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Article:

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Specialty Choice**

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Influence of Medical Student Age and Experience on Clinical Rotations and Specialty Choice

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Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Abstract

Background: Historically, most medical students began medical school right after completing their undergraduate degree. However, over the past 4 years, the average age of medical student matriculation was 24 years. Many students are taking a few years to pursue other opportunities before entering medical school, which has been shown to help in the transition to the clinical years of medical school.

Methods: An anonymous online quantitative survey was sent from June 2017 through March 2018 to medical students enrolled in clinical rotations at four large medical schools representing different regions of the US. In this study, students 25 years or older were considered non-traditional, while students under the age of 25 were considered traditional. Survey questions were adapted from a qualitative study on the experiences of mature-aged medical students.

Results: A total of 195 medical students responded to the survey, which was about a 14% participation rate. The average age upon entering medical school was 24.1 years. Compared with traditional students, non-traditional students indicated that life experience ($p < 0.001$), previous work experience ($p < 0.001$), and age ($p < 0.001$) had a stronger impact on their clinical rotations. Additionally, non-traditional students reported a stronger influence of work experience ($p < 0.004$) and age ($p < 0.001$) on specialty choice than traditional-aged students.

Conclusion: These findings support the idea that non-traditional students gain valuable experience from the time between obtaining their undergraduate degree and starting medical school, which is a significant factor in determining specialty choice and residency locations.

Keywords: Clinical rotations • Life experience • Non-traditional students • Specialty choice • Undergraduate medical education • Work experience

Introduction

Prospective physicians in the United States traditionally complete 4 years of undergraduate study, applying to medical school during this time, and start medical school soon after college graduation. As a result, many students begin their medical studies before the age of 25 and without the opportunity to pursue interests or experiences outside of classroom academic work following college graduation [1]. This situation is also true in schools outside of the US (i.e., UK), although internationally, the medical track is often pursued even earlier. Making such a weighted decision so early in life with limited exposure and previous experience may be challenging, especially when students move from the familiar classroom environment to the “real-life” clinical setting. Students often describe difficulty and stress in the transition from the preclinical to clinical years of medical school [2, 3]. Students attribute these challenges to many factors, such as the change of learning environment from classroom to on-the-job learning, professional socialization, longer working hours than other professional peers, the breadth of knowledge needed for clinical medicine, and a feeling of being useless in their new role [2, 3].

It has been shown that prior work experience, problem-based learning, and confidence in baseline knowledge and skills may ease the transition into the clinical years of medical education [4]. There is anecdotal evidence that medical schools are emphasizing the importance of prior experience and maturity before entering medical school. Yet, little work has been done in the US to investigate the shift of medical schools accepting older, more experienced students. As of 2016, the average age of matriculation was 24.4 years [1], with a larger proportion of students starting medical school over the age of 25. This is older than the traditional age of students entering medical school immediately upon completion of an undergraduate degree. This change is reflected in the way medical school admissions committees emphasize the diversity of each class often through students' interest in pursuing other opportunities prior to the long commitment of attending medical school and beginning residency training. The competitive nature of medical school applications has also

pushed students to differentiate themselves on their applications, which is often achieved by exploring other opportunities such as professional work or research.

Moreover, older students do not have lower grades than younger students in higher education as a whole [5]. In fact, studies have suggested that older students (specifically women) perform better than both older men and younger women in medical school [6]. Other studies have shown that age is positively associated with clerkship grades in fields such as internal medicine [7]. It has been hypothesized that older students at the graduate school level are able to perform at a level equal to or better than that of their younger peers because they often have more motivation, mature learning skills, more life direction and experience, and better time management skills [8–10]. This translates into less anxiety when transitioning into the clinical years of their education [9].

The authors' previous qualitative work has shown that life experience, work experience, and age are vital factors that shape students' perceptions of their expectations and roles in the clinical years of their medical education [11]. This study built upon these findings to assess the impact of these factors on medical students during their clinical rotations. The aim of this study was to characterize the influence of age at medical school matriculation (traditional versus non-traditional) on clinical medical training experience, including reasons for pursuing the career of medicine, interactions in the clinical environment, performance on clinical rotations, and medical specialty choice for residency training. We hypothesized that age plays a role in how medical students perceive their clinical experiences and career decision-making.

