

Choosing primary care as a profession: A systematic review

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ABSTRACT

The importance of primary care as a means toward individual and community health is unchallenged. However, with the number of primary care physicians entering the field on the decline in the United States, a clear view of the career pipeline becomes crucial, especially with regard to the role of medical education. The literature posits a number of predictive variables as important determinants of career selection. Much of the research focused on career decisions that are based upon preclinical ideation rather than occupational outcomes. We conducted a synthesis of the literature to explore factors most influential when selecting primary care as a profession. CINAHL, Web of Science, Ovid MEDLINE, and PubMed MEDLINE were explored from January 2008 to December 2017 to identify salient factors associated with a career decision to follow a primary care pathway. This review yielded 226 publications with 27 meeting our inclusion and quality criteria. Our analysis generated five overarching categories that best represent salient influences toward primary care as a career: general academic experiences, pipeline programs, student debt, characteristics of the educational institution, and student characteristics. We found that career decisions toward primary care were best supported by sound medical educational practice, remunerative expectations, and individual qualities such as familial background and preferred lifestyle. Our findings are congruent with earlier analyses in that academic experiences play an important role in career development toward primary care. However, our study did not capture rural experiences or demographic factors, both reported in previous studies in which preclinical students were queried. For medical educators, administrators, and students themselves, these outcomes represent largely modifiable factors when addressing the looming physician shortage.

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Introduction

While the primary care physician (PCP) is often viewed solely as a provider of individualized medical care, he or she also represents a critical frontline component of the nation's public health infrastructure supporting population health through responsiveness to both patient *and* community [1]. Academically trained in the preventive care and gatekeeping for more advanced health services, the PCP is well-positioned to address emerging health concerns such as increased medical costs, access to care, and the needs of an aging population. The U.S. primary care workforce, however, is facing projected shortages, and fewer

medical residents are seeking the less lucrative primary care track. Most workforce studies exploring factors important in the PCP career pathway are focused on data collected from students during pre-clinical years and provide little understanding of the global role of medical education on career development. To address this limitation, our analysis explores determinants of career choice based upon measurable career endpoints rather than the first or second year student ideation. This work provides a unique and objective overview of the literature as a means of understanding potential areas of intervention relative to the growing shortage of PCPs.

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The American Academy of Family Physicians defines the PCP as one who practices family medicine, internal medicine, or pediatrics [2]. Predictive models reported by the Association of American Medical Colleges (AAMC) indicate that by 2025 demand for *all* physician services in the U.S. will exceed supply—including a shortfall among those in primary care of between 12,500 and 31,100 [3]. More daunting estimates—accounting for population growth, age demographics, and insurance expansion—project a shortage of 52,000 physicians by 2025 [4].

This gap is exacerbated by fewer students entering primary care after graduation from medical school. In comparing graduating cohorts between 1990 and 2007, Schwartz et al. [5] report a decrease in the number of those who *intend* to practice general internal medicine; similar findings have been reported for internal medicine residents [6]. This ongoing trend is reflected in more recent Match® data; only 8.7% of graduating students from the class of 2017 entered family medicine residencies with 18.6% entering internal medicine during the same year [7].

Due to the harmful effects of this shortage on both the patient and his/her community, investigators continue to explore why some physicians select primary care as a career while others do not. Individual-level factors include empathy [8], post-residency lifestyle expectations [9], and ones' religion [10]. Utilization of problem-based learning approaches [11], completing international health [12,13] and family medicine electives [14], and the longitudinal integrated clerkship [15] are examples of academic influences that appear to support primary care as a career choice. In addition, student debt—though aligned with factors such as a student's family's wealth or growing up in a rural area—continues to be posited as a salient determinant of one's career choice. According to the AAMC, the median debt for U.S. medical graduates in 2017 was slightly less than \$192,000 [16].

Though singular variables may have an important role in career decisions, Lawson and Hoban [17] suggest using multivariate methods when studying factors conducive to primary care. This approach has yielded a host of significant intermediated variables including educational experiences, patient care characteristics, *and* lifestyle [18]; student characteristics, a sense of volunteerism, and having a social orientation [19]; and gender, intent to practice in underserved areas, altruistic beliefs, and social orientation [20].

