

Where Are They Now? Alumni Outcomes From a Medical School Primary Care Pathway Program

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ABSTRACT

Background and Objectives: Many medical schools have implemented primary care tracks to increase the number of medical students pursuing primary care. The Primary Care Program (PCP) at the Keck School of Medicine of University of Southern California is a 4-year primary care pathway that trains medical students to work in urban, underserved communities and has shown high student match rates into primary care residencies. This study evaluates the PCP graduates in residency and after residency, and assesses their career outcomes, their career characteristics, and the impact their PCP experience had on their careers.

Methods: All PCP alumni who graduated between 2015 and 2022 were invited to complete a 21-item Qualtrics (Qualtrics, LLC) survey. Descriptive data analysis was conducted through Qualtrics, and open-ended data were coded for themes.

Results: Seventy percent of PCP alumni (86/122) responded to the survey, with 65% (56/86) in residency/fellowship and 35% (30/86) in practice. Among those who matched into primary care residencies (61/86, 71%), the percentage that practiced or intended to practice general primary care was 70% (43/61). Respondents in practice (30) described their practice characteristics, including locations and payor mix consistent with majority underserved communities. Open-ended responses captured the impact that the PCP had on alumni's careers, with themes including mentorship, friendship/community, educational/service experiences, future career, exposure to types/kinds of practice, and social determinants of health exposure.

Conclusions: PCP alumni credit this program with impacting their retention in primary care and their career trajectories. This program can serve as a model for other institutions to help increase the number of medical students who pursue primary care careers.

INTRODUCTION

Globally, there is a primary care physician shortage, worsened by the COVID-19 pandemic, an aging population, and the number of specialists outpacing generalists.^{1–5} In the United States, 30% of the population reported difficulty accessing primary care physicians.⁶ By some estimates, the United States will lack up to 50,000 primary care physicians by 2030, a shortage equivalent to approximately twice the size of today's primary care workforce.^{7,8} An inadequate primary care workforce creates a public health crisis wherein patients lack access to basic preventative and chronic disease management services.

To address the US primary care physician shortage, some medical schools have developed training aimed at increasing the percentage of graduates who practice in primary care, particularly in rural and/or underserved areas.⁹ These pro-

grams include longitudinal medical school primary care pathways, clerkship experiences, and medical schools with 3-year primary care programs.^{9,10} These primary care longitudinal pathways vary in format, but their overall goal is to recruit and retain students interested in primary care by providing them with positive primary care experiences, mentors, and role models.

Much of the literature on primary care longitudinal pathways in US medical schools focuses on medical student residency match outcomes. Many programs show positive results in increasing the number of students matching into primary care residencies.¹¹ However, looking at students' postresidency careers is also important because medical school match rates overestimate the number of primary care physicians in the workforce.¹² The published studies that do evaluate long-term outcomes of medical school primary care programs

largely focus on rural programs, showing positive outcomes. Specifically, graduates from rural primary care medical school training tracks are more likely to practice primary care in rural areas than those trained outside those programs.^{12–15} The number of recent, long-term studies on urban primary care longitudinal program practice outcomes is limited.^{16,17}

The Primary Care Program (PCP) at the Keck School of Medicine (KSOM) of University of Southern California is a primary care pathway for medical students spanning the 4 years of medical school with a focus on training students to work in urban underserved communities. Previous research has shown that the PCP has a high medical student match rate into primary care residencies and has increased the percentage of KSOM students matching into primary care fields.¹⁸ The purpose of this study is to build on the prior study and evaluate the PCP graduates who are both in residency/fellowship and in practice, and assess their (a) demographics and match data, (b) career characteristics, and (c) how the PCP shaped their career trajectories.