Methods

An anonymous online quantitative survey consisting of 21 questions was sent to medical students enrolled in clinical rotations at The George Washington University School of Medicine and Health Sciences, Yale School of Medicine, Case Western Reserve University School of Medicine, and University of Texas Health Science Center at San Antonio from June 2017 through March 2018. These institutions were identified as representative of different regions of the country. Additionally, we had established contacts at each of these medical centres who were willing to disseminate our

survey to students. Non-traditional students were defined as students who were 25 years or older when entering medical school. Traditional students were defined as students below the age of 25 when entering medical school.

Survey questions were adapted from a qualitative study on the experiences of mature-aged medical students [11]. The questions asked students to identify the amount of time (if any) they had between college and medical school and state the activities or jobs they had during that time. Also, the survey asked about the factors that influenced student choice to attend medical school. Students also had to rate the impact that certain factors such as age, life experience, and work experience had on their clinical rotations. Other questions asked students to rate the aspects of clinical rotations that were most important to them, such as independent time to learn, guidance by attendings, and level of teaching. These ratings were assessed on a scale of 1 to 5. Students also provided information on their expected specialty choice, and they rated factors that most impacted that choice. Additionally, students identified attributes in their peers that correlated with success on clerkships. There were also response questions for students to explain their answer choices. Demographic information was collected on the age at matriculation, age at expected graduation, gender, ethnicity, marital status, and number of children. A statistical *t*-test analysis was conducted using SPSS software to determine any significant differences in responses between the two groups. This project was considered exempt by the institutional review board at The George Washington University (IRB #051224).

Results

A total of 196 students responded to the survey, which was about a 14% participation rate. The average age upon entering medical school was 24.1 years, with a range of 23 to 44. Among the respondents, 51% were female, 46% were male, and 3% responded other or did not answer the question. About two-thirds ($n = 121$; 66.1%) of the respondents were classified as traditional, with 95.7% of this group taking 1 or 2 years after finishing their undergraduate degree before starting

medical school. In contrast, 79.1% of students characterized as non-traditional had 3 or more years between finishing their undergraduate degree and starting medical school, with 100% working professionally during this time; 34.7% of these students volunteered in some capacity, with another 25.3% attending graduate school.

The most common reason for entering medical school was altruism (69.3% of non-traditional students, 73.6% of traditional students) followed by prior exposure to the field (50.7% of non-traditional students, 64.5% of traditional students) (Figure 1). Both groups of students ranked preparedness (81.3% of non-traditional vs. 88.4% of traditional), interactions with attendings (78.7% of non-traditional vs. 85.1% of traditional), interactions with patients (72.0% of non-traditional vs. 77.7% of traditional), and clinical acumen (69.3% of non-traditional vs. 74.4% of traditional) as the attributes most often found in their peers that resulted in a strong performance on clinical rotations. Both groups also gave age the lowest ranking among the attributes (Figure 2).

Compared with traditional students, non-traditional students were more likely to report that life experience (82.2% vs. 64.7%, $p < 0.001$), previous work experience (63.9% vs. 35.6%, $p < 0.001$), and age (54.8% vs. 26.1%, $p < 0.001$) had an impact on their clinical rotations. Additionally, non-traditional students felt that previous work experience ($p < 0.004$) and age ($p < 0.001$) had more influence on specialty choice than usual-age students (Table 1). In terms of specialty choice, both sets of students were most likely to enter internal medicine (14.7% of non-traditional, 14.0% of traditional), then obstetrics-gynecology and emergency medicine in similar numbers (10.7% each of non-traditional students, 10.7% each of traditional students) (Figure 3). Older students agreed more strongly with the idea that they wanted to maximize their clinical experience, even if it impinged on personal time ($p < 0.048$).

