JOINT STATE GOVERNMENT COMMISSION

General Assembly of the Commonwealth of Pennsylvania

MEDICAL SCHOOL IMPACT ON THE PRIMARY CARE PHYSICIAN SHORTAGE IN PENNSYLVANIA

Staff Study

December 2021

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REPORT

(HR 625 of 2020)
Medical School Impact on the
Primary Care Physician Shortage in Pennsylvania

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The report is also available at http://jsg.legis.state.pa.us

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The Joint State Government Commission was created in 1937 as the primary and central non-partisan, bicameral research and policy development agency for the General Assembly of Pennsylvania.[1]

A fourteen-member Executive Committee comprised of the leadership of both the House of Representatives and the Senate oversees the Commission. The seven Executive Committee members from the House of Representatives are the Speaker, the Majority and Minority Leaders, the Majority and Minority Whips, and the Majority and Minority Caucus Chairs. The seven Executive Committee members from the Senate are the President Pro Tempore, the Majority and Minority Leaders, the Majority and Minority Whips, and the Majority and Minority Caucus Chairs. By statute, the Executive Committee selects a chairman of the Commission from among the members of the General Assembly. Historically, the Executive Committee has also selected a Vice-Chair or Treasurer, or both, for the Commission.

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A Commission study may involve the appointment of a legislative task force, composed of a specified number of legislators from the House of Representatives or the Senate, or both, as set forth in the enabling statute or resolution. In addition to following the progress of a particular study, the principal role of a task force is to determine whether to authorize the publication of any report resulting from the study and the introduction of any proposed legislation contained in the report. However, task force authorization does not necessarily reflect endorsement of all the findings and recommendations contained in a report.

Some studies involve an appointed advisory committee of professionals or interested parties from across the Commonwealth with expertise in a particular topic; others are managed exclusively by Commission staff with the informal involvement of representatives of those entities that can provide insight and information regarding the particular topic. When a study involves an advisory committee, the Commission seeks consensus among the members.[2] Although an advisory committee member may represent a particular department, agency, association, or group, such representation does not necessarily reflect the endorsement of the department, agency, association, or group of all the findings and recommendations contained in a study report.

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[1] Act of July 1, 1937 (P.L.2460, No.459); 46 P.S. §§ 65–69.

[2] Consensus does not necessarily reflect unanimity among the advisory committee members on each individual policy or legislative recommendation. At a minimum, it reflects the views of a substantial majority of the advisory committee, gained after lengthy review and discussion.

Over the years, nearly one thousand individuals from across the Commonwealth have served as members of the Commission's numerous advisory committees or have assisted the Commission with its studies. Members of advisory committees bring a wide range of knowledge and experience to deliberations involving a particular study. Individuals from countless backgrounds have contributed to the work of the Commission, such as attorneys, judges, professors and other educators, state and local officials, physicians and other health care professionals, business and community leaders, service providers, administrators and other professionals, law enforcement personnel, and concerned citizens. In addition, members of advisory committees donate their time to serve the public good; they are not compensated for their service as members. Consequently, the Commonwealth receives the financial benefit of such volunteerism, along with their shared expertise in developing statutory language and public policy recommendations to improve the law in Pennsylvania.

The Commission periodically reports its findings and recommendations, along with any proposed legislation, to the General Assembly. Certain studies have specific timelines for the publication of a report, as in the case of a discrete or timely topic; other studies, given their complex or considerable nature, are ongoing and involve the publication of periodic reports. Completion of a study, or a particular aspect of an ongoing study, generally results in the publication of a report setting forth background material, policy recommendations, and proposed legislation. However, the release of a report by the Commission does not necessarily reflect the endorsement by the members of the Executive Committee, or the Chair or Vice-Chair of the Commission, of all the findings, recommendations, or conclusions contained in the report. A report containing proposed legislation may also contain official comments, which may be used to construe or apply its provisions.[3]

Since its inception, the Commission has published over 400 reports on a sweeping range of topics, including administrative law and procedure; agriculture; athletics and sports; banks and banking; commerce and trade; the commercial code; crimes and offenses; decedents, estates, and fiduciaries; detectives and private police; domestic relations; education; elections; eminent domain; environmental resources; escheats; fish; forests, waters, and state parks; game; health and safety; historical sites and museums; insolvency and assignments; insurance; the judiciary and judicial procedure; labor; law and justice; the legislature; liquor; mechanics' liens; mental health; military affairs; mines and mining; municipalities; prisons and parole; procurement; state-licensed professions and occupations; public utilities; public welfare; real and personal property; state government; taxation and fiscal affairs; transportation; vehicles; and workers' compensation.

Following the completion of a report, subsequent action on the part of the Commission may be required, and, as necessary, the Commission will draft legislation and statutory amendments, update research, track legislation through the legislative process, attend hearings, and answer questions from legislators, legislative staff, interest groups, and constituents.

[3] 1 Pa.C.S. § 1939.

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December 2021

To the Members of the General Assembly of Pennsylvania:

We are pleased to release *Medical School Impact on the Primary Care Physician Shortage in Pennsylvania* as directed by House Resolution 625 of 2020. The report studies efforts within medical schools to promote student choice in primary care, to include primary care experience in the curriculum, and to accurately monitor and report graduate retention in primary care. Importantly, the report includes extensive information about students, ongoing programs, and new initiatives gathered during meetings with the Commonwealth's nine medical schools. The report concludes with findings and recommendations for the General Assembly's consideration.

The full report is available at http://jsg.legis.state.pa.us/

Respectfully submitted,

Glenn J. Pasewicz
Executive Director

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INTRODUCTION

The nation as whole faces a mounting shortage of physicians. This is especially true for primary care physicians. Between 7,800 and 48,000 additional primary care physicians are needed to cover this shortage by 2034. The primary care shortage also extends to the Commonwealth, where there are currently 143 Primary Care Health Professional Shortage Areas. Pennsylvania's medical schools will play a vital role in supplying the physicians needed to meet this demand.

House Resolution No. 625 of 2020 directed the Joint State Government Commission to study medical students' selection of primary care as a specialty at Pennsylvania's medical schools. The Commission has previously covered the topic of medical health care professional shortages before with the 2015 report the *Physician Shortage in Pennsylvania* and the 2019 report *Pennsylvania's Health Care Workforce Needs.* This report builds off the findings and recommendations included in those previous reports.

To obtain the information requested by the General Assembly, Commission staff sent a questionnaire to the seven allopathic and two osteopathic medical schools in the state. All but one medical school provided a response to this questionnaire, in most instances, however, the data submitted to the Commission were incomplete. When possible, Commission staff interviewed representatives from the corresponding medical schools through teleconferencing software to discuss the submitted information.

In this report the training needed to become a primary care physician is examined. Additionally, the issues believed to be behind the shortage of primary care physicians are investigated, such as burden of student loan debt, burnout, and low investment in primary care. Residency and demographic data, along with information on primary care initiatives collected from the Commonwealth's medical schools are presented. The report includes information on the average number of graduates matching into primary care specialties from each institution, an estimate of how many graduates intend on working in the primary care field, and how many are retained by the state.

Summary of Recommendations

Recommendation #1: Data collection of Pennsylvania's primary care workforce are currently insufficient and should be improved to create more accurate predictions.

Data available on primary care physicians practicing in the state was limited and should be made the focus on future data collection efforts.

Recommendation #2: Overcome cultural and financial barriers preventing medical schools for promoting primary care.

Medical schools respond to student choice, incentives from federal and state governments, and media publicity. While there has been greater attention to the primary care shortage in recent years, the medical schools of Pennsylvania have little reason to prioritize the creation of new primary care physicians or to track of student outcomes in primary care. If the state created an incentive for the medical schools, they may be more willing to recruit and mentor candidates likely to practice in-state or in rural areas.

Recommendation #3: Increase funding to the Pennsylvania Primary Care Loan Repayment Program may help retain more primary care physicians.

The Federal Loan forgiveness program and program offerings from other states are more attractive to new physicians than Pennsylvania's Primary Care Loan Repayment Program which was decreased in November of 2021. Expanding the current funding levels would also allow more physicians to be eligible for the program.

Recommendation #4: Invest in the Primary Care Career Center and other programs targeting physician recruitment.

By expanding existing investment in recruitment programs from the Pennsylvania Primary Care Career Center which connects physicians to available positions across its geography, the Commonwealth can increase its primary care physician workforce. While the state needs to increase its capacity to train more primary care physicians, an increase to these programs would bring more health care physicians to rural areas in the short term.

Recommendation #5: Expand Pennsylvania's primary care pipeline programs.

Pennsylvania's primary care workforce could benefit from greater investment and expansion of existing physician pipeline programs, with a more focused emphasis on increasing the number of primary care physicians practicing in the Commonwealth's workforce and attracting students who wish to practice medicine in a rural setting.

BECOMING A PRACTICING PHYSICIAN

General Requirements to Becoming a Physician in Pennsylvania

The road to becoming a Doctor of Medicine in Pennsylvania consists of many years of education and training. While there are different medical specialties and areas of practice, typically, a student seeking a career as a physician earns a baccalaureate degree[4], then a doctorate from either an allopathic[5] or osteopathic[6] medical school. Afterwards, the student completes several years of residency training and possibly fellowship training as well.[7] The overall process of post-secondary schooling and training is extensive and can take over 10 years to complete.

Medical Prerequisite Courses

To enter medical school, students must be well-prepared through high school, as well as college undergraduate level. Some medical schools in Pennsylvania have course prerequisite requirements at the baccalaureate level prior to admission. For example, the University of Pittsburgh Medical School has prerequisite courses which include biology (one full year, exclusive of botany, ecology, and anatomy, with one full year lab or a single two-credit lab), general/inorganic chemistry (one full year with one full year lab or a single two credit lab), organic chemistry (one full year with one full year lab or a single two-credit lab), physics (one full year with one full year lab or a single two credit lab), an English/Intensive writing course, biochemistry, and statistics (preferably biostatistics).[8] Not all medical schools in Pennsylvania have a set of required prerequisite courses prior to admission. On the other side of the Commonwealth, University of Pennsylvania's Perelman School of Medicine provides no specified list of prerequisite courses. Instead, the school requires that "competency in biology, chemistry, physics, and mathematics must be demonstrated."[9]

[4] (also known as a bachelor's degree)

[5] "Allopathic medicine" is a term used for modern or mainstream medicine. – "What is Allopathic Medicine?" *Healthline*, https://www.healthline.com/health/allopathic-medicine, last accessed on January 13, 2021.

[6] "Osteopathic medicine" is a distinct branch of medicine in the U.S. that emphasizes the interrelated unity of all systems in the body, each working to heal in times of illness. American Osteopathic Association, "What is Osteopathic Medicine," https://osteopathic.org/what-is-osteopathic-medicine/, last accessed on January 13, 2021.

[7] JSGC, "The Physician Shortage in Pennsylvania," (Apr. 2015), p. 24.

[8] University of Pittsburgh School of Medicine, Office of Admissions and Financial Aid, "Admission Requirements," https://www.medadmissions.pitt.edu/admissions/you-apply/academic-requirements, last accessed on January 6, 2021.

[9] Perelman School of Medicine, University of Pennsylvania, "MD Admissions: Frequently Asked Questions," https://www.med.upenn.edu/admissions/faq.html#:~:text=A.,health%20advisor%20for%20undergraduate%20requirements, last accessed January 6, 2021.

Medical Admissions Test

While many perspective physicians participate in a pre-med program in their undergraduate collegiate years, the majority of a physician's academic medical education takes place in medical school. To earn admission to a medical school in Pennsylvania, prospective students must complete the Medical College Admissions Test (MCAT), a standardized, multiple-choice exam that has been a critical part of the medical school admissions process for over 90 years. Specifically, the exam is designed to test medical school applicants on the skills and knowledge medical educators and physicians have identified as key prerequisites for success in medical school and the practice of medicine.[10]

Medical School

Currently, there are over 130 medical schools within the U.S. which train students in allopathic medicine.[11] In addition to these allopathic schools, there are also numerous medical schools across the country that train students in osteopathic medicine. Within the Commonwealth, there are nine medical schools – seven that train students in allopathic medicine and two that train students in osteopathic medicine. Each of these nine schools will be discussed in further detail later in this report.

Medical school generally takes four years to complete. Students attending medical school can expect a rigorous mixture of classroom instruction and lab courses in their first two years. Classes can consist of basic sciences, such as anatomy, biochemistry, microbiology, pathology, and pharmacology, to name a few.[12] In a 2019 U.S. News and World Report article entitled "How Hard is the Medical School Curriculum," Dr. Aron Sousa, senior associate dean of academic affairs with the Michigan State University College of Human Medicine, described the amount of work medical students are expected to perform as being "formidable." Dr. Sousa explained that "[F]or the most part, the intellectual difficulty of the work is about the same as a meaningful upper level college course, but there is so much studying and work that even very good students work long hours."[13] While each medical school is different, the third and fourth years of medical school usually consist of clinical experience involving rotations at hospitals and clinics affiliated with the school. To be successful in their training, each student must be able to absorb their professors' lessons well enough to directly apply the knowledge extracted from those lessons during critical health crises.[14]

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[10] JSGC, "Pennsylvania Healthcare Workforce Needs Staff Study," (Apr. 2019), p. 39.
[11] "What to Expect in Medical School," *The Princeton Review*, https://www.princetonreview.com/med-school-advice/what-to-expect-in-medical-school, last accessed on January 13, 2021.
[12] *Ibid*.
[13] Ilana Kowarski, "How Hard is the Medical School Curriculum," *U.S. News and World Report: Education*, (Apr. 18, 2019), https://www.usnews.com/education/best-graduate-schools/top-medical-schools/articles/2019-04-18/how-hard-is-medical-school-and-what-is-the-medical-school-curriculum#:~:text=Young%20notes%20that%20medical%20school,interact%20with%20patients%2C%20he%20says, last accessed January 13, 2021.
[14] *Ibid*.

Student Debt

Many students who attend and complete medical school also grapple with the steep financial investment associated with rising tuition. According to the American Association of Medical Colleges (AAMC), 73 percent of all medical school students graduate with educational debt, which includes premedical education debt. Moreover, the AAMC reports that 70 percent of medical school students graduate with educational debt from medical school alone. Currently, the AAMC reports that the median medical student educational debt is $200,000. This level of indebtedness stands in stark difference to the 2020 median premedical educational debt of medical students which is currently $27,000.[15] A breakdown of the numerical debt is shown below in in Table 1.

Table 1
Medical School vs. Premedical School Debt Nationally
2020

Educational Debt	Percentage of Graduates	Median Debt
Premedical	31%	$27,000
Medical	70%	$200,000

Source: American Association of Medical Colleges, "Medical Student Education: Debt, Costs, and Loan Repayment Fact Card for the Class of 2020," (Oct. 2020), https://store.aamc.org/downloadable/download/sample/sample_id/374/, last accessed on January 13, 2021.

These numbers shift slightly when looking at the average medical school debt incurred by graduates of Pennsylvania medical schools. According to a 2021 survey done by U.S. News and World Report, students at six of the nine Pennsylvania medical schools have the following average indebtedness as shown in Table 2. Additional information on average debt collected directly from the individual medical schools can be found later in the report.

Table 2
Average Debt of Medical Graduates from Pennsylvania Medical Schools
2021[16]

Medical School	Average Debt
Drexel University School of Medicine	$233,943
Lewis Katz School of Medicine at Temple	$218,632
Perelman School of Medicine at University of Pennsylvania	$130,583
Sidney Kimmel School of Medicine at Thomas Jefferson University	$208,110
University of Pittsburgh	$190,964
Lake Erie College of Osteopathic Medicine	$209,643

[15] American Association of Medical Colleges, "Medical Student Education: Debt, Costs, and Loan Repayment Fact Card for the Class of 2020," (Oct. 2020), https://store.aamc.org/downloadable/download/sample/sample_id/374/, last accessed on January 13, 2021.

[16] "Debt Residents Programs Ranked in 2022." U.S. News & World Report, 2021. https://www.usnews.com/best-graduate-schools/top-medical-schools/debt-residents-rankings.

Residency Experience and Training

Students who want to become practicing physicians will need to spend three to seven years following medical school graduation in a residency or graduate medical education (GME). During that time, residents provide care for patients under supervision of physician faculty members and participate in additional educational and research activities. Hospitals, academic medical centers, health care systems, and other healthcare institutions sponsor residency programs. Certain medical specialties and subspecialties require a graduate's participation in a fellowship after the completion of a residency.[17] Typically, the duration of a primary care residency is three years for family practice, internists and pediatricians.

Medical students choose a residency in their final year of medical school based on their preferred medical specialty. Examples of residencies that are sometimes associated with primary care include emergency medicine, general surgery, family medicine, pediatrics, and psychiatry. The National Resident Matching Program (NRMP), also known as The Match, is a non-profit organization that works to match medical school students to available residency positions.[18]

Selection of Physician Specialties

Identifying what influences a medical student's specialty selection is an integral part of reviewing and analyzing efforts within medical schools to increase the number of primary care physicians. Understanding these influences is also vital to increasing the number of primary care physicians within the Commonwealth's workforce.

Selection of specialization can be complex. There are many factors influencing medical graduates' decisions to select an area of specialty. Factors range from students' individual characteristics such as age, gender and type of personality, the timing of the decision, medical school environment, elements of influence and role models, to the characteristics of the specialty itself. A specialty's characteristics can include the nature of problems and people encountered and served while in the practice, the continuing development of new technologies, and the anticipated quality of working life and specialty-related income.[19]

Factors can also include the curriculum used in the undergraduate medical education, exposure during internships and the type of rotations, as well as the exposure to different subspecialties during internship.[20] In addition, a student's selection can also be influenced more broadly by career motivation, life goals, and attitudes about social responsibility.[21]

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[17] *Supra*, n. 8.
[18] *Ibid*.
[19] Saleh S. Al-Ansari, MD, FFCM and Mohamed A. Khafagy, MD, PhD (Pb.H), "Factors Affecting the Choice of Health Specialty by Medical Graduates," *Journal of Family & Community Medicine*, (Sep. – Dec. 2006); 13(3): pp. 119-123.
[20] *Ibid*.
[21] Eva Pfarrwaller, MD, Johanna Sommer, MD, Christopher Chung, *et al*., "Impact of Interventions to Increase the Proportion of Medical Students Choosing a Primary Care Career: A Systematic Review," *Journal of General Internal Medicine*, (Sept. 2015); 30(9), 1349-1358, doi: 10.1007/s11606-015-3372-9.

Individual Characteristics

Medical students' specialty selections have produced some noticeable trends based on their individual characteristics such as age, ethnicity, and gender. This is especially true when it comes to students who select a career in primary care. For example, observational studies have shown that students who are of older age and of Hispanic ethnicity tend to select primary care residencies at higher rates.[22] A 1996 study provided a questionnaire to former students at the University of California, San Diego, School of Medicine to analyze students selecting primary care specialties. The questionnaire found that respondents who were older, female, an underrepresented minority, from a rural background, and who chose their specialty prior to medical school were significantly more likely to pursue a career in primary care.[23]

Alternatively, younger male students from suburban backgrounds, who value technology over human connection, and who attend private medical schools, are more likely to choose a specialty associated with a hospital setting.[24] Students from public medical schools also had a greater likelihood of selecting primary care as a specialty than those students from private medical schools.[25]

While race and ethnicity make a difference regarding primary care career selection, it is also possible to over-emphasize the connection. In 2018 AAMC reported that "about 30% to 40% of physicians practiced primary care across all subgroups; 41.5% of American Indian or Alaska Native physicians practiced primary care; 41.4% of Black or African American physicians practiced primary care; 36.7% of Hispanic physicians (alone or with any race) practiced primary care; and 30.6% of White physicians practiced primary care."[26] While it is important to increase the overall diversity found among medical physicians, this data suggests that individual factors are more important in predicting who will be interested in the primary care field.

A 2015 AAMC report surveying over 86,000 residents found that women tend to make up larger percentage of two of the three primary care subspecialties for residency programs – 58 percent of family medicine residents and 75 percent of pediatrics residents. The same study found that men account for 54 percent of internal medicine residents. Women also tended to specialize in psychiatry and obstetrics/gynecology more than men at 57 percent and 85 percent respectively. Men were more prevalent in specialties such as surgery (59 percent), emergency medicine (62

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[22] *Supra*, n. 22.

[23] J L Schieberl, R M Covell, C. Berry *et al.*, "Factors Associated with Choosing a Primary Care Career," *Western Journal of Medicine*, (Jun. 1996); 164(6): 492-496.

[24] Sean Schafer, MD; William Shore, MD; and Norman Hearst, MD, MPH, "Is Medical School the Right Place to Choose a Specialty?" *Journal of American Medical Association,* (2001); 285(21): 2782-2783, doi: 10.1001/jama.285.21.2782-JMS0606-4-1.

[25] Donna B. Jeffe, PhD; Alison J. Whelan, MD; and Dorothy A. Andriole, MD, "Primary Care Specialty Choices of United States Medical Graduates, 1997-2006," *Academic Medicine,* (June 2010), 85(6): 947-958, doi: 10.1097/ACM.0b013e3181dbe77d.

[26] "Figure 26. Primary Care versus Nonprimary Care Physicians by Race/Ethnicity, 2018." AAMC, 2019. https://www.aamc.org/data-reports/workforce/interactive-data/figure-26-primary-care-versus-nonprimary-care-physicians-race/ethnicity-2018.

percent), anesthesiology (63 percent), and radiology (73 percent).[27] A study going back to 1999 found that women physicians were more likely to choose primary care as a specialty in general.[28] Studies have also found that individuals with rural backgrounds and lower income expectations tend to have higher rates of interest in primary care residencies.[29] When examining a students' selection of specialty, it is important to note, that students selecting primary care residencies does not necessarily translate to a career in primary care. In other words, residents may carve out different career paths after their residencies.

Medical School Environment

Most medical students select their specialty within their third or fourth year of medical school. According to the AAMC, it is common for medical students also change their preferred residency specialty over the course of medical school.[30] There are several possible reasons as to why this change occurs. Many students hold preexisting impressions of their specialty preference. For some, these preexisting impressions are confirmed during medical school. However, for others, the preexisting impressions are discarded when the students acquire new perspective on specialties during their time in medical school. While students are pushed to select a specialty early in medical school, the image of specialties may be distorted by the "filter of the traditional academic setting."[31] That is, most professors and role models in medical schools generally hold careers that differ significantly from their nonacademic counterparts. Therefore, their perspectives may not always capture an accurate image of the practice of a given specialty.[32]

Many studies have also suggested that there is an antagonistic environment toward primary care within medical schools. The antagonistic view held by many faculty members in medical schools seems to coincide with a perceived lack of prestige in the primary care practice.[33] A 2010 Medical Research Report echoed this point, stating that "bashing" or bad-mouthing of primary care specialties can have a negative impact on primary care residency choice among students.[34]

Some studies have reported that "students interested in family practice were discouraged by the relatively low prestige of that specialty in the academic environment."[35] In other instances, the negative perceptions about primary care come from the students themselves before even entering medical school. Though more and more students are perceiving family medicine and other primary care specialties as lacking in prestige, some reports have found that interest in

[27] Lyndra Vassar, "How Medical Specialties Vary by Gender," American Medical Association, (Feb. 18, 2015), https://www.ama-assn.org/residents-students/specialty-profiles/how-medical-specialties-vary-gender.
[28] *Ibid*.
[29] Miriam Shapiro and Alice Fornari, "Factors Influencing Primary Care Residency Selection among Students at an Urban Private Medical School," *The Einstein Journal of Biology and Medicine*, (2010), p. 19.
[30] American Medical Association, "5 Things Students Overlook when Choosing a Specialty," (Jan. 25, 2019), https://www.ama-assn.org/residents-students/specialty-profiles/5-things-students-overlook-when-choosing-specialty, last accessed on August 30, 2021.
[31] *Supra, n. 24.*
[32] *Ibid*.
[33] *Supra* n. 29.
[34] *Ibid*.
[35] *Supra, n. 24.*

prestige is often inversely related to primary care career choice.[36] For some of the reasons listed above, some stakeholders within the medical field have concluded that medical school may not be the best place for a future physician to choose a specialty.[37]

Quality of Working Life

Quality of working life is a leading factor behind a medical student's specialty choice. Occupational hazards, job burnout, and overall job satisfaction are all aspects of quality of work life. Job burnout and even depression are common among practicing physicians. Many students seek to avoid a specialty that may lead to eventual burnout and work-related depression. This is impression was reenforced by an American Medical Association (AMA) survey, which found that 92 percent of physicians aged 35 or younger felt that work-life balance was important.[38] Prestige has also been considered one aspect of the quality of working life factor. However, as previously mentioned, the role of prestige is typically more common in the choosing specialties in areas other than primary care.[39]

Clinical Experience

Generally, clinical clerkships or other early clinical work experience during medical school impact a medical student's specialty selection. That is, high quality clinical experiences during medical school can promote interest for a particular specialty. The AMA recommends that students shadow an attending physician through an externship while in medical school to gain exposure to a particular specialty. These externships can help students gain a better understanding of the kind of work and problems that are encountered in a specialty. They can also help students who are undecided about what area to specialize in at the conclusion of medical school.[40]

Role Models and Mentors

Mentoring is a key component in the training and guiding of future physicians. A mentor is one who provides teaching, professional and personal guidance, sponsorship, role modeling, and socialization.[41] Mentor relationships can facilitate career success for medical students in many ways. Mentorship has improved job satisfaction and compensation and has also optimized productivity. Studies have shown that physicians with mentors are twice as likely to be promoted as compared to physicians without mentors. Additionally, medical trainees with mentors are

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[36] Jonathan R. Kerr, MD; M. Bianca Seaton, MSc; Heather Zimcik, MD; *et al*., "The Impact of Interest: How do Family Medicine Interest Groups Influence Medical Students?" *Canada Family Physician*, (Jan. 2008); 54(1): 78-79, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2293322/, last accessed on August 30, 2021.

[37] *Supra*, n. 24.

[38] Shannon Aymes, MD, "Work-Life Balance for Physicians: The What, the Why, and the How," *Medical News Today*, (Sept. 22, 2020), https://www.medicalnewstoday.com/articles/318087#Is-work-life-balance-just-hype?, last accessed on August 30, 2021.

[39] Yaser Sarikhani, Sulmaz Ghahramani, Mohsen Bayati, et al., "A Thematic Network for Factors Affecting the Choice of Specialty Education by Medical Students: A Scoping Study in Low-and Middle-Income Countries," *BMC Medical Education*, (Feb. 10, 2021), Art. No. 99.

[40] *Supra*, n. 30.

[41] Eva M. Aagaard, MD and Karen E. Hauer, "A Cross-sectional Descriptive Study of Mentoring Relationships Formed by Medical Students," *Journal of General Internal Medicine*, (Apr. 2003); 18(4): 298-302, doi: 10.1046/j.1525-1497.2003.20334.x.

"twice as likely to state that they received excellent career preparation."[42] Mentorship can also impact career selection and help medical students develop an interest in a certain specialty.[43] Early and frequent career advising may help students with unformed career aspirations make career decisions and solidify their goals, eliminating potential barriers to finding mentors that some students face.

According to a recent 2019 Association of American Medical Colleges (AAMC) questionnaire, role model influence was the third most frequently cited strong influence on specialty choice by 2019 graduates.[44] Other studies have acknowledged the impact of mentoring on a student's specialty selection. One specific study found that "students inclined to pursue primary care were more likely to state that mentors positively and directly impacted their desire and inclination."[45] Given the reportedly antagonistic environment toward primary care within medical schools, this would seem logical since studies have also found that "students pursuing any specialty, primary care or non-primary care, felt that individuals who refute negative stereotypes of physicians in their desired field are a great influence in their decision of specialty choice."[46]

Recent insight into the impact of mentorship in medical schools was obtained in a 2020 study utilizing an anonymous, online, cross-sectional survey forwarded to fourth-year osteopathic medical students at a medical school located in the mid-west. Respondents in the survey believed their mentorship experiences had a strong impact on "their decisions involving rotation choices, residency programs, field of practice, and career trajectory."[47] Survey respondents also believed the amount and quality of mentorship could be improved.[48]

Educational Debt

Education debt was the least influential factor according to the 2019 AAMC questionnaire briefly mentioned above and discussed in further detail below. This may seem counter-intuitive given the staggering cost of medical school and the heavy debt that generally comes attached to it following graduation. Students were twice as likely to cite concerns over earning potential when choosing a specialty when compared to debt. However, past studies have found that incurring medical school debt, even as the cost of medical school and the level of debt per student increased, had little or no influence on students deciding to enter primary care.[49]

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[42] Vikrant Bhatnagar, Sebastian Diaz, and Philip A Bucur, "The Need for More Mentorship in Medical School," *The Cureus Journal of Medical Science*, (May 2020); 12(5): e7984, doi: 10.7759/cureus.7984.
[43] *Ibid*.
[44] Brendan Murphy, American Medical Association, "The 11 Factors that Influence Med Student Specialty Choice," (Dec. 1, 2020), https://www.ama-assn.org/residents-students/specialty-profiles/11-factors-influence-med-student-specialty-choice, last accessed on August 27, 2021.
[45] *Supra*, n. 42.
[46] *Ibid*.
[47] *Ibid*.
[48] *Ibid*.
[49] *Supra*, n. 45.

Between 1974 to 1990, more students had to incur debt, and their overall total amount of debt increased. Despite this, students still maintained that debt had practically no influence on their selection of specialty. A 2010 study likewise found "no correlation with students' incurred debt level…"[50] Another 2014 report found that high educational debt can deter students from selecting primary care as a specialty, but generally only within public medical schools. The same did not appear to be true for private medical schools. In fact, many prestigious private medical schools are offering debt-or tuition-free programs, making the question of debt superfluous.[51]

Association of American Medical Colleges Questionnaire

The 2019 AAMC graduation questionnaire, referenced above, specifically requested insight from medical students across the country as to the reasons they chose their specialties. The questionnaire included a list of 11 commonly referred to factors known to influence over a student's selection of specialty. These factors included a specialty's fit with personality, interests, and skills; content of specialty; role model influence; work-life balance; fellowship training options; and other important and factors. The questionnaire then requested that respondent students rank the factors based on what influenced their selection. The AAMC questionnaire received over 16,000 responses.

A specialty's fit with personality, interests, and skills was indicated to be a strong influence on the student's selection by 99 percent of respondents. The content of specialty was selected by 98 percent of respondents as being a factor that had strong influence on their selection. Role model influence was the third most frequently cited strong influence on specialty choice by 2019 graduates, coming in at 81 percent. According the AAMC, personal fit, content, and role modeling were the top three factors among medical school graduates for each of the past five years.[52] A full breakdown of the 11 factors ranked by respondents in the 2019 AAMC questionnaire are as follows:

[50] Diane Indyk, Darwin Deen, Alice Fornari *et al*., "The Influence of Longitudinal Mentoring on Medical Student Selection of Primary Care Residencies," *BMC Medical Education*, (2011); 11:27.
[51] Kevin Budd, "Will Free Medical Schools Lead to More Primary Care Physicians," *AAMCNews*, (Dec. 2, 2019).
[52] *Supra*. n. 44.

Table 3 11 Factors Ranked as Strong or Moderate Influence for Selection of Specialty AAMC 2019 Medical Student Questionnaire	
Factor	**Percentage of Respondents**
Personality Fit	99%
Specialty Content	98
Role Model Influence	81
Work/Life Balance	77
Fellowship Training Options	61
Future Family Plans	61
Income Expectations	48
Length of Residency	43
Competitiveness of Specialty	39
Expectations of Family	29
Education Debt	22

Source: Data compiled by the Commission from Brendan Murphy, American Medical Association, "The 11 Factors that Influence Med Student Specialty Choice," (Dec. 1, 2020), https://www.ama-assn.org/residents-students/specialty-profiles/11-factors-influence-med-student-specialty-choice, Last accessed on August 27, 2021.

The AAMC questionnaire also asked students about the resources they used to research their specialties. For this question, the top picks among student respondents were advising and mentoring, which 47 percent of respondents found "very useful" and 27 percent found "moderately useful." In addition, participation in in-house and extramural electives were very useful for 44 percent and "moderately useful" for 26 percent of respondents.[53]

[53] *Ibid.*

Current Shortage of Primary Care Physicians

According to the Medical Association of Family Physicians, a primary care physician is defined as:

> a specialist in family medicine, general internal medicine or general pediatrics who provides definitive care to the undifferentiated patient at the point of first contact, and takes continuing responsibility for providing the patient's comprehensive care. This care may include chronic, preventive, and acute care in both inpatient and outpatient settings. Such physicians are specifically trained to provide comprehensive primary care services through residency or fellowship training in acute and chronic care settings.[54]

As mentioned above, typically, primary care has long been associated with the specialties of family medicine, which focus on treating patients of every age, internal medicine which focuses on treat adult patients, and pediatrics which focuses on patients under the age of 21. Despite those three specialties making up the foundation of primary care practice, there are other definitions of primary care physicians which include a broader range of specialties, such as obstetricians who specialize in caring for pregnant women and gynecologists which treat female reproductive organs.[55] Similarly, Geriatric medicine focusing on adults over the age of 60, is not traditionally included as a primary care specialty but is of growing importance as the United States population ages. What specialties are considered as primary care have shifted over time in part due to changes in patient behavior, insurance classification, and which services are in the most demand.

It is estimated that the United States could experience a shortage of between 37,800 and 124,000 physicians by 2034. Of that projected range, it is estimated that a shortage of between 17,800 and 48,000 will be primary care physicians. The range of shortfall decreased from the Association of American Medical Colleges' (AAMC) previous 2020 report numbers. The decrease is attributable to the use of higher estimates of the annual number of new primary care physicians entering the workforce. In addition, the AAMC's 2021 report included a portion of new Graduate Medical Education slots funded through the Consolidated Appropriations Act of 2021.[56]

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[54]"Primary Care." AAFP Home. December 12, 2019. Accessed December 1, 2021. https://www.aafp.org/about/policies/all/primary-care.html.

[55] "5 Primary Care Specialties Aspiring Doctors Should Consider." Medical Blog | St. George's University | The SGU Pulse. January 14, 2021. Last accessed December 1, 2021. https://www.sgu.edu/blog/medical/types-of-primary-care-specialties/.

[56] Consolidated Appropriations Act, 2021, Pub. L. 116-260.

