clinical clerkships outside of the classroom in settings such as hospitals, clinics, health centers, etc. Finally, the student must complete GME and a residency program for three to seven years. Residency positions are held by local hospitals, health centers, and/or FQHCs.

Figure 11: Flowchart of Educational Phases of the Medical Education Pipeline



While the basic curriculum of the allopathic and osteopathic colleges is the same, there are some important differences. The basic sciences and hospital training are taught from an osteopathic viewpoint, with a heavy emphasis on anatomy. Osteopathic medicine provides all of the benefits of modern medicine including prescription drugs, surgery, and the use of technology to diagnose disease and evaluate injury. It also offers the added benefit of hands-on diagnosis and treatment through osteopathic manipulative medicine, which emphasizes helping each person achieve a high level of wellness by focusing on health promotion and disease prevention.[86] Additional hours are spent learning the techniques of osteopathic manipulative medicine and focusing on preventive health care and nutrition.

[86] AACOM.

Osteopathic Medical Schools Train Physicians to Meet a Well-Documented Need

Colleges of osteopathic medicine continue to expand to meet the needs for America's physician workforce. This past year, the number of osteopathic physicians in the United States climbed to nearly 135,000, an 80% increase over the past decade.[87] The nation's 134,901 fully licensed active and practicing osteopathic physicians cover the entire scope of modern medicine, bringing a patient-centered, holistic, hands-on approach to diagnosing and treating illness and injury.

Osteopathic physicians can choose any specialty, prescribe drugs, perform surgeries, and practice medicine anywhere in the United States. Osteopathic physicians bring the additional benefits of osteopathic manipulative techniques to diagnose and treat patients. Osteopathic physicians work in partnership with patients to help them achieve a high level of wellness by focusing on health education, injury prevention, and disease prevention. According to the AOA's latest report on the osteopathic medical profession, within 57% of D.O.s practice in primary-care fields, and 43% of D.O.s practice in other specialties. The top five non-primary-care specialties for D.O.s were emergency medicine, anesthesiology, obstetrics and gynecology, general surgery, and psychiatry.[88]

Even though many new colleges of osteopathic medicine and regional campuses have opened or been approved by the COCA during the past five years, Tripp Umbach believes that demand for osteopathic physicians will continue to grow faster during the next 20 years than the supply of medical school graduates.

[87] 2022-OMP Report.

[88] 2022 AOA: Osteopathic Medical Education Report.

Appendix C: Applicants to Osteopathic Medical Schools

Table 5 below shows the number of applications for the 2021 academic year for each osteopathic medical school. In 2021, not one school had fewer than 1,000 applicants.[89]

Table 5: 2021 Applicants to Osteopathic Medical Schools

Colleges of Osteopathic Medicine/Schools of Osteopathic Medicine	Total
ACOM (AL)	5,925
ARCOM (AR)	3,511
ATSU-KCOM (MO)	5,383
ATSU-SOMA (AZ)	7,988
AZCOM (AZ)	7,499
BCOM (NM)	4,691
CCOM (IL)	8,633
CHSU-COM (CA)	3,989
CUSOM (NC)	4,879
DMU-COM (IA)	4,739
ICOM (ID)	3,564
KCU-Kansas (MO)	6,038
LECOM & Elmira (PA/NY)	11,957
LECOM Bradenton (FL)	9,184
LMU-DCOM (TN)	7,139
LUCOM (VA)	4,421
MSUCOM (MI)	8,237
MU-COM (IN)	5,754
Noorda-COM (UT)	1,295
NSU-KPCOM (FL)	8,288
NYITCOM Long Island (NY)	10,069
OSU-COM (OK)	4,782
OU-HCOM (OH)	5,741
PCOM & S. Georgia (PA & GA)	10,041
PCOM Georgia (GA)	4,443
PNWU-COM (WA)	5,239
RowanSOM (NJ)	7,010
RVUCOM Colorado/Utah (CO/UT)	3,980
TouroCOM-NY (NY)	8,037
TUCOM-CA (CA)	6,134
TUNCOM (NV)	4,269
UIWSOM (TX)	5,411
UNE COM (ME)	4,059
UP-KYCOM (KY)	4,552
VCOM-Auburn (AL)	4,025
VCOM-Carolinas (SC)	5,157
VCOM-Louisiana (LA)	2,717
VCOM-Virginia (VA)	6,579
WCUCOM (MS)	3,887
WesternU/COMP (CA)	7,123
WesternU/COMP-Northwest (OR)	4,571
WVSOM (WV)	5,316
Total	**246,256**

[89] 2021 AACOM Report on Applicant Designations.

