

Brief Report

Bridging the Gap from Classroom to Clerkship to Career: Informal Surgical Mentorship for Pre-Clerkship Medical Students

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Received Mar. 25, 2025; Accepted for publication Jul. 3, 2025; Published online Aug. 15, 2025
 Kans J Med 2025 Jul-Aug; 18:78-82. <https://doi.org/10.17161/kjm.vol18.23769>

ABSTRACT

Introduction. Mentorship is important in medical education, yet its specific impact on pre-clerkship medical students interested in surgery remains underexplored. We hypothesized that a formal but unstructured surgical mentorship program would increase students' interest in surgery and improve their self-perceived readiness for the third-year surgical clerkship.

Methods. In this before–after study, pre-clerkship students at The University of Kansas School of Medicine were paired with volunteer surgical faculty mentors. An initial one-on-one meeting was required, while the frequency and structure of subsequent meetings were left to the participants. Surveys assessing student confidence and perceptions of the program were administered via Research Electronic Data Capture® (REDCap®) before the program and again six months later. Changes were analyzed using the Wilcoxon rank sum test for independent groups ($p < 0.05$).

Results. Of the 47 students enrolled, 31 (66.0%) completed the pre-program survey, and 24 (51.1%) of these completed the post-program survey. After six months, students reported significantly greater confidence in their preparation and knowledge for the third-year surgical clerkship, surgical skills, and understanding of surgical career pathways. More students also identified potential residency letter writers. However, 87.5% of respondents reported inconsistent mentor-mentee meetings.

Conclusions. A formal yet unstructured surgical mentorship program significantly improved pre-clerkship students' confidence in pursuing a surgical career and preparing for the surgical clerkship. Despite inconsistent meeting frequency, the program enabled meaningful mentorship without requiring rigid scheduling or extensive time commitments from participants.

INTRODUCTION

Mentorship is a cornerstone of surgical education, offering both mentees and mentors the opportunity to navigate medical careers

collaboratively. In surgical training, mentorship has been shown to improve career satisfaction and reduce stress and burnout.¹⁻³ During residency, it enhances diversity, scholarly productivity, and long-term professional fulfillment.⁴ Among medical students, mentorship may increase match rates into surgical residency programs⁵ and provides valuable, tailored guidance on applications.⁶ Early mentorship relationships are foundational for building resilience and long-term success in medical training.^{5,7,8}

Despite these benefits, many students struggle to find mentors during their pre-clerkship years (the first two years of medical school).^{9,10} Existing research on medical student mentorship programs primarily focuses on the clerkship years (the last two years of medical school), with limited attention to pre-clerkship students.^{7,11} With the United States Medical Licensing Examination® (USMLE®) Step 1 now scored pass/fail, students may feel increased pressure to commit to a specialty early and pursue experiences that strengthen their competitiveness for surgical residencies.¹²

To address this gap, we developed a mentorship program designed to connect pre-clerkship students with general surgeons and subspecialists. The primary goal was to assess the program's impact on students' attitudes toward surgery, perceived readiness for the surgical clerkship, and potential career pathways. A secondary aim was to evaluate the program structure for areas of improvement.

METHODS

Surgical faculty from a single academic institution was invited to participate as mentors. All pre-clerkship students were invited to apply and rank their preferences for specific surgical subspecialties. Mentor-mentee pairings were based on student preference and mentor availability. The institutional review board (IRB) approved the study as exempt, and written informed consent was waived.

All student participants completed a pre-program survey and were required to attend an initial one-on-one meeting with their assigned mentor. Subsequent interactions, including additional meetings, shadowing, and research opportunities, were left to the discretion of each mentor-mentee pair. A post-program survey was administered six months later; however, the duration of the mentorship relationship was not fixed, allowing pairs to continue or conclude their interactions beyond that timeframe.