Growth and Aging of Population

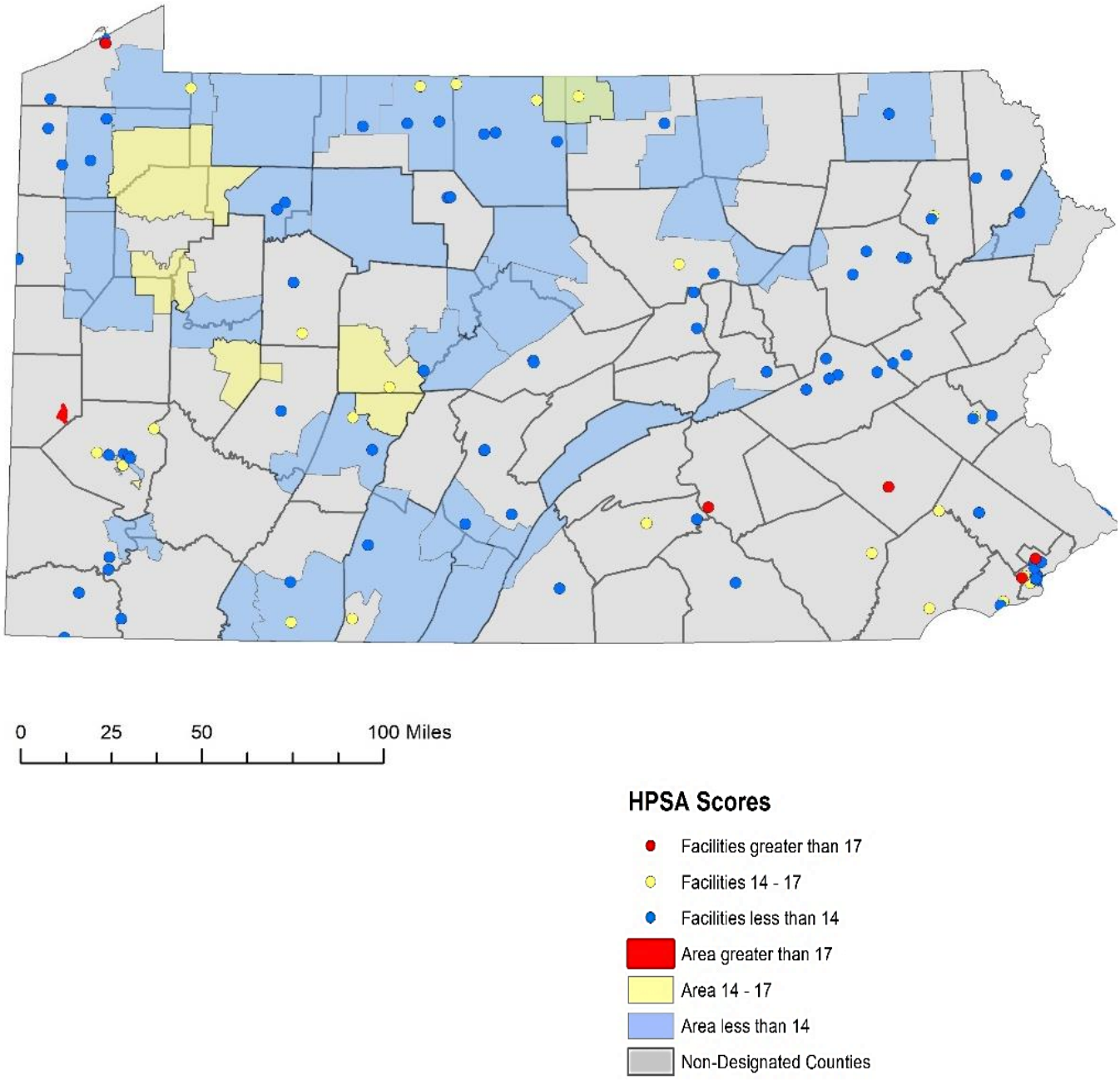
A key factor driving the projected shortage is a national population that is both increasing in size and age. The population of the United States is predicted to swell from about 328.2 million to 363 million from 2019 to 2034. The population under age 18 – generally a population group with a demand for pediatrics physicians – is projected to increase by 5.6 percent. The population aged 65 and older is projected to increase by 42.4 percent – generally a population group with a high demand for specialty physicians and primary care physicians.[57]

In addition, there is a significant portion of the physician workforce nationwide approaching retirement age. For example, the AAMC estimates that "more than two of five currently active physicians will be 65 or older within the next decade."[58] It is predicted that the growing prevalence of burnout among primary care physicians will increase with the on-going COVID-19 pandemic, leading many physicians to decide to accelerate their retirement, rather than delay it.[59]

In the years since the release of the Commission's report on physician shortages, the number has continued to grow. It has been reported that by 2030, Pennsylvania will be short 1,039 primary care physicians.[60] Another report, prepared by the U.S. Department of Health and Human Services in 2016, estimated that by 2025 there would be a shortfall of 1,000 primary care physicians in Pennsylvania.[61] As of 2021, Pennsylvania had 143 designated Primary Care Health Professional Shortage Areas (HPSAs) covering a population of 495,949. Over 100 physicians would be needed to remove these designations. [62] See the map below for a visual representation of the locations of Primary Care HPSAs and Primary Care Facility HPSAs throughout the Commonwealth.

[57] Association of American Medical Colleges, "The Complexities of Physician Supply and Demand: Projections from 2019 to 2034," (June 2021), p. 7.
[58] *Ibid*.
[59] *Ibid*.
[60] Petterson, Stephen M; Cai, Angela; Moore, Miranda *et al*., "State-level projections of primary care workforce, 2010-2030," (Sept. 2013), Robert Graham Center, Washington, D.C.
[61] U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Workforce, "State-Level Projections of Supply and Demand for Primary Care Practitioners: 2013-2025," (Nov. 2016), p. 11.
[62] Kaiser Family Foundation, "Primary Care Health Professional Shortage Areas (HPSAs)," https://www.kff.org/other/state-indicator/primary-care-health-professional-shortage-areas-hpsas/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D, Last accessed on November 2, 2021. HPSAs are defined service areas with a critical shortage of primary care physicians, dentists or mental health providers. A HPSA can be a distinct geographic area (such as a country, grouping, census tract, township or borough), a specific population group found in a defined geographic area or a specific public or non-profit facility.

Primary Care Geographic, Population, and Facility
HPSAs as of October 2021



Burnout in Primary Care

While the task of training new physicians to replace those retiring is considerable, the United State most also contend with large numbers of physicians in danger of leaving the workforce. Burnout among health care physicians has become a growing problem in the United States, especially among primary care physicians.[63] As physician burnout has grown in severity, stakeholders across the health care landscape have written extensively on its likely causes and consequences. In 2016, the CEOs from ten major health systems across the country declared physician burnout a public health crisis.[64] Addressing burnout in the primary care field is important because not only because of doctors leaving the primary care but also because qualified medical students are specialties that are associated with less stress.

Defining "Burnout"

The definition of the term "burnout" itself has varied since its inception. Burnout has been generally defined as a "syndrome of emotional exhaustion, depersonalization, and a sense of low personal accomplishment that results in decreased effectiveness at work."[65] However, a plurality of researchers appear to also favor the definition initially developed by University of California – Berkeley professor Christina Maslach and Rutgers University professor Susan E. Jackson, which defines "burnout" as a "psychological syndrome emerging as a prolonged response to chronic interpersonal stressors on the job."[66]

Prolonged responses under Maslach's and Jackson's definition include overwhelming exhaustion, feelings of cynicism and detachment from the job, a sense of ineffectiveness and lack of accomplishment or any combination thereof. From this definition came the Maslach Burnout Inventory (MBI) and the Maslach Burnout Inventory – Human Service Scale (MBI-HSS), two of the most commonly-used instruments to measure levels of burnout among employed individuals.[67]

Negative Impacts

The negative impact stemming from physician burnout can be substantial. It can detrimentally affect the quality of patient care by influencing clinical decision making, increasing medical errors and malpractice claims, and lowering patient satisfaction. Burnout can also lead to high physician turnover, strained relationships between providers and staff, and in some cases, drug and alcohol abuse. A recent study quantified the cost of physician turnover in monetary terms,

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[63] Debora Goetz Goldberg, PhD, MHA, MBA; Tulay G. Soylu, PhD, MHA, MBA; Victoria M. Grady, PhD, *et al.*, "Indicators of Workplace Burnout Among Physicians, Advanced Practice Clinicians, and Staff in Small to Medium-Sized Primary Care Practices," *Journal of the American Board of Family Medicine*, (May-June 2020); 33(3), doi: 10.3122/jabfm.2020.03.190260.

[64] Ashish K. Jha, MD, MPH; Andrew R. Iliff, MA, JD; Alain A. Chaoui, MD, FAAFP *et al.*, "A Crisis in Health Care: A Call to Action on Physician Burnout," *Harvard Global Health Institute*, *Massachusetts Medical Society*, pp. 1-2.

[65] *Supra*, n. 63.

[66] JSGC, "Pennsylvania Mental Health Care Workforce Shortage: Challenges and Solutions, A Staff Study," (June 2020), pp. 59-60.

[67] *Ibid*.

finding that physician turnover and reduced clinical hours attributable to burnout result in approximately $4.6 billion in costs each year nationwide.[68]

Level of Burnout

The recent level of burnout among American physicians has reached staggering numbers. While high levels of burnout within the health care industry have been widely reported, few studies have compared the level of burnout between primary care physicians and other types of health care professionals.[69] However, with more attention being placed on primary care, it has been revealed that primary care physicians are experiencing burnout at a higher level than many other health care professionals. According to a recent study, 79 percent of primary care physicians say they have experienced symptoms of burnout, compared to 68 percent among all the physicians surveyed in the study. Among all the specialists the study surveyed (excluding primary care physicians), the burnout rate was 57 percent.[70] Several other studies have estimated burnout rates at over 50 percent among American primary care physicians. Another recent study found that primary care physicians reported burnout at twice the rate of other health care professionals in primary care practices.[71]

A 2017 Agency for Healthcare Research and Quality report found that more than half of primary care physicians felt stressed because of time pressures and other work-related conditions. Researchers surveyed 422 family physicians and general internists who worked in 119 ambulatory care clinics and surveyed 1,795 patients from these clinics. The survey showed that more than half of the participating physicians experienced time pressures when conducting physical examinations. Nearly a third believed they needed at least 50 percent more time than was allotted for this patient care function. Nearly a quarter of participating physicians claimed they needed at least 50 percent more time for follow-up appointments. [72]

Physicians experiencing increased levels of anxiety and withdrawal were more than three times as likely to report burnout compared to those who did not experience such high levels. Small to medium-sized practices, defined as those with 1 to 15 providers and which tend to make up a significant number of primary care practices), experience more challenges during major workplace changes that may have an influence on workplace burnout.[73] The study also found that anxiety significantly increased the odds of burnout across the spectrum of health care professionals.[74]

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[68] *Supra*, n. 63.
[69] *Ibid.*
[70] InCrowd, *Physician Burnout 2019*, (Aug. 5, 2019), https://incrowdnow.com/syndicated-reports/physician-burnout-2019/, Last accessed on Sept. 10, 2021.
[71] Sumit D. Agarwal, MD, MPH; Erika Pabo, MD, MBA; Ronen Rozenblum, PhD, MPH, *et al*., "Professional Dissonance and Burnout in Primary Care: A Qualitative Study," *Journal of American Medical Colleges Internal Medicine*, (2020); 180(3): 395-401, doi: 10.1001/jamainternmed.2019.6326.
[72] Agency for Healthcare Research and Quality, "Physician Burnout," Pub. No. 17-Mo18-EF, (July 2017).
[73] *Supra*, n. 63.
[74] *Ibid*.

Causes

Burnout and overall job dissatisfaction for primary care physicians and their staff occur for many reasons. One key reason for burnout in primary care practice is the frequent changes in information technology associated with the practice. Specifically, primary care physicians and their staff experience numerous workplace changes brought about by Electronic Health Record systems (EHRs) and other information technology.[75] Though the purpose of EHRs is to reduce the time a physician spends completing laborious clinical documentation when treating a patient, many physicians claim they spend more time "connected to [our] computer screens than connected directly to our patients."[76]

Another cause of physician burnout in primary care, often indirectly related to EHRs as was mentioned above, are the quantity of a physician's workload and the ever-increasing workload of office-related responsibilities. In a 2020 study, primary care practitioners claimed that the sheer quantity of their workload is insurmountable and unrealistic. In addition, all participating physicians in the study expressed some level of dissatisfaction with how practitioners' jobs "seemed to involve less 'doctor work' and increasingly more 'office work.'"[77] Some examples of office work included "charting for billing or population health documentation purposes, fielding electronic messages and telephone calls, and processing paperwork."[78]

Some participants in the 2020 study referenced above expressed a concern and even discomfort in being an active professional working in a system that appears to hold professional values counter to their own. Participants also reported an overall feeling of being undervalued and stated that their responsibilities in caring for patients have increased, while their authority over their work simultaneously decreased. They further explained that their specialist colleagues routinely left drug refills, prior authorizations, test results, and workups to them. The increase in work responsibility and decrease in authority was also highlighted by some practitioners who described how patients, who were unable to contact other departments, "[turned] to [the PCP] for their last chance to get things done," leaving practitioners feeling as though other colleagues' obligations were being "dumped on" them.[79]

Burnout can negatively affect physician productivity, though inquiry regarding the connection between the two is still developing. The potential impact of burnout on productivity is especially troubling, considering that there has been an overall increase in pressure on physicians to raise their productivity as large hospitals and health systems absorb more physician practices.[80] This becomes a cyclical problem within the physician workforce because when physicians experience high levels of exhaustion from higher workloads, they become more likely to reduce

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[75] *Ibid*.
[76] Carrie Horwitch, MD, MPH, "Real Reason Docs Burn Out: EHRs Must Change for the Better," *Medical Economics*, (Jan. 25, 2019); 96(2), p. 14.
[77] *Supra*, n.71.
[78] *Ibid*.
[79] *Ibid.*
[80] Joanne Finnegan, "Hospitals put Pressure on Doctors to Increase Productivity," *Fierce Healthcare*, (Oct. 7, 2016), https://www.fiercehealthcare.com/practices/hospitals-put-pressure-doctors-to-increase-productivity, last accessed on November 29, 2021.

their clinical schedules, reduce the number of patients in their practice, leave the practice, or retire. The association between burnout and physician clinical work effort, as well as turnover is well documented in studies.[81] For example, a longitudinal prospective study on the association between burnout and physician work effort, found that for every 1-point decrease in satisfaction, there was a 30 percent to 40 percent increase in the likelihood that a physician would decrease work effort over the subsequent two years.[82]

As of 2021 the average annual salary of a primary care physician ranges between $221,000 to $248,000, while some more specialized fields like Cardiologists make over double that amount.[83] It is worth noting that a 2021 *New England Journal of Medicine* article reported that, for most primary care specialties, compensation increases appear to be outpacing increases in productivity. The article suggested that concerns about physician shortages, could be one explanation for higher compensation rates compared to productivity. According to the article, drops in primary care physician compensation and productivity occurred during the COVID-19 pandemic, especially during the earlier months of the pandemic. The same article reported that "an average 55 percent decline in revenue in the early months of the pandemic and many were forced to furlough medical staff."[84] Revenues in primary care have rebounded since the early months of the pandemic.[85]

Proposed Solutions

Numerous solutions have been proposed to mitigate the growing physician burnout crisis. One such solution is to develop more proactive support programs for mental health treatment for physicians suffering from the effects of burnout. Another proposed solution would be to improve the usability of EHRs. Improving EHRs could require reforming certification standards by the federal government and increasing the level of physician engagement in the design, implementation, and customization of EHRs.[86] Health care stakeholders have also agreed that workload reduction is necessary and could be achieved by off-loading work and eliminating inefficiencies by increasing the number of and training for support staff assisting physicians.[87]

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[81] Marcela G. del Carmen, MD, MPH; John Herman, MD; Sandhya Rao, MD; *et al.*, "Trends and Factors Associated with Physician Burnout at a Multispecialty Academic Faculty Practice Organization," *Journal of American Medical Association*, (2019); 2(3): e190554, doi:10.1001/jamanetworkopen.2019.0554.

[82] TD. Shanafelt; M. Mungo; J. Schmitgen*; et al*, "Longitudinal study evaluating the association between physician burnout and changes in professional work effort," *Mayo Clinic Proceedings*, (2016); 91(4): 422-431, doi: 10.1016/j.mayocp.2016.02.001.

[83]Physician Compensation Report: 2021 Medscape, April 16, 2021
https://www.medscape.com/sites/public/physician-comp/2021

[84] Bonnie Darves, "Physician Compensation Still Rising in Primary Care and Fast-Growing Urgent Care Section, but Flattening is Still Expected," *The New England Journal of Medicine*, (Jan. 11, 2021),
https://resources.nejmcareercenter.org/article/physician-compensation-still-rising-in-primary-care-and-fast-growing-urgent-care-sector-but-flattening-is-expected/, Last accessed on November 29, 2021.

[85] *Ibid*.

[86] *Supra*, n. 64.

[87] *Supra*, n. 72.

Role of Residencies for Primary Care Practitioners

As previously mentioned in this report, there are several factors that influence U.S. medical students' decision of where to specialize in their careers. To recap, factors such as age, ethnicity, demographic backgrounds, socioeconomic status, future earnings expectations, medical school faculty and student perceptions, and overall exposure in medical school, all can play a role in a graduate's decision.[88] Residencies may also play a specific role in determining the number of U.S. medical graduates who decide to practice in primary care.

Benefits to Residency Training Programs in General

In its 2015 report *The Physician Shortage in Pennsylvania*, the Commission described in detail, the role that residency training programs play in the overall physician workforce. According to the report, residency training programs have numerous direct, indirect, and intangible benefits besides ensuring that the physician workforce is well-trained and competent. These additional benefits include cost avoidance through resident coverage of clinical services.[89] In addition, General Medical Education (GME) residency programs serve medically underserved populations, and often provide continuing medical education programs for the sponsoring institution's medical staff.[90] Considering these significant benefits and the growing physician shortage, the Commission's 2015 report recommended an increase in the number of residency positions to train more physicians in Pennsylvania.[91]

This recommendation applied more broadly to all types of physicians as opposed to just primary care physicians, the focus of this report. An increase in residency positions may still assist in alleviating Pennsylvania's physician shortage. However, it should be noted that increasing the number of primary care residency positions alone, as has been done in past years, by itself, may not be enough to increase the number of U.S. graduates who go on to practice in primary care. Recent studies suggest that more is needed and that the organization and composition of primary care residency training itself must be improved to increase the number of new primary care physicians.

Funding and Disposition of Residencies

Residency training, also known as graduate medical training (GME), is a period of medical training medical school graduates participate in under the guidance and supervision of more experienced physicians. Students select and interview for residencies during their final year of medical school. Residency programs in the United States typically last from three to seven years. During that time, resident trainees care for patients under supervision of physician faculty members. Residents can also participate in additional educational and research activities.

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[88] Miriam Shapiro and Alice Fornari, "Factors Influencing Primary Care Residency Selection among Students at an Urban Private Medical School," *The Einstein Journal of Biology and Medicine*, (2010), p. 19.
[89] JSGC, *The Physician Shortage in Pennsylvania*, (Apr. 2015), pp. 28, 34.
[90] *Ibid*. at p. 28.
[91] *Ibid*. at p. 35.

Sponsors of residency programs often include hospitals, academic medical centers, health care systems, and other institutions.[92]

The Accreditation Council for Graduate Medical Education (ACGME) or the American Osteopathic Association (AOA) have accredited allopathic and osteopathic residency programs in the past. Recently, the AOA and the American Association of Colleges of Osteopathic Medicine joined the ACGME as member organizations. In 2015, all GME programs became subject to a single accreditation system.[93]

Most residencies in the United States are funded by Medicare. Since 1997, there has been a national cap on the number of Medicare-funded residencies offered to medical school graduates. Residencies funded by other federal agencies or charitable organization, university, hospital, or state resources are unaffected by the cap. These types of residencies have been increasing in recent years.[94]

The organization responsible for connecting medical school graduates with residency programs is the National Resident Matching Program (NRMP), a private, not-for-profit corporation. The main objective of the NRMP is to optimize the rank-ordered choices of applicants and program directors for clinical training throughout the United States. Practically speaking, the program provides a venue for matching applicants' and programs' preferences for each other using an internationally recognized mathematical algorithm. The first residency match was conducted in the NRMP's year of inception in 1952, when 10,400 internship positions were available for 6,000 graduating U.S. medical school seniors.[95] As of 2020, Pennsylvania had the fourth highest number of residency position matches of all 50 states, with 495 matches. The top three states with larger numbers included New York (1,563), Michigan (552), and Florida (540).[96]

International Medical Graduates

When discussing the role of residencies in primary care, it is important to briefly mention International Medical Graduates (IMGs), as IMGs account for roughly 22.5 percent of medical residents (who matched to first-year positions) throughout the U.S. and were roughly 19 percent of the Pennsylvania physician workforce in 2018.[97] IMGs have a large presence in primary care, especially in family medicine, and have accounted for over 23 percent of the U.S. family medicine

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[92] *Ibid*.
[93] *Ibid*.
[94] JSGC, *Pennsylvania Mental Health Care Workforce Shortage: Challenges and Solutions, A Staff Study*, (June 2020), p. 101.
[95] The Match, National Resident Matching Program, "Result and Data, 2021 Main Residency Match," (May 2021), p. iv, www.nrmp.org.
[96] 2020 NRMP Main Residency Match, Match Rates by Specialty and State, *The Match*, https://mk0nrmp3oyqui6wqfm.kinstacdn.com/wp-content/uploads/2020/05/Specialty-by-State-and-Applicant-Type_2020.pdf.
[97] Robbert J. Duvivier; Elizabeth Wiley; John R. Boulet, "Supply, Distribution, and Characteristics of International Medical Graduates in Family Medicine in the United States: A Cross-sectional Study," *BMC Family Practice* (March 30, 2019); 20(47), https://bmcfampract.biomedcentral.com/articles/10.1186/s12875-019-0933-8, Last accessed on November 29, 2021; 2018 Pennsylvania Physician Workforce Profile, *American Association of Medical Colleges* (2019).

workforce.[98] Given the shortages in the primary care physician workforce, IMGs may continue to play an important role in helping alleviate these shortages.

IMGs are eligible for licensure in the U.S. if they completed medical school (listed in the World Directory of Medical Schools) outside the U.S. and Canada, passed the United States Medical Licensing Examination, and completed an approved residency training program in the U.S.[99]

The U.S. Department of State has established a special visa program, the exchange visitor non-immigrant visa (J-1), for non-citizen IMGs approved to participate in work and study-based exchange visitor programs, such as residency training programs. This is the most common visa that IMGs use to participate in U.S. GME programs. As a condition of its issuance, the J-1 visa can require that after completing the residency training program, the IMG must return to their home countries to practice for at least two years before reentering the U.S.[100]

IMGs may be eligible for a waiver of the 2-year residency requirement if the waiver applicant is sponsored by an Interested Governmental Agency (IGA) that is interested in the physician's continued employment in the U.S. State health agencies are considered IGAs and these agencies can recommend IMGs receive a waiver under the Conrad State 30 program.[101]

The Conrad State 30 program focuses on primary care providers with the program goal of improving access to primary care.[102]The service sites for those approved under the program must be in an HPSA, MUA, or MUP. The sites must also agree to serve patients with Medicare, Medicaid, and those who are uninsured or underinsured. Among other requirements, the IMG must practice a minimum of 40 clinical hours in direct patient care per week and must agree to serve for three years.[103] As the program's name, Conrad State 30, implies, each state is limited to 30 waivers per year. It is worth noting, that the Appalachian Regional Commission (ARC) also offers a J-1 visa waiver program for IMGs who agree to practice in underserved areas that are in the Appalachian region.[104] According to the Commission's 2015 report *The Physician Shortage in Pennsylvania*, 52 of Pennsylvania's 67 counties lie within the Appalachian region according to the ARC. The requirements of the ARC are similar to those within the Conrad State 30 program.[105]

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[98] Robbert J. Duvivier; Elizabeth Wiley; John R. Boulet, "Supply, Distribution, and Characteristics of International Medical Graduates in Family Medicine in the United States: A Cross-sectional Study," *BMC Family Practice* (March 30, 2019); 20(47), https://bmcfampract.biomedcentral.com/articles/10.1186/s12875-019-0933-8, last accessed on November 29, 2021.
[99] JSGC, *The Physician Shortage in Pennsylvania*, (Apr. 2015), pp.43-44.
[100] *Ibid.*
[101] Pennsylvania Department of Health, "J-1 Visa Waiver Program (Conrad 30) Statement of Policy" (Updated Aug. 8, 2021), https://www.health.pa.gov/topics/Documents/Health%20Planning/J-1VisaWaiverProgram%20Revised%20Policy.pdf, last accessed on November 29, 2021.
[102] *Ibid.*
[103] *Ibid.*
[104] *Supra*, n. 97.
[105] *Ibid.* at p. 44.

Residency Figures

In 2021 the NRMP broke its prior records for residency registrants and positions nationwide – 48,700 registrants (an 8 percent increase over 2020) and 38,106 positions (a 2 percent increase) with 36,179 positions filled according to the matching algorithm. According to the 2021 NRMP report, there were also 1,892 positions offered through the 2021 Match Week Supplemental Offer and Acceptance Program (SOAP), of which 1,773 were filled. Only 119 positions remained unfilled at the conclusion of SOAP, resulting in a 99.6 percent fill rate overall for all positions placed in the 2021 Match.[106]

The year of 2021 has also been a record-breaking year for primary care residencies. A record-high number of positions were offered, and overall position fill rates increased. Primary care positions are broken down into three primary care specialties: family medicine, internal medicine, and pediatrics. Positions for internal medicine (categorical) also hit their highest number on record this year, with 9,024 positions and a position fill rate of 95.7 percent. Family medicine has experienced position increases every year since 2009. Family medicine offered 4,823 positions and filled 4,472 (92.7 percent). It should be noted, however, that of the 16,860 positions filled in family medicine, internal medicine, and pediatrics, only 11,013 (65 percent) were filled by U.S. medical school seniors.[107]

Studies backed by data from the NRMP going back to the 1980's, have shown that the number of available primary care residencies is not always necessarily determinant of the number of primary care physicians that enter the workforce, especially among U.S. medical school graduates. For example, between 1983 and 1989, the number of residency positions in primary care offered throughout the United States increased faster than the positions were filled by U.S. graduates. In that time, family practice positions increased by 4 percent and the fill rate for U.S. medical school graduates decreased from 71 percent to 60 percent. The amount of internal medicine positions offered had increased by 19 percent, while the fill rate dropped from 72 percent to 64 percent between the same years. The increase in positions and decrease in fill rate among U.S. graduates was similar between these years for pediatric residencies.[108]

This trend was also present in 2019 when there was a record-high number of primary care residency positions offered (15,946) through the NRMP. However, there was also a record low percentage of primary care positions filled by U.S. graduates.[109] According to the 2019 NRMP report, of the 15,355 primary care filled (96.3 percent overall fill rate), 7,272 (45.6 percent) were filled by U.S. graduates with international graduates filling the majority of the positions.[110]

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[106] *Ibid.*
[107] *Ibid.*
[108] Committee of the Institute of Medicine Division of Health Care Services, "Primary Care Physicians: Financing Their Graduate Medical Education in Ambulatory Settings," National Academy Press, (Washington D.C. 1989).
[109] The Johns Hopkins University School of Medicine, "As Doctor Shortage Continues, Residency Programs Show Some Success at Graduating More Primary Care Physicians," *Newsroom*, (Apr. 9, 2019), https://www.hopkinsmedicine.org/news/newsroom/news-releases/as-doctor-shortage-continues-residency-programs-show-some-success-at-graduating-more-primary-care-physicians.
[110] The Match, National Resident Matching Program, "Result and Data, 2019 Main Residency Match," (2019), www.nrmp.org.

In 2020, 17,135 primary care residency positions were offered – a 7 increase from 2019. Of the 16,343 positions that were filled (95 percent overall fill rate), only 45 percent were filled by U.S. graduates.[111]

Influence of Residencies on Primary Care Practitioner Numbers

Residencies are critical for training physicians, especially those physicians who go on to practice in primary care. Because primary care physicians cover a broad range of services, while simultaneously coordinating care with health facilities, specialists and other health care providers, primary care medical residents must learn their professional skills at many different sites. These sites include inpatient sites, emergency departments, intensive care units, and ambulatory specialty practices. This generally means that their time in primary care residency training is sometimes limited to only one or two half-day sessions per week.[112] It is worth noting that primary care practitioners typically spend the bulk of their time practicing in a physician's office setting. This setting is underemphasized in much of their residency training.[113]

Though the value of residency training cannot be understated, the number of graduates filling primary care residencies may not be a good predictor of how many physicians enter into the primary care workforce. Some evidence for this theory comes from a 2020 study that evaluated 17,509 graduates from 20 campuses across 14 university systems across the United States to determine the actual output of primary care graduates. The commonly used Residency Match Method predicted a 41.2 percent primary care output rate. The study concluded that the actual primary care output rate was 22.3 percent and 17.1 percent under a new proposed Intent to Practice Primary Care (IPPC) Method, created in the study.[114]

Based on the 2020 study numbers, viewed in conjunction with NRMP data, simply increasing the number of primary care residency positions under the Match program may not be the long-term solution to the shortage of primary care practitioners from a residency-based perspective. Moreover, if the goal is to increase the numbers of U.S. medical school graduates who go on to practice in primary care, it may be appropriate to look more at the organization of the residency training itself as the *Journal of General Internal Medicine* suggested in its recent study. Further, it would also be beneficial to establish a more reliable method, such as the IPPC method, for determining the actual output of primary care practitioners upon the conclusion of their training.

According to the *Journal of General Internal Medicine* the way residency training programs are organized may have an impact on a physician's decision to go into primary care. The journal's study surveyed 100 internal medicine primary care residency program directors across the United States. The survey results were then reviewed to determine which characteristics

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[111] The Match, National Resident Matching Program, "Result and Data, 2020 Main Residency Match," (2020), www.nrmp.org.

[112] American Association of Medical Colleges, "Profiles of Three High-Performing Primary Care Residency Clinics," (May 2018), prepared by the Center for Excellence in Primary Care at the University of California, San Fran., p. 1.

[113] *Supra*, n. 108.

[114] Mark Deutchman, MD; Francesca Macaluso, MPH; Jason Chao, MD, *et al.*, "Contributions of U.S. Medical Schools to Primary Care (2003-2014): Determining and Predicting Who Really Goes into Primary Care," *Family Medicine*, 2020; 52(7): 483-90, doi: 10.22454/FamMed.2020.785068.

were associated with programs where more than half of graduates pursued primary care. There were 70 respondents of the 100 primary care residency program directors surveyed. Of the 70 directors who responded, it was learned that 57 percent of the internal medicine primary care residency graduates go directly into primary care.[115]

The survey's analysis revealed that patient care time was one factor that appeared to be associated with how successful residency programs were at graduating primary care physicians. There has also been a push within many residency programs to incorporate more outpatient training opportunities, which also likely had a positive impact on graduating more primary care physicians.[116] Further, the study found that residency training filled with more time seeing patients, a greater diversity of outpatient experiences, and supportive resources that address social determinants of health all positively influence the desire to pursue a career in primary care among residents.[117]

Residencies can and often do play a role in a medical school graduate's decision to pursue a career in primary practice. While an increase in the number of primary care residency positions is a step in the right direction to increasing the number of primary care practitioners, this alone will likely not resolve the primary care practitioner shortage, from a residency-based solution standpoint. More focus should be put on evaluating the organization of the primary care residency training itself. Emphasis should be put on increasing outpatient training opportunities, as well as increasing resident trainees' overall exposure to patients.

The Return on Investment in Primary Care

Recent Investment in Primary Care

With Pennsylvania (and the United States as a whole) experiencing an increasing shortage of primary care physicians, it is important for the Commonwealth to consider investing in primary care. Such increased investment has significant support from stakeholders within the medical field. However, despite this growing support, the United States health care spending percentage on primary care is only nominal at best. In 2017, the United States only spent six to eight percent of health care dollars on primary care services.[118] In 2018, that percentage shrunk to four to seven percent and in 2020, the percentage hovered between five to seven percent.[119] These primary care

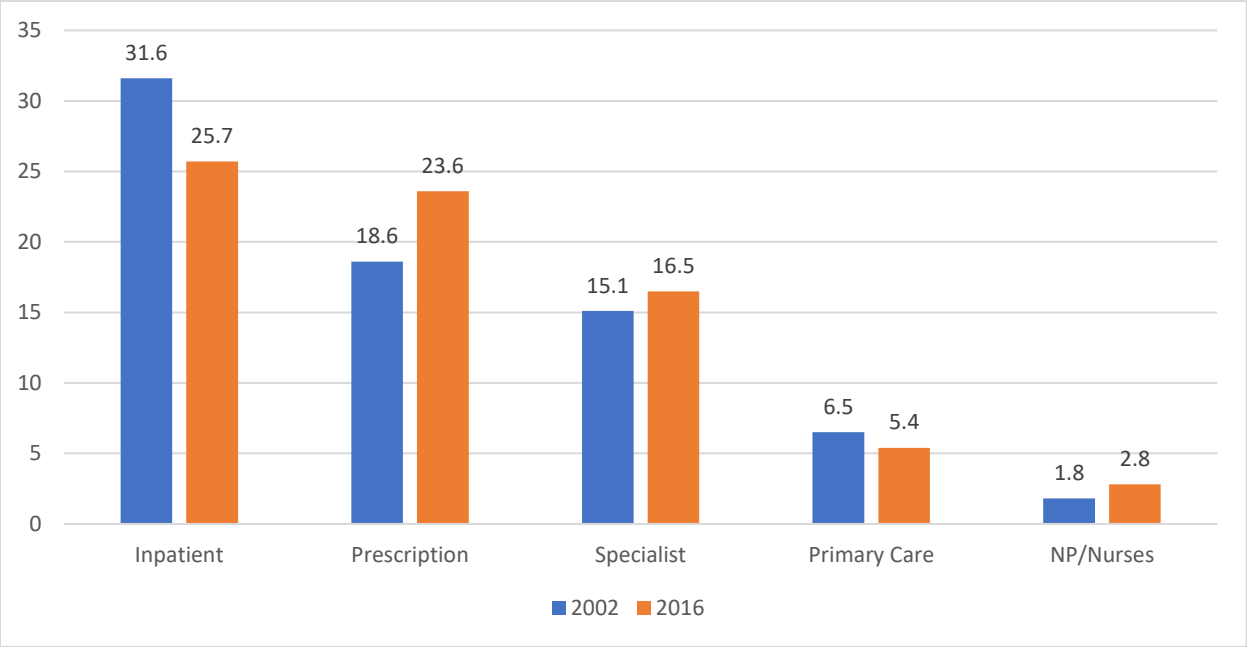
[115] *Supra*. n. 109.
[116] *Ibid*.
[117] Paul O'Rourke, MD, MPH; Eva Tseng, MD, MPH; Karen Chacko, MD et al., "A National Survey of Internal Medicine Primary Care Residency Program Directors," Journal of General Internal Medicine, (July 2019), 34(7): 1207-1212, doi: 10.1007/s11606-019-04984-x.
[118] Russell S. Phillips, "Investment in Primary Care is Needed to Achieve the Triple Aim," *Health Affairs*, (May 10, 2017), doi: 10.1377/hblog20170510.060008; Center for Primary Care, Harvard Medical School, "Investment & Innovation in Primary Care: An Update and Call to Action," (Aug. 20, 2020),
[119] Glen Stream, MD, FAAFP, MBI, Michael Tuggy, MD, "Delivering Value in Healthcare Starts with Increased Primary Care Investment," *Medical Economics*, (Aug. 6, 2018).

spending percentages are a sharp contrast from those in other Organization for Economic Co-operation and Development (OCED)[3] countries which currently average 14 percent.[120]

Low primary care investment is not a new phenomenon in the United States. A trend of insufficient investment has been occurring for almost 20 years. Data provided from the Medical Expenditure Panel Survey (MEPS) demonstrates that between 2002 and 2016, primary care investment saw an average of only four percent of United States health dollars. The data also showed that primary care was among the lowest percentage of spending when compared to other health care practitioners. See Graph 1 below.

Graph 1

Trends in U.S. Healthcare Spending by Category; 2002 & 2016



Source: Data from the Medical Expenditure Panel Survey, 2002-2016.

Over the past decade, Pennsylvania has maintained one of the lower primary care spending averages when compared to other states. In a 2019 report entitled *Investing in Primary Care: A State-Level Analysis*, primary care spending was examined for 29 states, including Pennsylvania. The report reviewed and calculated primary care spending averages based on a narrow primary care definition and a broad primary care definition. The narrow definition was restricted to physicians identified in the MEPS as practicing family medicine, general practice, geriatrics, general internal medicine, and general pediatrics. The broad definition

[120] Organisation for Economic Co-Operation and Development (OCED) is an international organization that works to build economic policies to improve the lives of its member nations. Member nations of OCED include the U.S., United Kingdom, France, Germany, Sweden, Switzerland, Ireland, Italy, Spain, Turkey, Norway, Canada, Austria, Denmark, Japan, New Zealand, Australia, Israel, Chile, Colombia, and other countries across the globe. – OCED Homepage, https://www.oecd.org/about/document/ratification-oecd-convention.htm, last accessed June 30, 2021.

included nurses/nurse practitioners, physician assistants, OB/GYNs, general psychiatrists, psychologists, and social workers.[121] Out of the 29 states examined, Pennsylvania had the second lowest primary care spending percentage from 2011 to 2016 based on the narrow definition, and the fourth lowest when based on the broad definition, as seen in Table 4.

Table 4
Percent of Primary Care Spending across States by Primary Care Definitions, 2011-2016

State	Narrow Definition	Broad Definition
AL	6.2%	10.8%
AZ	5.2	8.7
CA	6.1	10.8
CO	5.0	10.6
CT	3.5	10.6
FL	5.7	8.8
GA	5.7	9.6
IL	5.0	9.0
IN	4.7	9.7
KY	4.5	10.0
LA	5.3	8.3
MA	4.8	10.9
MD	5.5	9.6
MI	4.7	9.0
MN	7.6	14.0
MO	4.6	11.7
NC	5.9	10.0
NJ	4.6	8.2
NY	5.0	10.0
OH	4.6	8.7
OK	6.7	10.7
OR	5.6	10.9
PA	**4.2**	**8.5**
SC	5.0	8.3
TN	4.8	8.8
TX	6.3	10.0
VA	5.7	10.0
WA	5.9	10.1
WI	6.2	11.1

Source: Patient-Centered Primary Care Collaborative, Investing in Primary Care: A State-Level Analysis, Robert Graham Center, (July 2019), p. 16.

[121] Patient-Centered Primary Care Collaborative, *Investing in Primary Care: A State-Level Analysis*, Robert Graham Center, (July 2019), p. 13.