Program Background

The PCP, developed in 2011, is a primary care pathway beginning in the first year of medical school at KSOM, a private, urban, research-focused institution.¹⁸ The PCP was initiated through a Health Resources and Services Administration pipeline grant with the goal of increasing the number of KSOM medical students working in urban, underserved areas and entering primary care careers (family medicine, geriatrics, internal medicine, medicine–pediatrics [med-peds], and pediatrics) by providing them with multiple community and primary care experiences and faculty mentoring throughout medical school.¹⁹ The program budget is now supported by KSOM, furthering the program’s success and growth.

Students who are accepted to KSOM and have an interest in primary care apply to the PCP. They are selected annually prior to matriculation after completing a written application and interviewing with the PCP faculty and staff. Students are chosen based on their primary care interest and commitment to primary care values. Since 2011, the number of students accepted into the program annually has increased from 12 to 32 students out of a class of 186 (12 students annually, 2011–2014; 18 students annually, 2015 and 2017; 24 students annually, 2016 and 2018–2020; 32 students annually, 2021–2023) with an average acceptance rate of 84% (276/330).

The curriculum is front-loaded in the first 2 years (pre-clerkship) with a large proportion of didactic and experiential learning. The clerkship does not have a dedicated PCP curriculum; however, in 2024, a postclerkship advanced primary care curriculum was added (not evaluated in this study). The PCP is a KSOM certificate program with additional recognition at graduation. Students are not bound to choose primary care fields when they graduate; however, of the PCP’s first eight graduating classes, 70% have chosen a primary care residency in family medicine, internal medicine, med-peds, or pediatrics.¹⁸

The PCP has five primary care educational, skill-building modules in the first and second years (Appendix A):¹⁸

1. **Clinical care.** Students participate monthly in required longitudinal primary care community clinic experiences with primary care physician role models during their first- and second-year doctoring course.
2. **Service learning.** Students participate in required community-based nutrition²⁰ and exercise teaching,²¹ and an interprofessional geriatrics experience.²²
3. **Educational trainings.** Students participate in required primary care skill-based educational noontime workshops.
4. **Leadership development.** Students participate in optional student interest groups and conference development.
5. **Research.** All KSOM students participate in a required research project, and PCP students are strongly encouraged to choose a primary care research project.²³

Another PCP focus includes community building among the students and with their primary care physician mentors.

METHODS

A total of 122 PCP KSOM alumni graduated in between 2015 and 2022. We emailed all 122 PCP alumni in October 2022 asking them to complete the survey, with reminders sent two times over 2 weeks. We sent a final text survey reminder in February 2023. A drawing for two \$20 Starbucks gift cards was offered in November 2022 and February 2023 to incentivize participation. Three PCP students who did not graduate were excluded. Among the 122 PCP alumni, 55 were in practice and 67 were in residency or fellowship at the time of this survey.

The 21-item survey was distributed via Qualtrics (Qualtrics LLC) and included 19 close-ended and two open-ended questions (Appendix B). We analyzed and compiled the data into three main categories: (a) general demographic and match data, (b) current practice characteristics, and (c) the PCP’s impact on respondents’ practices. Data presented in categories (a) and (c) comprise the total survey respondents (86), including those in practice and in residency/fellowship (categorized as “intend to practice”). To obtain a more representative picture of practice characteristics, data presented in category (b) were comprised only of those in practice (30).

Descriptive data analysis was conducted via Qualtrics using descriptive statistics and χ^2 analysis at $P < .05$. Open-ended qualitative data analysis was conducted using an inductive approach,²⁴ deriving themes through the text, and was exploratory. No question was mandatory, and some quantitative questions allowed respondents to select all that applied. Our study defined primary care specialties as family medicine, internal medicine, med-peds, and pediatrics,²⁵ and was deemed exempt by the Institutional Review Board (#UP-20-01459).

RESULTS

Demographics and Match Data

Of the 122 PCP KSOM alumni, 86 (70% response rate) who graduated in between 2015 and 2022 completed the survey (Table 1).