The survey included 31 Likert-scale questions developed by the research team to assess five domains: (1) interest in surgery, (2) self-perceived readiness for the third-year surgical clerkship, (3) perceived knowledge of surgical skills and techniques, (4) confidence in achieving surgical career goals, and (5) perceived importance of mentorship in surgical education (Table 1). These outcome domains align with previous studies that showed improved clerkship performance and increased surgical residency application rates.^{7,11}

No existing validated instrument fully captured the intended constructs; therefore, the survey was developed based on a literature review and expert input from surgical faculty. Student focus groups provided feedback to refine question wording, improve clarity, and eliminate ambiguity. Data were collected and managed using Research Electronic Data Capture® (REDCap®) hosted at The University of Kansas Medical Center.^{13,14}

To minimize participant burden, mentors were not surveyed. No identifying information was collected to preserve anonymity, including linkages between pre- and post-surveys, which precluded the use of paired statistical tests. Consequently, the Wilcoxon rank sum test for independent groups was used to assess differences in Likert-scale responses. Fisher's exact tests were used to compare categorical responses, and Mann-Whitney *U* tests were used for continuous variables. All analyses were performed using R (version 4.2.1), with statistical significance set at $p < 0.05$. No *a priori* power analysis was conducted.

Table 1. Surgical mentorship program survey responses.

Characteristic	Pre-Program, N = 31 ^a	Post-Program, N = 24 ^a	p-Value ^b
Q1: What is your current year in medical school?			0.180
First Year Medical Student	27 (87.1%)	17 (70.8%)	
Second Year Medical Student	4 (12.9%)	7 (29.2%)	
Q2: I am sure I want to pursue a surgical specialty for residency.			0.877
Strongly Agree	10 (32.3%)	9 (37.5%)	
Agree	10 (32.3%)	6 (25.0%)	
Disagree	0 (0.0%)	1 (4.2%)	
Strongly Disagree	0 (0.0%)	1 (4.2%)	
Undecided	11 (35.5%)	7 (29.2%)	
Q3: I feel confident that I am on the right track to match into a surgical specialty for residency.			0.803
Strongly Agree	2 (6.5%)	4 (16.7%)	
Agree	13 (41.9%)	10 (41.7%)	
Disagree	2 (6.5%)	2 (8.3%)	
Strongly Disagree	0 (0.0%)	1 (4.2%)	
Undecided	14 (45.2%)	7 (29.2%)	
Q4: I feel prepared for the 3rd-year surgical clerkship.			0.001
Strongly Agree	0 (0.0%)	4 (16.7%)	
Agree	1 (3.2%)	8 (33.3%)	
Disagree	11 (35.5%)	4 (16.7%)	
Strongly Disagree	2 (6.5%)	1 (4.2%)	
Undecided	17 (54.8%)	7 (29.2%)	
Q5: I feel my knowledge base is sufficient for the 3rd-year surgical clerkship.			<0.001
Strongly Agree	0 (0.0%)	3 (12.5%)	
Agree	0 (0.0%)	4 (16.7%)	
Disagree	14 (45.2%)	4 (16.7%)	
Strongly Disagree	7 (22.6%)	1 (4.2%)	
Undecided	10 (32.3%)	12 (50.0%)	
Q6: I feel I have a strong grasp of surgical skills.			0.020
Strongly Agree	0 (0.0%)	2 (8.3%)	
Agree	0 (0.0%)	5 (20.8%)	
Disagree	14 (45.2%)	4 (16.7%)	
Strongly Disagree	6 (19.4%)	3 (12.5%)	
Undecided	11 (35.5%)	10 (41.7%)	

Table 1. Surgical mentorship program survey responses. continued.