The Value of Investing in Primary Care

The slim margin of spending on primary care has signaled growing concern to many experts in the health field hoping to increase the efficiency and affordability of health care. This concern stems from the fact that studies have shown a significant value to primary care within the U.S. health system. For instance, one recent study demonstrated that for every $1 spent in primary care, $13 is saved in down-the-road health costs. In fact, the American Academy of Family Physicians has concluded that if the United States spent closer to 12 percent of its health care dollars on primary care, it would likely cut individual patient costs and lead to an overall decrease in health care expenditures.[122] Simply put, if more federal and state funds are invested in primary care (through increased subsidizing of education and training and reimbursement of primary care physicians), the population will be healthier and less of its money will be spent by individuals on down-the-road health care and treatment costs.

A 2019 Journal of American Medical Association (JAMA) Internal Medicine study determined that individuals receiving primary care had significantly more high-value care, slightly more low-value care, and better overall experiences with health care services than those not utilizing primary care. The JAMA reached this conclusion after conducting a "nationally representative analysis of noninstitutionalized U.S. adults 18 years or older who participated in the Medical Expenditure Panel Survey."[123] The study compared the quality of care and experience of 49,286 U.S. adults with primary care versus 21,133 adults without primary care between 2012 and 2014, while analyzing temporal trends from 2002 to 2014. Its conclusion prompted the JAMA to recommend that "[p]olicymakers and health system leaders seeking to improve value should consider increasing investments in primary care."[124]

It is worth noting that in the study, primary care was not uniformly associated with more high-value care. One example of this was found with the treatment for heart failure and pulmonary disease – respondents associated primary care in this category with worse care than those without primary care. However, there were a relatively small numbers of respondents without primary care that qualified for these measures and approximately half of these patients also had visits with a relevant specialist. The study noted that prior research showed that, in general, specialists provide higher quality of care in their area, but generally do not address medical issues beyond their area of specialty. For this reason, the study determined that these particular findings "should not be interpreted as suggesting that a specialty dominated model would be better."[8]

Given the general agreement among health industry stakeholders on the value of primary care and the potential cost savings it offers, it can be perplexing why it is commonly underfunded. According to the Center for Primary Care at Harvard Medical School, health care services are generally more profitable in the United States to treat conditions than to prevent them from occurring. The center attributes this line of thought to the fee for service (FFS) payment model

[122] *Supra*, n. 119.
[123] David M. Levine, MD, MPH, MA; Bruce E. Landon, MD, MBA, MSc; and Jeffrey A. Linder, MD, MPH, "Quality and Experience of Outpatient Care in the United States for Adults with or without Primary Care," *JAMA Internal Medicine*, 2019; 179(3): 363-372, doi: 10.1001/jamainternmed.2018.6716.
[124] *Ibid*.

which is the predominant model across the country. The FFS model is "fundamentally misaligned with the nature of continuous, comprehensive, and coordinated primary care."[125] It is worth noting however, that there is a growing trend where many primary care start-ups are beginning to adopt value-based payment models which allows for more provider accountability when it comes to total cost, quality, and experience of care.[126]

Another 2019 report mentioned previously, found that there is an association between increased primary care spending and fewer emergency department visits, total hospitalizations, and hospitalizations for ambulatory care-sensitive conditions. This report does acknowledge that its data set has limitations, and as a result, it states that it cannot conclude that the association is causal. However, the report does note that the association is replicated in other research literature. Despite its limitations, the report also provides that there is consistent and even growing evidence demonstrating that primary care-oriented systems achieve better health outcomes, more health equity, and lower costs. Like other studies on primary care, the report agrees that primary care continues to be chronically underfunded in the U.S.[127]

Rhode Island Model

Since there is a consensus within the health field that there needs to be a greater investment in primary care, some states have begun increasing the investment of their health care dollars in primary care. Rhode Island is a prime example, though its investment pertains more directly to its insurance industry rather than to any medical schools located within its borders.

The Rhode Island General Assembly enacted the Rhode Island Health Care Reform Act in 2004. This piece of legislation established the state's Office of Health Insurance Commissioner (OHIC), which, among other things, was empowered to protect health care consumers and engage providers and improve the state's health care system. In 2008, the OHIC conducted a study that reviewed high performing health care systems and their affiliated health care plans nationwide. The study specifically examined its own level of spending on primary care in comparison to primary care spending in those respective high performing states. The results from the study concluded that Rhode Island's own primary care spending was around an average of six percent of its overall health care spending – an average visibly lower than benchmark plans in other higher performing states, which ranged from a low of seven percent (Massachusetts HMO) to a high of 14 percent (Group Health of Washington State).[128]

Based on its study results, the OHIC established affordability standards to lower costs and improve quality of health care in 2009. The affordability standards focused on increasing investments in primary care infrastructure, expanding the adoption by primary care practices of the patient-centered medical home model, standardizing provider incentives to adopt electronic

[125] Center for Primary Care, Harvard Medical School, "Investment & Innovation in Primary Care: An Update and Call to Action," (Aug. 20, 2020), https://info.primarycare.hms.harvard.edu/blog/investment-innovation-primary-care, last accessed on June 30, 2021.
[126] *Ibid.*
[127] *Supra*, n. 121.
[128] American Academy of Family Physicians, Primary Care Spend Toolkit, "Rhode Island's Regulatory Work on Primary Care Spend," (2019).

medical records systems, and establishing a collaborative process to change the way providers are paid reducing the state's reliance on longstanding fee-for-service payment methodologies.[129]

Most pertinent to primary care investment, the standards established by the OHIC required health plans to increase the proportion of their medical expenses spent on primary care by one percentage point per year from 2010 to 2014. In addition, each insurer was required to submit a plan to the OHIC that demonstrated how the increase was achieved without contributing to an increase in premiums.[130]

A 2012 *Primary Care Spending in Rhode Island* report examined the performance of the state's three largest health insurers against the primary care spending targets outlined in the OHIC's affordability standards. The report found that insurance companies were hitting their targets and that while primary care spending was growing, total medical spending was falling – total primary care spending for commercial members increased by 23 percent while total medical spending fell by 18 percent. By 2011, insurers were spending 8 percent of medical claims dollars on primary care, an increase from five percent in 2007.[131]

Two years later, the statistics improved. A 2014 *Primary Care Spending in Rhode Island* report found that insurers were continuing to meet their spending targets, with some exceeding them. Overall spending on primary care grew 37 percent from 2008 to 2012, while total medical spending fell 14 percent. The report noted that in 2012, the market had spent $7 million more on primary care than it did the year prior. Annual primary care spending increased by $18 million dollar from 2008 to 2012. During this same period, annual total medical spending dropped $115 million. Ultimately, the study concluded that investments in both fee schedules and non-FFS methods had the effect of boosting Rhode Island's primary care delivery system. The report pointed to the OHIC's affordability standards, which it credited with generating the additional investment of $64 million from commercial insurers since 2010. In addition, the report highlighted that raising the portion of premium dollars spent on primary care facilitated the state's transition to a value-based care system. According to the report, such investments helped clinicians keep people healthy and out of more intensive care.[132]

While Rhode Island's success is worth noting, it is also important to note that all states are different. Establishing an office authorized to promulgate affordability standards for insurer investment in primary care may or may not be a feasible pathway to prioritizing the funding of primary care. However, it is one key example of how some states are beginning to see the actual return on investment of primary care – a return that in many cases appears to have an overall increase in value of health care, a reduction of emergency room visits, and an overall health care cost savings.

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[129] *Ibid.*
[130] *Ibid.*
[131] Office of the Health Insurance Commissioner, State of Rhode Island, *Primary Care Spending in Rhode Island – Health Insurer Compliance & Initial Policy Effects*, (Sept. 2012), pp. 2-4.
[132] Office of the Health Insurance Commissioner, State of Rhode Island, *Primary Care Spending in Rhode Island – Health Insurer Compliance & Initial Policy Effects*, (Jan. 2014), pp. 1-3.

The 25 x 2030 Collaborative

When examining the best possible ways to increase the number of medical school graduates choosing to specialize in primary care physicians, it is important to briefly mention the 25 x 2030 Collaborative.

For quite some time, the United States has been experiencing an increasing shortage of primary care physicians. As has been discussed in past reports prepared by the Commission, this shortage has been aggravated by several different factors, some of which include significant increase in overall population, a growing senior population, physician retirement, and changing physician work patterns.[133]

Of the factors mentioned above, the growing senior population is one of the most significant. It has been predicted that between 2010 and 2030, the population of Americans over the age of 65 will increase by 75 percent from fewer than 40 million to 69 million. If correct, this would mean that by 2030, one in five Americans will be a senior citizen. In Pennsylvania, the senior population (age 65 and older) grew at a rate over 20 times that of the Commonwealth's general population – an increase of 16.3 percent from 2010 to 2017.[134]

The connection between the growing senior population and the dearth of primary care physicians lies within the total number of office visits to primary care physicians. Approximately 80 percent of older adults have at least one chronic condition, while 68 percent have at least two. Because people with chronic conditions tend to use more health care services, and because people who are older generally have more chronic diseases, the increase in the U.S. senior population will drive up the need for primary care physicians. Moreover, the increase in seniors nationwide will be a significant impetus behind a projected increase in the total number of primary care office visits from 462 million in 2008 to 565 million in 2025.[135]

An increase in the supply of primary physicians is associated with a decrease in mortality. Unfortunately, only 13 percent of U.S. medical school graduates match into family medicine residency programs. Recognizing this, eight different family medicine organizations launched an initiative formally known as "America Needs More Family Doctors: 25 x 2030" in 2018. The purpose of the initiative is to help increase the number of medical school graduates in the United States choosing to specialize in family medicine to 25 percent by 2030 – as of 2018, the number of those graduates choosing to specialize in family medicine was about 12 percent. The organizations collaborating on the initiative are the American Academy of Family Physicians, the American Academy of Family Physicians Foundation, the American Board of Family Medicine, the American College of Osteopathic Family Physicians, the Association of Departments of

[133] JSGC, "Pennsylvania Health Care Workforce Needs Staff Study," (Apr. 2019); Jacob Prunuske, MD, MSPH, "America Needs More Family Doctors: 25x2030 Collaborative Aims to Get More Medical Students into Family Medicine," *American Family Physician*, (Jan. 15, 2020); 101 (2): 82-83.
[134] JSGC, "Pennsylvania Health Care Workforce Needs Staff Study," (Apr. 2019), p. 11.
[135] *Ibid.*

Family Medicine, the Association of Family Medicine Residency Directors, the North American Primary Care Research Group, and the Society of Teachers of Family Medicine.[136]

The 25 x 2030 Collaborative appointed a steering committee to oversee the goals of the initiative. In its role, the steering committee adopted several "guiding principles" to help the achieve the initiative goals. These guiding principles included: being more flexible to newly emerging conditions, considering radical new approaches, commit to learning and knowledge-based, mission-driven decision making, address issues of inequity and disparity, prioritize initiatives to grow the family medicine workforce, and embrace unorthodox partners and collaborative efforts. [137]

The steering committee has also formed four working groups that focus on pinpointing evidence-based actions that institutions and programs can initiate to support students electing to specialize in family medicine. In adhering to the guiding principles, the working groups also hope to: expand pipeline programs, place more family doctors on medical school admissions committees, change admissions criteria to favor selection of candidates with a higher likelihood of choosing family medicine, identify new family physician mentors and role models, rigorously evaluate the impact of curricular and extracurricular activities on student choice, and increase attention to the medical student clerkship experience."[138]

Those behind the initiative admit that the goal is an ambitious one, however, its organizers believe that such a goal is possible if medical schools and those practicing in the medical field can assist in changing "the practice environment so that family doctors can address the challenges of electronic health records, performance metrics, prior authorizations, and other systemic issues contributing to morale injury and burnout."[139] In particular, the initiative believes that current family doctors in the field play a critical role in the effort to increase the number of family physicians. It recommends that these physicians work to recruit before medical school, assist in the changing of the medical school experience, continue to advocate for family medicine, and be willing to embrace change.[140] Pennsylvania should keep a close eye on the work of the initiative and the results from its work.

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[136] Jacob Prunuske, MD, MSPH, "America Needs More Family Doctors: 25x2030 Collaborative Aims to Get More Medical Students into Family Medicine," *American Family Physician*, (Jan. 15, 2020); 101 (2): 82-83; American Academy of Family Physicians, "AAFF Hosts Launch of 25 x 2030 Student Choice Collaborative," (Sept. 5, 2018), https://www.aafp.org/news/education-professional-development/20180905twentyfiveby2030.html, last accessed on April 13, 2021.

[137] Jacob Prunuske, MD, MSPH, "America Needs More Family Doctors: 25x2030 Collaborative Aims to Get More Medical Students into Family Medicine," *American Family Physician*, (Jan. 15, 2020); 101 (2): 82-83.

[138] *Ibid.*

[139] *Ibid.*

[140] *Ibid.*

National Health Service Corps

Originally established by the U.S. Congress under the Emergency Health Personnel Act of 1970[141], the National Health Service Corps (NHSC) "provides scholarships and loan repayments to health care providers in exchange for a period of service in a health professional shortage area (HPSA)."[142] HPSAs are "areas–rural or urban–with a shortage of primary medical care, dental, or mental health providers."[143] HPSAs are further broken down by the Health Resources and Services Administration (HRSA) into geographic HPSAs, population HPSAs, and facility HPSAs.

The NHSC program officially started carrying out its duties in 1972 and continued to do so multiple decades later through numerous statutory reauthorizations. The Patient Protection and Affordable Care Act of 2010 (ACA)[144] later permanently reauthorized the activities of the NHSC. The ACA mandated a new funding source for the NHSC—the Community Health Center Fund (CHCF), a fund instituted to supplement the program's annual appropriation. The CHCF eventually replaced the NHSC's discretionary appropriation.[145] Since its inception, more than 63,000 primary care medical, dental, and mental and behavioral health professionals have served through the NHSC program.[146]

In 1970s, the NHSC experienced substantial growth with a shift in the number of NHSC-approved providers from 181 providers to over 1,800. The NHSC's loan repayment program was established in the 1980s for medical health professionals. The eligibility of the loan repayment program expanded to mental health disciplines in the early 1990s, while primary care disciplines were added to the program in the 2000s and dental health was subsequently added shortly thereafter.[147]

Today, the program is administered by the HRSA, within the Department of Health and Human Services. To carry out its intended purpose, the NHSC places clinicians in facilities that tend to have difficulties recruiting and retaining health care providers. These types of facilities are generally not-for-profit, or government operated.[148] The NHSC's intended purpose is illustrated in its current mission statement–to build "healthy communities by supporting qualified health care providers dedicated to working in areas of the United States with limited access to care."[149]

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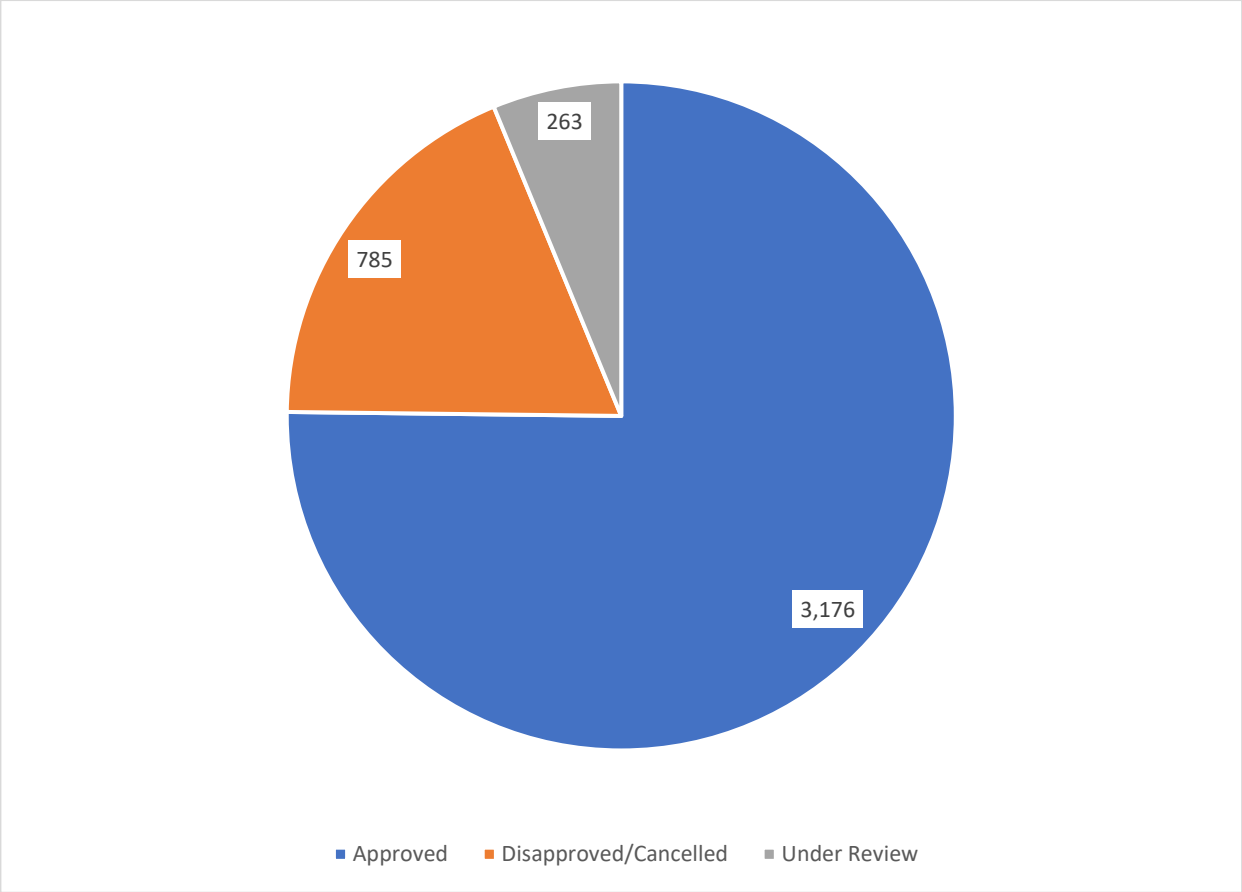
[141] Emergency Health Personnel Act, P.L. 91-623 (Dec. 31, 1970).
[142] Elayne J. Heisler, "The National Health Service Corps," (Apr. 26, 2018), https://fas.org/sgp/crs/misc/R44970.pdf, last accessed on May 7, 2021.
[143] Health Resources and Services Administration, "Shortage Designation: Health Professional Shortage Areas & Medically Underserved Areas/Populations," https://bhw.hrsa.gov/shortage-designation, last accessed May 7, 2021.
[144] Patient Protection and Affordable Care Act, 124 Stat. 119 (111th Cong., 2nd Sess. 2010).
[145] *Supra*, n. 142.
[146] Health Resources and Services Administration, National Health Service Corps, "About Us," https://nhsc.hrsa.gov/about-us, last accessed on May 7, 2021.
[147] *Ibid.*
[148] *Supra*, n. 142.
[149] *Supra*, n. 143.

The NHSC is pertinent to this report because the program is also designed to help strengthen and grow the country's primary care workforce on a national level.[150] According to its 2019 Report to Congress, the NHSC accepted new site applications in 2019 between April 16 and June 13, 2019, and re-certification applications between January 1 and February 26, 2019, and August 20 and October 1, 2019. The NHSC also accepted streamlined applications from sites classified as NHSC auto-approved throughout the year from October 1, 2018 through September 30, 2019. The total number of site applications, including NHSC auto-approved sites, submitted for fiscal year 2019 was 4,224 with 3,176 approved, 785 disapproved or cancelled, and 263 under review, including 46 pending a site visit (See Chart 1). There are currently more than 17,740 NHSC approved sites.[151]

Graph 2

2019 New NHSC Site Application



Source: Chart created by JSGC based on data compiled by U.S. Department of Health and Human Services, Health Resources and Services Administration, "Report to Congress, National Health Service Corps of the Year 2019," p. 6, https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/about-us/reports-to-congress/nhsc-report-congress-2019.pdf, last accessed May 11, 2021.

[150] *Supra*, n. 146.

[151] U.S. Department of Health and Human Services, Health Resources and Services Administration, "Report to Congress, National Health Service Corps of the Year 2019," p. 6, https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/about-us/reports-to-congress/nhsc-report-congress-2019.pdf, last accessed May 11, 2021.

According to the NHSC, over 17 million people receive care from more than 16,000 clinicians serving at NHSC-approved sites in urban, rural, and even tribal communities. More than 60 percent of NHSC members serve at more than 8,400 community health centers. The NHSC also currently has more than 1,500 NHSC scholars in residency or school.[152]

The NHSC is made up of three individual programs, each financial in nature. There is a federal scholarships program, a federal loan repayment program, and a state loan repayment program. The NHSC's federal scholarship program was established under the Public Health Service Act.[153] The program grants scholarships to individuals enrolled full-time in specified education programs at a fully accredited U.S. school. Once obtained, scholarship money can be utilized to cover an individual's tuition, reasonable education expenses, and a monthly living stipend. To be eligible, individuals must be a U.S. citizen (U.S. born or naturalized) or U.S. national. Individuals must also be enrolled as a full-time student (or accepted for enrollment) in medical schools (allopathic and osteopathic), physician assistant programs, dental schools, and advance practice nursing schools (nurse practitioner and nurse midwife) within one of the 50 states, the District of Columbia, or a U.S. territory. Military reservists are eligible for the scholarship program, if they serve in a reserve component of the Armed Forces including the National Guard. It is worth noting that one's military training or service does not satisfy the scholarship program service commitment.[154]

To secure the applicable scholarships, individuals "must agree to complete their training (including residency training or required clinical hours, where applicable) in primary care."[155] For each year of scholarship support received, students must agree to provide an additional year of service in a HPSA and NHSC-approved site or facility to receive additional scholarship. The program's maximum durational requirement for full-time service at an approved facility is four years. NHSC scholars are required to complete their service commitment on a full-time basis and are required to fulfill their service commitment in a HPSA of "greatest need," – an HPSA is designated as having a "greatest need" annually by the HRSA.[156]

The federal loan repayment plan under the NHSC provides loan repayment for "qualifying educational debt." Qualifying educational debt under the program specifically includes "principal, interest, and related expenses of outstanding government and private student loans obtained for undergraduate or graduate education for tuition, along with reasonable educational and living expenses."[157] The plan applies to all providers eligible for the scholarship program, along with dental hygienists and behavioral/mental health providers. Those seeking acceptance into the plan must be a U.S. citizen (U.S. born or naturalized) or U.S. national.[158] Individuals must be licensed

[152] *Ibid*.
[153] 42 U.S.C. § 254l.
[154] Health Resources and Services Administration, "How to Meet Eligibility Requirements for the NHSC Scholarship Program," https://nhsc.hrsa.gov/scholarships/eligibility-requirements.html, last reviewed March 2021.
[155] *Supra*, n. 142 p. 2.
[156] *Ibid.* at pp. 2-3.
[157] *Ibid.* at p. 3.
[158] Health Resources and Services Administration, "NHSC Loan Repayment Program," https://nhsc.hrsa.gov/loan-repayment/nhsc-loan-repayment-program.html#application-requirements, last reviewed April 2021.

or have the appropriate certificate to practice. Individuals must also be employed or have accepted an offer to be employed at an NHSC-approved work site.[159]

The state loan repayment program (SLRP) provides cost-sharing grants to all U.S. states and territories to operate their own loan repayment programs. In particular, the program offers loan repayment to primary care providers working in state HPSAs. The SLRP is like the Federal Loan Repayment Program, with some key differences. One key difference is that the state-operated program is a matching grant between the state and the NHSC. Another important distinction is that under the SLRP, states may choose to expand or contract the types of clinicians who are eligible to participate in their program. Under the SLRP, states may also require more than two years of service in exchange for loan repayment. States may require more years of service or expand professional eligibility to address their unique workforce needs. Awarded grants are non-taxable benefits to the recipient provider.[160]

To be eligible for the SLRP an individual must:

- Be a U.S. citizen (U.S. born or naturalized), U.S. national, or Lawful Permanent Resident
- Be licensed to practice in the state where they will work (where work will occur)
- Be currently working or be applying to or be accepted to work at an eligible site located in an HPSA
- Have unpaid government or commercial loans for school tuition, reasonable education expenses and reasonable living expenses, segregated from all other debts (that is, not consolidated with non-educational loans).[161]

In 2021, a federal Government Accountability Office report evaluated the NHSC program for the 2020 fiscal year. This report noted that 15 percent of the workers who received funding were physicians. The GAO report also indicated that physicians, physician assistants and dentists had proportionally more applicants who did not receive funding for their scholarship program. The report noted that for the general loan repayment program that over 900 applicants did not receive funding because they did not work in an area with a severe enough shortage. Because Pennsylvania had an approval rate of 56.7 percent and 24 NHSC site vacancies, it is likely that not enough applicants were working in rural areas of the state that are designated as severe shortage areas.

[159] 42 U.S.C. § 254d(i), as amended, and 42 U.S.C. § 254l-1; *Ibid*. at pp. 3-4.
[160] 42 U.S.C. § 338l.25; National Health Services Corp, "State Loan Repayment Program (SLRP)," (Dec. 2020), https://nhsc.hrsa.gov/sites/default/files/NHSC/loan-repayment/nhsc-slrp-fact-sheet.pdf, last accessed on May 11, 2021.
[161] National Health Services Corp, "State Loan Repayment Program (SLRP)," (Dec. 2020), https://nhsc.hrsa.gov/sites/default/files/NHSC/loan-repayment/nhsc-slrp-fact-sheet.pdf, last accessed on May 11, 2021.

From 2012 to 2019 The National Health Service Corps repayment and Scholarship program produced a total of 3,645 Physicians.[162] Nationally, 75 percent of the physicians were allopathic, 81 percent of the physicians worked in the same HPSA or community in which they completed their residency, while 24 percent worked in a rural community. Of the 90 NHSC program graduates who completed their residency in Pennsylvania, ten of them ultimately left to practice in other states. To offset this loss, 22 physicians moved to Pennsylvania who had completed their residency out of state. Out of all of physicians who completed the NHSC program in that seven-year period, nearly three percent work in Pennsylvania.

Of the 102 physicians who completed the NHSC program working in PA, 53 percent currently work in a HPSA, 61 percent work within either a HPSA or within the community in which they completed their program, and 24 percent work in a rural area. Because these statistics are below the national averages, it reinforced the Commission's recommendation that Pennsylvania could improve efforts to retain its physicians.[163] Of those NHSC graduates working in Pennsylvania 32 percent live in Philadelphia County while eight percent live in in Allegheny County. Physicians who graduate the program are three times as likely to live in a major Pennsylvania city than an average resident.

Table 5
National Health Service Corps (NHSC)
Providers in Fiscal Year 2020 and Site Vacancies
as of October 15, 2020, PA and neighboring states[164]

State	Number of Sites Participating	Number of sites with NHSC providers	Number of NHSC providers	Rate of application approval	NHSC site vacancies as of 10/15/2020
Pennsylvania	409	140	266	56.7	24
Delaware	38	18	36	80	0
Ohio	417	181	355	69	26
New Jersey	145	43	67	49.2	5
Maryland	233	101	269	77.1	33
West Virginia	408	109	159	64.2	14
New York	1536	524	1058	72.3	25

[162] HRSA.gov Alumni Clinician Dashboard, last accessed on 11.3.21, https://data.hrsa.gov/topics/health-workforce/clinician-dashboards#AlumniDashboards
[163] *Ibid.*
[164] Govt Accountability Office, *National Health Service Corps: Program directs funding to areas with greatest provider shortages*, GAO-21-323. Washington, D.C.: GPO, 2021 https://www.gao.gov/assets/gao-21-323.pdf, p.25-26 Government Accountability Office. https://www.gao.gov/products/gao-21-323, last accessed November 12, 2021.

Pennsylvania Primary Care Career Center

Given the primary care-related focus of this report, it is worth briefly mentioning the Pennsylvania Primary Care Career Center. The Primary Care Career Center (PCCC) is a nonprofit agency that matches clinicians and administrators with jobs at Community Health Centers, rural health clinics, and other primary care facilities. The PCCC is a collaboration between two entities: the Pennsylvania Department of Health and the Pennsylvania Association of Community Health Centers, both of which are responsible for the founding of the PCCC.[165]

Specifically, the PCCC works to help link candidates to the most compatible opportunities and communities in which to live and work. To accomplish this work, the PCCC seeks to build relationships with:

- Medical, dental, and other health professional schools and programs
- Pennsylvania Department of Health
- Pennsylvania Office of Rural Health
- Area Health Education Centers (AHECs)
- Associations representing physicians, dentists, nurse practitioners and others
- The National Health Service Corps
- Foundations and other organizations committed to enhancing access to primary care in the Commonwealth.[166]

Specifically, the PCCC locates a related career opportunity and then provides an interested individual's name and information to an employer. The PCCC determines an individual's preferences, such as urban or rural setting, desired region of Pennsylvania, the size of the organization and other job preferences to narrow the search for an appropriate position. The service provided by the PCCC is free of charge to an individual seeking opportunities. Contact information for the PCCC is available on its website.[167]

[165] Pennsylvania Primary Care Career Center, https://www.paprimarycarecareers.org/, last accessed on September 17, 2021.
[166] *Ibid.*
[167] *Ibid.*

MEDICAL SCHOOLS

Requests for data called for in House Resolution 625 were sent to each of the nine medical schools in Pennsylvania in the form of a questionnaire found in the Appendices. Commission staff teleconferenced with professionals of the individual medical schools to discuss the results. All but one school, Drexel College of Medicine, provided staff with a response. Comprehensiveness of the responses varied from school to school and the majority could not provide the entirety of the requested data because of technical constraints or limited staff resources.

To generalize the results, most of the Pennsylvania medical schools had information on the specialization chosen by their graduates and details pertaining to the location of their program. Data were provided either publicly, or in some cases, directly to Commission staff. Unfortunately, the further away from medical school a graduate gets, typically the more limited the records become. Several of the medical schools maintain their own records on graduates for fundraising purposes or subscribe to the AMA database. Information on the amount of debt accumulated by Pennsylvania medical students in primary care fields was also unavailable in most instances.

A major limitation of residency data collected by Commission staff is that it is often misleading regarding the actual numbers of students entering primary care position. Typically, any students who enters the following specialties are counted as primary care:

- Family Medicine,
- General Internal Medicine,
- General Pediatrics,
- Combined Internal Medicine / Pediatrics.

However, many of the students in these primary care residencies choose to subspecialize later in their careers and many end up not working in primary care. Historically, this has led medical schools and media outlets to over-report the number of Physicians entering primary care. As mentioned in an earlier section of this report, an alternative way of measuring primary care output was proposed by Dr. Mark Deutchman in *Contributions of U.S. Medical Schools to Primary Care (2003-2014): Determining and Predicting Who Really Goes into Primary Care*. Known as Intent to Practice Primary Care (IPPC). Its purpose is to determine physician intent to work in the primary care field by counting family medicine along with the less common specialties of internal medicine-primary, internal medicine-pediatrics, and pediatric-primary.

The IPPC count also has several limitations, notably in the study it produced around a 20 percent undercount of the number of working primary care physicians when there was a manual follow up to confirm the actual number of physicians who went into primary care. This method

provides only a rough approximation since many specialties switch programs after their first year, and many students who specialize in internal medicine still become primary care physicians. Another caveat was that the method was not tested against osteopathic students in the original study who historically have higher rates of working in primary care after residency.

Despite these limitations, it was shown to be an expedient way of estimating the number of physicians produced by medical schools that was closer to the actual total than counting everyone matched into a specialty associated with primary care. Both methods of counting, Primary Care Residency Match, and Intent to Practice Primary Care appear in Table 6 and in the write ups on the individual medical school. Taken together, these methods may be used to form a range of primary care physicians produced in Pennsylvania.

Table 6
Average Number of Primary Care Residents
Produced by PA Medical Schools[168]

School Name	Primary Care Residency Match Yearly Average	% PA Residency	IPPC Yearly Average	% PA Residency
Drexel University College of Medicine	97	26%	24	32%
Geisinger Commonwealth School of Medicine	32	34	7	52
Lewis Katz School of Medicine at Temple University	80	46	19	53
Pennsylvania State University College of Medicine	50	34	15	43
Perelman School of Medicine at University of Pennsylvania	54	34	13	32
Sidney Kimmel Medical College at Thomas Jefferson University	86	34	27	37
University of Pittsburgh School	54	29	11	25
Philadelphia College of Osteopathic Medicine	136	58	53	61
Lake Erie College of Osteopathic Medicine	181	26	73	34
Grand Total	770	36%	242	42%

[168] Compiled by Commission Staff from Residency Match data submitted by medical schools and publicly available sources.

Drexel University College of Medicine

Background

Initially established as the Homeopathic Medical College of Pennsylvania, Drexel University College of Medicine traces its roots back to 1848, when it provided "standardized training in the emerging system of medicine called homeopathy, linked to a foundation in the orthodox medical science and practice."[169] The college was later renamed to Hahnemann Medical College after Samuel Hahnemann, who founded the practice of homeopathic medicine. Hahnemann's original focus on homeopathic medicine had departed by the 1920s and the college became a nationally known academic medical center that provided subspecialty care, particularly for cardiovascular disease.[170]

The medical college also has heritage connected to the Woman's Medical College of Pennsylvania, which was founded in 1850 as the Female Medical College of Pennsylvania. The Woman's Medical College was the first medical school in the world for women. After training women physicians who practiced all over the world for 120 years, the school became co-educational in 1970, and operated under the name Medical College of Pennsylvania, or MCP.[171]

Both Hahnemann and the Medical College of Pennsylvania were combined into one health system named the Allegheny University of the Health Sciences in 1996 until 1998 when Tenet Healthcare Corporation acquired the hospitals. After this acquisition, a non-profit named MCP Hahnemann University was established to take over the merged schools.[172]

In 2002, MCP Hahnemann University became the Drexel University College of Medicine in Philadelphia. Drexel University itself was founded in 1891 as the Drexel Institute of Art, Science and Industry. After its name change, Drexel University College of Medicine continued its expansion with its doctoral, master's and professional programs leading to the establishment of the Graduate School of Biomedical Sciences and Professional Studies within the College of Medicine.[173] The College of Medicine's current mission statement reads as follows:

> Drexel University College of Medicine excels and innovates in education, research, and delivery of compassionate care in our culture of diversity, spirited inquiry, collaboration, and opportunity.[174]

[169] Drexel University College of Medicine, "History," https://drexel.edu/medicine/about/history/, last accessed on February 15, 2021.
[170] *Ibid.*
[171] *Ibid.*
[172] *Ibid.*
[173] *Ibid.*
[174] Drexel University College of Medicine, "Mission, Guiding Principles and Vision Statement," https://drexel.edu/medicine/about/mission-and-vision/, last accessed on February 15, 2021.