Discussion

This study showed that age and experience play a role during clinical rotations of medical school and help shape career decisions of medical students. Our findings showed that non-

traditional students (>25 years) were more likely than traditional students to believe that age, previous work experience, and life experience had an impact on their clinical rotations during the third and fourth years of medical school. The implication is that older students are able to rely on their age and experiences to help them perform well on rotations. A previous study at McGill University in Canada found similar results, in that older students (aged 25 or older) relied on their age and experience to enhance their clinical work; that study specifically mentioned that older students felt they had a great grasp of “human experience” that allowed them to better interact with patients [12]. Additionally, other reviews of previous research have found that maturity and more life experiences helped students feel more prepared for entering clinical rotations [13]. This may be because these students can harness their experiences when moving from the classroom into the clinical setting.

Both groups of students had similar reasons for choosing medicine as a career and entering medical school. Regardless of student age, the main reason for entering medical school was altruism. The next most common answer was prior exposure to the field. This finding highlights that age doesn't provide any further rationale for students to pursue a career in medicine. It may simply be that a younger student has strong reasons to enter the field without the experience of an older student. Conversely, an older student may need more work and life experience to make that decision and find the rationale to become a doctor. Previous research suggests that a large proportion of older students also report career dissatisfaction as a significant factor in entering the field of medicine [14, 15]. The altruistic nature of medicine may have been more appealing to those changing careers, but at the same time younger students may have felt that pull all along. Thus, age does not seem to be a deciding factor when choosing to enter medical school. It could be helpful to ask about other factors such as financial incentives, social status, and family pressure to form an even deeper understanding of students' rationale to become a doctor.

An interesting finding from our study was students' perceptions of their peers. Both traditional and non-traditional students identified preparedness, interactions with attendings,

interactions with patients, and clinical acumen as the attributes that allowed their peers to perform well on clinical rotations. Previous research found that peer ratings are more valuable in predicting student success in internship than academic success or faculty ratings [16]. Similarly, peer evaluation is a reliable measure of physician performance in areas such as communication, humanistic qualities, and clinical skills once students move on to becoming practicing physicians [17]. This suggests that students are able to intuitively understand the traits they must possess and develop to perform well in the clinical setting. Furthermore, both groups of students selected age the least amount of times as the attribute that allowed their peers to perform well on rotations. A similar finding in other research found that mature students' ease of transition into the clinical environment is more a result of prior life experience than age [13]. This highlights the fact that age doesn't necessarily impact the intrinsic factors that make a good doctor. Thus, the experiences students possess are likely the factor that allows them to perform well clinically.

The attributes identified by the student respondents align well with the 15 core competencies the Association of American Medical Colleges has identified for students entering medical school [18]. While not a perfect correlation, the main concepts are similar in that students must interact well with others, be reliable, think critically, and have a strong knowledge base. Additionally, other reviews of the literature have summarized professional competence as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served" [19]. This summary of a fully competent physician aligns with our findings and suggests students have recognized and developed these attributes through experience irrespective of their age.

It is important to note that these attributes often develop with more experience, which often comes with being older and having more experiences to draw upon and learn from. On top of that, the clinical environment is extremely team oriented to avoid errors and deliver optimal care to patients [20–22]. Much of the teamwork focuses on proper communication rather than clinical

knowledge [22, 23]. As a result, experiences in a work or professional setting can serve students well when faced with the challenges of being part of a healthcare team.

We also found that non-traditional students felt previous work experience and age had more of an influence on their specialty choice than traditional students. However, both groups of students chose similar types of specialties to pursue, with internal medicine being the most common, followed by obstetrics/gynecology and emergency medicine. This finding suggests that older students rely more on their age and experience to help them make this career choice, but ultimately these factors don't play as much of a role as they believe. The choices may be due more to the nature of the specialties than student self-perception. For example, often more residency positions are available in internal medicine than in any other field. Additionally, internal medicine offers more options further down the road for fellowship and sub-specialization, which is often appealing to students [24]. It has been suggested that older students tend to choose specialties with fewer years of training [15], as well as more generalized medicine such as primary care [25, 26]. At the same time, many premedical students in the US feel that primary care lacks financial incentives and prestige and can be "uninteresting" compared to other specialties [27]. This idea indicates that age and experience shape students' perception of a specialty and the choice of specialty to pursue as a career.