Among the 86 respondents, 11 (13%) said the PCP was a significant factor in deciding to attend KSOM, 36 (42%) indicated that the program was somewhat of a factor, and 39 (45%) said the program was not a factor.

Respondents were asked what residency specialty they matched into and what specialty they were practicing or intended to practice (Table 2). Among the 86 respondents, 61 (71%) matched into primary care residencies. Among those 61 who matched into primary care residencies, the percentage that stayed practicing, or intended to stay practicing general primary care was 70% (43).

A total of 33 among 61 PCP graduates who matched into a primary care specialty matched into family medicine. Thirty-one of those 33 (94%) were practicing or intended to practice general family medicine, with two later switching into a psychiatry residency. Of note, 15 (48%) family medicine physicians completed or intended to complete fellowships to enhance their primary care practice, including addiction medicine, community health, human immunodeficiency viruses, palliative medicine, primary care psychiatry, and sports medicine. Among the 15 graduates that matched into internal medicine, 6 (40%) were practicing or intended to practice general internal medicine. Among the five graduates that matched into med-peds, three (60%) were practicing or intended to practice general med-peds. Among the seven graduates that matched into pediatrics, three (43%) were practicing or intended to practice general pediatrics, with one respondent not specifying. The proportion of alumni who matched into family medicine and were practicing or intending to practice family medicine (31/33, 94%) is statistically higher than the proportion of alumni who matched into internal medicine and were practicing or intending to practice internal medicine (6/15, 40%, $P=.00004$), pediatrics (3/7, 43%, $P=.0006$), and med-peds (3/5, 60%, $P=.02$).

Current Practice Characteristics

PCP alumni described their current practice characteristics (Table 3). This section focuses on respondents that were out of their residency/fellowship and in practice (30/86, 35%).

Practice Specialty

Respondents were working in family medicine (15, 50%), internal medicine (2, 7%), pediatrics (2, 7%), med-peds (1, 3%), or specialties (10, 33%).

Practice Setting

Most respondents practiced in urban areas (27, 90%), with smaller numbers practicing in suburban areas (7, 23%) and rural areas (2, 7%). Many practiced in California (23, 77%) and the rest in another state (7, 23%).

Professional Duties

Of the respondents, 24 (80%) were working clinically 75% to 100% of the time, and 6 (20%) were working clinically 50% to 74% of the time. Respondents reported engaging in the following professional activities: direct patient care (28, 93%), teaching (18, 62%), administration (9, 31%), leadership (9, 31%), advocacy (7, 24%), and research (5, 17%).

Clinical Setting

The most prominent settings respondents worked in were the clinic (14, 47%), hospital (11, 37%), urgent care (10, 33%), large health system (eg, Kaiser, Dignity, Sutter; 10, 33%), academic setting (9, 30%), federally qualified health center (6, 20%), emergency room (5, 17%), safety net (4, 13%), intensive care unit/critical care unit (3, 10%), private practice (1, 3%), and student health (1, 3%) setting.

Payor Mix

The types of insurance that respondents accepted included Medicare (25, 83%), Medi-Cal/Medicaid (23, 77%; Medi-Cal is the California implementation of Medicaid), primary preferred provider organization/exclusive provider organizations (22, 76%), primary health maintenance organization (20, 69%), and uninsured/safety net (18, 60%).

Clinical Services

The types of clinical services that respondents provided included outpatient (21, 72%), office-based procedures (eg, skin biopsy, toenail removal, joint injections, suturing; 21, 72%), gynecology procedures (eg, implantable contraceptives; 18, 62%), well-child care (18, 62%), acute care procedures (eg, casting, splinting; 15, 52%), medication assisted treatment for opioid use disorder (13, 45%), and inpatient hospital medicine (13, 45%).

Mentorship

Approximately two-thirds of respondents were mentoring medical students, residents, fellows, and/or other trainees (18, 60%), nearly one-third said they were not mentoring but were interested (9, 30%), and a small number said they were not mentoring and were not currently interested (3, 10%).