Program Information

Drexel University College of Medicine was unresponsive to requests for information from Commission staff. No information could be obtained on special programming or opportunities for either primary care or students underrepresented in Medicine. Limited data could be found for the class of 2025. The institution's website indicates that 31 percent of its students are Pennsylvania residents and that the average age of its students is between 23 and 24.[175]

Table 7
Drexel School of Medicine Class Characteristics[176]

Class Graduating Year	2023	2025
Percentage Female	52%	57%
Traditionally underrepresented in medicine	18%	19%
Percent Nontraditional Students	15%	19%
Percent MD/PhD Combined	1%	1%
Total Number	260	303

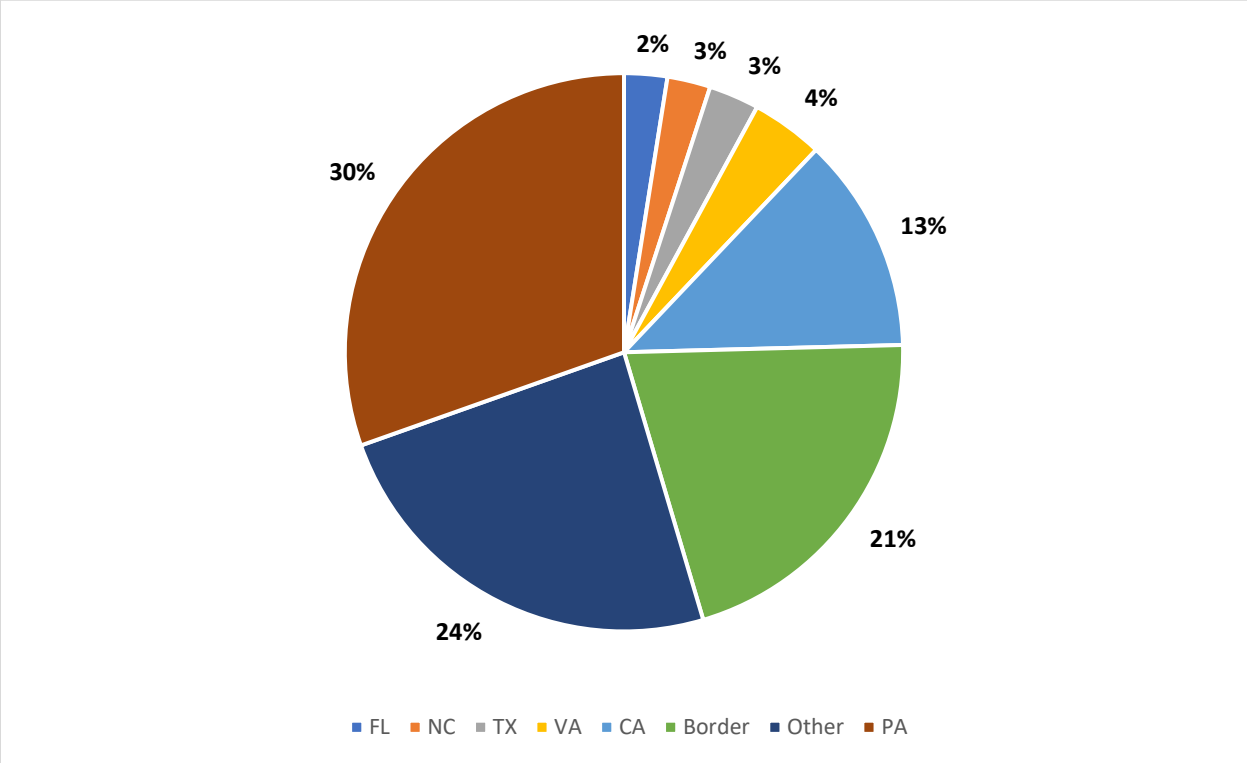
The school has a Family Medicine Residency Program that was started in 2019. According to their website, Drexel claims that 93 percent of students receive some form of financial assistance.[177] The total program cost of its medical school program would be $346,700 over 4 years.[178] Information by *The College Scorecard* from the Pennsylvania Department of Education stated that the average debt of Drexel Medical School graduates is $85,358, whereas the median debt is $263,067.[179] US News found that Drexel is ranked 12th in the national list of average indebtedness of 2020 with $233,943.[180]

[175]"Medical Student Demographics." Drexel University College of Medicine. 2021. https://drexel.edu/medicine/academics/md-program/md-program-admissions/medical-student-demographics/.
[176] "Medical Student Demographics." Drexel University College of Medicine. December 2019. https://web.archive.org/web/20191221073600/https://drexel.edu/medicine/academics/md-program/md-program-admissions/medical-student-demographics/
[177] "MD Program Tuition & Financial Aid." College of Medicine. Last accessed November 30, 2021. https://drexel.edu/medicine/academics/md-program/md-program-admissions/tuition-financial-aid/.
[178]Bethany. "Is Drexel Medical School Tuition Worth It?" Student Loan Planner, March 13, 2021. https://www.studentloanplanner.com/drexel-medical-school-tuition-worth/.
[179] *Ibid.*
[180] *Supra*, n. 16.

Residency Data

Graph 3

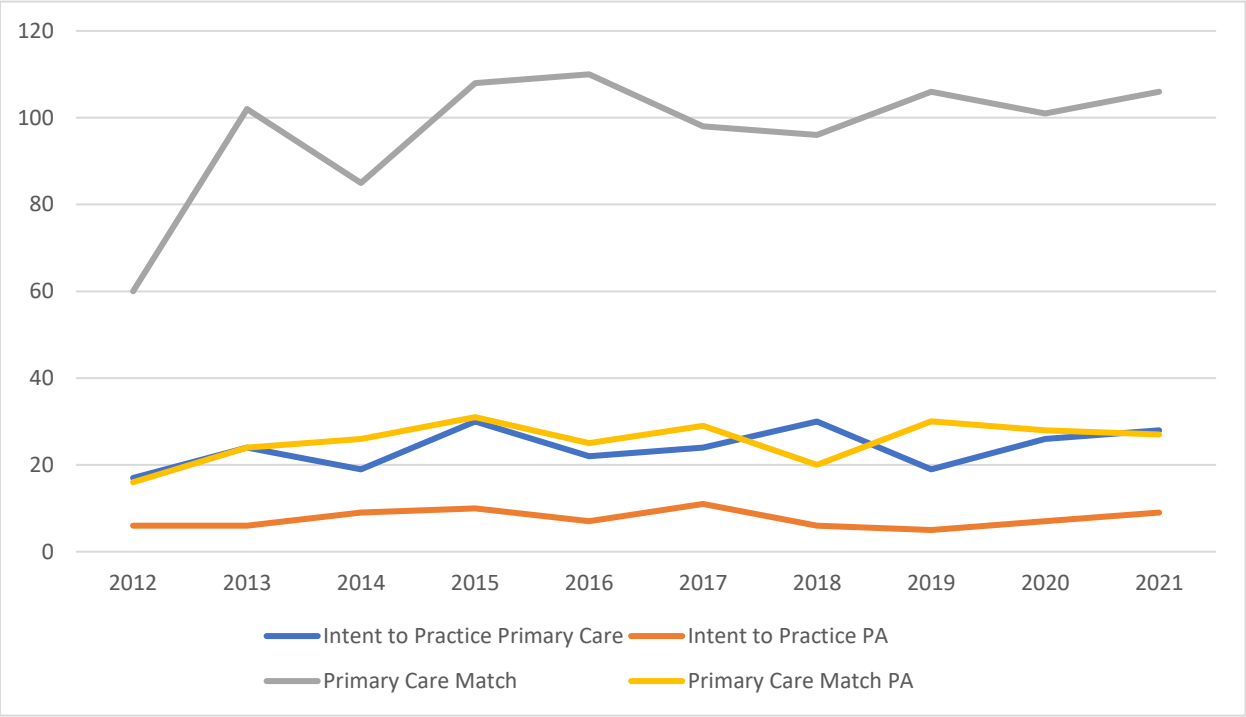
Drexel Primary Care Intent Residency by State; 2012-2021



According to publicly available information from Drexel's website, the medical school graduates approximately 277 medical students, 97 of which match into primary-care residencies each year. Typically, around a quarter of these residencies are located in Pennsylvania. When using the PCCI counting method, 24 students a year graduate from Drexel with an intent on becoming primary care physicians. Of these students, eight typically enter a residency located in-state, while another seven attend their residency in a state bordering Pennsylvania.

Graph 4

Drexel Primary Care Residencies; 2012-2021



Over the last decade the number students entering a primary care residency from Drexel College of Medicine has grown by 23 percent while the general student population has risen by 21 percent. The percent of primary care intent students has also grown during this time, although its low sample size makes it difficult to draw conclusion. In 2021, intent to practice primary care students represented 10 percent of the total graduating class of medical students.

Geisinger Commonwealth School of Medicine

Background

Geisinger Commonwealth School of Medicine ("Geisinger Commonwealth") is primarily based in Scranton, Pennsylvania. In addition to its MD program, Geisinger Commonwealth also offers a Master of Biomedical Sciences in both Scranton and Doylestown, Pennsylvania. The school also offers a Professional Master's program in Doylestown.[181] The school was originally known as the Commonwealth Medical College (TCMC) and was incorporated in 2008 and held its first classes of MD degree students and Master of Biomedical Sciences (MBS) degree students in August 2009.[182]

In April 2011, TCMC opened a 185,000-square-foot Medical Sciences Building in Scranton to house academic and research programs. In 2014, TCMC was granted full accreditation by both the Middle States Commission on Higher Education and the Liaison Committee for Medical Education. TCMC integrated its school with Geisinger Health System in 2017. It was at this time, that the school changed its name to Geisinger Commonwealth School of Medicine.[183]

Today, Geisinger Commonwealth has regional campuses located in Atlantic City, Danville, Doylestown, Sayre, Scranton and Wilkes-Barre. Over 6,145 students applied for a spot in the 2024 class, which currently has 115 students, 76 of which are Pennsylvania residents. The class of 2024 is comprised of 56 men and 59 women. Twenty students are first generation to attend college in their families.[184] Geisinger Commonwealth also has more than 1,200 clinical faculty when counting its regional campuses.[185] The medical school's current mission is as follows:

> Geisinger Commonwealth School of Medicine educates aspiring physicians and scientists to serve society using a community-based, patient-centered, interprofessional and evidence-based model of education that is committed to inclusion, promotes discovery and utilizes innovative techniques.[186]

[181] Geisinger Commonwealth School of Medicine, "About Geisinger Commonwealth School of Medicine," https://www.geisinger.edu/education/about/about-geisinger-commonwealth-school-of-medicine, last accessed on February 15, 2021.
[182] Geisinger Commonwealth School of Medicine, "Mission and History," https://www.geisinger.edu/education/about/about-geisinger-commonwealth-school-of-medicine/mission-history, last accessed on February 15, 2021.
[183] *Ibid*.
[184] Geisinger Commonwealth School of Medicine, "MD Class Profile," https://www.geisinger.edu/education/admissions/md-admissions/class-profile, last accessed on February 15, 2021.
[185] Geisinger Commonwealth School of Medicine, "MD Admissions," https://www.geisinger.edu/education/admissions/md-admissions, last accessed on February 15, 2021.
[186] *Supra*, n. 182.

Program Information

Discussions with Geisinger Commonwealth School of Medicine staff provided information on programs offered and the demographic composition of their student body. These officials indicated that the average age of medical students was a bit older than in previous generations, age 25 compared to 22.[187] The reason for this was that over half of its students did not arrive directly from undergraduate programs. The school found that military veterans and students with master's degree are becoming more common. There was no significant difference in the gender of its students.

Geisinger has several programs to attract students traditionally underrepresented in medicine, who comprise 18-19 percent of its student population. The school maintains goals of establishing a welcoming culture when these are first visiting the campus, offering scholarship aid, and higher prioritizing of diversity during the admissions process. According to the school, most of the students underrepresented in medicine are ethnically Latino. Approximately five to six percent of its medical school students are Black. The majority of Black medical students at this school are women and that the number of Black men has not grown significantly over the years despite efforts attract more.

School officials noted that Pennsylvania residents are favored in admission. While 20 percent of applications to the medical school come from Pennsylvania, they comprise approximately 75 percent of the student population. The out-of-state-pool is comprised of 5,000 students competing for 30 seats. The school also talked about Regional Education Academy for Careers in Health - Higher Education Initiative, known as REACH-HEI. This program is aimed at high school students who are either from low-income families or the first generation in their family to go to college.

Like many schools, Geisinger medical school offers interest groups students can join based on specialties, such as family medicine or internal medicine, and has a chapter of the Primary Care Progress organization on their campus. Medical students at the school study a curriculum in primary care with a focus on an integrated care delivery system. Because one third of their network is insured by health plans, this gives Geisinger hospitals a stronger incentive to promote health because they have financial reason to keep patients out of the hospital. The school also teaches their students about the limitations of the fee-for-service model and how it affects physician behavior as well as alternatives such as value-based payments where the benefit of services to the patients is of higher concern than the cost of the services provided. Representatives from the school also discussed other Geisinger initiatives related to primary care such as “65 Forward” for older patients designed to address social determinants of health, while the “Geisinger At Home” program involves visits to the homes of repeat patients.

[187] Zoom Conference on January 7, 2021 with Dr. Steven Scheinman, Geisinger Commonwealth School of Medicine.

Recently, the school updated its primary care education offerings through the Abigail Geisinger Scholars Program. The program provides free tuition for students who would work at a Geisinger hospital for four years after their residencies. Initially the college chose 10 students a year who were free to choose any specialty. However, in 2019, the program was expanded to 45 students and the focus in primary care was increased so that at least a third of the participants must specialize in primary care. Currently 80 students have been accepted into the program since its creation. Officials noted that interest in the program is also high, as the school has received over 1,000 applicants. School officials told Commission staff that the program is modeled after military and public health service programs, and a $2,000 stipend is granted to its students in addition to free tuition.

While students in the Scholars program can leave the state and do their residency anywhere, they have an obligation to practice at a hospital of the Health System's choosing for four years. The school hopes that many graduates of the program will desire to stay employed at Geisinger hospitals longer. The program was created in part because traditional efforts to recruit physicians can include costly sign-on bonuses to entice physicians to relocate to a new area. Because the program is still early in its development, there are no measurable outcomes to access the program's level of effectiveness currently.

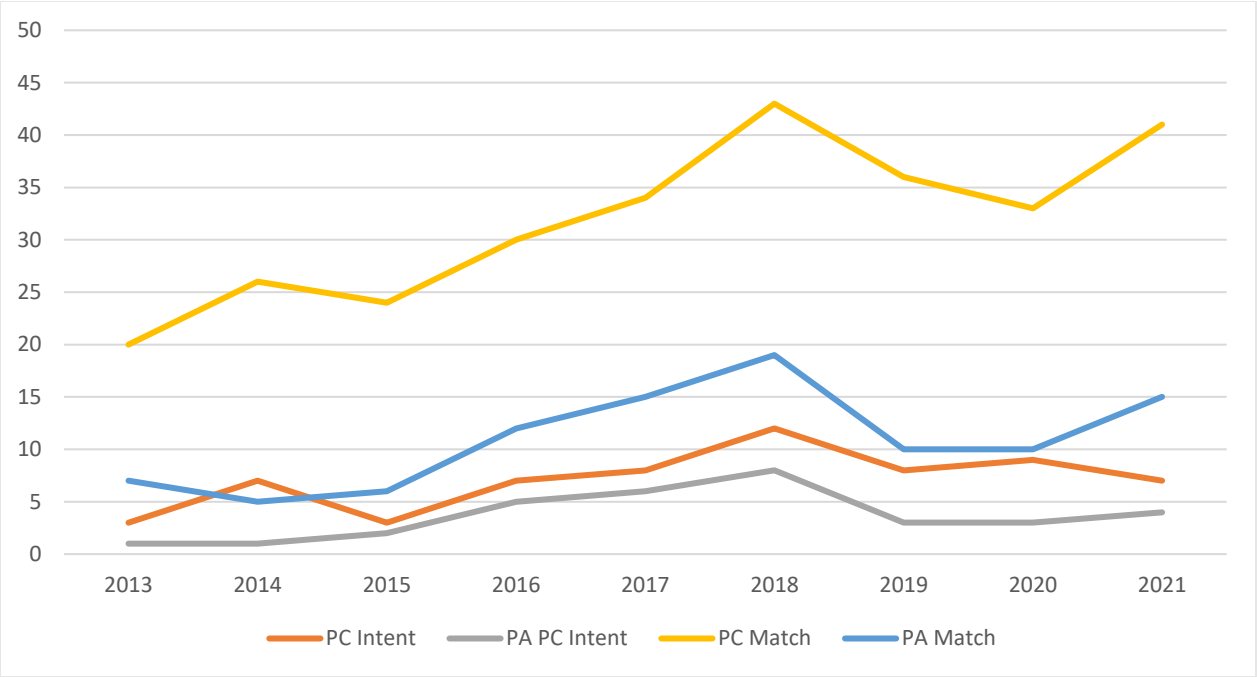
Geisinger reported that under 20 percent of students graduate with no debt, and for the 83 percent of students that had debt, the median amount was $242,000. The school noted that in five years the numbers will be different due to the influence of the Abigale Geisinger Scholars Program. The school has given out $3 million in scholarships which they prioritize based on financial need. When asked what could be done to create more primary care physicians in the state, the school officials suggested that the true need in Pennsylvania is to increase the pool of eligible candidates.

Residency Data

According to their residency match data, Geisinger Commonwealth has graduated an average of 83 students annually over the last nine years. Although nearly 32 students matched into a residency program associated with primary care, perhaps as few as nine graduates become primary care physicians based on the IPPC count. This method of counting suggests that four of primary care physician attend a residency in PA each year.

Graph 5

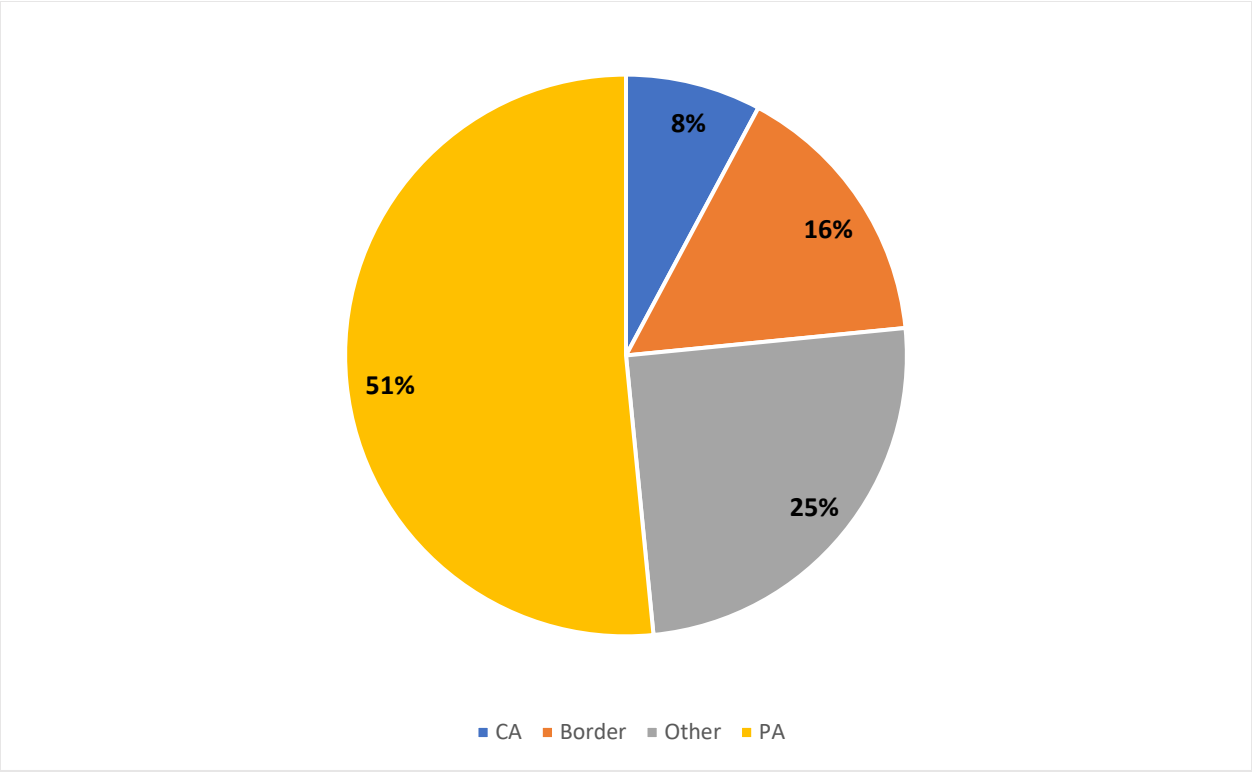
Geisinger Primary Care Residency
2013-2021



When looking at 2021 data, the number of students matching into primary care residencies and who are in intent on becoming primary care physicians has doubled since 2013. However, the IPPC count of students does not show as strong of an upward trend and vary significantly from year to year. These average figures are likely to continue to increase over the next decade as the school grows. Due to the influence of the Abigail Geisinger Scholars program, regardless of where the students of that program travel for their residencies, a minimum of 15 primary care students will come to work in Pennsylvania for a four-year period.

Graph 6

Geisinger Commonwealth Primary Care Intent Residencies by State



Lewis Katz School of Medicine at Temple of University

Background

Located in Philadelphia, Temple University's Lewis Katz School of Medicine was established in 1901 and was the first co-educational medical school in the Commonwealth. In its infancy, the medical school was composed of 20 original faculty members with 35 students enrolled in classes held in Temple's College Hall during its first academic year. Classes were held during weekends and evenings to accommodate working students and clinical instruction was provided at the Samaritan Hospital – later renamed Temple University Hospital in 1929. Frederick C. Lehman and Frank E. Watkins became the first graduates of the medical school in 1904, while Sara Allen and Mary E. Shepard became the first women to receive MD degrees. In 1907, a day program was instituted, and the medical school was relocated into the same buildings as the university's dental and pharmacy schools.[188]

Over the years, the medical school expanded in size and facilities. A medical research building was opened in 1963 and a science hall was opened a few years later in 1969. In 1985, the medical school established an MD/PhD program. In 1999, Temple's school of medicine developed an educational affiliation with Fox Chase Cancer Center, a National Cancer Institute-designated Cancer Center.[189]

In 2009, the school opened a state-of-the-art Medical Education Research Building. In 2011, the relationship with Fox Chase was expanded, making Fox Chase a full member of the Temple University Health System. Finally, in October of 2015, the medical school was officially dedicated as the Lewis Katz School of Medicine.[190] Late Temple University alumnus and trustee, Lewis Katz was a lawyer and philanthropist who established the Katz Foundation – a foundation that for more than quarter of a century supported charitable, educational, and medical causes.[191]

Today the school is centrally located in a 480,000 square-foot medical education and research building.[192] The school of medicine also has a regional campus at St. Luke's University Network in Bethlehem, Pennsylvania.[193] The school is part of the $1.6 billion Temple University

[188] Temple University, Lewis Katz School of Medicine, "Temple's History," https://medicine.temple.edu/education/student-life-resources/resources-students/md-student-handbook/temples-history#:~:text=Its%20MD%2FPhD%20program%20was,variety%20of%20instruction%20and%20investigation, last accessed on February 4, 2021.
[189] *Ibid.*
[190] *Ibid.*
[191] Temple University, Lewis Katz School of Medicine, "About Lewis Katz," https://medicine.temple.edu/about-lewis-katz, Last accessed on February 15, 2021.
[192] Temple University, Lewis Katz School of Medicine, "About the School," https://medicine.temple.edu/about/about-school, last accessed on February 15, 2021.
[193] Temple University, Lewis Katz School of Medicine, "Why Temple?" https://medicine.temple.edu/education/md-program/why-temple, last accessed on February 15, 2021.

Health System.[194] Each year the school accepts approximately 200 students into its MD program.[195] The current Lewis Katz School of Medicine mission statement provides the following:

> Lewis Katz School of Medicine at Temple University is dedicated to excellence in education, research and patient care, achieved by faculty, staff, and learners who represent and serve our diverse society.

The school provides:

- Education that is patient-centered, instilling in learners the school's ethic of human service and lifelong learning
- Research that advances and integrates basic and clinical science
- Patient care that is administrated with compassion and understanding, utilizing contemporary knowledge and techniques.[196]

Program Information

Much of the demographic information requested by HR625 was currently unavailable from Lewis Katz School of Medicine. In staff discussion with representatives from the institution, it was estimated that in recent years, the class has been comprised of 50 percent Pennsylvanians, with the hope that this increase leads to more students who practice locally.[197] When asked about recruiting students to the school interested in primary care, it was noted that the school does not specifically choose students interested in primary care, instead focusing on student choice. They noted that during the interview process students are asked about their goals. It was suggested that many older students tended to go into primary care, possibly because they sought shorter residencies.

The school also provided information on students underrepresented in medicine that come to Lewis Katz. In the 1990s, this institution was one of the top schools in graduating Black physicians. Since that time other medical schools have begun to compete for the same pool underrepresented candidates. One potential solution identified by the school is a shift in approach to try and identify more locally interested candidates. As of 2020, the school estimated that 25 percent of its incoming class was Black or Latino.

Lewis Katz representatives noted that they place no deliberate emphasis on primary care in their curriculum, however they claimed to have a higher degree of primary care teachers and advisors both in the classroom in preclinical years and administration so that students are exposed to these role models early in their studies. In the first two years of their medical education, students

[194] *Supra*, n. 16.
[195] Temple University, Lewis Katz School of Medicine, "MD Program," https://medicine.temple.edu/education/md-program, last accessed on February 15, 2021.
[196] Temple University, Lewis Katz School of Medicine, "Mission," https://medicine.temple.edu/about/about-school/mission, last accessed on February 15, 2021.
[197] Zoom Conference on November, 19 2020 with Gerald Sterling, Douglas Riefer, Margot Savoy,Lewis Katz School of Medicine at Temple University.

are involved in community clinics which increases student exposure to the primary care field. While Lewis Katz staff expressed there had been interest at the school for the creation of a primary care scholars track that would specialize more in this field, there were no concrete plans at the time of the interview. Students intending on going into primary care after medical school can attend interest groups for internal medicine and family medicine. These groups allow students to meet practicing physicians, shadowing, and offer more clinical experience.

The school representatives noted they have a 2011 regional campus St. Luke's Hospital in Bethlehem. While this campus started with 30 students it has since increased to 40. This setting allows for clinicals at St. Luke's Hospital. The first class at this campus graduated in 2015, and some graduates stayed local for residency.

Interviewed officials felt that students are more focused on income potential than debt when choosing a career and that poorer students have a higher potential to drop out of the program. Lewis Katz has five full paid scholarships a year and their scholarships are dependent on fundraising. Currently the institution nationally ranks 25th in average indebtedness among US News at $218,632.[198]

Residency Data

Lewis Katz officials that estimated that 40-50 percent of their students have Pennsylvania residencies and did not know the percent that stayed in primary care field. There is currently no graduate primary care residency program offered at Lewis Katz. Since the school does not make its full residency data publicly available, it impossible to estimate the number of primary care physicians staying in state. Limited data on primary care specialty from the school was shown in Table 8 below.

Table 8
Selection of specialty at Lewis Katz SOM

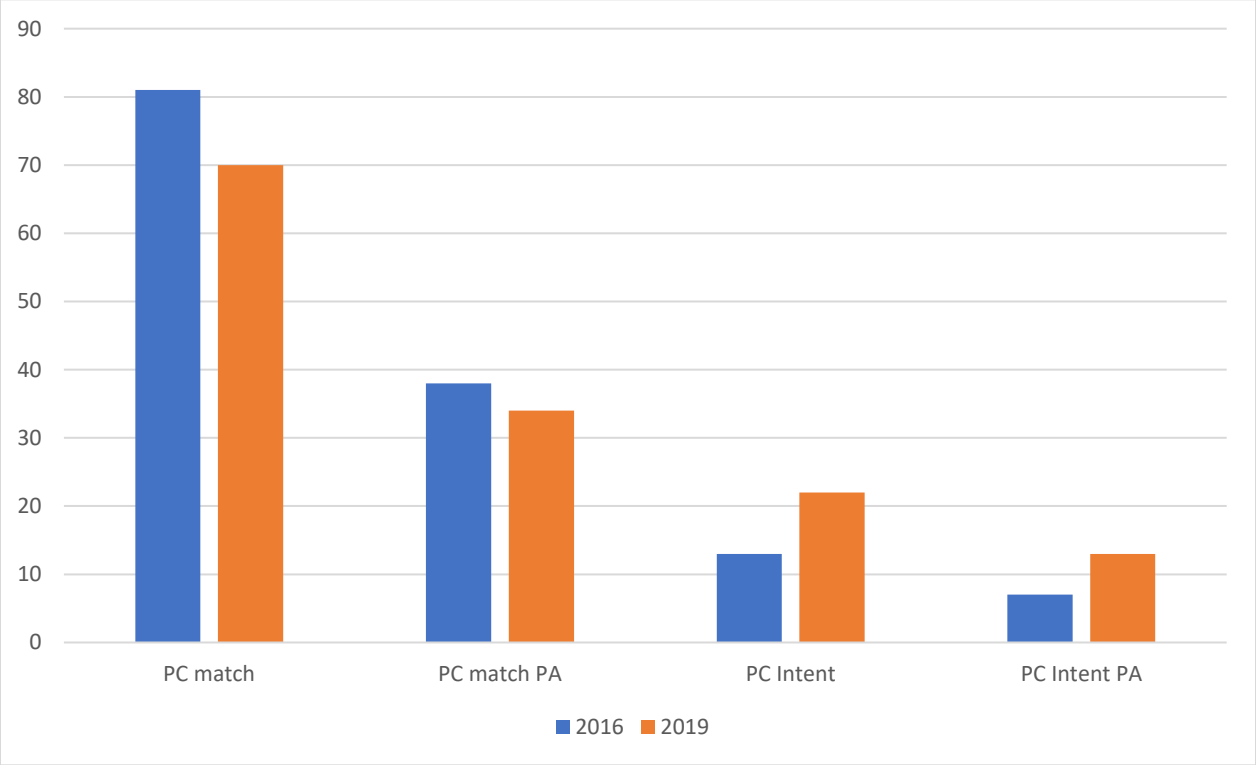
Specialty	2016	2017	2018	2019	2020
Internal Medicine	48	46	43	50	55
Family Medicine	13	18	19	22	14
Pediatrics	20	15	15	4	15
Total	81	79	77	76	84

[198] *Supra*, n. 16

Although Lewis Katz had less residency match data publicly available than many other institutions, Commission staff was able to obtain complete data on primary care residencies matches for the 2016 and 2019 graduating classes. Of the Lewis Katz graduates who matched into a primary care residency 2016 and 2019 school years, 47 percent of them remained in state, 19 percent went to a neighboring state and 10 percent went to California. The number of students matching into primary care residencies have declined and those with specialties indicating an intent to practice primary care have increased.

Graph 7

Lewis Katz SOM Primary Care Residencies; 2016 and 2019



Lake Erie College of Osteopathic Medicine

Background

With over four different campuses (Erie, Pennsylvania; Greensburg, Pennsylvania; Elmira, New York; and Bradenton, Florida), Lake Erie College of Osteopathic Medicine ("LECOM") is currently one of the largest medical schools in the U.S.[199] LECOM was established in 1992, making it the 16th college of osteopathic medicine in the nation. The college's Charter Class began in August of 1993, at a new campus located in Erie, Pennsylvania. The college received full accreditation from the American Osteopathic Association with the graduation of its inaugural class in May of 1997.[200]

LECOM's increase in enrollment led to the college tripling the size of the original medical school building, adding another 100,000 square feet of new facilities. The original campus currently consists of 53 acres along Lake Erie. In September of 2004, LECOM welcomed its first class of medical students in its new Bradenton campus in Florida. Expanding further in size, the school also opened a medical school campus in 2009 on the private liberal arts university campus of Seton Hill, located in Greensburg, Pennsylvania. LECOM once again opened another medical school campus in Elmira, New York in 2020 for 129 medical students. In addition to its medical school campuses, LECOM has also expanded its size and influence by building and purchasing numerous other facilities to benefit its neighboring community and students concerning the practice of osteopathic medicine.[201]

Currently, LECOM has 2,383 students enrolled in its Doctor of Osteopathic Medicine program, with 7,615 program alumni. Today, LECOM's mission statement reads as follows:

> The mission of the Lake Erie College of Osteopathic Medicine is to prepare students to become osteopathic physicians, pharmacy practitioners, and dentists through programs of excellence in education, research, clinical care, and community service to enhance the quality of life through improved health for all humanity. Serving as a guiding light and cornerstone in medical education and true to the core principles of its founders, the Lake Erie College of Osteopathic Medicine has expanded its reach to include exceptional programs in graduate studies designed to provide scholars superlative education in the respective areas of study. The professional programs are dedicated to serve all students through innovative curriculum and the development of postdoctoral education and interprofessional experiences.[202]

[199] LECOM, "Quick Facts," https://lecom.edu/about-lecom/quick-facts/, last accessed on February 15, 2021.
[200] LECOM, "LECOM History," https://lecom.edu/about-lecom/lecom-history/, last accessed on February 15, 2021.
[201] *Ibid.*
[202] LECOM, "Mission Statement of the Lake Erie College of Osteopathic Medicine," https://lecom.edu/about-lecom/lecom-mission/, last accessed on February 16, 2021.

LECOM expressly states that some of its key educational goals of the College of Osteopathic Medicine include educating students to "become physicians within the osteopathic concept" and to additionally "educate and develop primary care physicians who will practice in the osteopathic tradition."[203]

Program Information

While the LECOM did not provide specific data for students who entered into primary care tracks, they did offer a general breakdown of their student population. The majority of the students are young, with 35 percent over the age of 28; 46 percent are Female, while 60 percent are from out of state.[204]

Table 9
LECOM Student Population by Race
2020

Ethnicity	Total
Asian	20.8%
Black	1.5%
Hispanic	5.1%
White	68.7%

The organization uses an "Alumni tool" to track its former students through an admissions database which is updated voluntarily via forms. Social media and alumni events are used to drive engagement with this program. LECOM Hospital days are an opportunity for alumni to speak with first and second year students about clinical rotations. During these days third and fourth year students can meet with alumni to discuss residency opportunities. Due to the COVID 19 pandemic many of these activities are now conducted through teleconferencing software. Over the last three years ,the institutions noted that around 30 percent of the students stay in state for their residency.

LECOM offers a three-year Primary Care Scholars Pathway program for students interested in pursuing primary care at an expediated rate. To enter this program, they must agree to enter family practice and internal medicine specialties and work in the primary care field for five years after graduation. To achieve a medical degree in only three years, students face shorter summer break, a course load with a stronger focus on primary care curriculum and skip clinical rotations unrelated to primary care. Student also attend monthly capstone experience meetings. Recruitment to the program is accomplished by interviewing new students to see if they would be

[203] *Ibid.*
[204] Email from Zboyovski, Judith. *LECOM Response: (HR625) Medical Student Choice in Primary Care*, Lake Erie College of Osteopathic Medicine, Office of the Provost. December 14, 2020.

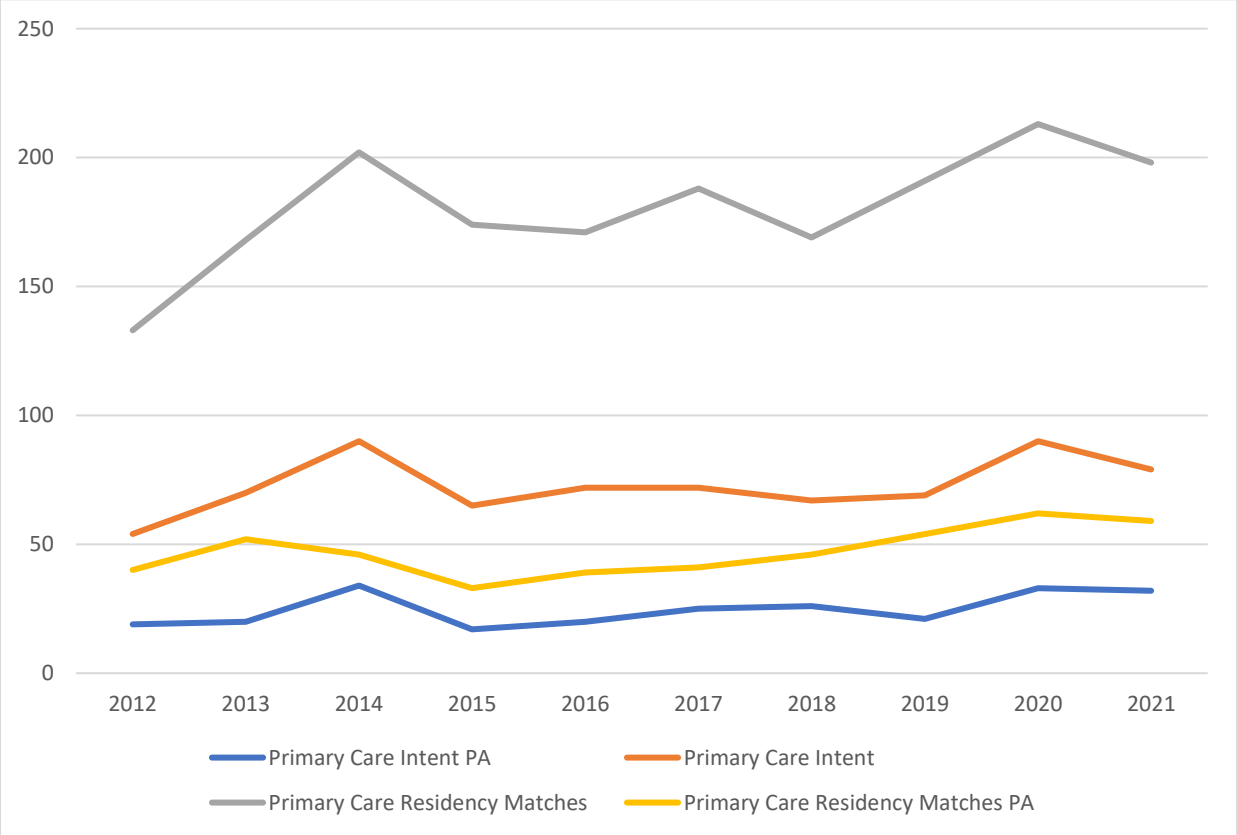
good candidates for the accelerated programs. Additionally, there is an accelerated Physician Assistant Pathway program to aid the physicians assistants who wish to attain their medical doctorate. Six out of the twelve slots are reserved for students going into primary care residencies.