The study was limited by the nature of response timing. Students are divided among different rotations, and the specific rotation the student was on could have shaped his or her perspective and survey response. For instance, being on a rotation a student was less interested in or found difficult may have affected the response. Additionally, a survey opens the door for implicit biases based on the nature of questions asked and the topics presented. Students can only rely on their own perceptions and experiences, and thus it can be difficult to interpret the meaning of some responses. For instance, "impact" is a term respondents had to interpret, and it could translate to academic success as well as general daily performance during a rotation. It is also important to note that the study may have self-selected for a certain type of student respondent. Students who

possess the characteristics and attributes we identified may also be the type of students more likely to respond to a survey and subsequently the same people who more often enter the specialties discussed.

Further research could be performed to validate the claim that older students are able to transition more effectively into the clinical setting based on their age and resulting prior experiences. This information could be elucidated by expanding on the survey we used and adding a question about student preparedness for the clinical environment based on age and experiences. It could be helpful to understand students' experience working specifically in a team setting and the impact that played in working in a clinical environment. In line with that, the specific type of experiences a student had before attending medical school could elucidate differences in performance in the clinical setting. Studies have found that prior research experience is associated with better academic performance but lower ratings on professionalism and expertise [28]. Additionally, students who have previous professional healthcare qualifications often feel they can draw on their experience to aid in their professionalism, communication, teamwork, and general familiarity with the healthcare environment. These skills are all valuable aspects for medical students to develop during clinical rotations [29].

It may also be interesting to compare age and experiences to academic performance on clinical rotations. Although this may be a short-term barometer of student success, it could be helpful in determining an appropriate age or set of experiences needed for acceptance into medical school. The previously mentioned study at McGill University also found that older students had lower preclinical grades but performed equally well during the clinical years. The authors hypothesized the similarity as largely due to the older students' age and experience, ability to connect with patients, and concern with "real learning" over test scores [12]. Thus, there appears to be some indication that age and experience may factor into academic performance during clinical rotations.

Building on that idea, the identification of age and experience as important factors that impact a student's performance on clinical rotation can have implications for medical school admissions committees. These factors are important for students to feel prepared to transition into the clinical setting. Often age comes with experiences that provide students with the attributes identified that allow them to perform well on clinical rotations. Ideally, this also means that they will utilize these attributes in the real-world setting when they become practicing physicians on multidisciplinary healthcare teams. Previous research in Canada, Australia, and New Zealand identified differences in older and younger medical student applicants. Namely, older students in Canada often entered with lower MCAT scores and GPAs [12]. Additionally, older students in Canada and Australia did not perform as well during their preclinical years based on academic performance or awards and prizes won [14]. Yet, older students in New Zealand performed as well as, if not better than, younger students in the earlier years of medical school [25]. The main takeaway is that older students in all three countries performed just as well during their clinical years [12, 14, 25]. It may be important for admissions committees to consider age and/or experience to determine the applicants that possess the necessary attributes to become strong physicians.

We may also want to further explore the concept of age and specialty choice. Although previously mentioned research has shown that age plays more of a factor than we found in terms of students pursuing less time-intensive residencies, it has also been shown that the most important factor is interest in a specialty subject matter [30]. Asking further questions of students as to the reasons for specialty choice will help us understand this decision process and potentially help career deans and advisors.

In conclusion, there is agreement among many students of all ages that there are certain reasons to become a physician and certain attributes one must possess to perform well. These attributes are often developed through various experiences. Yet, this doesn't explicitly mean that a student must be of a certain age to have garnered the right amount and types of experiences. While it is often the case that with age comes experience and the ability to develop the necessary

attributes that allow students to become strong clinical performers and ultimately physicians, it is not a prerequisite that one be of a certain age to have those experiences.