Questions surrounding career choice and medical specialty have also been explored through systematic review of the literature. The first seminal review was published in 1995 by Bland et al. [21]. Their analysis of 74 publications, published between 1987 and 1993, reported demographic characteristics (gender, age, and marital status); broad undergraduate academic experiences; non-physician parents; limited interest in prestige technology, and surgery; low expectations toward income; and a desire to work with diverse populations and health problems, as important characteristics of selection of primary care as a career. The authors took an overarching view of the question in an effort to develop a model useful in understanding the then current state of the literature.

More recently, Senf et al. [22] analyzed 36 publications reporting rural background as being positively associated with selecting family medicine as a career. In a comparative analysis, Puertas et al. [23] examined 55 articles specific to high-, middle-, and low-income countries, reporting that rural location, appropriate role models, and working conditions facilitate entry. A review by Campos-Outcalt et al. [24] of 85 studies concluded that required clinical training emerged as a salient curricular component. Authors discuss the positive impact of faculty role models on specialty choice as well as the inverse relationship between federal biomedical research funding and the percentage of graduates selecting primary care. Finally, Stagg et al. [25] examined 36 manuscripts published between 1995 and 2010 reporting that preceptorships, where the physician was rated as a “high quality teacher,” positively influenced career decisions toward primary care.

A chief concern of the literature is that most studies explore career influences based upon student ideation early within the educational process rather than an objective endpoint such as residency match or medical practice. It is difficult to identify valid correlates of career choice in the absence of clear occupational decisions. Therefore, the aim of this study was to identify salient factors—based upon studies utilizing objective and measurable career outcomes—that supports one's decision to enter primary care. Our objectives were to (1) systematically review the literature for studies meeting our inclusion criteria, (2) identify variables supportive of primary care as a career, and (3) group selected studies into overarching categories based upon primary study findings. Gaining such a perspective will supports medical education, policy, and workforce decisions targeting the shortage of primary care in the U.S.

Methods

Prior to the beginning of our study, the authors conducted an unrestricted review of the literature to better understand the tapestry of work completed in this area and to support a grounded search strategy. Four databases were selected: CINAHL, Web of Science, Ovid MEDLINE, and PubMed MEDLINE. These resources were selected because they (1) represent those offering the greatest amount of coverage reflecting medicine, medical education, and career selection and (2) together index well over 20,000 unique journal titles. Using the general search terms “primary care” and “career choice” yielded 1,493 manuscripts published between 1971 and 2017. After abstract review, 1,216 were deemed relevant to our investigation. Our review of these publications supported the addition of the phrase “specialty selection” as part of our final search strategy one which has been utilized previously.

Equipped with a grounded search strategy, each database was explored over a 10-year look-back period from January 2008 to December 2017 (Table 1). To ensure a comprehensive approach, searches were tailored to take advantage of the unique functionality and support for medical subject headings (MeSH) available within each database. Selected studies include those where participants were identified as (1) students matched into a specific residency, (2) residents, or (3) practicing physicians. We viewed residency as an acceptable proxy for career choice given historically low attrition rates [26,27]. Only those manuscripts focusing on original research (including best practices), published in English, and centered on primary care within the United States were selected. Articles excluded from our investigation included those (1) published prior to 2008, (2) based upon data provided by those who could not provide a measurable career path decision, and (3) scoring less than 80

when assessed using an adapted Strengthening the Reporting of Observational studies in Epidemiology (STROBE) Statement discussed below. Systematic analyses were also excluded. During the critique process, data items harvested from each manuscript included database source, citation information, purpose, population and size, response rate, data years, study design, methodology, statistical procedures, and findings. This information was utilized during comparative analysis of selected manuscripts.

Both authors (McKinley Thomas, Jeff Jones) critically appraised the quality of all identified manuscripts. A third reviewer—unaffiliated with the current study—was recruited to provide an independent perspective as well as guidance when dissent occurred between authors. All three reviewers offered objective measures of quality for each study. As a guide to critical assessment, authors utilized the STROBE Statement which outlines reporting criteria for observational studies [28]. STROBE was selected given its applicability to a host of research designs. To garner an objective score (0–100) for each manuscript, the model was adapted to include measures for each of the six focal areas; Title/Abstract (5), Introduction (10), Methods (25), Results (25), Discussion (20), and Other Information (5). A seventh element was added to our adaptation of the STROBE statement included to assess the quality of bibliographic and reference materials; Bibliography/References (10). Each section is further broken down into additional subsections that are useful when assessing the quality of published literature (Table 2). Point assignments were made based upon our views of the relative importance of each section in providing sufficient content for study replicability. Based upon this adaptation of STROBE, each reviewer assigned an overall numerical score to each manuscript. Any publication with an average score of 80 or above was retained for final analysis. Mendeley Reference Manager 1.16.3 was incorporated for document management. As per federal research guidelines and those provided by Georgia Southern University, this study does not constitute human subjects research and did not require Institutional Review Board review.