Impact of the PCP on Practice

Quantitative Results

When alumni (85) responded about the impact of the PCP on their career choice, 35 (41%) said the PCP significantly impacted their decision to choose a primary care career, 20 (24%) said it somewhat impacted their decision, and 10 (12%) said it did not impact their career choice. Of note, the PCP experience also impacted 5 (6%) of students' decisions not to choose primary care as their career. The remainder of respondents selected "other" (13, 15%) and wrote in responses. Some example quotes included

[The PCP] informed how I [would] practice [in] a nonprimary care career.

As a [National Health Service Corps] scholar, I was committed to primary care prior to starting medical school and joining [the PCP]. However, [the] PCP did impact my decision to choose family medicine as a career.

Among respondents (83) indicating what PCP experiences or resources influenced their current practice/career, respondents noted the following: being involved in a longitudinal primary care clinic (69, 83%), PCP academic faculty role models (58, 70%), PCP clinic faculty role models (57, 69%), PCP peers (50, 60%), interprofessional geriatrics training (34, 41%), primary care student interest groups (19, 23%), PCP noontime trainings (16, 19%), and teaching community-based nutrition classes (15, 18%).

Qualitative Results

Respondents (43/86, 50%) commented on how the PCP impacted their educational and/or career journey. Through an inductive coding approach, responses were grouped into six major themes: receiving mentorship, creating friendships/community, engaging in educational/service experiences, impacting their future careers, providing exposure to types/kinds of practice options, and a better understanding of the role of social determinants of health (Table 4).

DISCUSSION

Multiple studies have demonstrated the increasing need for primary care physicians. Efforts are needed at multiple systemic levels to meet this growing demand. In the United States, pathway programs have been shown to increase interest in and commitment to primary care, as well as the number of medical students choosing primary care residencies.^{11,26–28}

The data on US medical school primary care pathways are limited, however, focusing on match outcomes and rural programs. Little recent data have focused on the postresidency outcomes of urban primary care tracks, which is a strength of this study. The goal of this study was to evaluate PCP alumni after graduation and assess (a) demographics and match outcomes, (b) practice characteristics, and (c) the PCP's impact on career choices.

Seventy-one percent of PCP alumni respondents matched into primary care residencies. Of those students, 70% stayed practicing general primary care. This percentage is higher than what has been reported in the literature; another US study found that only 54% of medical school students who matched into primary care residencies stayed practicing general primary care.¹² This higher absolute percentage of PCP graduates still practicing/intending to practice primary care, relative to the national average, may suggest that students participating in a primary care pathway might be more likely to stay in primary care after residency. Factors that contribute to this outcome may include focused programming on primary care career options, early primary care training, role modeling, mentorship, skill building, leadership and advocacy training,

and early primary care explorations.

Retention in primary care careers was highest among PCP graduates who matched into family medicine (94%) and med-peds (60%). This finding is similar to rates of retention in primary care nationally in family medicine (92%)²⁹ and med-peds (63%).³⁰ Compared to the national rates, PCP graduates had higher rates of retention in primary care among those who matched into internal medicine (40% among PCP graduates vs 12% nationally).³¹ PCP graduates matching into pediatrics had lower primary care retention rates compared to national rates (43% among PCP graduates vs 54% nationally).³² Because the sample size for our PCP cohort currently in practice is small, future studies may analyze a larger sample size and include only physicians in practice to compare the PCP data more rigorously to the national data. Overall, the PCP has a high number of medical students that match into primary care residencies and stay in general primary care. However, opportunities still exist within residency programs to foster interest in general primary care practice, especially in internal medicine and pediatric residencies.^{30,31}

Some notable practice characteristics among the clinically practicing PCP alumni included that 76% of respondents practiced in urban areas in California. Furthermore, most respondents worked more than 75% of their time clinically, engaged in direct patient care and teaching, with a lesser percentage engaged in administration, leadership, advocacy, and research. When indicating the types of insurance they accepted, 83% accepted Medicare, 76% accepted Medi-Cal/Medicaid, and 59% accepted uninsured/safety-net patients. Moreover, 30% (9/30) of practicing alumni were working in federally qualified health center/safety-net settings where Medicare/Medi-Cal/Medicaid and uninsured patients were likely to represent a substantial proportion of their patient panel, highlighting the commitment of PCP graduates to working with underserved and vulnerable patients.

