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Authors

Rhodin, Kristen E
Hong, Cierra S
Olivere, Lindsey A
[et al.](#)

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Implementation of a Surgical Oncology Disparities Curriculum for Pre-Clinical Medical Students

Kristen E. Rhodin, M.D.^{a,*}, Cierra S. Hong, B.A.^{b,*}, Lindsey A. Olivere, B.S.^b, Elizabeth P. Howell, B.S.^b, Vinay K. Giri, B.S.^b, Kurren A. Mehta, B.S.^b, Taofik Oyekunle, M.S.^c, Randall P. Scheri, M.D., F.A.C.S.^a, Betty C. Tong, M.D., M.H.S., F.A.C.S.^d, Julie A. Sosa, M.D., F.A.C.S.^e, Oluwadamilola M. Fayanju, M.D., F.A.C.S.^{a,f,g,h,i}

^aDepartment of Surgery, Duke University Medical Center, Durham, NC, Box 3513, Durham, NC 27710, USA

^bDuke University School of Medicine, Durham, NC, 27710, USA

^cDepartment of Biostatistics and Bioinformatics, Duke University School of Medicine, Durham, NC, Box 2717, Durham, NC 27710, USA

^dDivision of Cardiovascular and Thoracic Surgery, Department of Surgery, Duke University School of Medicine, Box 3531, Durham, NC 27710, USA

^eDepartment of Surgery, University of California, San Francisco (UCSF), San Francisco, CA 94143, USA

^fWomen's Cancer Program, Duke Cancer Institute, Durham, NC 27710, USA

^gDepartment of Population Health Sciences, Duke University School of Medicine, 215 Morris Street, Durham, NC 27701

^hDuke Forge, Duke University, Durham, NC 27710, USA

ⁱDepartment of Surgery, Durham VA Medical Center, 508 Fulton St, Durham, NC 27705

Corresponding Author: Oluwadamilola M. Fayanju, M.D., M.A., M.P.H.S., F.A.C.S., Duke University Medical Center Box 3513, Durham, NC 27710, Tel: 919-681-9156, lola.fayanju@duke.edu.

*Equal first author contribution

Author Contributions:

- Conception and design: Rhodin, Hong, Sosa, Fayanju
- Development of Methodology: Rhodin, Hong, Sosa, Fayanju
- Acquisition of data: Rhodin, Hong
- Analysis and interpretation of data: Rhodin, Hong, Olivere, Oyekunle, Howell, Giri, Mehta, Fayanju
- Writing, review, and/or revision of the manuscript: Rhodin, Hong, Olivere, Howell, Giri, Mehta, Scheri, Tong, Sosa, Fayanju
- Administrative, technical, or material support: Rhodin, Hong, Olivere, Howell, Sosa, Fayanju
- Study supervision: Scheri, Tong, Sosa, Fayanju

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Abstract

Background: Under- and uninsured surgical-oncology patients are at higher risk of perioperative morbidity and mortality. Curricular innovation is needed to train medical students to work with this vulnerable population. We describe the implementation of and early educational outcomes from a student-initiated pilot program aimed at improving medical student insight into health disparities in surgery.

Materials/Methods: First-year medical students participated in a dual didactic and perioperative-liaison experience over a 10-month period. Didactic sessions included surgical-skills training and faculty-led lectures on financial toxicity and management of surgical-oncology patients. Students were partnered with uninsured and Medicaid patients receiving surgical-oncology care and worked with these patients by providing appointment reminders, clarifying perioperative instructions, and accompanying patients to surgery and clinic appointments. Students' interest in surgery and self-reported comfort in 15 AAMC core competencies were assessed with pre- and post-participation surveys using a 5-point Likert scale.

Results: 24 first-year students were paired with 14 surgical-oncology patients during the 2017-2018 academic year. 16 students (66.7%) completed both pre- and post-program surveys. 5 students (31.3%) became "More Interested" in surgery, while 11 (68.8%) reported "Similar Interest or No Change." Half of the students (n=8) felt more prepared for their surgery clerkship after participating. Median self-reported comfort improved in 7/15 competencies including Oral Communication and Ethical Responsibility. All students reported being "Somewhat" or "Extremely Satisfied" with the program.