Results

Our delineated search of the literature between 2008 and 2017 yielded 226 manuscripts meeting our *search* criteria, 33 of which met our

Table 1. Search strategy by dataset.

Data source	Search strategy
CINAHL	Career choice AND primary care OR specialty selection (as Boolean and Natural Language)
Web of Science	Career choice AND primary care OR specialty selection
Ovid MEDLINE	Career choice AND primary care OR specialty selection [mapped to subject heading]
PubMed MEDLINE	(“Career Choice” [Mesh] OR career choice) AND (“Physicians, Primary Care” [Mesh] OR primary care) AND (“Internship and Residency” [Mesh] OR residents OR “Students, Medical” [Mesh] OR medical students OR medical student OR resident).

Table 2. Adapted STROBE checklist and scoring values.

Focal areas	Subsections	Maximum score
Title and abstract	<ul style="list-style-type: none"> • Clarity • Key findings 	5
Introduction	<ul style="list-style-type: none"> • Basic conclusions • Background and rationale • Objectives 	10
Methods	<ul style="list-style-type: none"> • Study design • Setting • Participants • Variables • Data sources and measurement • Bias • Study size • Quantitative variables • Statistical methods 	25
Results	<ul style="list-style-type: none"> • Participants • Descriptive data • Outcome data • Main results • Other analyses 	25
Discussion	<ul style="list-style-type: none"> • Key results • Limitations • Interpretation • Generalizability 	20
Other information	<ul style="list-style-type: none"> • Funding 	5
Bibliography and references	<ul style="list-style-type: none"> • Comprehensiveness • Recency of publication dates 	10

inclusion guidelines (see Fig. 1). Each manuscript was reviewed using the adaptation of STROBE methodology discussed earlier. The average score over all articles was 67.8. Six manuscripts with scores less than 80 were removed due to quality concerns, and the average score was increased to 89.6 among the remaining 27 manuscripts (see Table 3). Manuscripts were then categorized based upon those factors reported by each as most supportive of primary care as a career choice. This process was guided by standard qualitative methods discussed elsewhere [29].

Study characteristics

Sixteen articles focused on participants who had either matched into a specific residency ($n = 11$) or those currently working within a specific residency program ($n = 5$). Eight studies investigated practicing physicians including one centered on internal medicine residency alumni. One study involved Departments of Family Medicine within the U.S. Two studies incorporated a combination of participants such as practicing physicians and medical school archival data. The average sample size across articles incorporating human subjects was 7,207. Most articles selected were either cross-sectional ($n = 10$) or retrospective