The PCP impacted many respondents' career choices, with 65% of respondents indicating that the PCP either significantly or somewhat impacted their decision to choose a primary care career. In the open response section, even alumni who did not pursue primary care commented on how the program helped inform their current career with primary care principles, showing the impact participating in the PCP can have on all students, regardless of ultimate specialty.

Limitations of this study included a smaller sample size, especially of PCP alumni who had completed residency. In addition, the response rate of 70% of alumni captured a large proportion, but may not be representative, of all PCP alumni; those who answered may have had more favorable program experiences. Further, PCP students were already highly interested in primary care at matriculation, which may have increased their likelihood to stay practicing primary care and lessened the impact the PCP had on influencing their career choice if they already were planning on being a primary care physician. Moreover, our specialty practice data included responses from alumni who were in training, which might have

led to an overestimation of the percentage of alumni practicing general primary care. When asking respondents about the payer mix, we inadvertently indicated only the California version of Medicaid (as Medi-Cal), which may have lowered the number of respondents who selected that option. Future studies may look at a larger sample of PCP graduates who are in practice and explore the nature of administrative, leadership, teaching, advocacy, and research work to better characterize our graduates' profile of activities. This activity profile then could be compared to national averages to gain insight into PCP strengths and areas for development, in keeping with one of the goals of our program to develop primary care physicians who are involved in additional activities/roles beyond patient care.

Since the development of this program in 2011, a substantial shift has taken place in the culture of primary care at KSOM. This change has allowed for continued programmatic support and growth, increased resources, and increased funding. These resources include early educational primary care skills-based training, advanced primary care skills for postclerkship students, additional mentorship, advocacy training, leadership training, and an increased focus on primary care research. The PCP exists at a private, quaternary care, research, and hospital-focused institution, and generalizability to other primary care medical school pathways should be taken in that context. This study is an initial step in developing a set of best practices and experiences for primary care pathway programs to better nurture medical students interested in primary care and serving underserved communities.

CONCLUSIONS

In conclusion, the outcomes from a US medical school primary care pathway were discussed in this study. Results showed that a high proportion of PCP graduates who match into primary care residencies stay practicing general primary care. This retention can be further strengthened by residency program initiatives aimed at retaining residents in primary care and providing additional primary care experiences and mentorship. The PCP has had a lasting impact on the program's graduates, influencing postresidency careers, exposure to primary care pillars, and community building and mentorship. The PCP can serve as a model for other institutions to help address the primary care workforce shortage. Primary care longitudinal medical school pathways like the PCP can have a lasting impact and can influence students' career choices and primary care foundational skills.

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TABLE 1. PCP Alumni Response Rates Per Graduation Year

Graduation year	Response rate among total respondents (N=86) n/N, %	Response rate among graduates per year (N varies per year) n/N, %
2015	10/86, 12	10/10, 100
2016	6/86, 7	6/11, 55
2017	8/86, 9	8/13, 62
2018	7/86, 8	7/7, 100
2019	16/86, 19	16/19, 84
2020	11/86, 13	11/21, 52
2021	19/86, 21	19/21, 90
2022	7/86, 8	7/20, 35
Did not indicate	2/86, 2	2