Appendix D. Regional Profile Ohio

Ohio Population Data

Ohio covers 40,858 square miles and was home to an estimated population of 11.7 million in 2019, including more than 2.3 million citizens living in rural parts of the state.[90] The state projected an estimated population decline of 0.3% from 2020 to 2021. According to the ACS, 81.2% of Ohio's population is white, 13.2% is African American/Black, 2.7% is Asian, 0.3% is American Indian/Alaska Native, 0.1% is Native Hawaiian or other Pacific Islander, and 4.3% is of Hispanic/Latino origin.[91]

A total of 5.4% of Ohio residents lack health insurance.[92] According to the USDA Economic Research Service (ERS), the average per-capita income for Ohioans in 2020 was $53,641, with the rural per-capita income at $46,140. The ERS reports, based on 2020 ACS data, that the poverty rate in rural Ohio is 12.4%, compared with 1.6% in urban areas. A total of 11.3% of the rural population has not completed high school, while 8.7% of the urban population lacks a high school diploma, according to 2016-2020 ACS data reported by ERS. The unemployment rates are 4.9% in rural Ohio and 5.2% in urban areas (USDA-ERS, 2019).

Demographics[93]

The 2021 population estimate for Cincinnati was 308,935. This population has decreased 0.4% since the 2020 census. The population in Hamilton County has also decreased (-0.5%) since the 2020 census to 826,139.[94] The population estimate for Ohio is 11.8 million residents, also decreasing (-0.3%) since the 2020 census.[95]

Table 6: Demographics in Ohio

	Population, 2021 estimate	Population, % change (2020-2021)	Persons < 5 years, 2021	Persons <18 years, 2021	Persons 65+, 2021
Ohio	11,799,374	-0.3%	5.7%	22.1%	17.8%
Cincinnati	308,935	-0.4%	6.9%	21.4%	12.2%
Hamilton County	826,139	-0.5%	6.3%	23.0%	16.1%

[90] https://www.ruralhealthinfo.org/states/ohio

[91] Ibid.

[92] Ibid.

[93] U.S. Census Bureau.

[94] Ibid.

[95] Ibid.

Race and Ethnicity[96]

In 2021, 50.6% of the population in Cincinnati identified as white, while 4.4% identified as Hispanic. Of residents in Hamilton County, 67.3% identified as white, while 3.9% identified as Hispanic. Those indicators are both lower than the state percentages. In Ohio, 81.2% of the population identified as white in the 2021 census, while 4.3% identified as Hispanic.

Table 7: Race and Ethnicity in the Ohio Region[97]

	White (alone) %	African American %	American Indian and Alaska Native %	Asian %	Native Hawaiian and Other Pacific Islander %	Two or More Races %	Hispanic %
Ohio	81.2%	13.2%	0.3%	2.7%	0.1%	2.6%	4.3%
Cincinnati	50.6%	40.3%	0.1%	2.4%	0.0%	5.2%	4.4%
Hamilton County	67.3%	26.6%	0.3%	3.0%	0.1%	2.7%	3.9%

Education[98]

Within Hamilton County, 91.9% of residents attain a high school diploma; the statewide percentage is 91.1%. Ohio reports 29.7% of its residents having a bachelor's degree or higher.

Table 8: Education in the Ohio Region

	High school graduate or higher age 25 years+ 2017-2021 %	Bachelor's degree or higher, age 25 years+ 2015-2019 %
Ohio	91.1%	29.7%
Cincinnati	88.6%	39.6%
Hamilton County	91.9%	39.6%

Income and Poverty[99]

Studies have shown that low household income often is associated with poor physical and mental health status, less social support, more behavioral risk factors, higher rates of obesity and uncontrolled blood pressure, and poor medical diagnoses.

Median household income in the city of Cincinnati for 2021 was $45,235. For Ohio, the median household income totaled $61,938. The percentage of persons in poverty in Hamilton County (15.7%) and Cincinnati (24.7%) were both higher than the state's 13.4%.

[96] Ibid.

[97] Ibid.

[98] Ibid.

[99] Ibid.

According to County Health Rankings, 21% of children in Hamilton County live in poverty; the figure is 17% nationally.