Conclusions: We demonstrate that an innovative program to expose pre-clinical medical students to challenges faced by financially and socially vulnerable surgical-oncology patients is feasible and may increase students' clinical preparedness and interest in surgery.

Keywords

Health Disparities; Insurance Status; Surgical Oncology; Undergraduate Medical Education

Introduction

In an evolving healthcare landscape, health insurance status increasingly dictates the type and quality of healthcare that patients receive. This is especially true among patients who have been diagnosed with cancer. It has been well reported that oncology patients with low socioeconomic status are more likely to present with late-stage disease, experience delays in treatment, and exhibit poor rates of follow-up.¹⁻⁵ Among patients requiring surgery for their cancer, uninsured patients and those with Medicaid are especially vulnerable.⁶⁻⁸ These patients are less likely to receive cancer-directed surgery than their privately insured counterparts.^{4,5,9} Furthermore, those with Medicaid or no insurance coverage that do undergo surgery have heightened rates of postoperative morbidity and mortality.⁷

Recognition of existing health disparities and the role these gaps play in increasing healthcare costs is crucial in the training of future health professionals. Indeed, many have voiced concern that medical education can no longer ignore the role our medical system

plays in perpetuating health disparities.¹¹ Currently, there is no standardized curriculum for health disparities education at the medical school level. Recent initiatives from the Association of American Medical Colleges (AAMC) are intended to promote the incorporation of social determinants of health into undergraduate medical education.¹² Many of these initiatives couple classroom introductions to these topics with community outreach focused on primary care and rural health settings.^{11–15} There remains a paucity of literature, however, describing the feasibility and educational outcomes of medical school programs to address these needs among the surgical specialties.

Curricular innovation at the medical school level is needed to train future physicians to work with vulnerable populations. Efforts to teach this skillset early in the education of future physicians will help inform medical trainees' perspectives throughout their training. Broadening the focus of health disparities education beyond the scope of primary care is also critical in shaping student understanding of how patient care is affected by socioeconomic factors. With these educational goals in mind, we created a program for pre-clinical medical students to serve as perioperative liaisons for under- or uninsured surgical oncology patients. Our primary aim was to broaden medical student exposure to health disparities in surgery, with a secondary goal to develop a framework that would ultimately also improve care for this underserved population. Herein, we describe the implementation and early educational outcomes of this pilot, student-initiated program.

Materials and Methods

Program Description and Logistics

A 10-month student-run program was designed to educate students about disparities in surgical oncology care. Third-year medical students collaborated with surgical faculty at a cancer center providing tertiary and quaternary specialty care. Together, they designed a curricular program named SOARR (**S**urgical **O**ncology **A**mbassadors **R**edefining **R**ecovery), which included both didactic sessions and an interactive patient experience (Figure 1). Funding was provided by the Albert Schweitzer Fellowship.

At our institution, the pre-clinical curriculum is condensed into the first year, the second year is dedicated to clinical clerkships, and the third year provides students an opportunity for dedicated research. Our program recruited first-year medical student participants and third-year medical student mentors in order to pair pre-clinical students with those who had completed their clerkship rotations. The program was presented to the entering first-year class and interested students volunteered to participate in the program as an extracurricular activity. The 10-month didactic curriculum included several sessions covering introductory surgical skills (e.g., knot-tying, suturing, and laparoscopic simulation) and an orientation to the operating room (e.g., learning sterile technique and how to scrub). Lectures from faculty were also included in the didactic sessions and emphasized topics such as the burden of financial concerns on cancer patients (i.e., financial toxicity) and clinical decision-making in breast and endocrine oncology.^{17–19} Faculty discussed the epidemiology and surgical management of their respective disease groups and detailed the perioperative workflow and multidisciplinary aspects of cancer care.