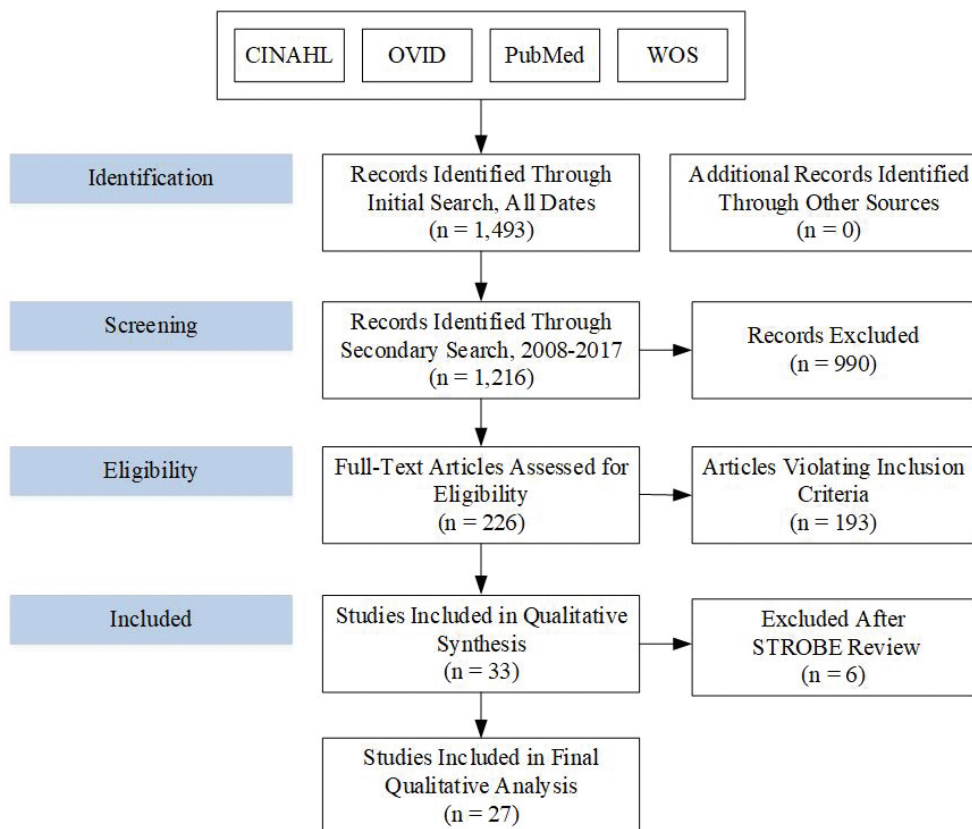


Figure 1. Search process by data source, stage, and yield.

Table 3. Selected articles by author, year, methodology, and adapted STROBE score.

Authors	Year	Methodology	Score
Brokaw et al.	2009	Retrospective cohort	96
Clinite et al.	2014	Cross-sectional	91
DeZee et al.	2011	Cross-sectional, mixed methods	92
Erikson et al.	2013	Cross-sectional	93
Frintner et al.	2013	Cross-sectional	87
Jones et al.	2014	Program evaluation	93
Khwaja et al.	2015	Retrospective cohort	85
Kost et al.	2014	Retrospective cohort study	96
Kost et al.	2015	Cross-sectional	89
Krousel-Wood et al.	2012	Retrospective cohort study	82
Kubal et al.	2010	Prospective	91
Long et al.	2016	Qualitative	85
Lupton et al.	2012	Retrospective	93
McDonald et al.	2008	Cross-sectional	80
McDougle et al.	2013	Retrospective cohort study	92
Morley et al.	2015	Cross-sectional	87
Peccoraro et al.	2013	Cross-sectional	90
Phillips et al.	2014	Retrospective cohort	89
Quinn et al.	2011	Program evaluation	92
Saguil et al.	2012	Retrospective cohort	91
Stanley et al.	2015	Cross-sectional	92
Umoren et al.	2015	Cross-sectional	92
Vaikunth et al.	2014	Retrospective	82
Walker et al.	2010	Qualitative	96
Wilkinson et al.	2010	Retrospective cohort	82
Wimsatt et al.	2016	Cross-sectional	92
Zink et al., etc.	2010	Program evaluation	90

($n = 10$). One investigation utilized a mixed methods approach while three articles centered on program evaluation. Only one study took a prospective approach to their investigation while two others utilized qualitative methods. Given the scoping nature of our review, qualitative and best practice manuscripts were included in our analysis.

Qualitative categories

Retained manuscripts were categorized into groups according to their primary results yielding five distinct categories: general academic experiences, pipeline programs, student debt, characteristics of the educational institution, and student characteristics.

General academic experiences

Research focused on academic experiences represented the largest group of articles ($n = 8$) meeting our search criteria and includes general student-centered, instructional experiences that function to endorse primary care. Three studies [30–32] describe the positive influence of rotational elements such as working in a continuity clinic where the student is able to work with the same

patients over time, building rapport with them. Rural clinical rotations, PCP preceptorships, and patient characteristics—such as having a chronic disease treatable through ambulatory rather than specialist care—also seem to influence medical students to choose careers in primary care. These data support the presentation of primary care throughout matriculation as a precursor to generalist medicine. Outcomes of clinical rotations (clerkships) also appear to be a motivating factor. Saguil et al. [33] reported a positive, statistically significant association between family medicine, internal medicine, and pediatric clerkship grades and residency match. Students who received better grades in primary care clerkships were more likely to choose a career in primary care.

Long et al. [34] identified a number of prominent instructional factors influential toward primary care. These include learning how social factors can influence a patient's response to medical care, mentor and faculty perceptions of primary care, and structural features of the training environment. Peripheral educational experiences also play an important role in career decisions including exposure to global health electives [35], and completing a Master of Public Health degree [36]. Finally, Kost et al. [37] reported statistically significant ($p < 0.000$) and increased odds of entering primary care among those who had participated in family medicine interest groups [odds ratio (OR) 2.45; 95% confidence interval (CI) 1.81-3.31] and underserved pathway programs [OR 4.37; 95% CI 1.96-9.71].