Between the 2017-18 and 2019-20 school years, approximately four percent of students graduated the institution without any medical school debt. Over the last three years, the level of tuition assistance has steadily increased from 33 percent in 2018 to 53 percent in 2020. LECOM ranks 35th in national average indebtedness with $209,643.[205]

Residency Data

Graph 8

LECOM Primary Care Residencies
2012-2021

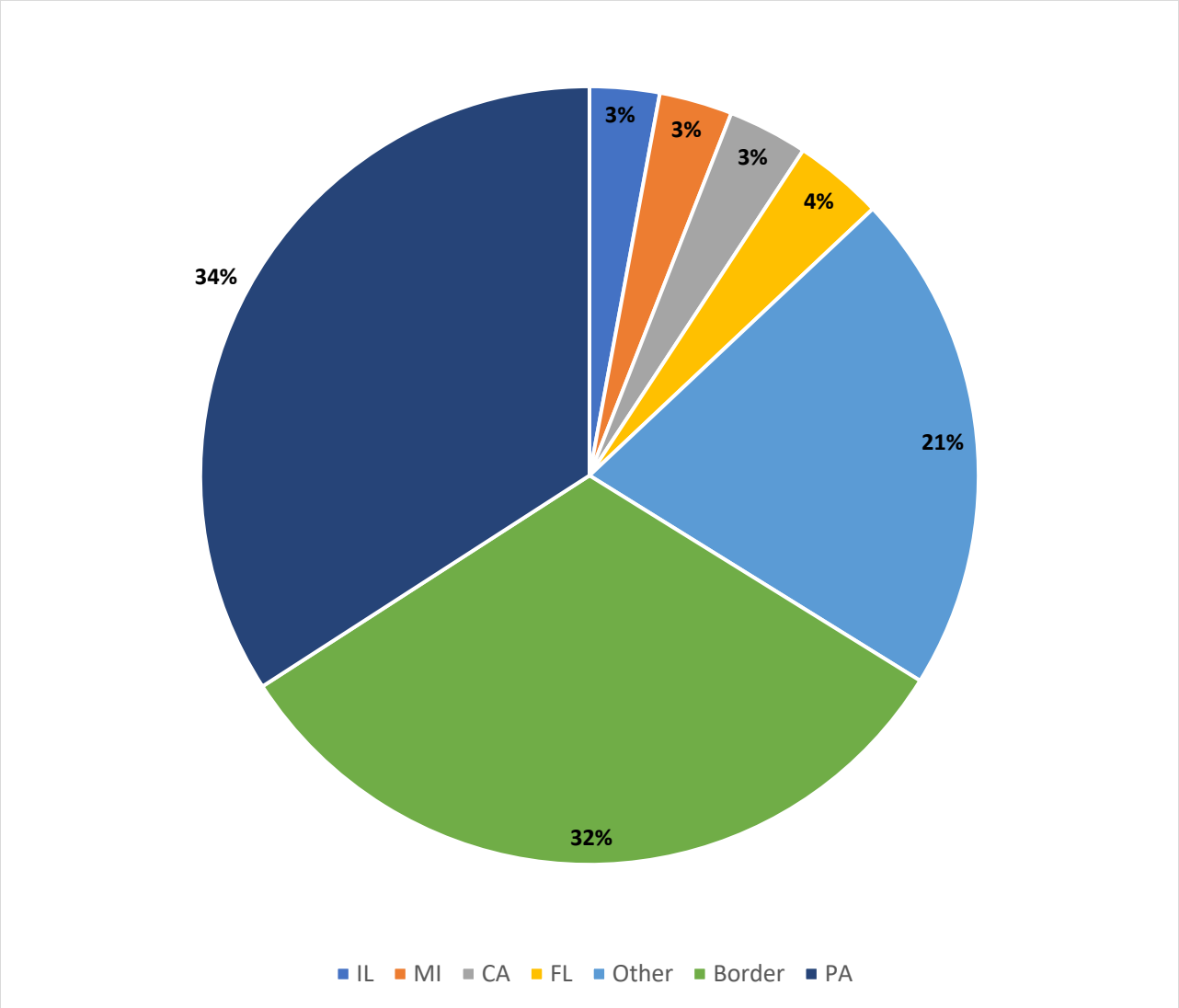


[205] *Supra* n. 16.

LECOM graduates approximately 380 students a year and 181 match into primary care residencies. Over the last decade, both the numbers of students matching into primary care have risen by 48 percent and the IPPC count has risen by 46 percent. Nearly half of its students who matched into a primary care residency have studied internal medicine, 40 percent family medicine and 10 percent pediatrics. On average, 73 of these students intend on becoming primary care physicians annually; 24 of these students will perform their residency in PA while another 15 go to a neighboring state.

Graph 9

LECOM Primary Care Student
Intent Residency Location by State



Perelman School of Medicine at the University of Pennsylvania

Background

Established in the city of Philadelphia in 1765, the Perelman School of Medicine at the University of Pennsylvania (PSOM) is not only the oldest medical school in Pennsylvania, but also the oldest in the United States[206] The medical school's longstanding history is filled with rich legacy in the field of medicine. PSOM was the first and only medical school established and in operation within the original thirteen American colonies. The school of medicine was founded by John Morgan, a Philadelphia physician who had earned his medical degree in England. The college's corporate name was the College of Philadelphia until 1779.[207] Pennsylvania Hospital, which became associated with Penn's medical school, was established in 1751 and was the first hospital in the U.S. In 1874, Penn's hospital, the Hospital of the University of Pennsylvania, became the first teaching hospital nationwide. Penn physicians and scientists have played a prominent role in the field of medicine and have participated in many notable medical discoveries over the last few decades, such as the first general vaccine against pneumonia and the development of magnetic resonance imaging (MRI) and other imaging technologies.[208]

Today, PSOM ranks among the top research-oriented medical schools nationwide, as well as one of the most selective. PSOM's current acceptance rate for its typical 6,000-plus applying students is 4.4 percent. In the class of 2024, 155 students matriculated. Of those 155, 88 percent were out-of-state applicants and 12 percent were in-state, while 52 percent of students were men and 48 percent were women.[209]

The medical school currently has over 2,600 full-time faculty members, over 760 medical students, and more than 1,300 residents and fellows. There are approximately 6,529 individuals currently employed with the medical school. The school is also affiliated with a number of additional medical facilities including Penn Presbyterian Medical Center, Pennsylvania Hospital, Chester County Hospital, Lancaster General Hospital, and Penn Medicine Princeton Health.[210] The school's current mission statement reads as follows:

> Our mission is to advance knowledge and improve health through research, patient care, and the education of trainees in an inclusive culture that embraces diversity,

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[206] Perelman School of Medicine at the University of Pennsylvania, "Overview," https://www.med.upenn.edu/psom/overview.html, last accessed on January 20, 2021.
[207] Penn University Archives & Records Center, "Brief Histories of the Schools of the University of Pennsylvania – School of Medicine: A Brief History," https://archives.upenn.edu/exhibits/penn-history/school-histories/medicine, last accessed on January 20, 2021.
[208] Penn Medicine, "History of Penn Medicine," https://www.pennmedicine.org/about/mission-and-history/history-of-penn-medicine#:~:text=Pennsylvania%20Hospital%2C%20part%20of%20Penn,the%20nation's%20first%20teaching%20hospital., last accessed on February 4, 2021.
[209] Perelman School of Medicine, "MD Admissions: Entering Class Profile," https://www.med.upenn.edu/admissions/entering-class-profile.html, last accessed on February 3, 2021.
[210] *Supra*, n. 206.

fosters innovation, stimulates critical thinking, supports lifelong learning, and sustains our legacy of excellence.[211]

Program Information

PSOM uses the Penn Access Summer Scholars (PASS) program and memorandums of understanding with historically Black colleges and universities to attract students underrepresented in medicine.[212] They also work to increase exposure to primary care through free clinics experiences and career pathways on the admissions website. PSOM noted that their admissions department does not track intended specialty of new students, and currently this institution has no mechanics in place to keep track of students remaining in primary care.

PSOM created the Measey Primary Care Pathway Program (MPCPP) in 2019 to increase the number of primary care physicians graduating from its school. This program is geared toward students interested in family medicine, outpatient general internal medicine, outpatient general pediatrics, and geriatrics. MPCPP provides additional primary care experiences throughout their school experience. Examples include the pre-clerkship longitudinal patient care experience where students are assigned to a primary care practice, a summer stipend available to students working in primary care between semesters, and a year of primary care clerkship. While the MPCPP shows promise in aiding the development of primary care students, so far only 31 students have been involved in the program as of 2020.

Other primary care offerings from PSOM include:

- Longitudinal Experience to Appreciate the Patient's Perspective
- 11 Student interest Groups linked to primary care specialties
- Free Clinic at the Puentes de Salud/ University City Hospital Coalition
- 5 Primary Career Specialty advisors
- Alumni mentorship network/circle.

The average medical school debt of those with primary care specialties was $140,131 in 2020. The average amount of debt among its students who had debt was $130,583. Nationally, the school is ranked 103rd among the most expensive medical schools.[213] In 2020, 39 percent of their students had medical school debt, but school officials noted that the number typically ranges between 35 and 55 percent.

[211] *Ibid.*
[212] Zoom Conference on January 4, 2021 with Matthew Press, Steven Cobb at Penn Medicine.
[213] *Supra,* n. 16.

Currently, 86 percent of PSOM's student body receive some form of need-based or merit scholarship. PSOM students who are pursuing a dual MD/Ph.D. receive full scholarships to cover the cost of tuition and fees, as well as a stipend for living expenses. Student Scholarship is one of the three focuses for PSOM's current Capital Campaign. Moreover, the school has engaged in significant efforts to raise additional funds to support MD and MD+ program for students working toward dual degrees, such as an MBA. The Capital Campaign focus on scholarships, along with the financial assistance and scholarship number comparisons showing PSOM with a larger provision of scholarships than Pennsylvania's other medical schools may in part, explain the reason Penn Medicine's cost of tuition and average student debt is much lower.

Residency Data

PSOM compared data from its 1990-99 cohort of students with more recent classes from 2016-2020.[214] In the 1990s cohort, the school found that a third of its graduates had a specialization associated with primary care. In the 2016-2020 cohort, closer to 43 percent of the graduates entered a specialization associated with primary care. Over the years, a larger proportion of its students have specialized in internal medicine, which has doubled from 11 percent to nearly 25 percent. During the same period, the percentage of family medicine graduates from PSOM has shrunk from 5.5 percent to 2.7 percent. Despite the increase in the total number of students choosing primary care specialization, conclusions are limited. Family medicine specialty typically has a higher likelihood of working in primary care compared to internal medicine.

Table 10

Specialization	1990-1999	2016-2020
Internal Medicine	11.3	24.6
Pediatric	9.5	8.8
Family Medicine	5.5	2.7
Obstetrics Gynecology	5.4	2.2
Geriatrics	0.4	NA
Psychiatry	3.9	4.7
Overall	33.3	42.9

In the 2016-2020 cohort, 54 percent of primary care residents were female compared to 46 percent in the general population of students. Less than 14 percent were born outside of the US. Overall, the ethnic and racial composition of primary care residents was similar to that of the general population of medical school students as noted in Table 11.

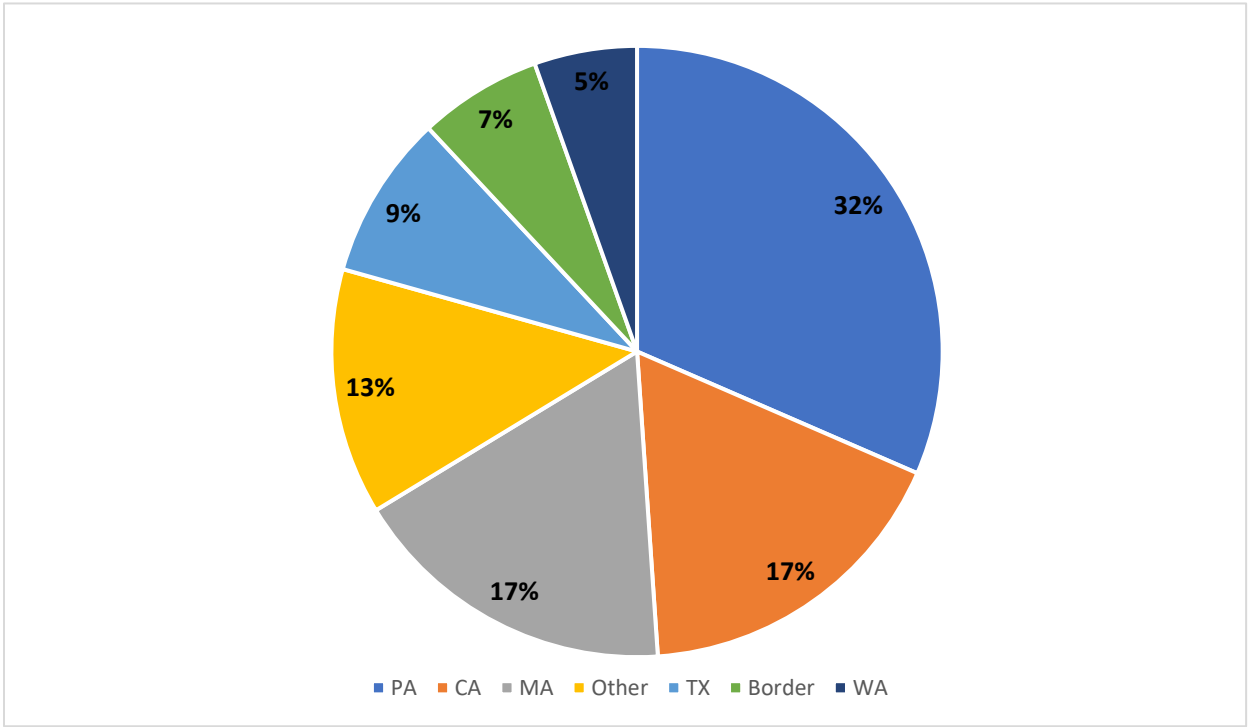
[214] *Supra*, n. 212.

Table 11		
Race or Ethnicity	**Total**	**Primary Care Residency**
Asian	22.5	19.9
Black	6.4	5.6
Hispanic	3.1	3.3
Multi	14.4	15.7
Other	.8	.6
White	50.8	53.1

In 2016-20 graduates representing almost 35 percent of the primary care residents remained in the Pennsylvania for residency. When looking back at the 1990s cohort 24 percent of primary care residents had a Pennsylvania address listed.

Graph 10

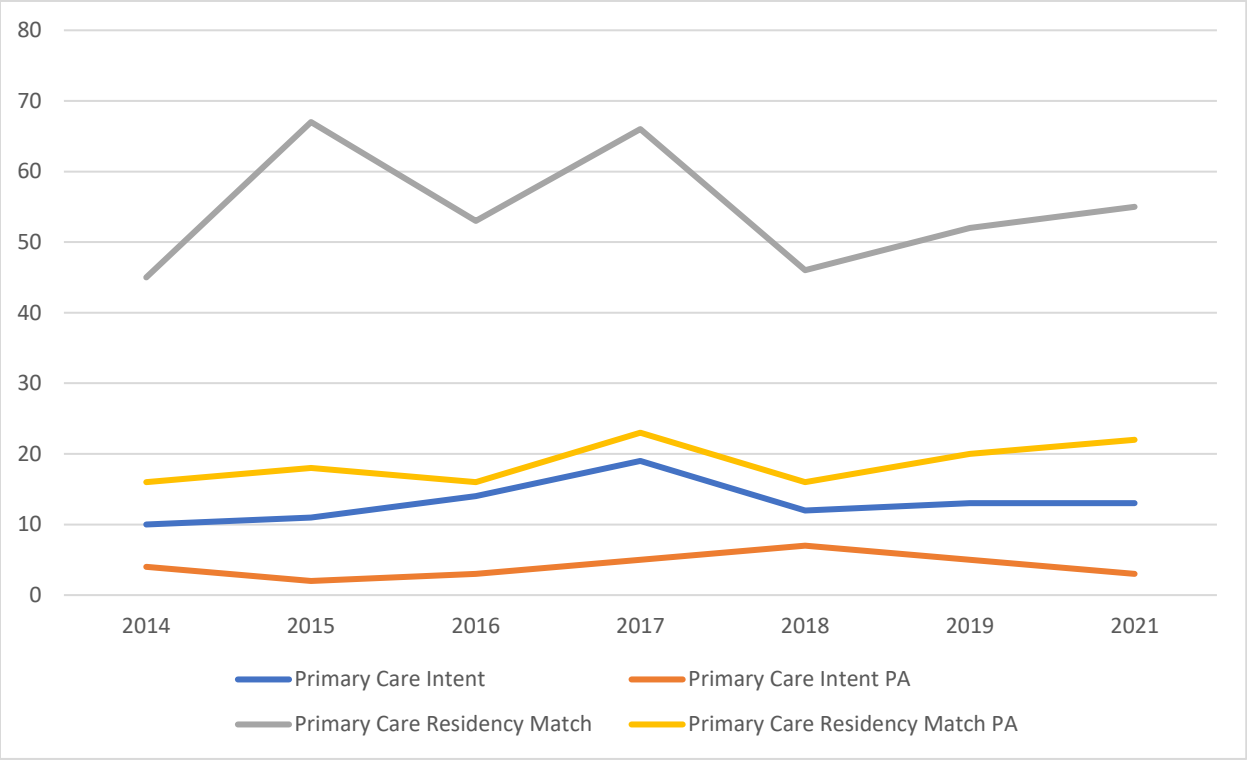
PSOM Primary Care Residency by State



Only partial residency match data for PSOM was available for the last decade. On average, PSOM graduated 150 students a year, and close to 12 percent of these students matched into a primary care residency. Only about nine percent of its student population graduated PSOM with the intent on becoming a primary care physician. Over the last eight years students matching into primary care residencies rose by 11 percent. The amount of primary care intent students has remained stable, but due to its small sample size it is difficult to draw conclusions on output.

Graph 11

PSOM Primary Care Residencies



Pennsylvania State University College of Medicine

Background

Pennsylvania State University College of Medicine and its Medical Center are situated in Hershey, Pennsylvania, with facilities spanning over 550 acres. The college of medicine itself was the first in the nation to have a dedicated Department of Humanities and a Department of Family and Community Medicine.[215]

The origin of the college of medicine can be traced back to 1963. It was at this time that the M.S. Hershey Foundation offered $50 million in grant money to The Pennsylvania State University ("Penn State") to establish a medical school in Hershey. In addition to the grant, Penn State also received $21.3 million from the U.S. Public Health Service. The university used the grants to construct a medical school, research center, and teaching hospital. Ground was broke to build these facilities in 1966. This hospital today is the Penn State Health Milton S. Hershey Medical Center.[216]

Shortly after its building completions, Penn State College of Medicine welcomed its first medical students in 1967, with the Medical Center accepting its first set of patients three years later in 1970. The first graduation of medical students from the college occurred in 1969. The original buildings on the Medical Center campus in 1970 included the Medical Science Building and University Hospital, Animal Research Farm, Laundry and Steam Plant, and University Manor Apartments.[217]

Since it opened its doors in 1967, the college has grown significantly in size and become nationally recognized. For the entering class of 2020, the college received approximately 11,479 applications, for which it granted 721 interviews. The 2020 class has approximately 152 medical students. This class of 152 students includes individuals from 25 different states, Washington D.C., and Canada. Currently, 65 of the 152 students are residents of the Commonwealth.[218] Today, the college of medicine's mission statement reads as follows:

> Penn State Health Milton S. Hershey Medical Center, Penn State College of Medicine, and Penn State Children's Hospital are committed to enhancing the quality of life through improved health, the professional preparation of those who will serve the health needs of others, and the discovery of knowledge that will benefit all.[219]

[215] Penn State College of Medicine, "History," https://med.psu.edu/history, last accessed on February 16, 2021.
[216] *Ibid.*
[217] *Ibid.*
[218] Penn State College of Medicine, "Entering Class Profiles," https://med.psu.edu/md/class-profiles, last accessed on February 16, 2021.
[219] Penn State College of Medicine, "Mission & Values," https://med.psu.edu/mission-values, last accessed on February 16, 2021.

Program Information

Penn State staff spoke about their institution's efforts to attract students under-represented in medicine.[220] In addition to their Office for Diversity, Equity, and Inclusion, the school administers pipeline programs for both high school and undergraduate students. Due to their close proximity, Penn State partners with the Milton Hershey School for their summer internship program and the Healthcare Careers Program.

One of the larger pipeline programs at Penn State is the Pre-health program for Underrepresented Leaders in STEM Education. Known as "PULSE," this program educates high schoolers using medical student volunteers who plan a 12-week curriculum. Students are drawn from around the area and perform small group activities and attend lectures to raise interest in medical school. Another part of the pipeline is the Healthcare Careers Exploration Program, which rotates high school students through different departments, allowing them to shadow health care professionals. While some of the pipeline programs are not exclusive to underrepresented demographics, they do target schools with diverse populations.

At the undergraduate level, Penn State hosts programs for diverse students who intend to become medical researchers or physicians. Penn State offers opportunities for medical students to mentor undergraduate students with diverse backgrounds interested in medicine at Penn State and Lincoln University. The school offers early assurance at some historically Black universities such as Lincoln and Hampton University in Virginia, meaning they will accept high achieving students while they are still undergraduates in college.

Penn State's pipeline to medical school also extends into college with the Primary Care Scholars Program. This program is a two-week offering for undergraduate students, created over 25 years ago. The first week of the program introduces primary care, while the second week focused on practices. Another chance to promote the field is on Primary Care Day, an annual event for undergraduate college and select high school students which typically attracts 200-300 students a year. The goal of the event is to raise exposure to primary care careers.

Regarding the demographic composition of its student body, the school representatives noted that four percent of its student population were Black and 6 percent were Latino. Approximately 60 percent of its student population were female, while 40 percent were male. The average age of their students was 28 years. Typically, just under half of their students were from out of state (47 percent), though this number has dropped more recently to about 40 percent. The school also appoint a student affairs liaison for students traditionally underrepresented in medicine. Penn State's mentoring program pairs alumni mentors from diverse backgrounds with current medical students. The school also appoint a student affairs liaison for students traditionally underrepresented in medicine.

One of the most important programs mentioned by Penn State was the "3+3 program," an accelerated pathway for students to complete their medical school programs in three years followed by a three-year residency program for internal medicine or family medicine at a Penn

[220] Unless otherwise noted, information in this section was obtained during a Zoom Conference on Dec 1, 2020 with Terry Wolpaw and Britta Thompson, Penn State College of Medicine.

State affiliated medical center. In addition to accelerated programs that quickly produce medical school students, Penn State also has a program designed to help students who are unsure they are interested a primary care career. Known as the "Scholar in primary care concentration: Longitudinal program," this newer offering from Penn State starts when students enter school. This program provides the opportunity to learn about the primary care field without any obligation and engage with those physicians by creating relationships and providing mentoring opportunities.

Penn State also offers opportunities to its students to gain more primary care experience. The Medical Home Longitudinal care program has existed for over ten years. It is a voluntary option for students in their clerkship (third year) to become part of patient-centered primary care home.

While Penn State has a reputation for producing physicians specializing in research, Penn State officials noted that the school does not try and influence its students' choice of profession, only to encourage students to follow their interests. However, as noted earlier in the report it is still important that students receive exposure to primary care early in their medical school studies, and that how the specialization is regarded by teaching staff and administrators in the wider university will affect the number of students entering primary care. The staff noted that their goal was to bring in all kinds of students and focus on developing skill sets and develop knowledgeable professionals who function well in teams.

The percentage of Penn State students that graduate with medical school debt according to AAMC self-reported figures was 70-82 percent of student graduate with types of debt (including undergraduate). According to data pulled from a graduate questionnaire, around 75-80 percent have debt. For the 2020 school year, the mean medical school debt was $226,500 with a total education debt of $249,500.

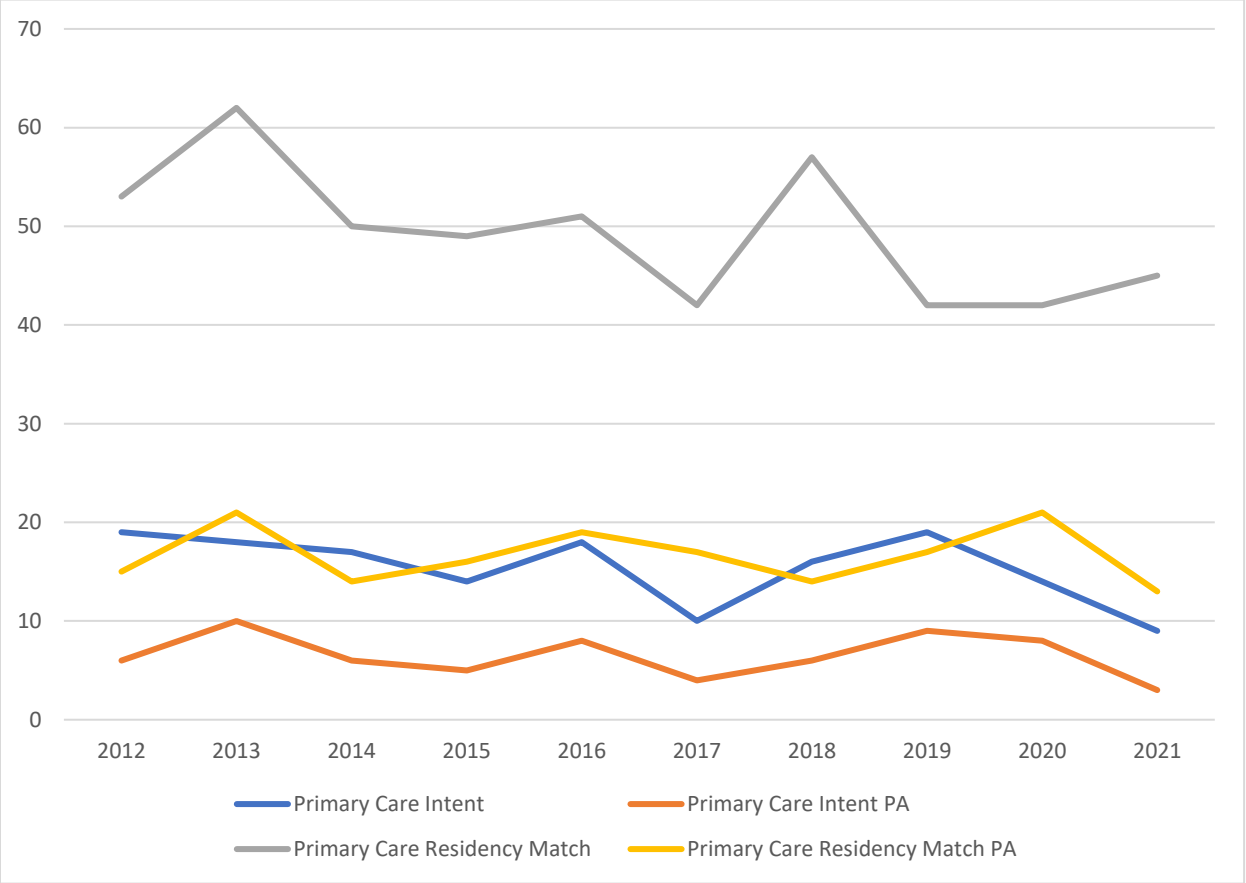
Penn State staff noted that since its school of medicine was founded in 1967, it does not have a large endowment for scholarships. Currently, the school offers six diversity scholarships. A self-reported collection noted that two-thirds of students received scholarships, stipends, or grants. The school did not provide information on the average amount of aid offered.

Residency Data

Penn State College of Medicine estimated that 35 percent of their students go into primary care related specialty and that one third of those students stay in Pennsylvania. According to AMA data collected by the school, 43 percent of all their graduates are in primary care related fields. As of 2020 school year, 38 percent of the graduating class had an in-state residency and in previous years it had ranged from 30-50 percent. They estimated that around 15 percent of those remaining 2020 graduates staying in-state were for primary care residencies.

Graph 12

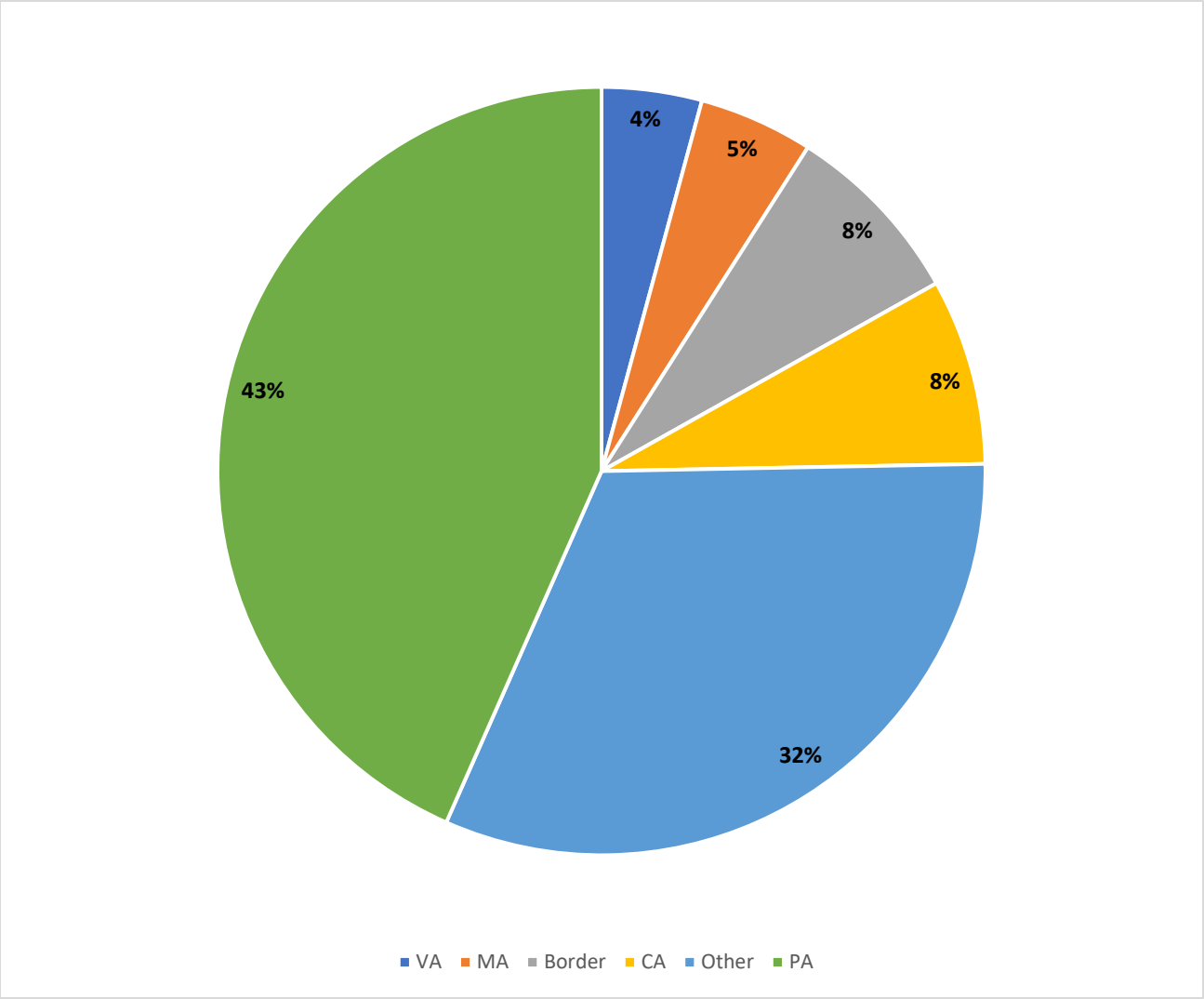
Penn State College of Medicine Primary Care Residencies; 2012-2021



When reviewing Penn State's residency data, Commission staff estimated that the school graduates around 138 students a year, 36 percent of which match into a residency associated with the primary care field. Closer to 11 percent of the graduated students enter a specialty with the intent on becoming a primary care physician. Over the last 10 years, the school's overall student population has remained unchanged, while the number of physicians matching into primary care has decreased around 15 percent. The number of IPPC students has also decreased but is prone to fluctuations from year to year due to its small size.

Graph 13

Penn State Primary Care Intent Residency by State



A higher percentage of the IPPC students remain in state for their residency, 43 percent compared to 34 percent of all primary care residency students. Looking at all primary care residencies taken by Penn State graduates the most common were internal medicine (42 percent), followed by pediatrics (28 percent) and family medicine (24 percent).

Philadelphia College of Osteopathic Medicine

Background

The Philadelphia College of Osteopathic Medicine (PCOM) began teaching and training students in 1899. The first medical school class at PCOM in 1899 consisted of two students. The college was originally located in two rented rooms in the Stephen Girard Building at 21 S. 12th Street in the heart of Philadelphia. However, the number of faculty and students grew, causing the college to relocate to larger facilities – eventually establishing an actual campus. Over the next 20 years or so, the college experienced more expansion – opening the Osteopathic Dispensary and purchasing its first building in 1916. The college was also officially renamed the Philadelphia College of Osteopathy in 1921. The college eventually went on to build a new Gothic-style college and hospital building just prior to the Great Depression.[221]

As part of its expansion in the early 1950s, the college acquired Women's Homeopathic Hospital, which it converted into a satellite facility called North Center Hospital. More properties and facilities were acquired by the college in the late 1950s and eventually the college's name was changed to its current name, Philadelphia College of Osteopathic Medicine.[222]

PCOM later expanded outside of Philadelphia by opening a rural health center in Sullivan County, Pennsylvania. The goal of this center was to provide care to medically underserved populations in rural Pennsylvania. In the mid to late 1990s, PCOM expanded and modernized its flagship campus in Philadelphia with additional labs and building renovations. In 1999, PCOM received accreditation by the Commission on Higher Education of the Middle States Association of Colleges and Schools. PCOM also opened its new, expanded PCOM Healthcare Center—Roxborough Division within that same year. In 2001, the PCOM purchased the former City Avenue Hospital. The college later expanded outside of the Commonwealth, creating a branch campus in Suwanee, Georgia in 2005 and a branch campus Moultrie, Georgia in 2017.[223]

PCOM's mission statement provides that it is dedicated to "[e]ducating health professionals to care for the whole person and advance the health of diverse communities."[224] Generally speaking, osteopathic medical schools have a strong history of teaching primary care as a core part of their curriculum and these institutions are well suited with the goal of producing more primary care practitioners.

[221] PCOM, "History," https://www.pcom.edu/campuses/philadelphia-campus/history.html, last accessed on February 16, 2021.
[222] *Ibid.*
[223] *Ibid.*
[224] PCOM, "Mission and Commitments," https://www.pcom.edu/about/mission-statement.html, last accessed on February 16, 2021.

Program Information

Commission staff were not provided information on the demographics of PCOM students, however some of this information was publicly available on their website as seen in tables below. Unfortunately, information could not be obtained on the percentage of their student population coming from outside of Pennsylvania and data for the 2017 and 2018 school years was unavailable to the public.

Table 12
PCOM Students Composition by Ethnicity and Race

Ethnicity and Race	2015	2016	2019	2020
White	66.5	60.2	63.1	62.2
Multi-race	14.1	23.8	13.4	11.1
Black	8.9	8.9	10.4	6.3
Asian	14	1.1	9.0	14.1
Hispanic	1.9	2.6	1.5	1.1
Unidentified/Other	3.3	3.0	1.9	2.9

As part of the school's core curriculum, PCOM students spend 4 months in community healthcare centers focusing on patient care.[225] During their first two years of school, PCOM offers options for students to observe physicians in various types of clinical settings. When asked about the advantages of teaching students at an osteopathic school, officials noted that their teachers frequently serve as primary care role models, coursework has more of a clinical focus, and that the school was not tied to hospital or tertiary care influences.

Table 13
PCOM Students by Gender

Gender	2015	2016	2019	2020
Male	51.7	47.8	49.3	43.7
Female	48.3	52.2	50.7	56.3

While PCOM did not provide Commission staff with breakdowns of medical student debt levels specifically for students who later entered primary care residencies, their website contained information on the percentage receiving financial aid for both Pennsylvania and Georgia campuses. As of 2021, the current estimated tuition and fees for the school is $220,344, although

[225] Unless otherwise noted information collected during Zoom Conference on December 1, 2020 with Ken Veit, Philadelphia College of Osteopathic Medicine.

their website estimates that the total cost to attend the school is $341,561.[226] When asked about primary care scholarships PCOM staff noted that scholarships were based on financial need and not career pathways. They stated that one reason for the higher-than-average debt rate among their students was due to their efforts to recruit first generation doctors, from poorer families.