For the patient-facing component of the program, students were given the opportunity to serve as perioperative liaisons for uninsured and Medicaid patients. Our institution is located in a county where approximately 13% of the population is uninsured, and many more receive coverage under Medicaid.¹⁶ Patients without insurance or with Medicaid and who were receiving surgical care for breast, endocrine, and lung neoplasms were eligible to participate. Once approval to participate was provided by the attending surgeon to the SOARR student coordinators, each patient was contacted regarding the program and her/his potential participation. Patients interested in participating were then paired with first-year medical student liaisons, with some students working in pairs. Medical students were given a checklist of tasks specific to their patient's diagnosis and upcoming operation and that were to be fulfilled throughout the perioperative period (Figure 2). Students also received access to their patient's electronic medical record and recorded patient interactions in the form of progress notes that were accessible to the patient's care team. Students were asked to serve as conduits of information between patients and their oncology teams and to be additional sources of social support for patients throughout the perioperative period.

Preoperative Responsibilities

First-year medical students met with third-year medical students to discuss the patient's pathology and review their medical charts prior to meeting the patient. In addition to the didactic sessions outlining perioperative workflow for each division, students were expected to read about their patient's disease process and standard treatment options. Subsequently, they attended their patient's preoperative clinic appointment, where they met the patient and attending surgeon. Students established a patient-preferred method of communication with their patient in order to send reminders for any additional preoperative appointments such as anesthesia screening or imaging. Students attended anesthesia screening appointments in order to be able to reinforce perioperative medication instructions. They also worked with patients to ensure they had a method of transportation on the day of surgery, reminded them of expected arrival time, and reinforced "NPO" restrictions. If barriers were identified prior to the day of surgery, students contacted the provider team and worked with patient navigators within the institution to triage and resolve these issues.

Intraoperative Role

Students were encouraged to meet their patients in the waiting room on the day of surgery and then accompany them to the preoperative area. After receiving permission from both the attending surgeon and the patient, students also accompanied patients to the operating room and shadowed or scrubbed into the case, as deemed appropriate by the attending surgeon. Following the surgery, students visited patients in the post-anesthesia care unit (PACU).

Postoperative Responsibilities

Students were encouraged to visit their patients on each postoperative day of their hospital stay. Following discharge, students contacted patients to remind them of postoperative appointments, laboratory visits, and/or medication changes. Students were also encouraged to attend postoperative clinic appointment(s).

Study Design and Analysis

AAMC core competencies aim to represent requisite skills for medical learners and fall under the following categories: interpersonal, intrapersonal, thinking and reasoning, and science competencies (Table 1).²⁰ To assess the impact of our program on student participants' education, a survey was designed to assess first-year students' self-reported levels of comfort in the 15 AAMC core competencies using a 5-point Likert scale – (1) very uncomfortable, (2) somewhat uncomfortable, (3) neutral, (4) somewhat comfortable, and (5) very comfortable – with special consideration given to the overlap of these competencies with health disparities and surgical oncology (Figure 3A). This survey was administered pre- and post-participation in the program. The survey utilized an anonymous identifier to allow for pairing of pre- and post-participation results. Only medical students who completed both pre- and post-participation surveys were included in the analysis. The median level of comfort and interquartile range (IQR) were determined for each competency at both pre- and post-participation time points. The change in level of comfort during the program was calculated for each competency. Similar analyses were carried out within each gender stratum.

At the conclusion of the program, student participants were also surveyed about changes in their level of interest in pursuing a career in surgery and/or oncology as well as any perceived benefit of the program for their future surgery clerkships (Figure 3B). Overall satisfaction with the program was assessed. Analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC) and Stata 14.2 (Stata, Corp., College Station, TX, USA) and were granted exemption by the Duke Institutional Review Board (IRB Pro00101488).

Results

The initial 10-month program spanned the 2017-2018 academic year. Thirty-two of the 116 first-year medical students (or about 1/4 of the entire class) at Duke School of Medicine initially expressed interest in participating in SOARR. Ultimately, 28 of these 32 students (87.5%) committed to program participation and completed pre-program surveys. A total of 14 patients (8 endocrine, 5 breast, and 1 lung) were recruited and paired with 24 student liaisons. Four students were unable to be paired with patients due to scheduling conflicts during the year. Of the 24 students (12 female, 12 male) who worked directly with patients, 21 (87.5%) completed surveys at the conclusion of the program. Sixteen medical students completed both pre- and post-participation surveys. Of these participants, eight (50%) identified as female, and eight (50%) as male.