	Median Household Income, 2017-2021	Persons in poverty, percent
Ohio	$61,938	13.4%
Cincinnati	$45,235	24.7%
Hamilton County	$63,080	15.7%

Unemployment

In December 2022, Ohio's unemployment rate totaled 4.2%.[100]

Table 9: Ohio's Economy at a Glance

Ohio	December 2022
Labor Force Data	OH
Civilian Labor Force[101]	5,737.7
Employment[102]	5,493.9
Unemployment[103]	243.8
Unemployment Rate %	4.2
Nonfarm Wage and Salary Employment	
Total Nonfarm	5,508.6
Mining and Logging	8.9
Construction	241.2
Manufacturing	695.8
Trade, Transportation, and Utilities	1,050.3
Information	69.1
Financial Activities	312.0
Professional & Business Services	709.8
Education & Health Services	905.8
Leisure & Hospitality	548.8
Other Services	212.9
Government	754.0

[100] U.S. Bureau of Labor Statistics, www.bls.gov

[101] Number of persons, in thousands, seasonally adjusted.

[102] Ibid.

[103] Ibid.

Health Overview[104]

- Overall, 8% of Ohio's population under age 65 did not have health insurance in 2022.
- In 2022, the ratio of population to primary-care physicians in Ohio was 1,290:1.[105]
- In 2022, the number of preventable hospital stays was 4,338 in Ohio.

Challenges in Ohio[106]

- High prevalence of frequent mental distress
- High prevalence of multiple chronic conditions
- High prevalence of cigarette smoking

Strengths in Ohio[107]

- Low occupational fatality rate
- High supply of mental health providers
- Low percentage of households experiencing severe housing problems

Highlights in Ohio[108]

- Food insecurity decreased 36% from 2012-2014 to 2019-2021, from 16.9% to 10.8% of households
- Obesity increased 27% from 29.8% to 37.7% of adults from 2015 to 2021
- Suicide decreased 10% from 15.7 to 14.1 deaths per 100,000 population from 2018 to 2020

Health Rankings

Health is influenced by every aspect of how and where we live. Access to secure and affordable housing, safe neighborhoods, good-paying jobs, and quality early childhood education are examples of important factors that can put people on a path to a healthier life.[109] But access to these opportunities often looks different based on different demographics such as where you live, the color of your skin, or the circumstances into which you were born.[110] Data show a persistent pattern in barriers to opportunity for people with lower incomes and for communities of color across the United States.[111] Patterned

[104] County Health Rankings & Roadmaps, 2021.

[105] Ibid.

[106] America's Health Rankings, 2022.

[107] Ibid.

[108] Ibid.

[109] County Health Rankings & Roadmaps, 2022.

[110] Ibid.

[111] Ibid.

differences in a range of health factors emerge from unfair policies and practices at many levels and over many decades.

Medical education programs anchored in communities have great potential to address both present and future needs for physicians who provide care to the region. Maintaining strong ties to the community improves clinical outcomes. As hospitals become responsible for health outcomes, strong community partnerships through medical education will become increasingly critical.

The below table shows the county health rankings of Hamilton County.

Table 10: County Health Rankings of Hamilton County [112]