Characteristic	Pre-Program, N = 31 ^a	Post-Program, N = 24 ^a	p-Value ^b
Q7: I feel prepared to perform basic instrument suturing in the operating room (OR).			0.146
Strongly Agree	2 (6.5%)	4 (16.7%)	
Agree	6 (19.4%)	4 (16.7%)	
Disagree	8 (25.8%)	6 (25.0%)	
Strongly Disagree	9 (29.0%)	3 (12.5%)	
Undecided	6 (19.4%)	7 (29.2%)	
Q8: I feel prepared to practice sterile technique in the OR.			0.020
Strongly Agree	4 (12.9%)	7 (29.2%)	
Agree	8 (25.8%)	12 (50.0%)	
Disagree	8 (25.8%)	1 (4.2%)	
Strongly Disagree	5 (16.1%)	2 (8.3%)	
Undecided	6 (19.4%)	2 (8.3%)	
Q9: I feel prepared to properly gown and drape in the OR.			0.047
Strongly Agree	4 (12.9%)	7 (29.2%)	
Agree	6 (19.4%)	8 (33.3%)	
Disagree	9 (29.0%)	1 (4.2%)	
Strongly Disagree	5 (16.1%)	3 (12.5%)	
Undecided	7 (22.6%)	5 (20.8%)	
Q10: I can currently name someone who would write a letter of recommendation for me for my residency application in a surgical specialty.			0.027
Yes	4 (12.9%)	10 (41.7%)	
No	27 (87.1%)	14 (58.3%)	
Q11: I am satisfied with my academic performance.			0.710
Strongly Agree	9 (29.0%)	6 (25.0%)	
Agree	17 (54.8%)	14 (58.3%)	
Disagree	1 (3.2%)	0 (0.0%)	
Strongly Disagree	0 (0.0%)	1 (4.2%)	
Undecided	4 (12.9%)	3 (12.5%)	
Q12: I feel comfortable interacting with surgeons.			0.235
Strongly Agree	7 (22.6%)	9 (37.5%)	
Agree	15 (48.4%)	11 (45.8%)	
Disagree	3 (9.7%)	1 (4.2%)	
Strongly Disagree	0 (0.0%)	0 (0.0%)	
Undecided	6 (19.4%)	3 (12.5%)	
Q13: I understand how to network with surgeons.			0.024
Strongly Agree	1 (3.2%)	5 (20.8%)	
Agree	8 (25.8%)	8 (33.3%)	
Disagree	8 (25.8%)	4 (16.7%)	
Strongly Disagree	2 (6.5%)	0 (0.0%)	
Undecided	12 (38.7%)	7 (29.2%)	

Table 1. Surgical mentorship program survey responses. continued.

Characteristic	Pre-Program, N = 31 ^a	Post-Program, N = 24 ^a	p-Value ^b
Q14: I am confident in my current knowledge about the field of surgery relative to my current level of study.			0.034
Strongly Agree	0 (0.0%)	6 (25.0%)	
Agree	14 (45.2%)	10 (41.7%)	
Disagree	6 (19.4%)	2 (8.3%)	
Strongly Disagree	0 (0.0%)	1 (4.2%)	
Undecided	11 (35.5%)	5 (20.8%)	
Q15: I have a good idea of my future career path.			0.095
Strongly Agree	2 (6.5%)	6 (25.0%)	
Agree	10 (32.3%)	10 (41.7%)	
Disagree	2 (6.5%)	1 (4.2%)	
Strongly Disagree	1 (3.2%)	0 (0.0%)	
Undecided	16 (51.6%)	7 (29.2%)	
Q16: I know what I need to do to achieve my desired career path.			0.055
Strongly Agree	2 (6.5%)	4 (16.7%)	
Agree	12 (38.7%)	16 (66.7%)	
Disagree	6 (19.4%)	1 (4.2%)	
Strongly Disagree	0 (0.0%)	0 (0.0%)	
Undecided	11 (35.5%)	3 (12.5%)	
Q17: I feel like a surgical specialty is a good career path for someone like me.			0.677
Strongly Agree	6 (19.4%)	6 (25.0%)	
Agree	17 (54.8%)	9 (37.5%)	
Disagree	0 (0.0%)	1 (4.2%)	
Strongly Disagree	0 (0.0%)	0 (0.0%)	
Undecided	8 (25.8%)	8 (33.3%)	
Q18: Mentorship is important to my medical education.			0.038
Strongly Agree	26 (83.9%)	14 (58.3%)	
Agree	5 (16.1%)	10 (41.7%)	
Disagree	0 (0.0%)	0 (0.0%)	
Strongly Disagree	0 (0.0%)	0 (0.0%)	
Undecided	0 (0.0%)	0 (0.0%)	

^an (%)

^bFisher's exact test; Mann-Whitney *U* test

RESULTS

A total of 30 surgical faculty members volunteered as mentors, representing general surgery, acute care/trauma surgery, neurosurgery, orthopedics, plastic surgery, surgical oncology, cardiothoracic surgery, otolaryngology, vascular surgery, urology, and ophthalmology (Table 2). In all, 47 students were paired with faculty mentors, including 13 faculty members who agreed to mentor more than one student.