Table 14
PCOM Financial Aid

	2014-2015 (PA)	2015-2016 (PA)	2016-2017 (ALL)	2017-2018 (ALL)	2018-2019 (ALL)	2019-2020 (ALL)	2020-2021 (ALL)
Percentage of DO students receiving financial aid	83.2	82.7	87.5	87.4	88.3	86.3	84.8
Average indebtedness of graduates in academic year*	189,536	199,425	$198,702	$205,472	$217,124	219,408	N/A

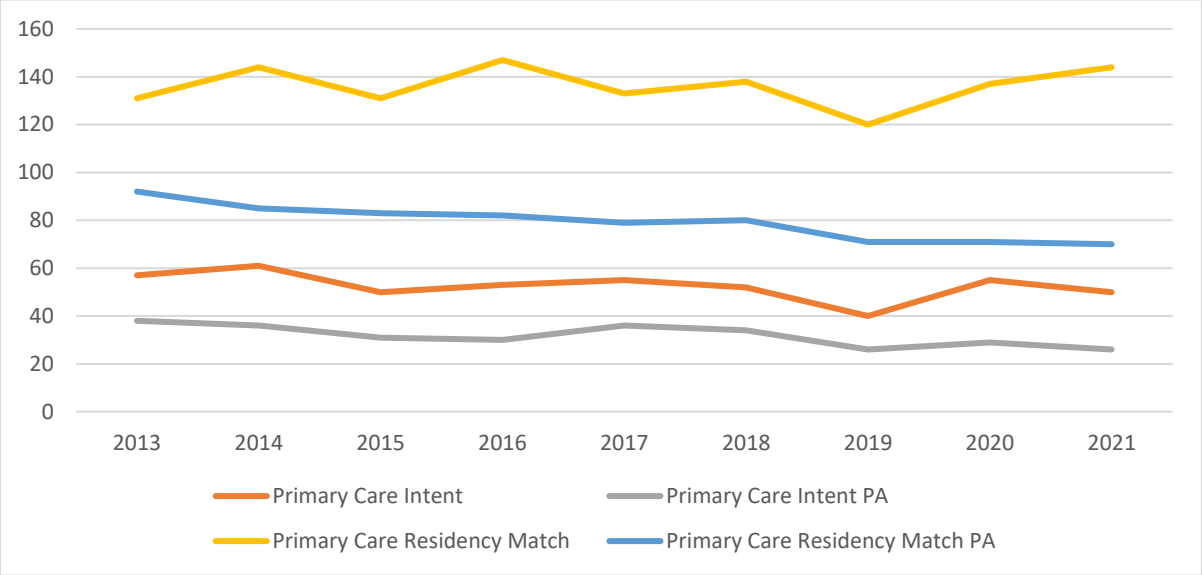
Residency Data

Interviewed PCOM representatives noted that the majority of their students go a residency associated with primary care and that only 25 percent might go on to become a specialist. Despite these claims, when examining residency match data from PCOM, the number of students who matched into a primary care residency in Pennsylvania is decreasing, as are the number of students with residencies intent on going into a primary care field. Residency data appears to show that 52 percent of the total student body enters a primary care field while 20 percent intend on becoming primary care physicians. The number of PCOM students has decreased by 2 percent, and the number of IPPC students has decrease 12 percent, and the total number of primary care residency matches has increased by 10 percent. Overall, fewer family medicine doctors are being trained at PCOM.

[226]"PCOM Cost of Attendance 2021-2022 Academic Year." PCOM. 2021. https://www.pcom.edu/about/departments/financial-aid/costs-of-attendance/#do.

Graph 14

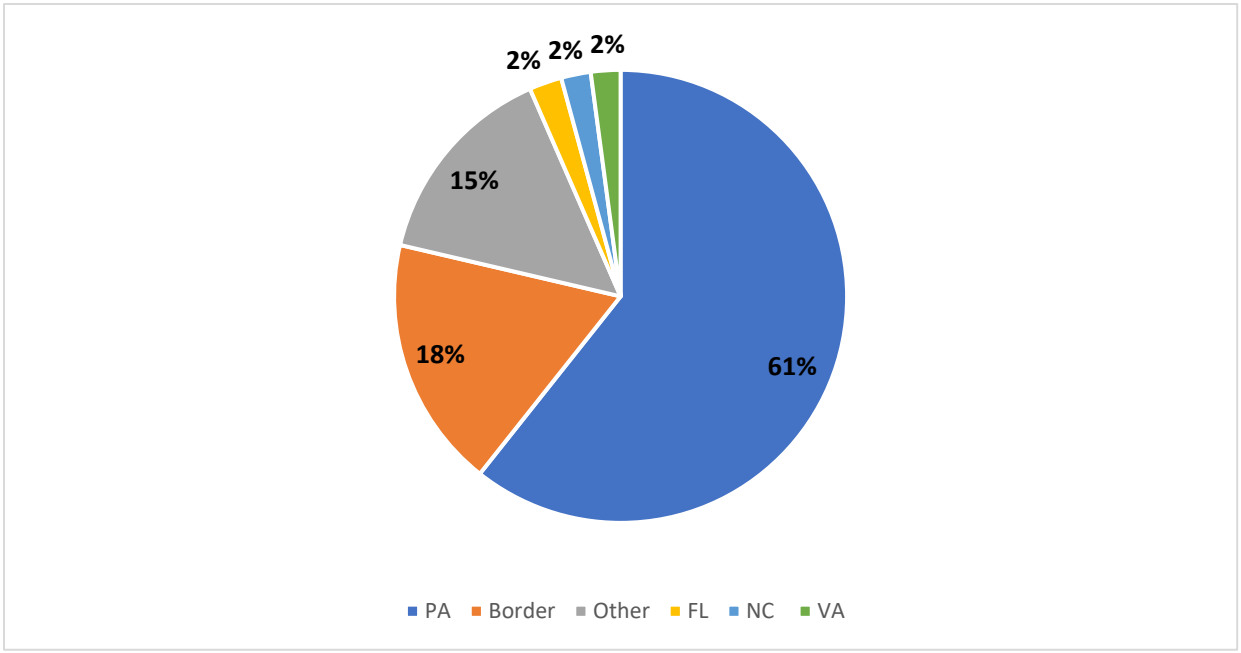
PCOM Primary Care Residencies 2013-2021



Despite these decreases in total student population, its mission as an osteopathic medical school has kept PCOM training more primary care students than all the allopathic medical schools in the state. PCOM also has the highest percentage of IPPC students staying in the state although this number has decreased by a third over the last nine years.

Graph 15

PCOM Intent to Practice Primary Care Residency by State



Sidney Kimmel Medical College at Thomas Jefferson University

Background

Located in Philadelphia, the Sidney Kimmel Medical College at Thomas Jefferson University was founded in 1824 as the Jefferson Medical College. Philadelphia University, which would later be merged with Jefferson, was founded in 1884, as the Philadelphia Textile School. Throughout its existence, the medical college has awarded more than 31,000 medical degrees. The college also has the distinction of having more living graduates than any other private medical school in the entire nation.[227]

In 1825, Jefferson Medical College became the first medical college in the U.S. to establish a clinic. This clinic later became the Thomas Jefferson University Hospital in 1877, making Jefferson Medical College the second medical school in the country to have a separate teaching hospital. Jefferson's size began to expand over time.[228] In 1891, the Jefferson Hospital Training College for Nurses merged with Jefferson, followed by the College of Allied Health Sciences in 1967. Thomas Jefferson University was officially established by name in 1969 alongside the opening of the College of Biomedical Sciences. The National Cancer Institute-designated Sidney Kimmel Cancer Center was established in 1991, and by 2006, Jefferson had renamed and added the Schools of Nursing and Health Professions.[229]

Jefferson further expanded by forming the Schools of Pharmacy and Population Health. Shortly thereafter, Jefferson officially became the Sidney Kimmel Medical College at Thomas Jefferson University in 2014 after receiving a $110 million gift from the Sidney Kimmel Foundation. Finally, in 2017, Philadelphia University and Thomas Jefferson University merged.[230]

Philadelphia University's heritage is traceable to the 1876 Centennial Exposition. It was here that textile manufacturers observed Philadelphia's failing textile industry. To improve the textile industry within Philadelphia, the Philadelphia Textile School was officially opened for classes in 1884. The school was eventually granted the right to award baccalaureate degrees and changed its name to the Philadelphia Textile Institute in 1942. The school's name eventually changed in 1961 to the Philadelphia College of Textiles and Science. With a significant increase in student population in the 1950s, 1960s, and 1970s, additional programs were added to the school. Such additions included programs in the arts, sciences, and business administration.[231]

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[227] Thomas Jefferson University, "Sidney Kimmel Medical College," https://www.jefferson.edu/academics/colleges-schools-institutes/skmc.html, last accessed on February 16, 2021.
[228] Thomas Jefferson University, "Our History," https://www.jefferson.edu/academics/colleges-schools-institutes/skmc/departments/surgery/history.html, last accessed on February 23, 2021.
[229] Thomas Jefferson University, "Our History: Jefferson (Philadelphia University + Thomas Jefferson University) Two Legacies Joined by One Vision," https://www.jefferson.edu/content/dam/academic/history/Combined-TJU-PhilaU-History-02152018.pdf, last accessed on February 23, 2021.
[230] *Ibid.*
[231] *Ibid.*

In 1999 the school was granted university status by the Commonwealth of Pennsylvania. The very same year, the school formally changed its name to Philadelphia University prior to joining Thomas Jefferson University in 2017 as mentioned previously.[232]

Based on the recent class of 2020 profile, the Sidney Kimmel Medical College at Thomas Jefferson University has students (in that particular class) from over 94 different undergraduate institutions. Students in this class are from over 32 different states across the country and over six different countries worldwide. Approximately 50 percent of students are men, while 50 percent are women. Moreover, 13 percent of students are from groups underrepresented in medicine, and 30 percent are from non-white ethnic groups.[233] Thomas Jefferson University's current mission statement reads as follows:

> We are a university with preeminence in transdisciplinary, experiential professional education, research and discovery, delivering exceptional value for 21st century students with excellence in architecture, business, design, engineering, fashion and textiles, health, science and social science – infused with the liberal arts.[234]

Program Information

Sidney Kimmel Medical College (SKMC) tracks its graduates and the residency programs they enter through the National Residency Match Program.[235] In addition, through its Longitudinal Database System (LDS), Jefferson's Office of Education maintains a more limited dataset of graduates over time. This data is collected from secondary sources such as the AMA Master File, augmented by surveys distributed to graduates at periodic intervals.

In 1970, Thomas Jefferson's medical school instituted a longitudinal study initiated by faculty member, Dr. Joseph Gonella. The study tracks the career paths of its graduates over a span of years into the graduate's practice. Currently, the study is the most comprehensive and uninterrupted study of its kind among all medical schools nationally. Due to the sheer volume of information being processed for the study, it takes four to five staff personnel to run Thomas Jefferson's longitudinal data program. A book reporting and analyzing the study's findings is in the process of publication. Studies as comprehensive as this longitudinal study can help provide insight into the current state and fluctuation of the Commonwealth's primary care physician workforce.

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[232] *Ibid.*

[233] Thomas Jefferson University, "SKMC Office of Admissions," https://www.jefferson.edu/academics/colleges-schools-institutes/skmc/admissions/selection-factors.html, Last accessed on February 23, 2021.

[234] Thomas Jefferson University, "About Jefferson," https://www.jefferson.edu/about.html, last accessed on February 23, 2021.

[235] Written response provided by *officials from Sidney Kimmel Medical School to Commission staff. Their response has been edited for formatting. Oct.18, 2021*

The Department of Family & Community Medicine (DFCM) has established a Mentoring Program for SKMC students interested in family medicine.[236] This program gives students access to a faculty member and to shadowing opportunities during the first two years of med school with a family physician in the clinical office. All students have a required clinical rotation in Family Medicine during their third year.

Family Medicine faculty members are also the moderators of the student Family Medicine Interest Group (FMIG). Students in FMIG host speakers and activities that help them learn more about the specialty of Family Medicine and the professional lives of family doctors.

The DFCM sponsors the Urban Underserved Program (UUP), designed to provide medical students mentoring, education and clinical experiences with urban, underserved populations. In a 2015 analysis of factors affecting practice outcomes, SKMC surveyed graduates who had participated in the UUP. 71 percent of UUP graduates responded to the survey.[237] Among survey respondents, 75 percent reported practicing in urban areas and 75 percent in underserved areas. Of the 21 graduates who work in underserved areas, 86 percent of them reported working with primarily urban underserved. Seventeen (61 percent) of UUP graduates reported spending more than 50 percent of their time working in a primary care capacity.[238]

SKMC medical school provides a unique opportunity for those of its students with rural backgrounds who have a strong interest in returning to practice in rural areas of the Commonwealth or Delaware. This opportunity comes with admission into the school's Physician Shortage Area Program (PSAP). Established in 1974, the PSAP is an educational program aimed at increasing the supply and retention of physicians in rural areas, with a specific focus on Primary Care doctors for Pennsylvania and Delaware. More specifically, the program recruits, trains, and supports students who have grown up or spent a substantial part of their lives in a rural setting in the U.S. and intend to practice in a similar area after residency training. Since primary care disciplines are areas of greatest need, the program places great emphasis on those students interested in primary care, however, those contemplating other specialties are still considered for the program.[239] Much of the program's success is derived from its careful selection of the students it recruits into the program, as well as the program's strong mentorship efforts by its dedicated student advisors.

The programs' advisors create robust contact points through personal connections with students to mentor them and guide them on career goals. The program offers monthly meetings for its students with its experienced and dedicated advisors who discuss short-and long-term goals with each student. The advisors are directly involved in the program, and send weekly emails to each student. Advisors provide curricular and career guidance and are available to the PSAP students all four years of medical school. PSAP students are also provided with a second-year medical student enrolled in the program, who helps orient them to medical school life and the PSAP itself. While mentorship programs are found in most medical schools, programs as

[236] Bob Motley, Written response provided by *officials from Sidney Kimmel Medical School to Commission staff. Oct.18, 2021*.
[237] *Ibid.*
[238] *Ibid.*
[239] Thomas Jefferson University, "Physician Shortage Area Program," https://www.jefferson.edu/academics/colleges-schools-institutes/skmc/programs/physician-shortage-area-program.html, last accessed October 22, 2021.

formalized and intensive as the PSAP are not common – there are only 12 substantially similar programs in the U.S. [240]

Thomas Jefferson's PSAP receives no state funding and is operated with a small budget provided by the school. The program has already generated success in its mission by increasing the number of rural family physicians. Since its inception, the program has trained more than 300 PSAP physicians. The outcomes of the program have been published in the *New England Journal of Medicine* and the *Journal of the American Medical Association*. These outcomes have shown that PSAP graduates are more than eight times as likely as their peers to become rural family physicians and that the program has a physician retention rate of 79 percent after 11-16 years in practice. In addition, the program's graduates account for 21 percent of family physicians practicing in rural Pennsylvania who graduated from one of the state's seven medical schools, even though they represent only 1 percent of graduates from those schools.[241]

The PSAP provides for up to 24 places in SKMC's first-year class. Priority is given to applicants enrolled in one of the eight colleges & universities that are members of the PSAP Cooperative: Allegheny College; Bucknell University; Franklin & Marshall College; Indiana University of Pennsylvania; Pennsylvania State University; Juniata College; University of Delaware; and University of Scranton.

All entering PSAP students are provided with advisors in the Department of Family & Community Medicine, who provide curricular and career guidance, and are available as mentors throughout all four years. PSAP students also get a "Big Sib," a second-year medical student from the PSAP, to help orient them to medical school life and to guide them through the Program. PSAP students are required to take at least one of their required clinical clerkships in a smaller community; they may also participate in is a longitudinal curriculum for the six required clinical rotations which include small town and rural areas. Students are also encouraged to take at least one of their senior clinical rotations in a rural/small town setting.

Additionally, special programming or educational tracks for students studying primary care include:

- Physician Shortage Area Program
- Urban Underserved Program
- Outpatient Community-Based Family Medicine elective (4th year students)
- Community Engagement Experience (community & population health) course for 4th year students.

[240] *Ibid*; Zoom Conference on October 21, 2021 with Aaron Douglas, Robert Motley, Howard Rabinowitz, Charles Pohl, Thomas Jefferson University, Sidney Kimmel College of Medicine.
[241] *Ibid*; H. K. Rabinowitz, "Recruitment, Retention, and Follow-Up of Graduates of a Program to Increase the Number of Family Physicians in Rural and Underserved Areas," *New England Journal of Medicine*, (Apr. 1, 1993); 328(13): 934-9, doi: 10.1056/NEJM199304013281307.

SKMC values the diversity of their student body and has a number of efforts to recruit students underrepresented in medicine (UIM). [242] The SKMC Office of Diversity and Inclusion Initiatives conducts a pipeline program designed to prepare premedical students for successful application and matriculation to medical school. Having just completed its seventh summer program, the Summer Training and Enrichment Program for Underrepresented Persons (STEP-UP) educates Black and Hispanic students intending to apply to medical school. With a goal of increasing the number of viable medical school applicants, the program includes medical school application process workshops, clinical shadowing opportunities and a formal Medical College Admissions Test (MCAT) preparation course. To increase interest at a younger age, SKMC also participates in Thomas Jefferson University's middle school (Saturday Academy) and high school (Future Health Professionals Program) pipeline programs. These programs provide science enrichment and exposure to a variety of health care fields for middle and high school students in the School District of Philadelphia.

Regarding medical school applications, the Dean for Admissions, the Senior Associate Dean for Diversity and Community Engagement. and the Associate Dean for Diversity and Student Diversity Programs work year-round to develop strategies and initiatives to increase the number of UIM students enrolled in SKMC. The school uses a holistic admissions review process that places an emphasis on life experiences.

Once in medical school, students have ample opportunity to gain experience in primary care. Almost every student participates in JeffHOPE, a student-run medical clinic for the homeless in Philadelphia. Additionally, there are a number of other volunteer activities that involve observation of medical care in the community. These experiences typically occur in the first two years of medical school and provide opportunities for students to develop an interest in primary care. In the third year of medical school, students spend 34 of the 50 weeks of their clinical experience in Family and Community Medicine, Internal Medicine, Obstetrics and Gynecology, Pediatrics and Psychiatry. These clinical rotations are a mix of in-patient and out-patient experiences. During the outpatient portions, student get direct experience with primary care.

Table 16
SKMC Students that Graduate with Medical School Debt[243]

	2015-16	2016-17	2017-18	2018-19	2019-20
# of Graduates	252	243	252	270	271
# with debt	179	162	165	190	177
students	71.0%	66.7%	65.5%	70.4%	65.3%

[242] Bernie Lopez, author. Written Response provided by *officials from Sidney Kimmel Medical School to Commission staff.. Oct.18, 2021*
[243] Susan McFadden, author Written Response provided by *officials from Sidney Kimmel Medical School to Commission staff. Oct.18, 2021*

SKMC provides scholarships from endowments and operational funds for medical students and ranks 36th in national indebtedness with $208,110.[244] Financial data pertaining to debt levels of both general and primary care student debt was available in Tables 16 and 17. Overall the number of graduates increased while those with debt have dropped. This may suggest a slight increase in the number of affluent students. While the median debt of primary care students was lower 3 percent than the general student population in 2016, by 2020 the trend had reversed.

Table 17
Average Medical School Debt of Students in Primary Care and Adjacent Specialties[245]

Primary Care specialty	**Class of**	**2016**	**2017**	**2018**	**2019**	**2020**
	Mean Debt	$194,157	$196,090	$197,819	$220,346	$204,461
	Median Debt	$199,098	$201,098	$197,545	$223,191	$217,160
	# of Borrowers	100	93	87	105	101
	Class of	**2016**	**2017**	**2018**	**2019**	**2020**
All Grads	Mean Debt	$203,170	$202,481	$202,596	$210,414	$202,483
	Median Debt	$204,820	$211,222	$198,074	$214,384	$210,796
	# of Borrowers	176	161	165	190	177

Table 18 indicates that over a third of SKMC students receive financial aid of some kind. Over the last five years, the number of students at the school has grown by 6 percent. In the same time period the number of students applying for financial aid has remained stable, but student receiving financial aid had dropped by 1 percent%.

Table 18
Percentage of Medical Students
Receive University Provided Tuition Assistance or Scholarship[246]

	2015-16	**2016-17**	**2017-18**	**2018-19**	**2019-20**
# enrolled	1056	1070	1086	1130	1119
# who apply	760	766	784	786	757
# receiving univ sch.	449	426	423	415	398
% of financial aid applicants	59%	56%	54%	53%	53%
% of total SKMC enrollment	43%	40%	39%	37%	36%

[244] *Supra*, n. 16.
[245] *Ibid.*
[246] Written Response provided by *officials from Sidney Kimmel Medical School to Commission staff. Their response has been edited for formatting. Oct.18, 2021*

Residency Data

This institution provided the Commission with its own calculations. For the purposes of this section primary care is the following specialties: family medicine, internal medicine, pediatrics, and combined medicine and pediatrics. When possible, several specialties as primary care adjacent which are valuable specialties that provide important care services that are sometimes considered primary care. For the purposes of this section, primary care adjacent specialties include OB/GYN, Obstetrics and Gynecology, Psychiatry.

SKMC divided its data among two cohorts. Recent graduates who are practicing physicians from 2012-18 and those that are still in residency from 2017-2020. For the classes of 2012 – 2018, the school produced 426 doctors who entered primary care field. Of those doctors, 168 (39 percent) currently practice in Pennsylvania. 70 percent of the primary care doctors trained at Sidney Kimmel who currently practice in Pennsylvania an in-state residency. Other states where TJU graduates completed residency before practicing in Pennsylvania were Delaware (11 percent), New Jersey (four percent) and California (three percent). For more information provided by Sidney Kimmel Medical College please see appendix.

Table 19
Percent of SKMC Students Going into Primary Care: Classes 2017-2020

Type of Care	Number Having Primary Care Residency	%
Primary Care	340	45.6%
Primary Care Adjacent	79	11.%
Not Primary	327	43.8%
Grand Total	746	100.0%

In the classes of 2017-2020 produced 419 primary care students who entered a primary care residency, 127 (30 percent) of these students had a residency in Pennsylvania when they matriculated to the school. 60 primary care students originally from Pennsylvania had an in-state residency while another 52 Students from neighboring states had a primary care residency in Pennsylvania. Because of the length of residencies it is too soon to know how many will practice in-state from this cohort. For more information provided by Sidney Kimmel Medical College please see the appendices.

Of the SKMC students who specialized in primary care but are still in graduate medical education, the average age was 27.6 with a standard deviation of 2.4. The oldest primary care resident was 46. 60 percent in this cohort were women. As evidence of interest in a career in primary care specialties by underrepresented in medicine students, in the five SKMC graduating classes from 2016-2020, 54.4 percent entered the primary care specialties of Family and Community Medicine, Internal Medicine, Obstetrics and Gynecology, Pediatrics and Psychiatry. See Table 20 below for more details on demographic composition of its more recent classes. More detail on the racial breakdown of this cohort can be found in Appendices.

Table 20
SKMC Race and Ethnicity of Primary Care Physicians, Classes 2017-2020

		Number Having Primary Care or Adjacent Residency	**%**
Race	Asian	95	22.7%
	Black	8	1.9%
	White, non-Hispanic	274	65.4%
	Other	42	10.0%
	Grand Total	**419**	**100.0%**
Ethnicity	Hispanic Latino or Spanish	29	6.9%
	Not Hispanic Latino or Spanish	390	93.1%
	Grand total	**419**	**100.0%**

University of Pittsburgh School of Medicine

Background

The University of Pittsburgh School of Medicine was originally chartered in 1886 as the Western Pennsylvania Medical College. In 1891, the school became affiliated with the Western University of Pennsylvania and was later integrated into the newly renamed University of Pittsburgh.[247] In its early years, most of the clinical instruction was provided by voluntary or part-time faculty. However, the school began to expand rapidly over the next few decades, allowing for the number of full-time faculty in the preclinical area to expand as teaching demands increased, and a more sophisticated curriculum was established.[248]

After the conclusion of World War II, the University of Pittsburgh established Schools of Medicine, Dental Medicine, Nursing and Pharmacy in a new building adjoining the principal teaching hospitals and the Graduate School of Public Health. It was intended that this would allow the medical school to engage a full-time teaching faculty for all departments. As the school grew and its needs increased, it began to receive generous grants from the A. W. Mellon Educational and Charitable Trust, the Richard King Mellon Foundation, and the Sarah Mellon Scaife Foundation. These sizable grants helped the school of medicine finance its vast expansions. In 1967, the University of Pittsburgh became a state related institution of higher education as part of Pennsylvania's State System of Higher Education – a development that helped ensure partial state funding for the school of medicine.[249]

Today the University of Pittsburgh School of Medicine's faculty is ranked among the top 20 nationwide in federal grant and contract support. The school received over 7,000 applicants for its recent entering class of 2020. The class of 2020 currently has 149 medical students, of which 54 percent are female and 37 percent are Pennsylvania residents. The class is also comprised of students from 28 different states and one foreign country. Sixteen percent of the class's students are from underrepresented minority groups.[250] The school of medicine's current mission statement reads as follows:

> …to improve the health and well-being of individuals and populations through cutting-edge biomedical research, innovative educational programs in medicine and biomedical science, and leadership in academic medicine. We strive to implement this mission with the highest professional and ethical standards, in a culture of diversity and inclusiveness, and in an environment that enables all students, faculty and staff to develop to their fullest potential.[251]

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[247] University of Pittsburgh School of Medicine, "A Century of Medical Excellence," https://www.medschool.pitt.edu/about/century-medical-excellence, last accessed on February 24, 2021.
[248] *Ibid.*
[249] *Ibid.*
[250] University of Pittsburgh, "School of Medicine Office of Admissions and Financial Aid," https://www.medadmissions.pitt.edu/admissions/who-we-are/class-profile, Last accessed on February 24, 2021.
[251] University of Pittsburgh School of Medicine, "About," https://www.medschool.pitt.edu/about, last accessed on February 24, 2021.

Program Information

At the time of the consultation with UPSOM, school officials were unable to provide demographic data on students going into medicine but felt that their office of student affairs would be able to generate that information.[252] While this information was ultimately not provided to the Commission, an estimate of composition of their student body is available in Table 19 generated based on incoming student population publicly available on their website.

Table 19
Pittsburgh University SOM student population [253] [254]

Category	2024	2025
Class size	149	147
Average age	24	24
Percentage in-state residents	37%	36%
Percentage under-represented minorities	16%	23%
Percentage female	54%	60%
States represented	28	28
Foreign countries	1	2

According to school representatives contacted by the Commission, UPSOM has several high school and undergraduate programs to attract students:

- Health Professions Prep is a high school program for youth in grades 9 – 12 during the school year
- Summer Premedical Academic Enrichment Program is an undergraduate early assurance summer program
- Traumatic Brain Injury Research, is an undergraduate research summer program
- Pittsburgh Undergraduate Research Diversity Program, is an undergraduate research summer program to attract students underrepresented in medicine.

[252] Unless otherwise noted information from this section, was collected from a Zoom Conference on January 6, 2021 with Robin Maier, University of Pittsburgh School of Medicine.
[253] "Who We Are: Class Profile." University of Pittsburgh. Archived October 2020. https://web.archive.org/web/20200919060508/https://www.medadmissions.pitt.edu/admissions/who-we-are/class-profile
[254] "Who We Are: Class Profile." University of Pittsburgh. Last accessed October 12, 2021. https://www.medadmissions.pitt.edu/admissions/who-we-are/profile.

UPSOM also offered programs aimed at enhancing student medical training. Examples include the Prologue to Medicine, a summer program for newly matriculated students, and the Jeannette South-Paul Scholarship, an away clerkship experience that is offered the third and fourth year of medical school.

The school had numerous initiatives to encourage and promote primary care. School officials noted that their required clerkship involves four weeks of family medicine training, four weeks of ambulatory adult medicine (which includes outpatient psychiatry) and ambulatory pediatric medicine (now part of eight-week pediatric clerkship), four weeks of OB/Gyn (which includes outpatient clinic), and one week of geriatrics. The variety of the clerkship experience helps give students more exposure to primary care than they would otherwise receive. Students can select also select an Areas of Concentration (AOC's). Students can choose to participate in several primary care related AOCs over the course of their four-year education including:

- Addiction Medicine
- Disabilities Medicine
- Geriatric Medicine
- Global Health and Underserved Populations
- Public Health
- Women's Health.

Additionally, there are also co-curricular electives related to primary care such as the Longitudinal Alliance Project which involves four years following a single patient, the Longitudinal Primary Care Experience which consists of one year seeing outpatient Family Medicine patients at continuity clinic half day weekly. UPSOM officials also spoke about their numerous clinical electives and acting internships in family medicine, adult medicine, pediatrics, geriatrics, psychiatry, and ob/gyn. The university identified 22 Extracurricular Activities and Leadership Opportunities offered at their medical school based on interest in specialties.

In 2020, 77 percent of the most recent graduating class graduated with medical school debt. In 2020, the average debt for primary care medical students of those with debt was $168,072. The median amount of debt was $173,880. In 2020, the average amount of debt of graduates who incurred debt was $190,964 and Pittsburgh was nationally ranked 53rd.[255]

[255] *Supra* n. 16.

UPSOM awarded a little over $10,479,000 to its student population in scholarships in 2020. These include UPSOM need-based aid and program specific scholarships. Included in these are:

- the James A. Ferrante, MD Scholarship,
- the Celia Grozman Memorial Scholarship Fund,
- the Alan Burckin, M.D. Scholarship and
- the Carl H. and Iris C. South Memorial Fund.

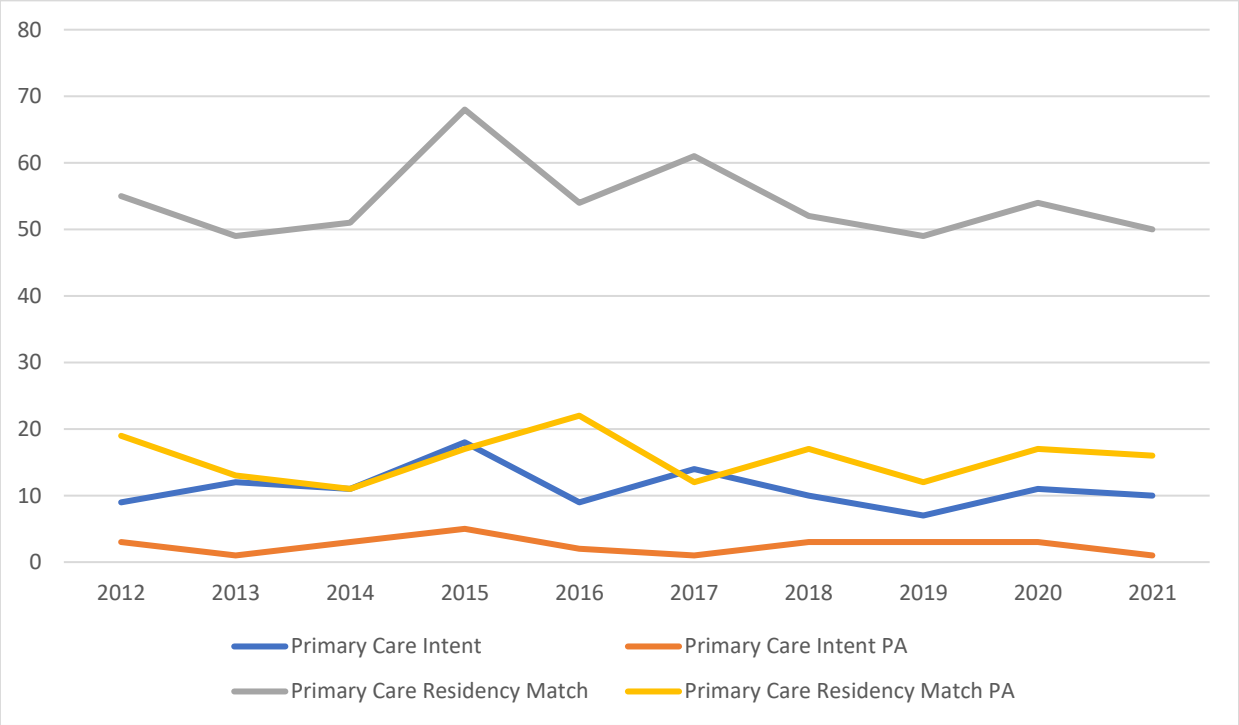
Each of these scholarships is aimed at primary care students. Close to 81 percent of the student population received some amount of scholarship from the UPSOM.

Residency Data

On average, UPSOM produces 143 students a year, 54 of those students match into a primary care related specialty, and 11 students intend on entering the primary care field. While close to 38 percent of students are reported as matching into a primary care related field as few as seven percent of its total student population may intend on being a primary care physician.

Graph 16

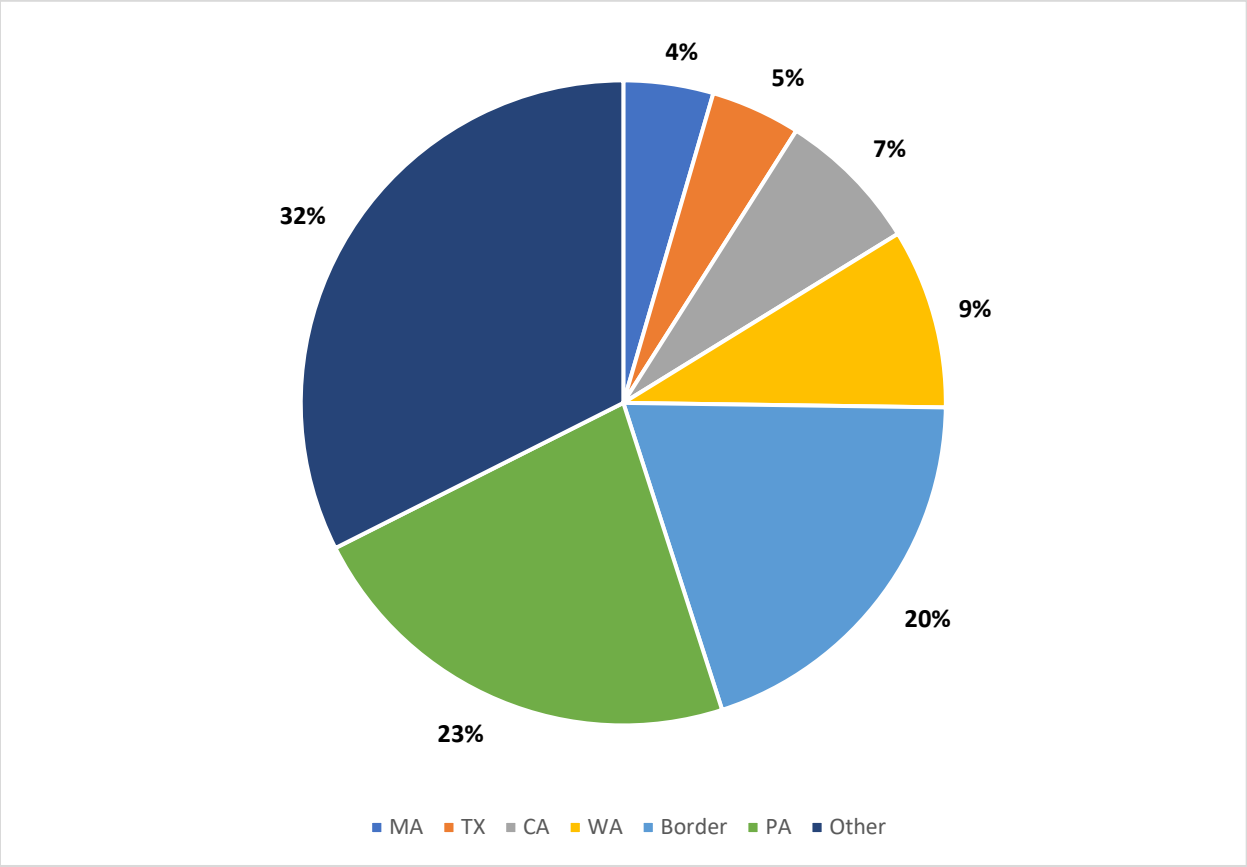
University of Pittsburgh SOM Primary Care Residencies 2012-21



Over the last decade UPSOM has seen its total school population decline by 15 percent. Similarly, the number of students matching into primary care residencies has dropped by nine percent. The number of students increased slightly, however; the sample size is likely insufficient to draw conclusions. While 29 percent of all primary care residencies stayed in state, only 23 percent of students intending to enter the primary care field had a residency in Pennsylvania.