At the program's conclusion, five students (31.3%) indicated that they became "More Interested" in surgery, and the remaining 11 (68.7%) reported "Similar Interest or No Change." Four students (25%) reported they were "More Interested" in oncology, 10 (62.5%) reported "Similar Interest or No Change," and two students (12.5%) said that they were "Less Interested." Half of the students (n=8) reported feeling better prepared for their surgical clerkship. All students (16/16) reported being "Somewhat" or "Extremely Satisfied" with program components.

There was net improvement in the median level of comfort in seven of the 15 AAMC core competencies. These included oral communication, ethical responsibility, reliability and dependability, capacity for improvement, quantitative reasoning, scientific inquiry, and living systems (Table 2); more students rated themselves as “very comfortable” with these competencies at completion of the program (Figure 4). The greatest collective improvement occurred among the intrapersonal competencies. Net decline in median comfort was only observed in service orientation. No change was noted in the remaining competencies.

Male students reported a higher baseline (i.e., pre-survey) level of comfort in more competencies than female students (Table 3). Both male and female students improved in 6 competencies. Net improvement was only observed among female students in the domains of ethical responsibility and human behavior, while net improvement in scientific inquiry was limited to male students. Female students had a greater positive shift in quantitative reasoning compared to their male colleagues (+1.5 vs +0.5). Declining levels of comfort with service orientation were limited to female students, while male students’ comfort declined in the social skills competency.

Discussion

In this study, we describe the implementation and early educational outcomes of SOARR, a novel, student-initiated didactic curriculum and perioperative liaison experience aimed at increasing pre-clinical medical students’ understanding of factors that may contribute to health disparities among surgical oncology patients. To our knowledge, this is the first medical student program aimed at addressing these needs in the field of surgical oncology.

Educational initiatives have been piloted to expose medical students to the social determinants of health in primary care, rural health settings, and student-run clinics.^{11,14} Following Atul Gawande’s 2011 *New Yorker* profile “The Hot Spotters,” both the AAMC and several United States (US) health professional schools have created “Hotspotting” programs. Programs at Virginia Commonwealth University and the University of North Carolina, Chapel Hill, have been designed to train health professional students in medicine, nursing, pharmacy, and social work to practice patient-centered care in the management of individuals with complex medical and social backgrounds.^{15, 21–23} Students who participate in “Hotspotting” work with patients who are high healthcare utilizers, with the ultimate goal of decreasing these patients’ healthcare expenditures.^{15, 23} These longitudinal partnerships between patients and students are often developed through home visits or regular phone calls, help with identifying resources and transportation, and setting goals for modifiable health risk factors.

Colleagues here at Duke previously described a student-led and -initiated educational program that has allowed medical students to work with cancer patients who have terminal disease.²⁴ This program provides pre-clinical medical, nursing, and physician-assistant students with the opportunity to learn about end-of-life care and empower them to lead difficult conversations regarding goals of care. Both the Duke end-of-life program and the national Hotspotting initiative provide unique educational opportunities to enhance the traditional undergraduate medical curriculum. SOARR, however, provides a unique

opportunity to learn about the surgical components of cancer care, its associated financial burdens, and the potential for disparities to affect both quality of care and health outcomes within a potentially vulnerable population.

Beyond demonstrating the feasibility of this initiative, we also report positive educational outcomes, with improvement in several of the AAMC core competencies expected of entering medical students. The majority of these improvements were in the domain of intrapersonal competencies. This reflects the capacity of our program's structure to impact students' ability to communicate clearly and compassionately with patients early on in their undergraduate medical education, before they otherwise have opportunities to be involved in patient care. The only competency in which students reported a decline in comfort occurred around the Interpersonal Competency of Service Orientation: "ability to assess and act upon a local community's need." This finding suggests the importance of including a program with a health-disparities focus such as ours in medical student education. As student exposure to the unique challenges faced by underserved populations increased, they may have become more aware of the extent to which "they didn't know what they didn't know" and the importance of asking questions of – rather than imposing solutions on – the patients we serve.