Of the participating students, 31 (66.0%) completed the pre-program survey, and 24 (51.1%) completed the post-program survey. Across both surveys, 80% of respondents were second-year (MS-2) students and 20% were first-year (MS-1) students, possibly reflecting increased interest in specialty selection among MS-2 students.

Table 2. Mentor-mentee pairing by surgical specialty/subspecialty.

Specialty/Subspecialty	Faculty*	Students*	Faculty with multiple mentees*
Acute care/trauma surgery	4	9	3
Cardiothoracic surgery	1	1	0
General surgery	7	11	1
Neurosurgery	3	5	2
Ophthalmology	1	1	0
Orthopedics	1	2	1
Otolaryngology	2	2	0
Plastic surgery	5	7	3
Surgical oncology	3	3	0
Urology	2	4	2
Vascular surgery	1	2	1
Totals:	30	47	13

*n

Statistically significant increases in student confidence were observed between the pre- and post-program surveys in several key areas (Table 1). Students reported greater confidence in their preparedness and knowledge base for the third-year surgical clerkship ($p = 0.001$ and $p < 0.001$, respectively). They also noted improved confidence in their surgical skills and overall knowledge of the field ($p = 0.020$ and $p = 0.034$, respectively). In addition, students expressed increased confidence in identifying a potential letter writer for surgical residency and understanding how to network with surgeons ($p = 0.027$ and $p = 0.024$, respectively). There also were gains in confidence regarding sterile technique and proper gowning and draping in the operating room ($p = 0.020$ and $p = 0.047$, respectively). While responses to the statement "Mentorship is important to my medical education" shifted from "Strongly Agree" to "Agree" in greater proportions ($p = 0.038$), all other changes in survey items were not statistically significant.

Descriptive statistics from the post-survey (Table 3) revealed that none of the students reported having a surgical mentor outside of this program. Most respondents (62%) rated the experience as "valuable" or "very valuable," and 70.8% described the quality of their mentoring relationship as "good" or "very good." Additionally, 75.0% reported receiving valuable advice, and 62.5% reported an increase in their knowledge of surgery. However, 87.5% of mentees noted a lack of regular meetings with their mentor beyond the initial interaction, as defined by the mentees themselves.

Table 3. Surgical mentorship program responses following program completion (N = 24).

Characteristic	n (%)
Q1: Do you currently have a mentor in a surgical specialty that is not due to this program?	
Yes	9 (37.5%)
No	15 (62.5%)
Q2: How satisfied are you with the mentorship program?	
Very Satisfied	4 (16.7%)
Satisfied	13 (54.2%)
Neutral	4 (16.7%)
Dissatisfied	1 (4.2%)
Very Dissatisfied	2 (8.3%)
Q3: What was the quality of advice you received from your mentor?	
Very Good	4 (16.7%)
Good	14 (58.3%)
Neutral	3 (12.5%)
Poor	0 (0.0%)
Very Poor	3 (12.5%)
Q4: Did you shadow your mentor?	
Yes	5 (20.8%)
No	19 (79.2%)
Q5: Approximately how many times did you shadow your mentor?	
0-1	23 (95.8%)
2-3	1 (4.2%)
Q6: Did you regularly meet with your mentor [as defined by you, the mentee]?	
Yes	3 (12.5%)
No	21 (87.5%)
Q7: Approximately how many times did you meet with your mentor outside of clinical or surgical experiences [including the initial meeting]?	
0-1	21 (87.5%)
2-3	2 (8.3%)
>5	1 (4.2%)
Q8: The experiences my mentor provided me with were	
Very Valuable	3 (12.5%)
Valuable	12 (50.0%)
Neutral	6 (25.0%)
Worthless	0 (0.0%)
Very Worthless	3 (12.5%)
Q9: The quality of my mentor relationship was	
Very Good	3 (12.5%)
Good	14 (58.3%)
Neutral	3 (12.5%)
Poor	1 (4.2%)
Very Poor	3 (12.5%)
Q10: I can be open and honest with my mentor.	
Strongly Agree	4 (16.7%)
Agree	10 (41.7%)
Disagree	1 (4.2%)
Strongly Disagree	2 (8.3%)
Undecided	7 (29.2%)

Table 3. Surgical mentorship program responses following program completion (N = 24). continued.