Pipeline programs

Six articles centered upon curricular evaluations of specific programs overtly designed to enhance a student's interest in primary care. Lupton et al. [38] discuss a significant difference in the percent of University of California postbaccalaureate premedical program alumni participating in primary care compared to control physicians (51.1% vs. 40.1%, respectively). Similar benefits are described by Quinn et al. [39] specific to the University of Missouri School of Medicine Rural Track Pipeline Program. Wilkinson et al. [40] reported an increased likelihood of participants matching into primary care after implementation of the Family Medicine Student Track—FaMeS Program. Similarly, according to Jones et al. [41], 60% of participants in the University of Chicago School Of Medicine's SERVE Program matched into

primary care compared to 36% for non-participants. Finally, enrollees in the University of Washington's Underserved Pathways Program [42] and the University of Minnesota-Duluth's Rural Physician Associate Program [43] also exhibited a comparatively greater likelihood of selecting primary care as a career. This work serves as evidence of ongoing best practices in medical education to promote the "early and often" approach toward opportunities in primary care during matriculation.

Student debt

Five studies on the topic of student debt were retained. Historically, a great deal has been written on the relationship between student debt and career selection. However, study results have varied due to the uncertain relationship between debt and income/lifestyle expectations as well as poor study designs. Compared to matched fourth-year students who ranked primary care as their *last* career selection, Clinite et al. [44] report that those ranking primary care as their *first* choice rated work enjoyment among underserved populations more favorably than financial compensation and average salary. Three additional studies [45–47] indicated a strong relationship between debt level and preferences toward primary care; students who prefer less debt after medical school and residency were more likely to select primary care as an occupation. Conversely, DeZee et al. [48] reported limited interest in primary care—rather than debt—as a predisposing factor. Of all the themes identified in the current study, student debt appears to be the least well-defined and most difficult to interpret.

Characteristics of the educational institution

Four articles centered on the educational institution and addressed general elements of the environment in which the medical curriculum is administered. For example, Erikson et al. [49] discuss the influences of both negative experiences, such as "badmouthing," and positive academic practices, including primary care clerkships, on the likelihood of practicing primary care, attributing 8.0% of total variance to school-level factors alone. Brokaw et al. [50] found that students who take courses at regional campuses are more likely to choose a PCP career while Morley et al. [51] outline the importance of "social mission" exhibited by the degree-awarding institution. Finally, an analysis by Wimsatt et al. [52] indicates that match rates into

family medicine were higher among public *versus* private medical school graduates.

Student characteristics

Characteristics of the individual student also emerged as an important category within four manuscripts—defined here as intrinsic features of the student that reflect a proclivity toward primary care. For example, McDougale et al. [53] report a relationship between Step 1 scores taken early in medical school and career selection; students with lower grades tended to select primary care compared with those scoring higher. Walker et al. [54] discussed three emergent themes related specifically to the individual, each influencing one's decision to enter a primary care or a more specialized field. These include (1) personal motivators (family lifestyle, professional responsibility over financial gain, and work in a rural setting), (2) career motivators (academic research compared to working as a hospitalist, for example), and (3) clinical support (e.g., available medical technology).

Throughout our investigation, only two studies reported specific factors as *unimportant* when exploring career pathways, both categorized as student characteristics: volunteerism [55] and receiving a service award [56].

Discussion

This investigation sought to explore factors represented in the literature as most important when making objective decisions to enter a primary care field. Five categories emerged after a critical review; general academic experiences, pipeline programs, student debt, characteristics of the educational institution, and student characteristics. Each represents a unique grouping of factors identified among those who had made an objective and measurable career decision. Our findings support previous research in many ways. For example, the importance of clinical training in the form of a continuity clinic or clinical rotations and broad educational experiences are often lauded as important determinants of career choice [24]. This finding was reflected throughout the current study. Additionally, one's desire to work with diverse populations [21], income expectations [22], and faculty role models [22,24,57] are factors—represented in previous systematic analyses—represented here. The congruency between our findings and previous investigations strengthens our understanding of the importance of medical

education and related academic experiences in guiding one's career path.