Graph 17

University of Pittsburgh Primary Care Intent Residencies by State



Visualizing Medical School Data

To supplement data provided by the medical schools, Commission staff also reviewed available data from the American Medical Association (AMA) to determine which students are remaining in state to complete their residency. One reason for the importance of this review is the maldistribution of physicians across the state. Pennsylvania has a large rural population, almost one-half of the doctors practice in three counties (Philadelphia, Montgomery, and Allegheny near Pittsburgh), while almost three quarters (75 percent) of the population live in the other 64 counties.[256] While the Commonwealth trains hundreds of medical students each year, Pennsylvania's low retention rate means that many of these students ultimately decide to practice elsewhere after their residencies are completed.

The Physician Masterfile from the AMA includes current and historical records for over 1.4 million physicians, residents, and medical students nationwide. One example of how data are used by researchers is determining the footprint of medical schools in communities across the county. The website of the "Med School Mapper", a project by the Health Landscape organization, defines footprint maps in the following way:

> These maps depict the historical relationship between a program and its community, state, and region. The areas incorporated in the 70% threshold footprint have most consistently attracted program graduates and may not have had as many family physicians if the program had not existed. In this regard, the footprint may indicate an area's measure of dependence on the program for its family physicians. Areas with graduates that are outside the footprint are not unimportant, as many may be underserved areas. Residency programs can use these maps for internal reflection about whether they are fulfilling their missions, and to demonstrate their value to hospital and community leaders.[257]

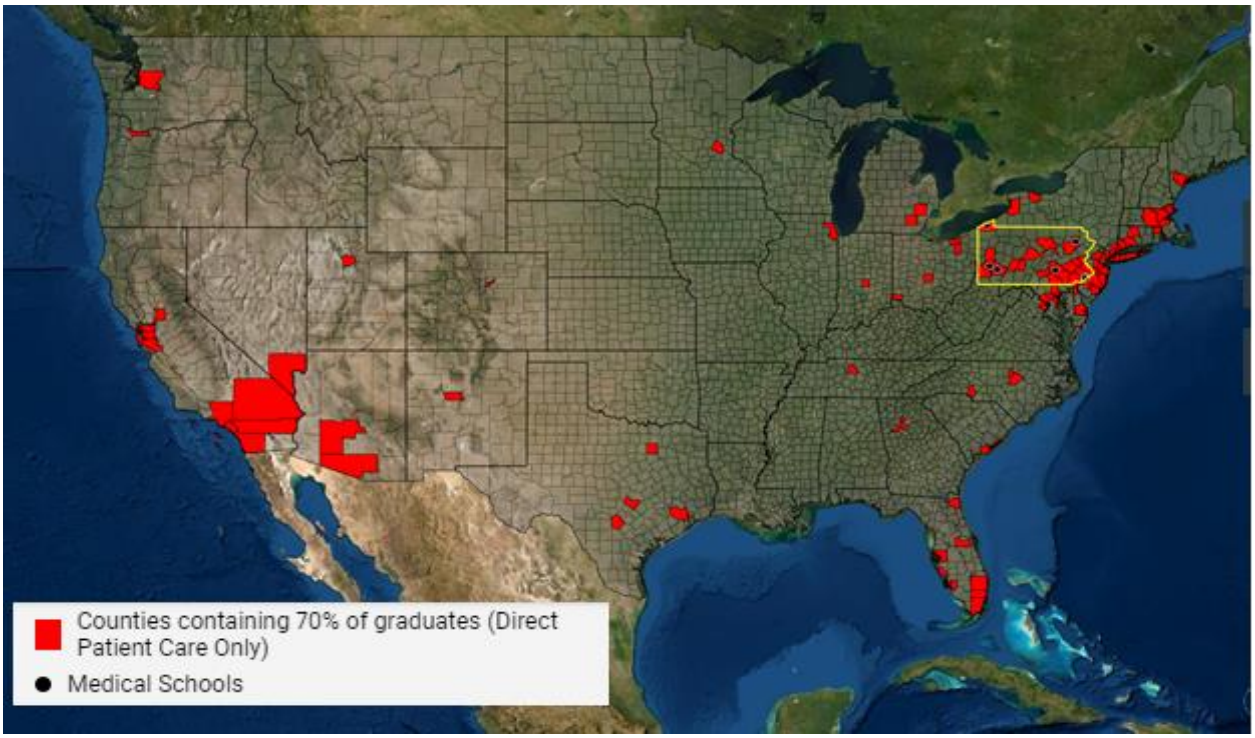
According to the data used by Med School Mapper, just under a third of all physicians trained in state stay in Pennsylvania. Most Pennsylvania medical graduates are located in states containing major urban centers such as Florida, Texas, and California as well as bordering states. A reproduction of the footprint map using data from Commonwealth's medical schools appears below.

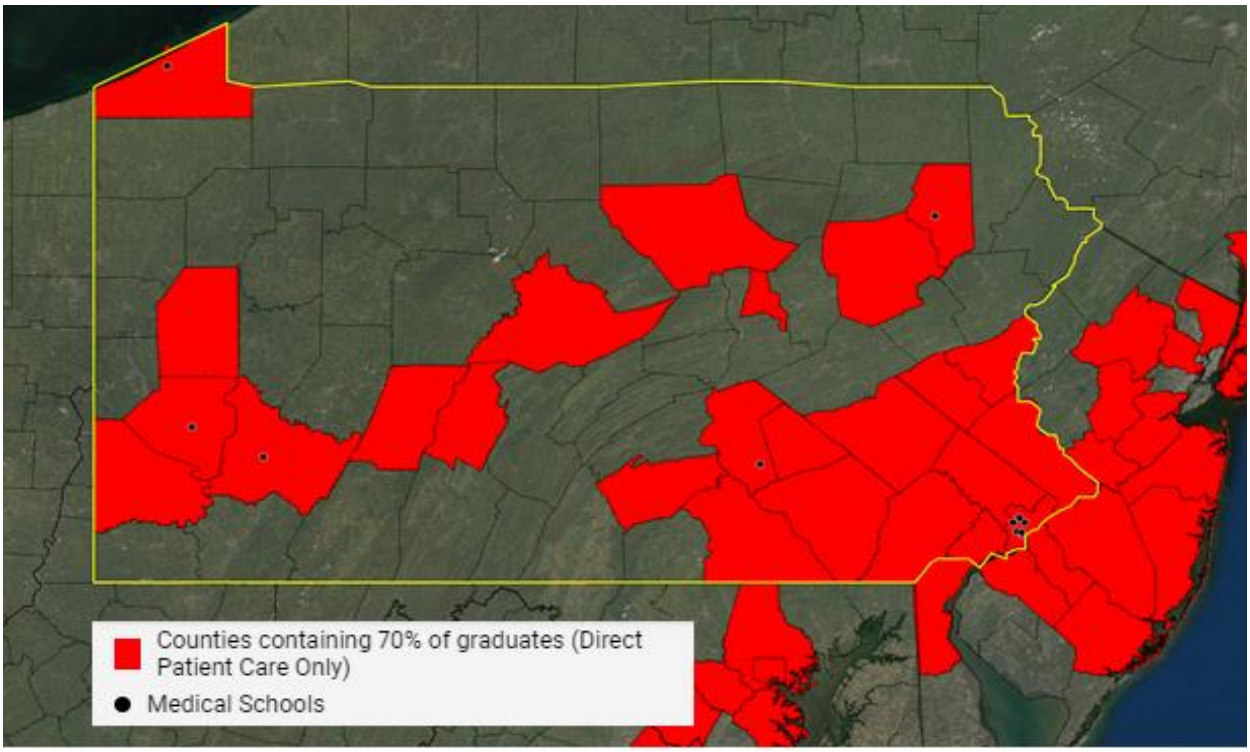
An enlarged version of the Med School Mapper's Pennsylvania report indicates that all urban counties in the state appear on the footprint map and that Centre, Butler, Cambria, Blair, Lycoming, Montour were the only rural counties included. All counties in the Commonwealth containing medical schools were also indicated on the footprint map. While large numbers of graduates may not practice medicine in rural counties, the Pennsylvania medical schools are still important to those areas because they rely on a higher percentage of Pennsylvania trained doctors than urban counties

[256] Written Response provided by *officials from Sidney Kimmel Medical School to Commission staff. Their response has been edited for formatting. Oct.18, 2021*

[257] Med School Mapper, 2020, *Health Landscape*, https://maps.healthlandscape.org/medschoolmapper, last accessed Nov. 24, 2021.

U.S. Counties Containing 70 percent of Pennsylvania Medical School Graduates, 2020





Source: Med School Mapper, 2020, Health Landscape, https://maps.healthlandscape.org/medschoolmapper/, last accessed Nov. 24, 2021.

The Med School Mapper was also able to generate information on the characteristics of Pennsylvania physicians. Pennsylvania has a population of 1,395 residents for every primary care physician in the state. Of the 43,506 physicians of any specialty who graduated from Pennsylvania medical schools only 13,889 are practicing in state. The majority of Pennsylvania-graduated medical students work in low-income areas across the country, while only a quarter of the physicians that remain in state work in these areas. Only 1.6 percent of all physicians trained in the state choose to work in rural areas of the Commonwealth

Table 20
Total Number of Physicians Trained and Percent Remaining in State by Medical School, 2020

Medical School	Physicians Trained at School	# Remaining in State	Percentage Remaining in State
Lake Erie College of Osteopathic Medicine[1]	2,299	579	25%
University of Pittsburgh School of Medicine	4,563	1,437	32%
Pennsylvania State University College of Medicine	3,511	1,267	36%
Geisinger Commonwealth School of Medicine	99	36	36%
Philadelphia College of Osteopathic Medicine	7,383	3,165	43%
Drexel University College of Medicine	3,277	748	23%
Lewis Catz School of Medicine	6,118	2,085	34%
Perelman School of Med at University of PA	4,966	1,117	23%
Hahnemann University School of Medicine[2]	3,564	1,011	28%
Sidney Kimmel Medical College	7,726	2,444	32%
Pennsylvania Total	43,506	13,889	32%

1.Includes Seton Hill Campus
2. Hahnemann University School of Medicine Closed in 2019
Source: Compiled by Commission staff, data from Med School Mapper, 2020, Health Landscape, https://maps.healthlandscape.org/medschoolmapper/, last accessed Nov. 24, 2021.

When compared to the general population of physicians, primary care specialties have a higher percentage of remaining in state to practice medicine, while family medicine specialists are even more likely to stay. On average, 13 percent of all graduates trained at Pennsylvania medical schools became primary care physicians that stay in Pennsylvania. Half of those primary care medical students will be family medicine specialists. This data lends support to the idea that supporting family medicine specialties may be one of the best ways to increase the amount of primary care physicians that remain in state.

Table 21
Primary Care Physician Workforce by Medical School, 2020

Medical School	Primary Care	Primary Care in State	Percentage remaining in State	Family Medicine All	Family Medicine in state	Percentage remaining in State
Lake Erie College of Osteopathic Medicine[1]	836	255	31%	427	143	33%
University of Pittsburgh School of Medicine	1,413	495	35%	398	152	38%
Pennsylvania State University College of Medicine	1,181	487	41%	459	229	50%
Geisinger Commonwealth School of Medicine	44	16	36%	16	10	63%
Philadelphia College of osteopathic medicine	3,382	1,550	46%	2,056	986	48%
Drexel University College of Medicine	990	262	26%	345	108	31%
Lewis Catz School of Medicine	2,068	732	35%	715	285	40%
Perelman School of Med at University of PA	1,219	297	24%	228	64	28%
Hahnemann University School of Medicine[2]	1,212	391	32%	305	125	41%
Sidney Kimmel Medical College	2,437	873	36%	1,022	416	41%
Pennsylvania Total	15,629	5,597	36%	6,245	2,602	42%

1. Includes Seton Hill Campus
2. Hahnemann University School of Medicine Closed in 2019
Source: Compiled by Commission staff, data from Med School Mapper, 2020, Health Landscape, https://maps.healthlandscape.org/medschoolmapper/, last accessed Nov. 24, 2021.

The AMA data provided by the Med School Mapper tool was consistent with other findings that close to a third of Pennsylvania-trained primary care physicians remain in state. A review of this data found that Pennsylvania College of Osteopathic Medicine has the highest percentage of its student population becoming primary care physicians and has the largest percent of primary care physicians to remain in state. Lewis Katz and Sidney Kimmel also produced large amounts of primary care physicians. While Penn State had a smaller percentage of its total student population going into primary care, it retained half of its students who would go on to specialize in family medicine.

In addition to gathering data on medical school students selecting primary care specialties within Pennsylvania, this report provides related findings and recommendations on medical schools and the production of primary care physicians within the Commonwealth. House Resolution No. 625 referenced numerous recommendations within the Commission's 2015 advisory board report *The Physician Shortage in Pennsylvania*. Among these recommendations include improvements to workforce data collection, encouraging medical schools to establish programs to increase physician supply, and implementing a state pipeline program. This report reiterates and updates some of the 2015 report's recommendations (as well as the Commission's 2019 report *Pennsylvania's Health Care Workforce Needs*) that are still relevant today as they pertain to medical schools and the goal of increasing the number of primary care physicians in Pennsylvania.

Recommendation #1: Data collection and predictions on the Pennsylvania's primary care workforce are currently insufficient.

To encourage more medical school students to pursue careers as primary care practitioners, it is essential to have an accurate collection of data on the number of medical school graduates who are entering and remaining in primary care practice within the Commonwealth. If accurate practitioner numbers cannot be obtained, true primary care workforce planning within the Commonwealth will be difficult to achieve and monitor. Furthermore, it will be difficult to measure progress made, if any, in expanding the number of practicing primary care physicians down the road. That said, accurately collecting such data has proven to be an onerous task.

Currently, data collection for primary care practitioners graduating from Pennsylvania medical schools is often unreliable and even sometimes incomplete. In addition, the roles of the medical schools in collecting such data, as well as the data collection methods used, tend to vary by school. Some medical schools have no administrative involvement in collecting data on the career paths of their medical school graduates once they graduate. Instead, this information is collected through surveys prepared and sent out by these schools' alumni associations. However, Thomas Jefferson University's medical school is good example of a medical school that has collected comprehensive data on the careers of its medical school graduates through a longitudinal data study initiated in 1964 and mentioned in greater detail previously in this report. The study tracks the career paths of its graduates into their years of practice. Currently, the study is the most comprehensive and uninterrupted study of its kind among all medical schools in the United States. Studies like Thomas Jefferson's longitudinal study can provide insight into the Commonwealth's primary care physician workforce and its evolution over time.

The American Medical Association database, commonly referred to as the AMA Physician Masterfile, has been a resource for procuring physician numbers throughout the U.S. The Physician Masterfile was started in 1906 and was initially created to support membership and mailing activities. Over time, it has expanded to "include significant education, training and professional certification information on virtually all Doctors of Medicine (MD) and Doctors of Osteopathic Medicine (DO) in the United States, Puerto Rico, Virgin Islands and certain Pacific Islands."[258]

The Physician Masterfile includes current and historical records for over 1.4 million physicians, residents, and medical students nationwide. Physician Masterfile records are never removed, which is why the database currently holds information on more than 226,000 deceased physicians. While the AMA Physician Masterfile is a comprehensive resource for finding records on physicians across the country, it has its limits. As previously mentioned, the database does not include information on a physician's scope of practice.[259]

At the federal level, workforce forecasts are projected by the Health Resources and Services Administration (HRSA). These projections are largely based on historical data, and thus have estimated future supply and demand as if past patterns of utilization, graduations, and decisions to work would continue to prevail."[260] However, these patterns do not always persist over time. Consequently, forecasts like the HRSA projections often vary significantly from other workforce forecast models. In addition to HRSA data, many academic researchers also utilized data collected by the American Medical Association (AMA), the Association of American Medical Colleges (AAMC), and the Pennsylvania DoH Bureau of Health Planning to address the issue of physician shortages.[261]

The AMA, the AAMC, and the Bureau of Health Planning rely on surveys, which are not always reliable methods of data collection. Many of these methods often "focus on single professions, typically assuming the continuation of current practice and utilization patterns."[262] In addition, major gaps exist within the available data on the health care workforce. Many data points are still lacking the specific numbers and types of health professionals currently employed, where they are employed, and in what roles they are employed.[263]

At the state level, the Pennsylvania Department of Health (DOH) has published recurring reports on the physician and physician assistant workforce. The most recent report was published in 2017 and provided detailed data on Pennsylvania's 2014 physician and physician assistant workforce. This report provides data on physicians licensed and practicing in Pennsylvania who responded to the Department's survey. The survey notes that the 29,594 physicians who responded accounted for 69 percent of all physicians licensed in Pennsylvania.[264]

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[258] American Medical Association, "AMA Masterfile," https://www.ama-assn.org/about/masterfile/ama-physician-masterfile, last accessed on Aug. 24, 2021.
[259] *Ibid*.
[260] JSGC, *Pennsylvania Health Care Workforce Needs: Staff Study*, (Apr. 2019), pp. 147-148.
[261] *Ibid*.
[262] *Ibid.* at p. 148.
[263] *Ibid*.
[264] Pennsylvania Department of Health, Bureau of Health Planning, *2014 Pulse of Pennsylvania's Physician and Physician Assistant Workforce*, Vol. 6, (Aug. 2017), p. 8.

The DOH report provides data about the respondents, such as age, gender, and specialty. The report even provides "quick facts" on primary care specialties of physicians practicing direct patient care within the Commonwealth. In addition, the report also notes that in 2014, the Commonwealth ranked 37th in the nation in retainage of physicians completing their medical education and residency in Pennsylvania, retaining 57.5 percent of active physicians.[265]

The DOH report serves as a great resource for physician workforce data throughout Pennsylvania. However, it too has limitations – the data it holds are based on only those physicians who responded to the report survey (an estimated 69 percent of actual Pennsylvania physicians). It also does not provide a complete breakdown of primary care physicians and the schools and residency programs from which they graduated. Furthermore, the report appears to have been published every three years leading up to 2017 (for totals from 2014). Commission staff was unable to obtain more recent data from DOH.

Many medical schools across the U.S. reportedly have sought to predict their primary care output. They often report their primary care output as 100 percent of graduates who match in internal medicine, family medicine, pediatrics, and medicine-pediatrics residencies. This primary care prediction method is known as the Residency Match Primary Care method (Residency Match). This method excludes graduates in subspecialty residencies, surgery, emergency medicine, as well as transitional and preliminary internal medicine residencies.[266]

The Residency Match method is frequently used and cited by medical school deans and public media and often shows schools producing 50 percent or even higher percentages of their graduates entering primary care. Such data are known to be unreliable and can significantly overstate actual numbers for actual primary care practitioner output. The unreliability of this method in predicting and determining the actual output of primary practitioners from medical schools is supported by past studies with findings that only 21 percent of third-year internal medicine residents, 10 percent of students entering internal medicine residencies, and 53 percent of pediatrics residents say they intend to practice primary care, as compared to 95 percent of physicians practicing family medicine applying for board certification.[267]

Another commonly used method to predict primary care output from residency positions is the Actual Primary Care method. This method involves commonly accepted criteria supported by the World Health Organization. Actual Primary Care is defined as "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community."[268] This definition does not include medical and surgical specialties that do not address the majority of the patient's health care needs. The Actual Primary Care method also excludes urgent care, emergency medicine, and hospitalists.[269]

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[265] *Ibid*. at p. 18.
[266] Mark Deutchman, MD; Francesca Macaluso, MPH; Jason Chao, MD, *et al.*, "Contributions of U.S. Medical Schools to Primary Care (2003-2014): Determining and Predicting Who Really Goes into Primary Care," *Family Medicine*, 2020; 52(7): 483-90, doi: 10.22454/FamMed.2020.785068.
[267] *Ibid.*
[268] *Ibid.*
[269] *Ibid.*

Improvement in data collection on primary care physicians is needed. Current data collection tools within the Commonwealth, along with the efforts of medical schools are insufficient to provide a complete an accurate picture of how many primary care physicians are graduating from Pennsylvania medical schools and entering the Commonwealth's workforce. As was recommended in both the Commission's 2015 and 2019 reports, the Commonwealth may want to consider establishing an independent body or assigning a bureau within an appropriate department or agency to collect and analyze additional data.[270]

The data to be collected and analyzed by this entity should include each individual health care profession's workforce, including the number of members in that workforce currently practicing in Pennsylvania, the geographic distribution, and the specialty distribution of those members. Such data should also include the current and future demand for each individual health care profession, using both existing and proposed models of health care delivery, and the demographics of each individual health care profession, as well as of the populations served.[271]

A good model of something like this kind of entity can be found in Georgia with the Georgia Board for Physician Workforce (GBPW). The GBPW falls under the Georgia Board of Health Care Workforce (GBHCW), which was intended to assist Georgia communities, especially in medically underserved areas, to receive improved access to needed physicians and other health care practitioners. The GBHCW identifies and meets the health care workforce needs of Georgia communities through its support and development of medical education programs.[272]

The GBPW focuses on the state's physician workforce and plays a key role in data collection of its practicing physicians. Since 2008, the GBPW has conducted an annual survey of graduating medical school students from each of Georgia's medical schools. The survey is designed to inform policy makers, medical school administrators, graduate medical education administrators, and other government and non-government agencies about the state's medical school pipeline. In addition, it provides insight into medical student specialty selection and residency site choice, and how many intend to ultimately practice in Georgia, after their training. Responses are collected from each of Georgia's five medical schools which include: Emory University School of Medicine, Medical College of Georgia at Augusta University, Mercer University School of Medicine, Morehouse School of Medicine, and Philadelphia College of Osteopathic Medicine Georgia Campus.[273] Information collection like this would be instrumental in learning more about Pennsylvania's primary care physician workforce and how to strengthen it.

[270] *Supra*, n. 260 at p. 148.
[271] *Ibid*. at pp. 148-149.
[272] Georgia Board of Health Care Workforce, "About the Board," https://healthcareworkforce.georgia.gov/about-us, last accessed on October 19, 2021.
[273] Georgia Board for Physician Workforce, "Georgia Board for Physician Workforce 2015 Georgia Medical School Graduate Survey" (2015), p. 3.

Recommendation #2: Cultural and financial barriers prevent medical schools for promoting primary care

A. Medical schools should try to eliminate the negative stigma of primary care specialties.

Medical school characteristics can play a key role in shaping a medical student's career choices. Studies have found that the "prevailing primary care culture at a school also plays a role." There is often an antagonistic environment toward primary care within medical schools. The dismissive view held by many faculty members in medical schools reinforces stereotypes that primary care practice lacks prestige in the medical community.[274]

A 2010 Medical Research Report stated that "bashing" or bad-mouthing of primary care specialties can have a negative impact on primary care residency choice among students.[275] Specifically, students who attend medical schools with a higher pervasiveness of disparaging comments toward primary care are less likely to become primary care physicians. One 2013 study found that students pursuing primary care career paths "may be more likely to be targeted with comments disparaging primary care and may also be more attuned and sensitive to them."[276]

Negative stigma within medical schools directed at primary care practice is not new. In fact, it has persisted in schools for decades. A 2016 *Annals of Family Medicine* study conducted a qualitative analysis of 52 primary care physician oral histories, which came directly from the Primary Care Oral History Collection lodged in the National Library of Medicine. Findings from the oral histories indicated that 63.5 percent of respondents experienced discouragement and disparagement about primary care. According to the study, this proportion remained high through five decades spanning from 1936 to 1985. It was further found that primary care disparagement was prevalent through individual and group attitudes and behaviors (cultural hostility), and medical school structure, which refers to the institutional level and organization make up (structural hostility).[277]

Respondents from the same study reported that cultural hostility toward primary care began as early as the medical school application process. For instance, some applicants were told during interviews that primary care aspirations were unwelcome, while other applicants received clear messages that certain fields were honored, and certain fields were to be avoided. Once in medical school, some respondents who had expressed a desire to pursue primary care, claimed they were told they were "too smart" to practice primary care medicine.[278]

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[274] *Ibid.*
[275] *Supra*, n. 266.
[276] Clese E. Erikson, MPAff; Sana Danish, MPP; Karen C. Jones, MAPStat, *et al*., "The Role of Medical School Culture in Primary Care Career Choice," *Academic Medicine*, (Dec. 2013), 88(12); 1919-1926, doi: 10.1097/ACM.0000000000000038.
[277] Joanna Veazey Brooks, PhD, MBE, "Hostility During Training: Historical Roots of Primary Care Disparagement," *Annals of Family Medicine*, (Sept./Oct. 2016), 14(5); 446-452, doi: 10.1370/afm.1971.
[278] *Ibid.*

Structural hostility toward primary care has been found in medical schools with faculty almost entirely committed to specialist medicine, often leaving few primary care mentors and role models during training. As was previously mentioned in this report however, it should be noted again that students in some cases hold negative perceptions about primary care subspecialties, like family medicine, before entering or even applying to medical school.[279]

Because most budding physicians select their specialty within their third or fourth year of medical school, it is important that medical schools evaluate the primary care environment that exists within their programs, both structurally and culturally. Stakeholders in the medical field have agreed to some extent, that "medical schools have a responsibility to produce primary care physicians." This is especially true in an "era of expected primary care shortages."[280]

One proposed method of addressing the current hostility toward primary care in medical schools (and the need for reform of such hostility) is for medical schools to conduct more research on primary care and population health to help further highlight the importance of primary care and the need for more qualified candidates to pursue it. Since medical schools often seek National Institute of Health funding, which helps improved their institutional reputation, while simultaneously advancing medical science through research, this type of research could serve both interests, and could help lead to the greater production of primary care physicians.[281]

To effectively reshape the culture and structure of medical schools to positively impact students interested in primary care, school deans and administrators (who are often cited the least by students as disparaging primary care) can and should play a role. For instance, these high-level school officials can institute a greater push to recruit more students from rural backgrounds – the students most likely to return to rural areas to practice in primary care. These same officials can be a driving force in the push for their schools to "offer more opportunities and incentives for students to participate in public health and community outreach activities, and they can identify preceptors and clerkship opportunities where students are exposed to thriving primary care practices."[282]

To improve primary care environment, schools can also work to recruit more faculty with primary care backgrounds. Since students spend much of their medical school interactions with faculty, recruiting more faculty with experience and respect for the practice could help offer positive support and mentoring for those students interested in primary care. It should be noted, however, that locating such individuals can be challenging, as many primary care practitioners face significant workloads and may not always have the availability to teach.

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[279] *Ibid.*

[280] Arch G. Mainous III, PhD; Maribeth Porter, MD, MS; Denny Fe Agana, MPH, *et al*., "Institutional NIH Research Funding and a Culture of Support for Family Medicine – Their Relationship to Family Medicine Specialty Choice," *Annals of Family Medicine*, (2018), 50(5); 369-371, doi: 10.22454/FamMed.2018.913629; *Supra,* n. 276.

[281] Arch G. Mainous III, PhD; Maribeth Porter, MD, MS; Denny Fe Agana, MPH, *et al*., "Institutional NIH Research Funding and a Culture of Support for Family Medicine – Their Relationship to Family Medicine Specialty Choice," *Annals of Family Medicine*, (2018), 50(5); 369-371, doi: 10.22454/FamMed.2018.913629.

[282] *Supra*, n. 276.

B. Investment in medical school mentoring programs that facilitate greater student interest and retention in primary care is needed.

As mentioned previously in this report, mentoring is a key aspect of the training and guidance of future physicians. Mentor relationships can facilitate career success for medical students in many ways and has improved job satisfaction and compensation and has also optimized productivity. In many cases, mentorships can impact career selection and help medical students develop an interest in a certain specialty. Proper career advising may help students with unformed career aspirations make career decisions and solidify their goals. Given the positive impact that mentoring can have on medical students and their specialty selections, investing in more formalized mentorship programs may generate greater interest and retention in primary care careers.

Many medical schools offer mentorship programs to their students. Some schools offer clinical mentoring programs, which "help to develop students' clinical skills and can increase interest in under-subscribed specialties."[283] Some mentorship programs focus on teaching professionalism and are often integrated into medical school curriculums, while other medical school mentorship programs, sometimes referred to as "academic mentoring programs," help students build a positive attitude toward academia while enabling them to tailor and apply academic research in ways that may benefit their careers.[284]

Mentoring programs in medical schools are usually based on following the successful initiatives employed at other institutions, and then building from that based on mentee/mentor feedback. Mentorship programs are funded by a range of sources, including the host university and/or third parties. Those with dedicated funding are more likely to have a greater level of structure, complete with dedicated administrative support to help co-ordinate activities and subsidize food and travel expenditures. The quality of medical school mentorship programs across the country, as well as the level of financial support each program receives varies significantly.[285]

A 2019 Advances in Medical Education and Practice article provided that, to be successful, mentorship programs should help the mentee to achieve short-and long-term goals; should include role modeling and help with career development; both mentee and mentor should benefit from the relationship; relationships should involve direct interaction between mentor and mentee; and mentors should be more experienced when compared with the mentee.[286] Some medical schools with formalized mentorship programs effectively incorporate these elements.

Some formalized programs can help encourage and support medical school graduates specializing in primary care. One example of a formalized program that provides mentorship to its medical students is the Thomas Jefferson Sidney Kimmel Medial College's Physician Shortage Area Program (PSAP). As described in greater detail previously in this report, the PSAP is an

[283] Danielle Nimmons, Shaista Giny, and Joe Rosenthal, "Medical School Mentoring Programs: Current Insights," *Advances in Medical Education and Practice*, (2019); 10: 113-123, doi: 10.2147/AMEP.S154974.
[284] *Ibid.*
[285] *Ibid.*
[286] *Ibid.*

admissions and educational program aimed at increasing the supply and retention of physicians in rural areas, with a specific focus on primary care doctors for Pennsylvania and Delaware.[287]

As an admission and educational program, there is a large mentorship component to the PSAP. Time is built into the program advisor's job description, but mentorship can be difficult to formalize since meeting with students usually must take place after typical work hours. Nonetheless, the programs' advisors create robust contact points through personal connections with students. Students recruited into the program have monthly meetings with experienced and dedicated advisors who discuss short-and long-term goals with each student. The advisors directly involved in the program also send weekly emails to each student - a show of support and interest in the students' progress and experience in school. PSAP advisors are not simply voluntary advisors who permit an open-door policy for students who may want to seek career guidance. Rather, advisors directly administering the program maintain that the mentorship aspect of the position is built into their actual job description at the school. The PSAP advisors provide curricular and career guidance and are available as mentors to the PSAP students all four years of medical school. PSAP students are also provided with a second-year medical student enrolled in the program, that helps orient them to medical school life and the PSAP itself. While mentorship programs are found in most medical schools, programs as formalized and intensive as the PSAP are not very common. Currently in the U.S., there are only 12 programs of similar. [288]

Thomas Jefferson's PSAP receives no state funding and is operated with a small budget provided by the school. The program has already generated success in its mission to supply and retain physicians in rural Pennsylvania and within primary care practice settings. This success is evidenced from its 79 percent retention rate after 11 – 16 years in practice (retention being the amount of PSAP graduates practicing and remaining in rural areas of Pennsylvania and Delaware and in primary care practice in many cases). It is worth noting that despite its success, the medical school has little incentive to expand the program which would require additional funding. In addition, declining rural populations and educational infrastructure is acting as a barrier to locating quality candidates for the program.[289]

With increased financial resources, other medical school mentoring programs could expand their footprint and increase success, like the PSAP. Increased funding for medical schools looking to enhance their mentorship programs, and especially programs with proven track records of success, could potentially ensure the continuity and even improvement of such programs in the future, long after the current college and program administrators retire. An investment of state funds in such programs, with proper conditions, may yield a statewide return on said investment, considering it is the Commonwealth that benefits with increased success of programs like the PSAP (if more students enter and stay in primary care and rural health careers because of the programs, Pennsylvania benefits by increasing primary care physician access to its residents).

[287] Thomas Jefferson University, "Physician Shortage Area Program," https://www.jefferson.edu/academics/colleges-schools-institutes/skmc/programs/physician-shortage-area-program.html, last accessed October 22, 2021.
[288] *Ibid*; Zoom Conference on October 21, 2021 with Aaron Douglas, Robert Motley, Howard Rabinowitz, Charles Pohl, Thomas Jefferson University, Sidney Kimmel College of Medicine.
[289] *Ibid*.

A recent study found that mentoring programs are becoming increasingly recognized as crucial components of the curriculum in medical schools, and can aid in developing students' professionalism, personal growth, knowledge, and skills. Moreover, the same study acknowledged that they "have also been shown to be of benefit in the retention and recruitment of trainees to under-subscribed specialties, including academic medicine."[290] State investment in formalized medical school mentorship programs designed to recruit and retain primary care physicians and physicians willing to serve rural and underserved areas in the Commonwealth, may help facilitate a greater interest in these areas among Pennsylvania's medical students.

The Commission's 2015 advisory committee report, *The Physician Shortage in Pennsylvania*, recommended that the General Assembly provide its "medical schools with funding to implement, continue, or expand a program, like PSAP, or another program aimed at increasing the physician supply." While programs like the PSAP may not see the same level of success at every medical school, this report reiterates the 2015 report recommendation that the General Assembly consider such investment in medical schools for programs like PSAP to help encourage medical graduates to pursue primary care careers.

Recommendation #3: An increase in funding to the Pennsylvania Primary Care Loan Repayment Program may help retain more primary care physicians

While the scope of this report focuses primarily on Pennsylvania medical schools and their production of primary care physicians, the need for increased financial support for primary care practitioners facing lofty medical school debt remains an important topic in the fight to increase the number of primary care physicians. Increasing financial support for the Primary Health Care Practitioners Program within the Department of Health (DOH) to enhance the appeal of the Primary Care Loan Repayment Program as a recruitment tool has been a recurring recommendation of the Commission over the years. In 2015, the Commission published an advisory committee report entitled *The Physician Shortage in Pennsylvania*, which highlighted the rising cost of attending medical school, along with the skyrocketing debt weighing down medical school graduates.[291]

The rising cost was once again echoed in the Commission's 2019 report entitled *Pennsylvania Health Care Workforce Needs: Staff Study*. Both studies analyzed the issue looking from the broad perspective of primary care physicians and practitioners in general. Both reports discussed improving state-sponsored financial assistance programs to aid graduating medical students to alleviate the weight of their student debt. This report will reiterate the importance of those programs and the need to improve them, especially for primary care physicians.[292]

[290] *Supra*, n. 276.
[291] JSGC, *The Physician Shortage in Pennsylvania*, (Apr. 2015).
[292] *Supra*, n. 260.

The federal government and many states have financed efforts to encourage primary care physicians to work in underserved areas through offering scholarships, loan repayment, direct financial incentives, and resident support programs that include a service requirement for the recipients.[293]

These programs share common goals and the requirement for service in exchange for financial support; however, they have some operational differences. Scholarship programs obligate participants early in their training and require their participants "to provide service, and hefty penalties are used to discourage participants from buying out their service obligations should their career interests change."[294] Loan programs also target medical students but differ in that they offer participants a choice of performing service or repaying program funds at standard interest rates.[295]

Loan repayment and direct financial incentive programs commit physicians much later, near the completion of their residency training. These types of programs typically do not exact penalties on physicians for failure to complete a period of service. With loan repayment programs, physicians receive assistance repaying traditional education loans. Alternatively, financial incentive programs provide unrestricted funds. Resident support programs respond to the growing financial pressures on residents with assistance in the form of scholarships, loan repayment, and direct financial incentives.[296]

In 1992, the Pennsylvania General Assembly, under Act 113, established the Primary Health Care Practitioner Program (PHCPP) and charged the DOH with developing and implementing a comprehensive program to support the supply and distribution of primary care practitioners within the Commonwealth.[297] Specifically, the Secretary of Health was instructed to "implement a comprehensive program designed to increase the number of primary care health practitioners in rural and urban shortage areas…"[298] According to Act 113, the PHCPP was also intended to provide a list of activities to help achieve this goal. Some of those activities included regularly reviewing and updating designated medically underserved areas, promoting the training of primary health care practitioners and service in medically underserved areas, promoting the ability of local communities to support primary health care practitioners, providing the General Assembly with an annual report on the activities of the DOH, and other endeavors.[299]

Within the DOH is a loan repayment program called the Pennsylvania Primary Care Loan Repayment Program (LRP). This program provides repayment options as a tool to recruit and retain primary care practitioners willing to practice in federally designated Health Professional Shortage Areas (HPSAs) within the Commonwealth.[300] The LRP made physicians, dentists, nurse practitioners and nurse midwives, and physician assistants all eligible for the programs benefits.

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[293] *Ibid*. at pp. 44-45.
[294] *Ibid.*
[295] *Ibid.* at p. 45.
[296] *Ibid*.
[297] Act of December 2, 1992 (P.L. 741, No. 113).
[298] *Supra*, n. 264 at pp. 40-41.
[299] *Ibid*.
[300] Pennsylvania Department of Health, "Pennsylvania Primary Care Loan Repayment Program (LRP)," https://www.health.pa.gov/topics/Health-Planning/Pages/Loan-Repayment.aspx, last accessed on September 28, 2021.