Characteristic	n (%)
Q11: My preparedness for a career in surgery improved because I participated in the mentorship program.	
To a great extent	3 (12.5%)
Somewhat	9 (37.5%)
Neutral	11 (45.8%)
Decreased to a great extent	1 (4.2%)
Q12: I believe I understand surgery better because I participated in the mentorship program.	
To a great extent	3 (12.5%)
Somewhat	12 (50.0%)
Neutral	7 (29.2%)
Decreased to a great extent	2 (8.3%)

*n (%)

DISCUSSION

Early mentorship can be invaluable in helping medical students make informed career decisions. However, forming mentor-mentee relationships often is challenging, especially for students without established medical connections, such as first-generation or underrepresented students.¹⁵ Additionally, having a role model in surgery is associated with a higher likelihood of pursuing a surgical career.¹⁶ Our mentorship program aimed to address these gaps by offering pre-clerkship students direct access to surgical faculty.

After six months, students reported significant improvements in confidence and perceived readiness. More students felt prepared for the third-year surgical clerkship and reported having surgical knowledge appropriate for their level. Confidence in surgical skills, as well as in sterile gowning and draping, also increased. These findings suggest that even informal mentorship can enhance students' preparedness for clerkship expectations, consistent with prior research showing that early surgical exposure boosts confidence.¹⁷

Students also reported a greater understanding of surgical career advancement. Confidence in networking with surgeons increased, and more students identified potential letter writers after the program. These outcomes likely reflect mentor-mentee conversations about navigating the path to surgical residency.

While the program improved student confidence, we did not expect it to significantly impact match rates, outcomes that are influenced by multiple factors, including test scores, grades, and research, as shown in prior studies.¹⁸ Still, most students were satisfied and found the experience valuable. These results suggest strong alignment between the program's goals and student expectations: gaining insight into a surgical career and building confidence.

Interestingly, the program did not significantly change students' intent to pursue surgery, likely due to high baseline interest. This introduces potential self-selection bias, as students already interested in surgery were more likely to enroll. Future iterations should target undecided students, as studies have shown that early surgical exposure can

increase interest in the field.^{19,20}

Challenges included inconsistent mentor-mentee meetings and limited shadowing experiences. These may reflect the relatively short six-month follow-up period. Future longitudinal assessments may better capture relationship development and improvements in areas like perceived residency competitiveness or surgical techniques. Over time, we anticipate more shadowing and operating room exposure will further enhance student confidence.²¹

In contrast to highly structured programs, such as one that demonstrated improved test scores and a 100% recommendation rate after a two-week intervention for first-year students,²¹ our unstructured, flexible model involving both MS-1 and MS-2 students likely yielded more modest gains. MS-2 students may have had smaller knowledge gaps, and the open-ended structure emphasized student initiative over prescribed content. While a standardized curriculum might improve consistency, we prioritized relationship-building and student ownership.

Although overall satisfaction was high, a minority of students expressed dissatisfaction or rated aspects of the program poorly. This may help explain the decline in students who “strongly agreed” that mentorship is important. Future surveys should include more detailed questions about sources of dissatisfaction and meeting logistics to guide program improvements. Although we did not survey mentors to reduce participant burden, collecting their feedback in future iterations could provide valuable insight. Additionally, our modest pre-survey (66%) and post-survey (51%) response rates may have limited the representativeness of our findings, potentially due to survey fatigue.

CONCLUSIONS

Mentorship with surgical faculty can be one of the most influential experiences for pre-clerkship students considering a surgical career. A formal, yet flexible program such as this may help bridge gaps in access and preparedness. Although long-term outcomes such as clerkship performance and match success remain to be evaluated, this program offers a meaningful foundation for future surgical mentorship initiatives.

ACKNOWLEDGEMENTS

The authors of this study would like to acknowledge the contributions of The University of Kansas Department of General Surgery, Department of Biostatistics and Data Science, the Student Surgery Organization, and the many surgery faculty mentors who participated in this project, all of whom without their input, advice, time, and personal investment in medical education, this study would not have been possible.

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Keywords: education, surgery, mentorship