Our findings were unique in a number of ways. The concept of "rural," often cited as an important predictive variable related to career choice [22–24], did not emerge here as important. Rural background, educational experiences, and rural career expectations may be clouded by a confounding relationship with other variables such as income, parental characteristics, and eventual practice setting. Additionally, student characteristics such as gender, age, marital status, and family background [21] did not emerge as salient within the current study compared to findings of previous analyses. One reason why rural and demographic factors did not play an important role here may be due to our selection of articles with objective measurable outcomes measures rather than those utilizing preclinical student ideation. Perhaps the importance of rural experiences and demographic factors—reported as important among preclinical populations—is overshadowed by clinical experiences provided later in one's medical education.

The research suggests that medical students' career decisions are largely founded upon (1) experiences received throughout one's medical education, (2) the cost of this education, and (3) predisposing features of the individual student. Studies repeatedly find that training opportunities and curricular structure strongly influences student career decisions. Monetary concerns also play an important role in decisions related to the career pathway. Student income expectations, coupled with concerns of practice and lifestyle, and expected debt after medical school, all work together to guide decisions related to occupation. Finally, those who selected primary care as career rank empathic qualities—such as building relationships with patients and caring for them in underserved, rural, and local clinics—as most important compared to wealth building.

These findings have significant implications for medical education. Our analysis identifies a number of studies supporting empathy through pedagogical methods such as rural rotations, multiple contacts with patients, and working with mentors/faculty vested in the message of primary care. In addition, policies affecting students' finances—such as debt reduction or forgiveness—represent partial solutions to the growing PCP shortage. Narrowing the earnings gap between specialists and PCPs would also address the financial concerns of students

improving the likelihood of selecting primary care as an occupation.

We believe these findings offer a unique insight into the career pathway due to our use of objective career decisions as inclusion criteria—a major strength of our study; only those articles with a measurable career decision were included. Given the importance of clinical experiences on decisions related to career, we feel the only means of identifying important pathways toward primary care is to measure predictive factors *after* the student has gained a clear understanding of the expectations of the many fields of medicine.

Two additional strengths of our review include (1) generation of a search strategy informed by a historical review of the literature and (2) incorporation of systematic, quantifiable measures of manuscript quality based upon an adapted STROBE Statement. Our data provide support for ongoing conversations regarding educational pathways toward primary care by exploring the literature through the lens of objectivity *versus* ideation; summative findings presented here are founded upon measurable career decisions rather than preclinical ambition.

One of the limitations of the current literature is that many studies utilize varying definitions of primary care; research selected here incorporated an amalgam of subspecialties when defining primary care practice potentially introducing bias. Though pipeline programs received a unique category outside of "general academic experiences," such programs should be more thoroughly explored to better ascertain educational characteristics that best support primary care as a career choice. This particular theme may have emerged as salient given that pipeline successes are due to their inclusion of students who already exhibited a strong interest in primary care. Specialty-specific research designed to examine career decision pathways is warranted. Similarly, the concept of "career choice" is a broad one and can include a number of areas such as academic medicine, primary care, primary subspecialties, and hospitalists. This study would have profited from an assessment of how these areas differ with regard to predictive variables. Also, it should be noted that the qualitative nature of our investigation lends itself to interpretation. However, selected articles were objectively scored and served as the foundation upon which qualitative categories were developed.

A major conclusion from our study, however, is that factors supporting primary care pathways should be examined—*as they relate to each other*.

Though our methodology provided a thematic view of the literature, we feel the evidence reflects a *web of elements* working in unison to facilitate career decisions. Any further investigation should question the interplay among medical education, economic expectations, and individual values in order to gain a more lucid perspective of the vocational pathway.

The literature is replete with data centered on student ideation during pre-clinical years rather than impartial measures such as residency selection or ultimate practice. It is not enough to base our understanding of career selection upon students' perceptions early in their education, especially prior to the third-year clerkship requirements. First and second-year community experiences are important to career decisions, but without richer, clinical opportunities in place, the student is unable to fully comprehend the lifestyle benefits or professional obligations of specialty areas. Indeed, student views on primary care change as a result of matriculation. In 2016, only 29.3% of students who aspired toward primary care (Family Medicine, Internal Medicine, Obstetrics, or Pediatrics) at the onset of their medical education reported the same interest upon graduation [58].

The importance of primary care as a bridge between medicine and community-based health is well supported. Our findings provide a glimpse into the mechanism behind professional employment decisions and support medical education as a leading influence on the career pathway. Understanding the interplay between medical education, financial considerations, and qualities of the student are of paramount importance when providing a workforce capable of delivering care to community-based populations that are most in need.

Conflict of Interest

The authors declare that they have no conflict of interest.

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