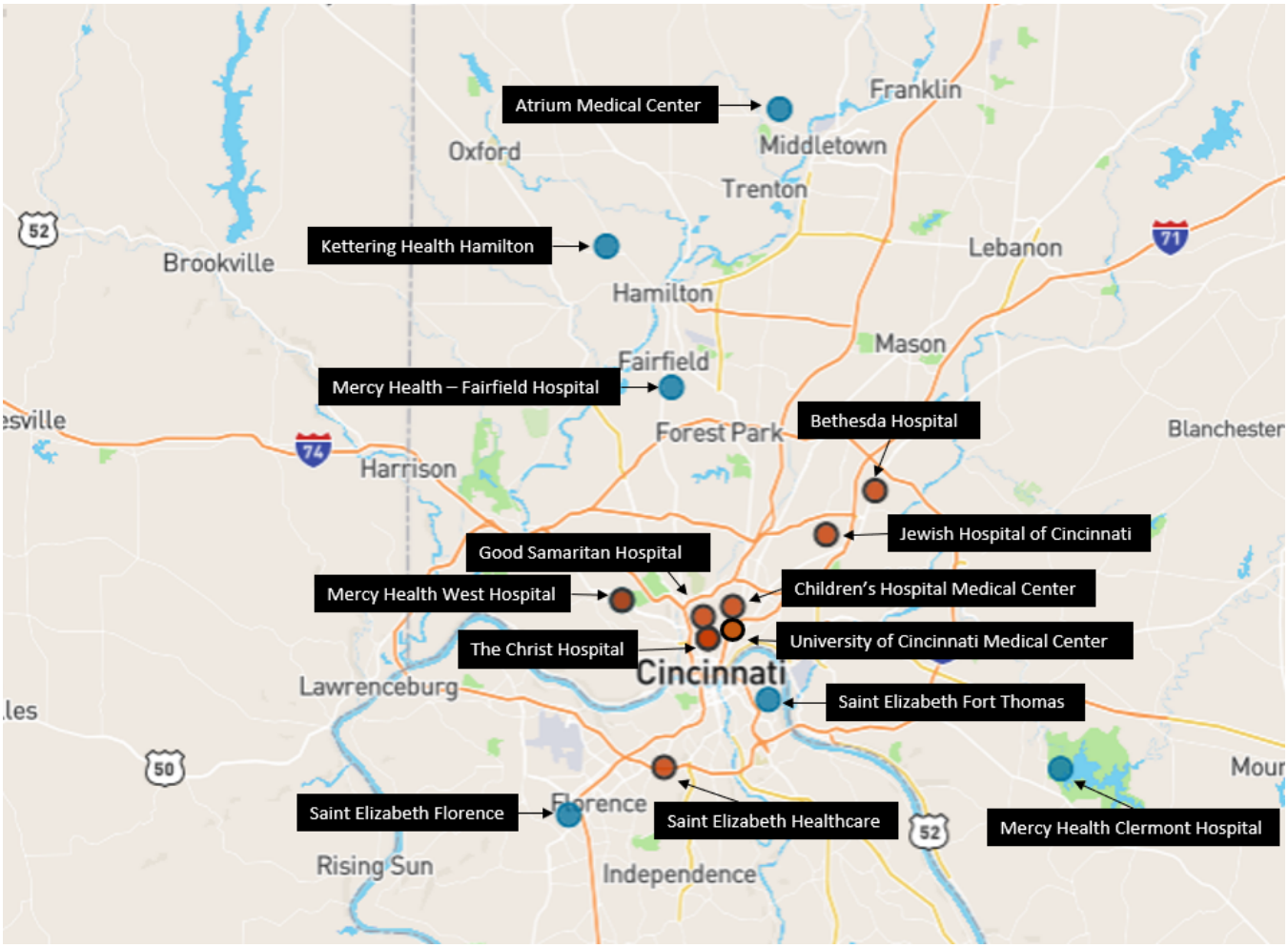
Hamilton County	2022 Ranking (of 88)
Health Outcomes	47
Length of Life	56
Quality of Life	48
Health Factors	35
Health Behaviors	22
Clinical Care	3
Social and Economic Factors	50
Physical Environment	88

[112] Ibid.

Appendix F. Clinical Landscape[113]

Figure 12 is a map of hospitals in and around Cincinnati, Ohio. The hospitals with the red dots are hospitals that have GME. The hospitals noted with the blue dot are those without GME at that location. According to the map there are six hospital locations without GME and there are eight hospitals with GME. Below the map is a table of each hospital on the map listed alongside the bed count. Collectively, the hospitals with GME have over 3,000 beds.

Figure 12: Cincinnati GME Map



[113] MySidewalk

Table 11: Hospitals and Medical Center Bed Count

Hospital Name	Location	Bed Count
With GME		
Bethesda Hospital	Cincinnati, OH	365
Children's Hospital Medical Center	Cincinnati, OH	615
Good Samaritan Hospital	Cincinnati, OH	365
Jewish Hospital of Cincinnati	Cincinnati, OH	172
Mercy Health West Hospital	Cincinnati, OH	197
Saint Elizabeth Healthcare	Edgewood, KY	459
The Christ Hospital	Cincinnati, OH	471
University of Cincinnati Medical Center	Cincinnati, OH	515
Without GME		
Atrium Medical Center	Middletown, OH	266
Kettering Health Hamilton	Hamilton, OH	170
Mercy Health Clermont Hospital	Batavia, OH	165
Mercy Health Fairfield Hospital	Fairfield, OH	214
Saint Elizabeth Florence	Florence, KY	150
Saint Elizabeth Fort Thomas	Fort Thomas, KY	157

Appendix G. Consultant Qualifications

Since 1990, Tripp Umbach has consulted with more than 100 academic medical centers. Tripp Umbach is an established national leader in providing feasibility studies and business plans for health science universities, academic medical centers, health systems, new and/or expanding medical schools, and communities that wish to develop and expand both undergraduate (UME) and graduate medical education (GME).

Tripp Umbach has conducted in-depth feasibility analyses for a wide variety of institutions and clients throughout the United States and internationally. Clients have included more than 30 new or expanding medical schools, both allopathic and osteopathic; numerous statewide partnerships; statewide and regional business plans for expanding GME; and feasibility studies for establishing physician assistant, physical therapy, pharmacy, optometry, and dental programs.

Tripp Umbach is the leading firm in conducting economic impact studies for health care and higher education institutions, having measured the economic impact of every U.S. medical school and major teaching hospital since 1995.

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Turning Ideas Into Action