The program required these eligible professionals to practice as a primary care practitioner in one of the Commonwealth's medically underserved areas for no less than three years. The repayment schedule provided that participating physicians would receive 15 percent of their award repayment in year one, 20 percent in year two, and 30 percent in year four, for up to a total of up to $64,000.[301]

The popularity of the LRP declined over time, possible due to the creation of the Federal Public Student Loan Finance program which attracted many physicians intending to work either at nonprofit hospitals or in the public sector. In 2014-15 DOH created a new loan repayment program using its authority under Act 113, which authorized the DOH to award grants "to promote the training, recruitment and retention of primary health care practitioners in designated medically underserved areas and to promote innovative methods for delivery of primary medical services in rural designated medically underserved areas."[302] The new and improved program expanded the list of eligible professionals to include psychiatrists and other behavioral health practitioners. The popularity of the program returned after a reduction of NHSC funding causing some physicians to look for alternatives.[303] During this time the LRP program offered up to $100,000 for full-time practitioners instead of $64,000 under the prior program.[304]

As of November 2021, DOH updated its fact sheet decreasing the loan repayment amount by 20 percent. Currently under the loan repayment program full-time physicians practicing in an HPSA or who serve a minimum of 30 percent low-income patients may receive up to $80,000.[305] In addition, primary care practitioners practicing in half-time positions may receive up to $40,000.

To qualify to receive loan repayment under the current program, primary care practitioners must meet eligibility requirements provided in the Repayment Forgiveness Application and must be currently employed at an LRP-approved practice site either (1) located in a federally designated HPSA or (2) serving a minimum of 30 percent low-income patients as previously mentioned.

Additional eligibility requirements include the following:

- Applicant must be a U.S. citizen (either U.S. born or naturalized) or a U.S. National;
- Applicant must be a graduate of an accredited educational program in the U.S.; and
- Applicant must possess a valid Pennsylvania license in one of the eligible disciplines under the LRP.[306]

[301] *Ibid.*
[302] *Ibid.*
[303] JSGC, "Pennsylvania Healthcare Workforce Needs Staff Study," (Apr. 2019), p. 48.
[304] *Ibid.*
[305] Pennsylvania Department of Health, "Primary Care Loan Repayment Program Fact Sheet," (Nov. 2021), https://www.health.pa.gov/topics/Documents/Health%20Planning/LRP%20Fact%20Sheet.pdf, last accessed on November 24, 2021.
[306] *Ibid.*

Factors that make an individual ineligible for participation in the program include the following:

- Having any outstanding service obligation for health professional or other service to the federal government (for example, NHSC Loan Repayment Program obligation, NHSC Scholarship Program obligation or a NURSE Corps Loan Repayment Program obligation) or other entity (for example, a recruitment bonus that obligates you to remain employed at a certain site); or

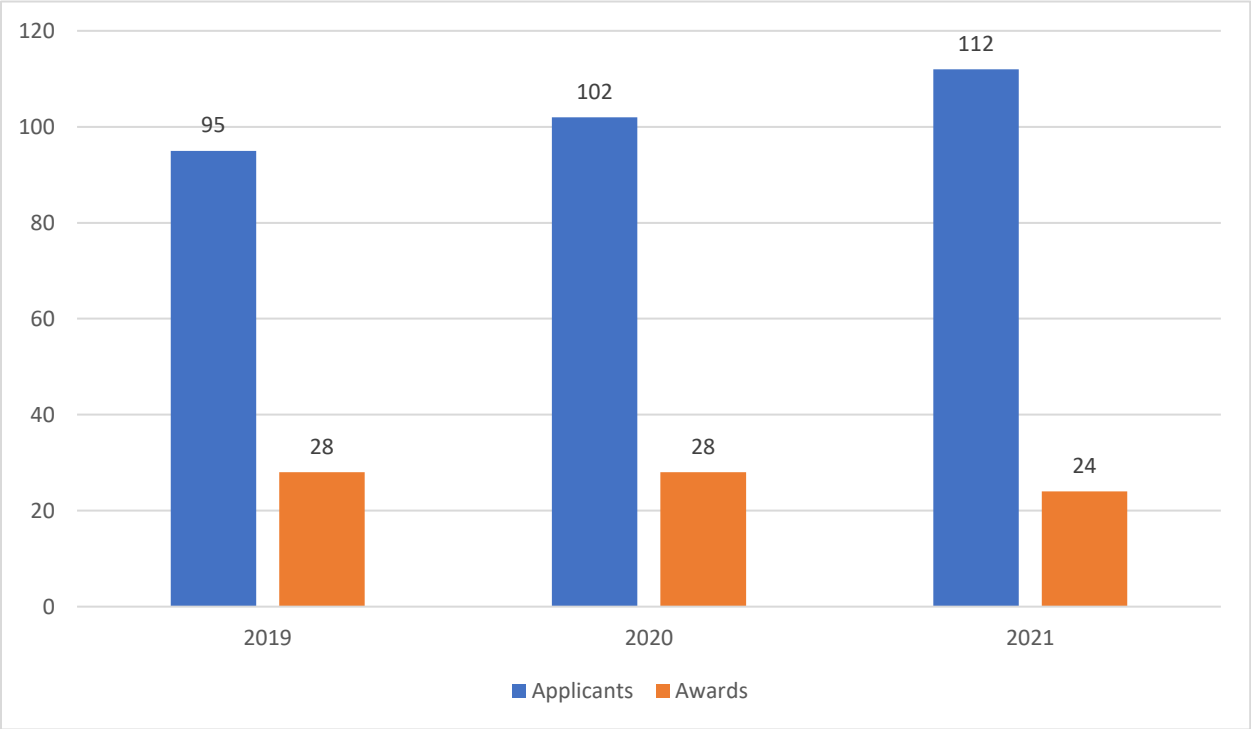
- History of having breached a prior health professional service obligation to the Federal, state, or local government or other entity.[307]

It is worth noting that not all eligible health care practitioners are awarded LRP grants. This is in large part because the award grants themselves are based on the availability of funding. The Commission's 2019 report *Pennsylvania Health Care Workforce Needs: Staff Study* reported that a reduction of HRSA funding for the federal NHSC loan repayment program caused an increase in interest in the LRP among Pennsylvania health professionals, which in turn resulted in a highly competitive application process using a Request for Application (RFA). Consequently, many applicants are not awarded loan repayment. In 2021, only 24 out of 122 applicants or 21 percent of applicants receive awards. It is worth noting that in 2021, 28 applicants were rejected out of the total amount of applicants because they did not meet mandatory requirements. See Graph below.

[307] *Supra*, n. 266 at p. 47.

Graph 18

Pennsylvania Primary Care Loan Repayment Program
Award Rates
2019-2021



Source: Compiled by Commission staff from Jacquelyn Condell, Loan Repayment Program Administrator, Department of Health, Primary Care Office; Ed Naugle, Ph.D, Director, Division of Health Professions Development, Department of Health, Bureau of Health Planning by electronic correspondence on October 28, 2021.

As mentioned in the Commission's 2015 report, physicians were often leaving Pennsylvania for one of its neighboring states because those states were offering more appealing loan repayment programs. For instance, at the time of the report was published, the state of Ohio was offering its physicians who commit to four years of service in an HPSA or HRSA, accept Medicare and Medicaid, and see patients regardless of ability to pay, the opportunity to receive up to $120,000 of loan forgiveness. The report also pointed out that New Jersey at the time was also offering up to $120,000 over a four-year period of service in state designated underserved areas or federally designated HPSAs for eligible primary care practitioners. These facts were pointed out once again in the Commission's 2019 report as was the Commission's recommendation that the General Assembly consider increasing the loan repayment amount beyond $100,000 and the length of service commitment from two to four years for physicians, while extending their length of service commitment from two to four years.[308]

[308] *Supra*, n. 266.

Despite these recommendations being proposed in the Commission's 2015 report, and reproposed in its 2019 report, there has been a decrease in the loan repayment amount and no change to the length of service commitments. Since studies have shown that loan repayment programs like the LRP do in fact attract graduating physicians into entering primary care in underserved areas, this report will again restate this recommendation from its prior two reports mentioned above.

Recommendation #4: Expansion and increased investment in Pennsylvania programs connecting physicians to available primary care positions throughout the Commonwealth can help increase the Commonwealth's primary care physician workforce

With an obvious shortage of primary care physicians nationwide and in Pennsylvania, statewide nonprofit and state-partnership programs working to mitigate the shortage in primary care have become very important.

One such program is the Pennsylvania Primary Care Career Center (PCCC). As mentioned previously in this report, the PCCC is a nonprofit agency that matches clinicians and administrators with jobs at Community Health Centers, rural health clinics, and other primary care facilities. The PCCC is a collaboration between two entities: the Pennsylvania Department of Health and the Pennsylvania Association of Community Health Centers.[309]

The PCCC works to help link candidates to the most compatible opportunities and communities in which to live and work, while building relationships with agencies and organizations like the Pennsylvania Department of Health and the Pennsylvania Office of Rural Health. The PCCC has recruited physicians and other providers to underserved areas. Since 2015 the PCCC has recruited 38 physicians out of the 135 total staff placed in underserved areas. When contacted by Commission staff, the PCCC recommended that an increase in their funding would help them to increase the number of rural placements. The PCCC also advocated for expanding the Pennsylvania Primary Care LRP, noting that rural areas of the state had need for dentists, behavioral health professionals, and nurse practitioners as well. Other ideas recommended by the organization included funding rural rotations for medical schools for students with financial difficulty of travel, lodging and food expenses.[310]

Commission staff did not examine the issue of expanding the scope of practice of physicians assistants and nurse practitioner's because it was outside the scope of primary care medical education. According to the PACHC representatives:

> (the organization) has been and remained neutral on expanded scope of practice for nurse practitioners (NPs) and physician assistants (PAs). However, we do support enabling NPs and PAs to practice to the fullest extent allowed under their license.

[309] Pennsylvania Primary Care Career Center, https://www.paprimarycarecareers.org/, last accessed on November 6, 2021.
[310] Email From Melinger-Blouch, Judd. Pennsylvania Association of Community Health Centers. JSGC Primary Care Physician Study, September 13, 2021.

> This can be enabled by reducing the restrictions for physician supervision, allowing NPs and PAs to work more independently. If the General Assembly were to pass legislation allowing NPs to practice independently, Community Health Centers would likely use them to fullest extent possible.[311]

Increasing the independence of NPs and PAs could be topic for further research.

Officials from the PACHC noted several more targeted solutions to the primary care physician shortage that could be explored by the General Assembly such as offering no-interest loans to students through rural health clinics and rural health centers to fund loan repayment options for primary care physicians. These loans could be repaid over a given time or even forgiven if the rural health facility retains the physician. Another idea raised by the PACHC was rewarding medical schools that could prove their medical school graduates had stayed in rural areas of the commonwealth after graduation for a period of five years to incentivize higher primary care output. Finally, the association suggested the creation of a fund for rural rotations of medical school students as "this poses a financial difficulty for students who would like to do a rotation in a rural area due to travel, lodging and food expenses" [312]

Recommendation #5: Pennsylvania's primary care workforce could benefit from greater investment and expansion of existing primary care pipeline programs, with a more focused emphasis on increasing the number of primary care physicians practicing in the Commonwealth's workforce

Pipelines are programs at all levels of education designed to target, enroll, and provide support to typically underrepresented students including minority, low income, and women, with the goal of increasing their representation in certain career fields.[313] Pipeline programs are becoming increasingly common in medical professions to address physician shortages and underrepresentation across the country.

Some pipeline programs target students early in their educational careers and support their progress towards becoming physicians. Pipeline programs come in many forms: some provide outreach to students in elementary schools, some are high schools dedicated to science education, and others focus on baccalaureate students preparing for medical school admissions. These programs can also provide "income through financial aid and connect students to mentors and others who can help with academics."[314]

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[311] *Ibid.*
[312] *Ibid.*
[313] Janet R. Katz, PhD, RN; Celestina Barbosa-Lekier, PhD; and Sandra Benavides-Vaello, PhD, RN, "Measuring the Success of a Pipeline Program to Increase Nursing Workforce Diversity," *Journal of Professional Nursing*, (Jan-Feb. 2016); 32(1): 6-14, doi: 10.1016/j.profnurs.2015.05.003.
[314] *Ibid.*

Currently, the Pennsylvania Area Health Education Center (AHEC)[315] provides a pipeline program known as the Search Academy program. The Pennsylvania Department of Health (DOH) provides grant funding to this program.[316] The purpose of the program is to help students at the middle school, high school, and college level to identify and pursue career paths in healthcare with the principal goal of increasing, improving, and diversifying the healthcare workforce in Pennsylvania. The stated mission of the program is to help communities meet their primary health care needs by establishing a statewide infrastructure bridging community and academic resources to:

- Recruit and retain primary care providers in underserved communities through educational and training programs

- Develop an information and communication network to provide professional support for community-based primary care practitioners

- Increase the representation of minority and individuals from underserved communities and populations in primary care and allied health professions.

- Evaluate and assess the public health needs of communities within and among the regions and provide innovative, multi-disciplinary responses to those needs.[317]

The program is not specifically focused on increasing the number of primary care physicians in Pennsylvania. Rather, it operates to increase and diversify the primary care workforce in general.[318]

It is worth mentioning that the DOH also provides grant funding to the Pennsylvania Academy of Family Physicians to support nine slots in primary care residency for individuals who have graduated medical school and go through a residency program.

Given the Commonwealth's projected shortage in primary care physicians, more must be done at the state level to recruit and retain more qualified and diverse individuals into the practice of primary care. In its 2015 report, the Commission recognized that pipeline programs are "are associated with positive outcomes for racial/ethnic minority and disadvantaged students on several meaningful metrics, including academic performance and the likelihood of enrolling in a health professions school."[319] In addition to increasing the number of qualified medical school applicants, the report pointed out that pipeline programs can help address health care disparities

[315] Pennsylvania AHEC is administered by an office based in the Penn State College of Medicine's Department of Family and Community Medicine. The program coordinates statewide funding, program development, program evaluation, grant reporting, and networking. The program's stated mission is to "[i]mprove health and wellness by collaboratively developing and providing education programs to enhance community health and broaden the distribution of a diverse health workforce, particularly for rural and underserved Pennsylvanians."
[316] Ph.D, Director, Division of Health Professions Development, Department of Health, Bureau of Health Planning by electronic correspondence on November 5, 2021.
[317] PA AHEC Search Academy, "About Search Academy," https://www.paahecsearch.org/about, last accessed on November 5, 2021.
[318] *Supra*, n. 315.
[319] *Supra*, n. 291 at pp. 24-25.

based on geography, race, and socioeconomic status.[320] Universities also recognize and attribute much of their success to pipeline program strategies, noting that such strategies are more helpful than one time outreach and recruitment and other short-term programs.[321]

As such, the Commission's report recommended that Pennsylvania implement a pipeline program that offers "grants to encourage schools to establish medical profession tracks or programs, similar to existing arts programs and other "magnet school" programs."[322] The report further recommended that these tracks or programs be located at existing schools, or at separate facilities, with the intent that all grants would be provided to enhance the existing educational systems rather than establish new ones. Furthermore, it was recommended that grants be available to "schools or communities with demonstrated health care, academic, or financial needs, such as schools in rural or low-income areas, or with high minority populations."[323]

The Commission's report recommended that the programs focus on primary care, which includes family medicine, general internal medicine, pediatrics, geriatrics, obstetrics/gynecology, and psychiatry. The programs should encourage family involvement and should be monitored for effectiveness. While acknowledging that desired outcomes of increasing the physician supply and increasing physician diversity could take a significant time to achieve, the Commission's report advised that incremental outcome and process evaluations, such as participant test scores and course grades, as well as program completion rates, should be performed to ensure effectiveness.

This report intends to highlight and reiterate the Commission's 2015 recommendation on a state pipeline program with all the above-referenced elements. While the DOH currently provides support in the form of grant funding to the AHEC's Search Program, expanding this support to expand existing medical school pipelines and programs in secondary schools could help alleviate the primary care physician shortage. Some existing programs focus on primary care practitioners in general, however, there should be increased emphasis the need on recruiting individuals to pursue careers as primary care physicians. Such programs should be monitored for effectiveness. Pipeline programs, if properly funded and incrementally monitored may help increase physician supply and diversity.

[320] *Ibid.*
[321] *Supra*, n. 312.
[322] *Supra*, n. 291 at p. 25.
[323] *Ibid.*

APPENDICES

PRINTER'S NO. 2964

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE RESOLUTION

No. 625 Session of 2019

INTRODUCED BY SCHEMEL, DECEMBER 2, 2019

REFERRED TO COMMITTEE ON HEALTH, DECEMBER 2, 2019

A RESOLUTION

Directing the Joint State Government Commission to conduct a study on medical student choice in primary care and issue a report.

WHEREAS, A report on physician shortage in this Commonwealth was generated in response to House Resolution No.735 (2014); and

WHEREAS, The 2015 report on physician shortage recommended improving physician work force data collection and analysis; and

WHEREAS, The 2015 report on physician shortage recommended encouraging medical schools to implement programs aimed at increasing this Commonwealth's physician supply; and

WHEREAS, The 2015 report on physician shortage recommended establishing a State pipeline program to prepare students for medical careers; and

WHEREAS, The 2015 report suggested that pipeline programs can address health care disparities with students from rural areas more likely to practice in rural areas and minority students more likely to practice in underserved areas; and

WHEREAS, The 2015 report on physician shortage recommended increasing the number of residency positions in order to train

more physicians in this Commonwealth; and

WHEREAS, Data suggests that by 2030, this Commonwealth will require an additional 1,039 primary care physicians, which represents an increase of 11% more than the current workforce, to maintain the status quo; and

WHEREAS, There are currently seven allopathic and two osteopathic medical schools in this Commonwealth; and

WHEREAS, Uncertainty surrounds medical schools' reports of the percentage of their students entering primary care as nearly 100% of family medicine residents remain in primary care, only approximately 25% of internal medicine residents and 50% of pediatrics residents remain in primary care; and

WHEREAS, Thirty-two percent of physicians in this Commonwealth completed their undergraduate medical education (UME) in this Commonwealth and 57% of physicians completed their UME and graduate medical education (GME) in this Commonwealth; and

WHEREAS, Only 12.6% of United States allopathic and osteopathic seniors enter Accreditation Commission for Graduate Medical Education (ACGME)-accredited family medicine programs and 11.4% of Pennsylvania allopathic and osteopathic seniors enter ACGME-accredited family medicine programs; and

WHEREAS, The Pennsylvania Academy of Family Physicians is committed to increasing the percentage of allopathic and osteopathic medical school graduates choosing family medicine to 25% by 2030; therefore be it

RESOLVED, That the House of Representatives direct the Joint State Government Commission to conduct a study on efforts within medical schools to promote student choice in primary care, to include primary care experience in the curriculum and

accurately monitor and report graduate retention in primary care and issue a report to the General Assembly; and be it further

RESOLVED, That the Joint State Government Commission seek input and information as appropriate from the following:

(1) The Department of State.

(2) The Department of Health.

(3) Pennsylvania medical school deans or a designated representative.

(4) The Pennsylvania Academy of Family Physicians.

(5) The Pennsylvania Chapter of the American Academy of Pediatrics.

(6) The Pennsylvania Chapter of the American College of Physicians.

(7) The Pennsylvania Association of Community Health Centers.

(8) Other persons that are knowledgeable of the issues surrounding medical student choice in primary care;

and be it further

RESOLVED, That the report of the Joint State Government Commission contain findings and recommendations and include any proposed legislation or funding regarding the following:

(1) Percentage of students entering and remaining in primary care specialties by institution.

(2) Demographics of students entering and remaining in primary care specialties by institution such as birth county, race, ethnicity, gender and age.

(3) Percentage of students entering primary care who remain in State for GME and for practice.

(4) Institutional mechanisms to track percentage of students remaining in primary care.

(5) Efforts to promote primary care within each institution.

(6) Special programming or educational tracks to promote primary care by institution.

(7) Special programming or opportunities for students underrepresented in medicine.

(8) Percentage of students participating in National Health Service Corps.

(9) Average medical school debt of students entering into primary care specialties;

and be it further

RESOLVED, That the Joint State Government Commission issue a report of its findings and recommendations to the General Assembly within one year of the adoption of this resolution.

12 Survey Questions
Sent to the Medical Schools

*For purpose of this study, the term **"primary care"** shall include:* **family medicine, general practice, geriatrics, internal medicine, obstetrics/gynecology, pediatrics, and psychiatry.** Further, as defined by the Association of American Medical Colleges, the phrase **"underrepresented in medicine"** shall mean those **"racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population."**

The Questions

1. What percentage of your medical students enter into and remain in a primary care specializations?

2. What is the demographic composition for those medical students within your institution entering into and remaining in a primary care specialization? Demographic breakdown shall include the following categories:

    a. Race
    b. Ethnicity
    c. Nationality
    d. Gender
    e. Age
    f. Out of state

3. What percentage of medical students who entered into primary care specializations are remaining in Pennsylvania for GME and for practice?

4. What mechanisms are used by your institution to keep track of the percentage of students remaining in primary care?

5. What efforts and initiatives does your institution engage in to attract students to primary care practice?

6. Does your institution have any special programming or educational tracks for students studying primary care? If so, explain more about them.

7. What efforts have been taken by your university to encourage or attract students underrepresented in medicine to enter into primary care?

8. What percentage of medical students in your school are currently participating in the National Health Service Corps?

9. What percentage of medical students in your school graduate with medical school debt?

10. What is the average (to include mean and median numbers) medical school debt of students who graduate with primary care specialties?

11. Does your institution provide any form of tuition assistance or scholarship to your medical students?

12. If so, what percentage of your medical students receive said university-provided tuition assistance or scholarship?

SUPPLEMENT MEDICAL SCHOOL RESIDENCY MATCH DATA

Drexel University, College of Medicine							
Year	Residencies	IPPC	IPPC PA	% PA	PC Match	PC Match PA	% PA
2012	221	17	6	35%	60	16	27%
2013	309	24	6	25	102	24	24
2014	270	19	9	47	85	26	31
2015	286	30	10	33	108	31	29
2016	297	22	7	32	110	25	23
2017	285	24	11	46	98	29	30
2018	277	30	6	20	96	20	21
2019	272	19	5	26	106	30	28
2020	287	26	7	27	101	28	28
2021	268	28	9	32	106	27	25
Total	2772	239	76	32%	972	256	26%

Source: "Residency Match," Drexel University College of Medicine, https://drexel.edu/medicine/academics/md-program/residency-match/, last accessed September 2021.

Geisinger Commonwealth School of Medicine (GCSOM)							
Year	Residencies	IPPC	IPPC PA	% PA	PC Match	PC Match PA	% PA
2013	63	3	1	33%	20	7	35%
2014	71	7	1	14	26	5	19
2015	70	3	2	67	24	6	25
2016	73	7	5	71	30	12	40
2017	88	8	6	75	34	15	44
2018	88	12	8	67	43	19	44
2019	96	8	3	38	36	10	28
2020	98	9	3	33	33	10	30
2021	96	7	4	57	41	15	37
Total	743	64	33	52%	287	99	34%

Source: Email from Steven Scheinman HR625 follow up September 23, 2021.

Lake Erie College of Osteopathic Medicine (LECOM)							
Year	Residencies	IPPC	IPPC PA	% PA	PC Match	PC Match PA	% PA
2012	266	54	19	35%	133	40	30%
2013	397	70	20	29%	168	52	31%
2014	391	90	34	38%	202	46	23%
2015	370	65	17	26%	174	33	19%
2016	383	72	20	28%	171	39	23%
2017	393	72	25	35%	188	41	22%
2018	417	67	26	39%	169	46	27%
2019	413	69	21	30%	191	54	28%
2020	398	90	33	37%	213	62	29%
2021	373	79	32	41%	198	59	30%
Total	3801	728	247	34%	1807	472	26%

Source: Email from David Fried LECOM, Match Data, August 17, 2021.

Lewis Katz School of Medicine at Temple University							
Year	Residencies	IPPC	IPPC PA	% PA	PC Match	PC Match PA	% PA
2016	224	15	7	47%	83	37	45%
2019	190	22	13	59	76	36	47
Total	414	37	20	54%	159	73	46%

Source: "Residency Match Day 2016" Lewis Katz School of Medicine, https://medicine.temple.edu/news/residency-match-day-2016, last accessed September 2021. "Career Outcomes," Lewis Katz School of Medicine, https://medicine.temple.edu/education/md-program/why-temple/career-outcomes, last accessed April 30, 2020.

Pennsylvania State University, College of Medicine							
Year	Residencies	IPPCM	IPPCM PA	% PA	PC Match	PC Match PA	% PA
2011	151	12	7	58%	55	18	33%
2012	130	19	6	32	53	15	28
2013	138	18	10	56	62	21	34
2014	130	17	6	35	50	14	28
2015	129	14	5	36	49	16	33
2016	143	18	8	44	51	19	37
2017	130	10	4	40	42	17	40
2018	142	16	6	38	57	14	25
2019	136	19	9	47	42	17	40
2020	134	14	8	57	42	21	50
2021	152	9	3	33	45	13	29
Total	1,515	166	72	43%	548	185	34%

Source: “MD Student Residency Match Lists,” Penn State College of Medicine. https://med.psu.edu/md-students/match-list, last accessed September 20, 2021.

Perelman School of Medicine at University of Pennsylvania (PSOM)							
Year	Residencies	IPPC	IPPC PA	% PA	PC Match	PC Match PA	% PA
2014	164	10	4	40%	45	16	36%
2015	160	11	2	18	67	18	27%
2016	131	14	3	21	53	16	30%
2017	162	19	5	26	66	23	35%
2018	146	12	7	58	46	16	35%
2019	147	13	5	38	52	20	38%
2021	145	13	3	23	55	22	40%
Total	1,055	92	29	32%	384	131	34%

Source: "Residency Match," *PCOM.edu*, https://www.pcom.edu/student-life/student-affairs/match-lists/, last accessed September 2021.

Philadelphia College of Osteopathic Medicine (PCOM)							
Year	Residencies	IPPC	IPPC PA	% PA	PC Match	PC Match PA	% PA
2013	273	57	38	67%	131	92	70%
2014	273	61	36	59%	144	85	59%
2015	280	50	31	62%	131	83	63%
2016	253	53	30	57%	147	82	56%
2017	256	55	36	65%	133	79	59%
2018	253	52	34	65%	138	80	58%
2019	244	40	26	65%	120	71	59%
2020	250	55	29	53%	137	71	52%
2021	267	50	27	54%	144	70	49%
Total	2349	473	287	61%	1225	713	58%

Source: Email from Ken Veit, *PCOM Match Numbers You Requested*, August 21, 2021

Sidney Kimmel Medical College at Thomas Jefferson University (TJU)							
Year	Residencies	IPPC	IPPC PA	% PA	PC Match	PC Match PA	% PA
2014	238	106	39	37%	35	10	29%
2015	276	117	39	33%	32	11	34%
2016	246	95	34	36%	22	11	50%
2017	247	104	29	28%	29	12	41%
2018	246	103	38	37%	20	4	20%
2019	269	101	36	36%	31	12	39%
2020	267	106	37	35%	30	15	50%
2021	260	91	29	32%	23	9	39%
Total	2049	823	281	34%	222	84	38%

Source: Residency Matches, *Jefferson.edu*, https://www.jefferson.edu/academics/colleges-schools-institutes/skmc/programs/md-phd/residencies.html, last accessed September 2021.

Sidney Kimmel Medical College (SKMC) Out of State: Classes 2017-2020 Still in GME		
Home State at Matriculation	Number Having Primary Care Residency	%
PA	127	30.31%
NJ	57	13.60%
NY	51	12.17%
DE	35	8.35%
CA	31	7.40%
FL	18	4.30%
MA	17	4.06%
MD	12	2.86%
VA	6	1.43%
IL	6	1.43%
RI	5	1.19%
WA	5	1.19%
CT	5	1.19%
ON	4	0.95%
NA	4	0.95%
MI	4	0.95%
TN	3	0.72%
MN	3	0.72%
NH	2	0.48%
NC	2	0.48%
CO	2	0.48%
GA	2	0.48%
OH	2	0.48%
MT	1	0.24%
NE	1	0.24%
SC	1	0.24%
HI	1	0.24%
ME	1	0.24%
NA	1	0.24%
AZ	1	0.24%
BC	1	0.24%
SD	1	0.24%
WI	1	0.24%
TX	1	0.24%
IN	1	0.24%
FR	1	0.24%
LA	1	0.24%
PQ	1	0.24%
MO	1	0.24%
Grand Total	**419**	**100.00%**

Primary Care as defined by SKMC includes the following specialties: Family Medicine, Family Medicine/Preventive Medicine, Internal Medicine, internal Medicine / Pediatrics, internal medicine/psychiatry. Medicine – Primary, Medicine-pediatrics. Med-Primary Care, OB/GYN, Obstetrics and Gynecology, Obstetrics/Gynecology/ Geriatrics, Psychiatry.

NA. Not Applicable

Sidney Kimmel Medical College (SKMC) Out of State: Classes 2017-2020 Still in GME Primary Care		
Residency State Given Home State at Matriculation	Number Having Primary Care Residency (location of residency by state)	%
PA	**127**	**30.31%**
CA	2	1.57%
CT	1	0.79%
DC	2	1.57%
DE	5	3.94%
FL	1	0.79%
GA	2	1.57%
IL	2	1.57%
LA	1	0.79%
MA	6	4.72%
MD	4	3.15%
ME	1	0.79%
MN	1	0.79%
NC	2	1.57%
NJ	9	7.09%
NV	1	0.79%
NY	10	7.87%
OH	7	5.51%
PA	60	47.24%
RI	2	1.57%
TN	2	1.57%
TX	2	1.57%
VA	1	0.79%
WA	2	1.57%
WI	1	0.79%
NJ	**57**	**13.60%**
CA	2	3.51%
CO	1	1.75%
CT	2	3.51%
DE	1	1.75%
GA	1	1.75%
MA	3	5.26%
MD	4	7.02%
MI	2	3.51%
NC	2	3.51%
NJ	6	10.53%
NY	6	10.53%
OH	3	5.26%
PA	22	38.60%
TX	1	1.75%
VA	1	1.75%
NY	**51**	**12.17%**

Sidney Kimmel Medical College (SKMC) Out of State: Classes 2017-2020 Still in GME Primary Care		
Residency State Given Home State at Matriculation	Number Having Primary Care Residency (location of residency by state)	**%**
AZ	1	1.96%
CA	1	1.96%
CT	1	1.96%
DC	1	1.96%
DE	1	1.96%
IL	2	3.92%
MA	3	5.88%
MD	2	3.92%
NJ	1	1.96%
NY	23	45.10%
OH	1	1.96%
PA	14	27.45%
DE	**35**	**8.35%**
CA	1	2.86%
CT	2	5.71%
DC	2	5.71%
DE	4	11.43%
FL	1	2.86%
IL	1	2.86%
MD	4	11.43%
NJ	1	2.86%
PA	16	45.71%
TX	1	2.86%
WA	1	2.86%
WV	1	2.86%
CA	**31**	**7.40%**
FL	**18**	**4.30%**
MA	**17**	**4.06%**
MD	**12**	**2.86%**
VA	**6**	**1.43%**
IL	**6**	**1.43%**
RI	**5**	**1.19%**
WA	**5**	**1.19%**
CT	**5**	**1.19%**
ON	**4**	**0.95%**
NA	**4**	**0.95%**
MI	**4**	**0.95%**
TN	**3**	**0.72%**
MN	**3**	**0.72%**
NH	**2**	**0.48%**
NC	**2**	**0.48%**
CO	**2**	**0.48%**

Sidney Kimmel Medical College (SKMC) Out of State: Classes 2017-2020 Still in GME Primary Care		
Residency State Given Home State at Matriculation	Number Having Primary Care Residency (location of residency by state)	%
GA	**2**	**0.48%**
OH	**2**	**0.48%**
MT	**1**	**0.24%**
NE	**1**	**0.24%**
SC	**1**	**0.24%**
HI	**1**	**0.24%**
ME	**1**	**0.24%**
NA	**1**	**0.24%**
AZ	**1**	**0.24%**
BC	**1**	**0.24%**
SD	**1**	**0.24%**
WI	**1**	**0.24%**
TX	**1**	**0.24%**
IN	**1**	**0.24%**
FR	**1**	**0.24%**
LA	**1**	**0.24%**
PQ	**1**	**0.24%**
MO	**1**	**0.24%**
Grand Total	**419**	**100.00%**

Primary Care as defined by SKMC includes the following specialties: Family Medicine, Family Medicine/Preventive Medicine, Internal Medicine, internal Medicine/Pediatrics, internal medicine/psychiatry. Medicine – Primary, Medicine-pediatrics. Med-Primary Care, OB/GYN, Obstetrics and Gynecology, Obstetrics/Gynecology/ Geriatrics, Psychiatry.
NA. Not applicable

Sidney Kimmel Medical College (SKMC) Percent of those entering primary care that stayed in PA for GME & Practice: Classes 2012-2018		
Practice State Given Residency State	Number Who Entered Primary Care for Both GME & Practice	%
PA	**168**	**39.44%**
AR	0	0.00%
CA	5	2.98%
CO	2	1.19%
CT	2	1.19%
DC	1	0.60%
DE	18	10.71%
FL	0	0.00%
GA	0	0.00%
IA	0	0.00%
IL	0	0.00%
IN	1	0.60%
KS	0	0.00%
KY	0	0.00%
MA	2	1.19%
MD	3	1.79%
MI	1	0.60%
MN	0	0.00%
MO	0	0.00%
NC	1	0.60%
NE	0	0.00%
NJ	6	3.57%
NM	0	0.00%
NY	2	1.19%
OH	0	0.00%
OR	0	0.00%
PA	118	70.24%
SC	1	0.60%
TN	0	0.00%
TX	2	1.19%
VA	0	0.00%
VT	0	0.00%
WA	1	0.60%
WI	2	1.19%
WV	0	0.00%
NY	**47**	**11.03%**
CA	**45**	**10.56%**
MD	**19**	**4.46%**
MA	**17**	**3.99%**
DC	**15**	**3.52%**
NJ	**14**	**3.29%**
IL	**14**	**3.29%**

Sidney Kimmel Medical College (SKMC) Percent of those entering primary care that stayed in PA for GME & Practice: Classes 2012-2018		
Practice State Given Residency State	Number Who Entered Primary Care for Both GME & Practice	%
DE	**12**	**2.82%**
OH	**10**	**2.35%**
VA	**10**	**2.35%**
CO	**7**	**1.64%**
FL	**6**	**1.41%**
NC	**5**	**1.17%**
WA	**5**	**1.17%**
AZ	**5**	**1.17%**
RI	**4**	**0.94%**
MI	**3**	**0.70%**
TX	**3**	**0.70%**
NH	**3**	**0.70%**
CT	**3**	**0.70%**
WI	**2**	**0.47%**
LA	**2**	**0.47%**
OR	**2**	**0.47%**
TN	**1**	**0.23%**
GA	**1**	**0.23%**
CN	**1**	**0.23%**
NA	**1**	**0.23%**
MN	**1**	**0.23%**
IN	**0**	**0.00%**
NM	**0**	**0.00%**
ME	**0**	**0.00%**
ON	**0**	**0.00%**
WV	**0**	**0.00%**
IA	**0**	**0.00%**
UT	**0**	**0.00%**
MS	**0**	**0.00%**
VT	**0**	**0.00%**
HI	**0**	**0.00%**
KY	**0**	**0.00%**
SC	**0**	**0.00%**
ND	**0**	**0.00%**
MO	**0**	**0.00%**
Grand Total	**426**	**100.00%**

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NA. Not applicable

University of Pittsburgh, School of Medicine							
Year	Residencies	IPPCM	IPPCM PA	% PA	PC Match	PC Match PA	% PA
2012	152	9	3	33%	55	19	35%
2013	142	12	1	8%	49	13	27%
2014	148	11	3	27%	51	11	22%
2015	149	18	5	28%	68	17	25%
2016	133	9	2	22%	54	22	41%
2017	156	14	1	7%	61	12	20%
2018	139	10	3	30%	52	17	33%
2019	138	7	3	43%	49	12	24%
2020	145	11	3	27%	54	17	31%
2021	129	10	1	10%	50	16	32%
Total	1,431	111	25	23%	543	156	29%

Source: Residency Match. University of Pittsburgh, Office of Admissions & Financial Aid, https://www.medadmissions.pitt.edu/admissions/who-we-are/residency-match, last accessed September 2021.