SOARR also has the potential to foster interest in pursuing a surgical career. Kozar and colleagues at the University of Texas, Houston, previously reported the significant positive influence that attending surgeons can have on first-year medical students' perceptions of surgery after even a brief, single-session intervention.²⁵ Specifically, they observed significant improvement in students' perceptions of the quality of surgeons' patient relationships and of gender distribution and academic opportunities within the field of surgery. SOARR is unique, however, in that it provides students with a variety of clinical experiences in which to observe surgeon-patient interactions as well as the opportunity for students to interact with attending surgeons in both the OR and informal classroom settings. While not formally assessed in program surveys, interactions such as these have the potential to dispel previously held negative perceptions of surgical careers and provide consistently accurate and positive exposure to the discipline.

Primary care physicians are already known to play an important role in addressing health disparities, but SOARR demonstrates the potential for surgeons – and specifically surgical oncologists – to also play a role in promoting health equity. Student interest in surgery appeared to increase as a consequence of program participation, and several students reported feeling more confident as they prepared for their surgical clerkship. Future iterations of the SOARR program will aim to assess what aspects of the curriculum were most helpful in fostering interest in surgical careers and what pre-conceived notions about the field of surgery changed through SOARR participation.

Limitations

This study had several limitations. Students choosing to participate in SOARR may have had a baseline interest in surgery or oncology, resulting in selection bias. In our inaugural year, initial patient recruitment was low, so not all students interested in participating could be paired with a patient. We have yet to characterize the driving factors behind a patient's

decision to participate and the disparities that may impact that decision. We were not able to standardize all aspects of the program, resulting in a student liaison experience that was variable with regard to length of patient interaction, communication, and ability to participate in the patient's surgery. By only including participants who completed both pre- and post-participation surveys in our analysis, our sample size was limited to 16, and only descriptive statistics are reported. In addition, significant changes to the survey in the program's second year precluded our combining the educational outcomes of our inaugural and second cohorts into one analysis as the response data are incommensurate. Further, we did not survey faculty on the students' performance and growth. Finally, we have not yet conducted an analysis of patients' perceptions of the program or of patient-facing outcomes.

Lessons Learned and Future Directions

Despite these limitations, this pilot year was fundamental for learning the logistics of patient recruitment, how to best integrate students into the care team, and the utility of each didactic session. We learned that patient recruitment should be started early and throughout the academic year in a rolling fashion. Partnering with each division's advanced practice providers (APPs) has proved essential to success in recruitment and early communication with patients. Further, APPs were an additional point of contact for students with patient questions or concerns. Students were best integrated into the team by timely communication, attendance at various components of the patient's care, and writing progress notes in the electronic medical record. Additionally, they were able to apply lessons from the didactics that were focused and goal-oriented.

With the helpful feedback of patients, participants, and attending physicians, the program has proved sustainable as it enters its third year. The program has just graduated its second cohort of student participants, with surveys that have been significantly amended to include further assessment of students' baseline interest and previous exposures to surgery, knowledge of healthcare economics, and understanding of the financial burden faced by cancer patients. Didactics remain goal-oriented but have expanded to include further topics on health insurance and inequity. Future directions include expansion of SOARR to include other surgical oncology fields, inclusion of other healthcare trainees in the program, and assessment of both patient outcomes and patients' perspectives on working with pre-clinical medical students.

Conclusions

Our study is the first to describe a program aimed at exposing pre-clinical medical students to the challenges faced by surgical oncology patients and the disparities in oncologic surgical care potentially arising from insurance status. We demonstrate that this innovative program is both feasible and potentially sustainable, and the curricular focus on health disparities appears to address critical gaps in medical education. Medical schools, in conjunction with their surgical leadership, should advocate for the creation of similar programs in order to broaden their students' early clinical experiences, provide accurate and positive exposure to surgery, and ultimately foster interest in the field of surgery.