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Table 1. Traditional and non-traditional student perceptions of the impact of attributes and personal experiences on clinical rotations*

Influencing factor	Traditional students (n = 121)		Non-traditional students (n = 75)		P value
	Mean score*	Responses of 4 or 5 (%)	Mean score*	Responses of 4 or 5 (%)	
Influence on interactions on clinical rotations					
Life experience	3.72	64.7%	4.23	82.2%	<0.001
Previous work experience	3.04	35.6%	3.93	63.9%	<0.001
Age	2.79	26.1%	3.38	54.8%	<0.001
Influence on specialty choice					
Previous work experience	2.53	22.9%	3.10	35.2%	<0.004
Age	1.87	9.0%	2.62	25.7%	<0.001

*Scores range from 1, *least impactful*, to 5, *most impactful*.

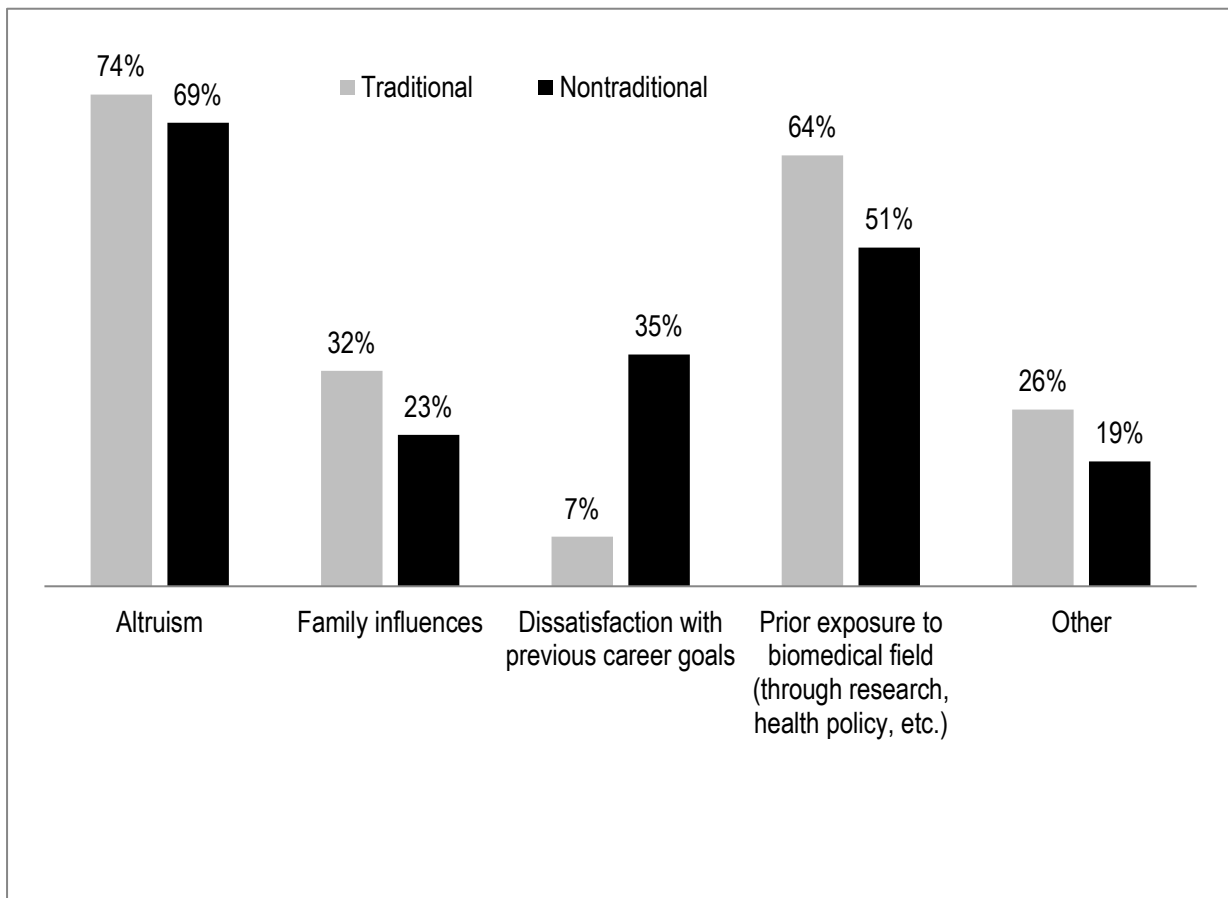


Figure 1. Reasons for pursuing medicine of traditional students (n = 121) and non-traditional students (n = 75). Respondents were able to choose more than one option. The average number of responses per participant was 2.0 for both age groups.