Abbreviation: PCP, primary care program

TABLE 2. Match and Practicing Specialties

Residency match specialty	n (%)	Practicing specialty	n (%)	Staying in general n/N (%)
Family medicine	33 (39)	Family medicine–general	31* (36)	31/33 (94)
Internal medicine	15 (17)	Internal medicine–general	6 (7)	6/15 (40)
		Internal medicine–specialist	9 (10)	
Med- peds	5 (6)	Med-peds–general	3 (3)	3/5 (60)
		Med-peds–specialist	2 (2)	
Pediatrics	8 (9)	Pediatrics–general	3 (3)	3/7 (43)
		Pediatrics–specialist	4 (5)	
Emergency medicine	5 (6)	Emergency medicine	5 (6)	
OB/GYN	3 (3)	OB/GYN	2 (2)	
Psychiatry	5 (6)	Psychiatry	6 (7)	
Surgical residencies	7 (5)	Surgical residencies	6 (7)	
Other specialties (dermatology, neurology, ophthalmology)	3 (3)	Other specialties (dermatology, neurology, ophthalmology)	4 (5)	
Not specified	2 (2)	Not specified	6 (7)	
Total	86	Total	86	

*Two residents switched to psychiatry.

Abbreviations: med-peds, medicine-pediatrics; OB/GYN, obstetrics and gynecology

TABLE 3. Current Practice Characteristics

Category	N=30 n (%)
Practice setting (select all that apply)	
Urban	27 (90)
Suburban	7 (23)
Rural	2 (7)
Practice state	
California	23 (77)
Non-California	7 (23)
Time working clinically	
75%–100%	24 (80)
50%–74%	6 (20)
Professional duties (select all that apply)	
Direct patient care	28 (93)
Teaching	18 (62)
Administration	9 (31)
Leadership	9 (31)
Advocacy	7 (24)
Research	5 (17)
Clinical setting (select all that apply)	
Clinic	14 (47)
Hospital	11 (37)
Urgent care	10 (33)
Large health system	10 (33)
Academic setting	9 (30)
Payor mix (select all that apply)	
Medicare	25 (83)
Medi-Cal/Medicaid	23 (77)
Primary PPO/EPO	22 (76)
Primary HMO	20 (69)
Uninsured/safety net	18 (60)
Clinical services (select all that apply)	
Outpatient	21 (72)
Office-based procedures	21 (72)
GYN procedures	18 (62)
Well-child care	18 (62)
Acute care procedures	15 (52)
Medication assisted treatment	13 (45)
Inpatient hospital medicine	13 (45)
Mentorship	
Currently mentoring	18 (60)
Not mentoring but interested	9 (30)
Not mentoring and not interested	3 (10)

Abbreviations: Medi-Cal, California implementation of Medicaid; PPO, preferred provider organization; EPO, exclusive provider organization; HMO, health maintenance organization; GYN, gynecology

TABLE 4. Themes of the PCP's Impact

Theme, n (%)	Example quote
Mentorship, 15 (35)	"[The] PCP helped expose me to role models who were delivering the type of whole-person, compassionate, and equity-driven care that I wanted (and now have the opportunity) to provide."
Friendship/community, 14 (33)	"I think more than anything, [the] PCP connected me with other like-minded individuals during medical school."
Educational/service experiences, 14 (33)	"[The] PCP was a great community of like-minded individuals that served as my home base during medical school. The early exposure to different clinics, [including] geriatric medicine, motivated me to apply into family medicine."
Future career vision, 12 (28)	"The early clinical exposure to primary care clinics was an invaluable training experience and greatly influenced my decision to pursue a career in family medicine. The mentors and peers I met through [the] PCP continue to inspire me and reaffirm my decision to work in primary care to serve my patients."
Exposure to types/kinds of practice, 9 (21)	"[The PCP] showed me that there are a variety of ways to practice primary care and [how] to carve out your own fulfilling practice."
Exposure to social determinants of health, 6 (14)	"[The PCP] armored me with a holistic view of health care, and to consider the nonmedical, social aspects of care."

Abbreviation: PCP, primary care program