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Highlights

- Student-initiated program examining health disparities in surgical oncology
- 24 pre-clinical medical students participated in the 2017-18 academic year; they were paired with a total of 14 patients treated by breast, endocrine, and thoracic surgical oncology teams
- After participation, 8/16 students felt more prepared for their future surgery clerkship
- Program is both feasible and sustainable, and may improve student interest in surgery and preparedness for future clinical curriculum

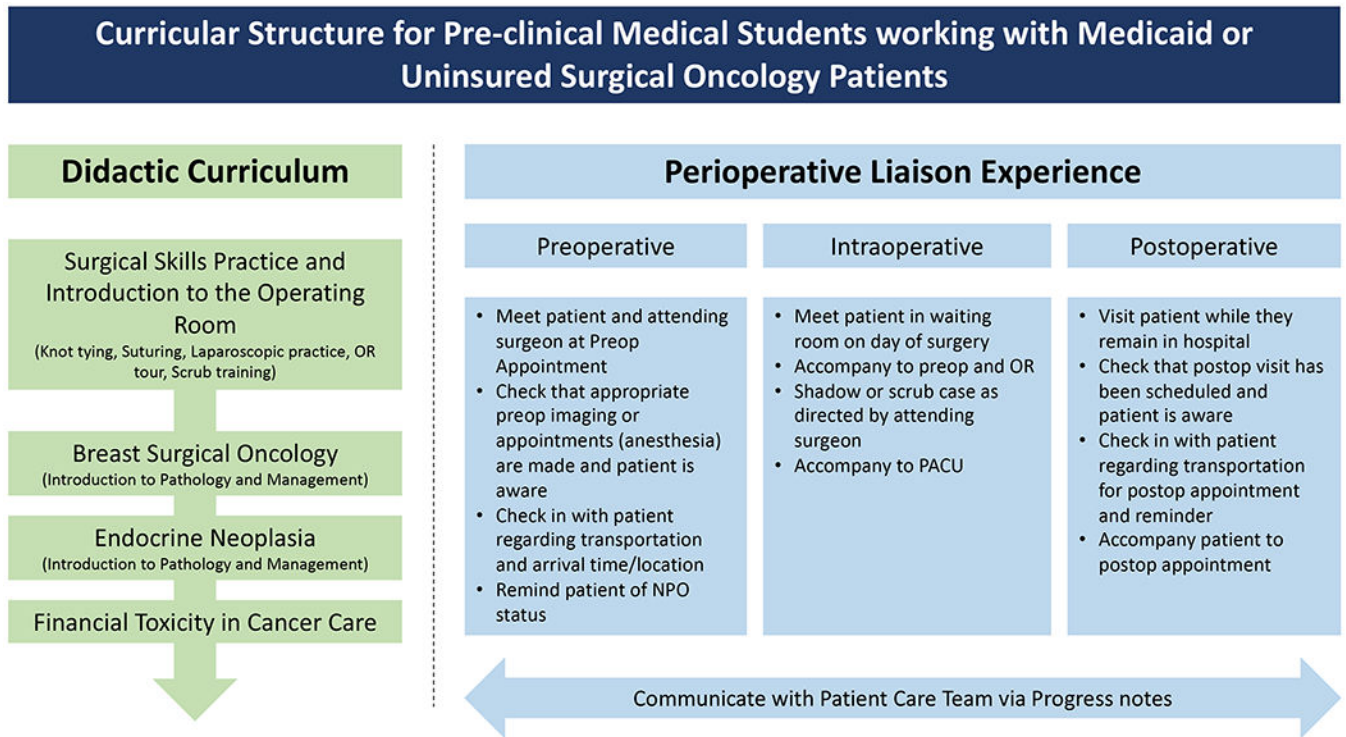



Figure 1. Overall Program Schematic of Didactic and Interactive Experiences for SOARR Student Participants



Please write down the date you completed the items listed below. Also, please provide initials of the Medical Student Liaison(s) who completed the task.

Pre-operative Checklist

- Attend patient's first appointment with surgeon discussing the operation if possible
- Discuss and confirm patient's preop imaging schedule if applicable:
 - 1:
 - 2:
 - 3:
- Attend DCI Patient Resource Fair (end of month, schedule will be provided)
- Help patient enroll in MyChart and educate how to use the program
- Patient has an established primary care provider (PCP) that they will f/u with after surgery
- Check that PAT Phone Screen is scheduled
 - Patient answered PAT Phone Screen
- Check that seed localization is arranged day prior to surgery in radiology (if applicable)
- Check that lymphoscintigraphy injection is arranged prior to surgery in nuclear medicine (if applicable)
- Contact patient 1-2 days prior to scheduled surgery
 - Patient answered and was reminded
 - Patient understood NPO status (nothing to eat after midnight before surgery)