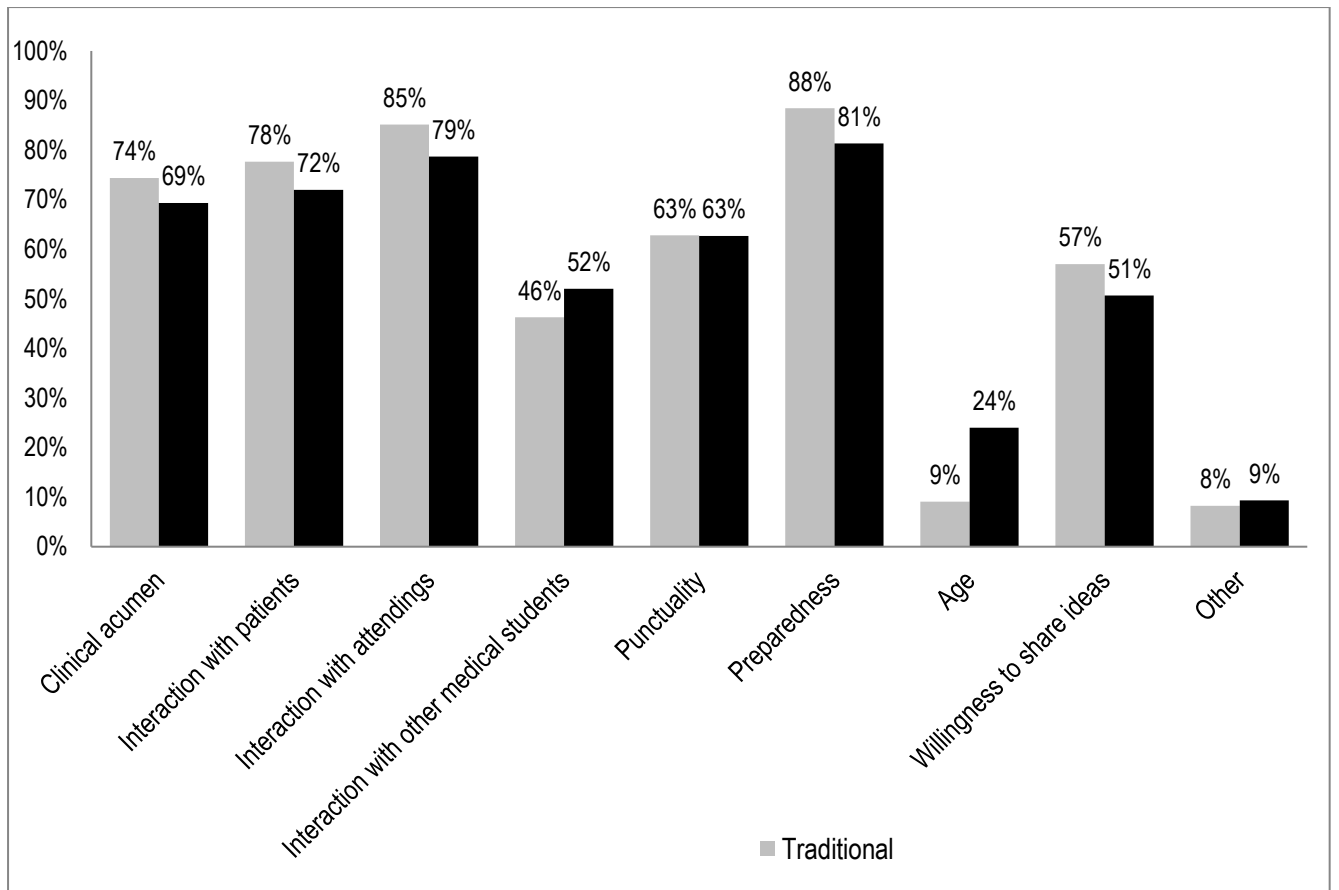


Figure 2. Attributes noticed in peers that allow them to perform well on clinical rotation, as stated by traditional students (n = 121) and non-traditional students (n = 75). Respondents were able to choose more than one attribute in answering the question. The average number of responses per participant was 5.1 for traditional students and 5.0 for non-traditional students.

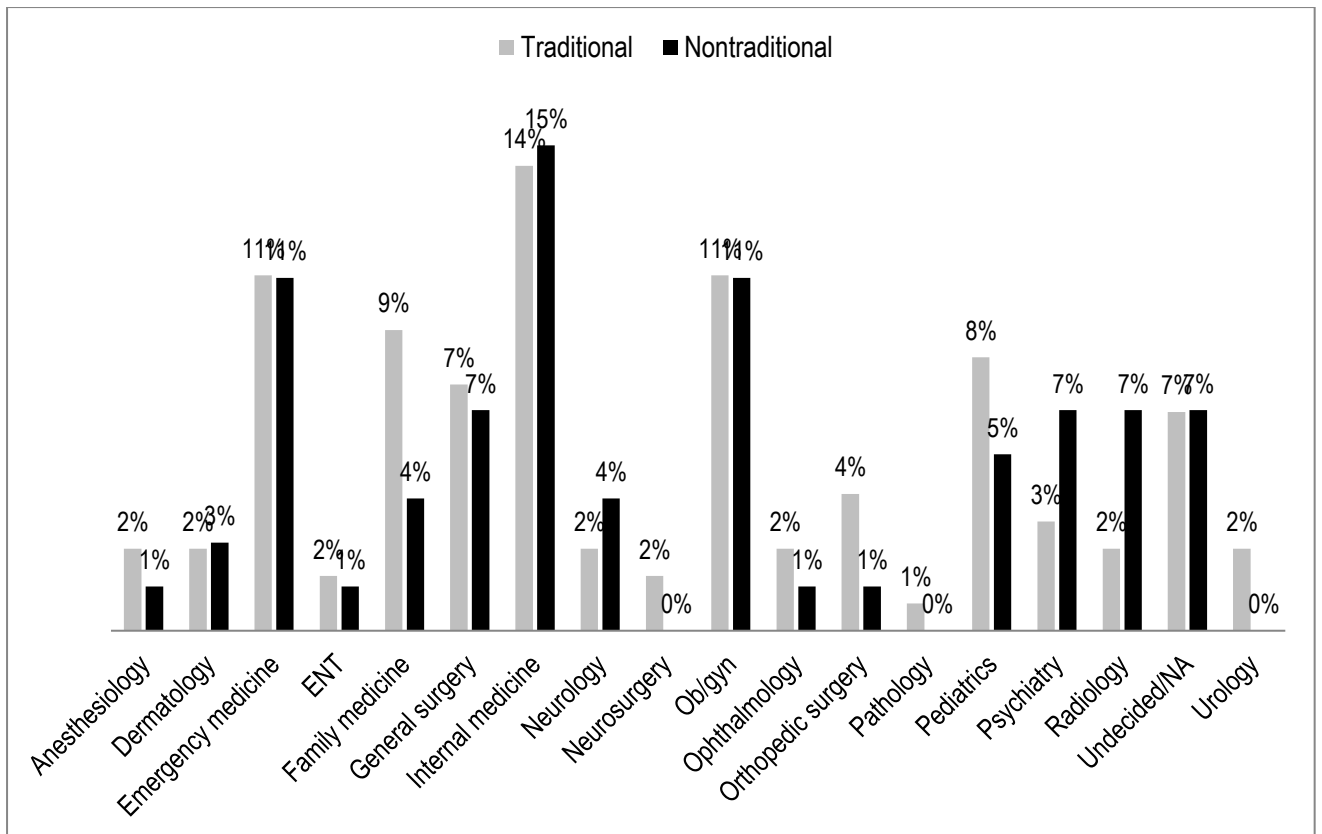


Figure 3. Specialty that traditional students (n = 121) and non-traditional students (n = 75) planned to pursue. Respondents were able to choose more than one specialty in answering the question. The average number of responses per participant was 0.94 for traditional students and 0.83 for non-traditional students.