Intra-operative Checklist

- If patient is having a sentinel lymph node biopsy (SLNB), meet in Nuclear Medicine for mapping
- Meet patient in PreOp (ASC or Duke North) and introduce self to operating resident/fellow
 - Patient arrived on time
- Scrub into case and provide assistance as surgeon sees fit
- Meet patient and family in PACU with attending surgeon to discuss surgery and next steps
 - Confirm date and time of postop surgical f/u appt
 - Confirm post op/discharge meds and schedule for lab draws if indicated. Clarify questions as needed
 - Confirm drain management plan

Post-operative Checklist

- If patient is admitted, visit patient prior to discharge
- Attend postop surgical f/u and drain removal appointments
 - Reminder call/text 1-2 days prior
- If applicable, check that postop PCP f/u scheduled within 7-14 days
- (Disease-dependent) Create schedule for self and patient, if applicable, to track patient's appointments, medications, lab draw, and wound care adherence
- Contact patient (in person, phone call, text) to assess progress and patient's overall well-being and questions

Figure 2.
 Perioperative Task Checklist for SOARR Student Participants

A.

Interpersonal Competencies: Please rate your ability and/or comfort with the following skills or behaviors. These reflect the core values of the AAMC.

	Very uncomfortable	Somewhat uncomfortable	Neutral	Somewhat comfortable	Very comfortable
To assess and act upon a local community's needs (service orientation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To demonstrate awareness of others' needs, goals, feelings, and the ways that social and behavioral cues affect others (social skills)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To demonstrate knowledge of socio-cultural factors that affect interactions and behaviors; appreciate cultural diversity and its influence on decisions and lifestyles of the patients you interact with; recognize one's own biases (cultural competence)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To work as a team with other health professional students to improve patient care (teamwork)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To communicate effectively and recognize potential communication barriers (oral communication)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Intrapersonal Competencies: Please rate your ability and/or comfort with the following skills or behaviors. These reflect the core values of the AAMC.

	Very uncomfortable	Somewhat uncomfortable	Neutral	Somewhat comfortable	Very comfortable
To behave in an honest and ethical manner with the highest personal and academic integrity (ethical responsibility)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To consistently fulfill obligations in a timely and satisfactory manner (reliability, dependability)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To troubleshoot and adapt to stressful/changing environments and situations (resilience and adaptability)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To set goals for the improvement of oneself (capacity for improvement)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking and Reasoning Competencies: Please rate your ability and/or comfort with the following skills or behaviors. These reflect the core values of the AAMC.

	Very uncomfortable	Somewhat uncomfortable	Neutral	Somewhat comfortable	Very comfortable
To use logic and reasoning to identify the limiting factors to a patient's care and problem-solve solutions (critical thinking)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To use quantitative reasoning to assist patients in receiving medical care i.e. medication adherence strategies, transportation etc. (quantitative reasoning)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To learn and use applicable scientific knowledge and apply it to a patient's cancer care (scientific inquiry)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To effectively convey information to others using written words i.e. notes in EPIC/email with providers (written communication)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Science Competencies: Please rate your ability and/or comfort with the following skills or behaviors. These reflect the core values of the AAMC.

	Very uncomfortable	Somewhat uncomfortable	Neutral	Somewhat comfortable	Very comfortable
To apply scientific knowledge of your patient's disease and be able to explain it to your peers (living systems)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To apply knowledge of self, others, and social systems to assess other factors that impact a patient's cancer outcome (human behavior)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B.

How has your interest in surgery changed during this program?

- More interested in surgery
 - Similar interest/no change
 - Less interested in surgery
 - No interest in surgery at all
-

How has your interest in oncology changed during this program?

- More interested
 - Similar interest/no change
 - Less interested
 - No interest in oncology at all
-

Do you feel more prepared for your surgery clerkship having participated in this program?

- Yes
 - Maybe
 - No
-

Figure 3.

Pre- and Post-participation Survey Completed by SOARR Student Participants

A) Questions based on 15 AAMC Core Competencies for Entering Medical Students.

B) Questions gauging interest in surgery and oncology as well as preparedness for surgical clerkships.

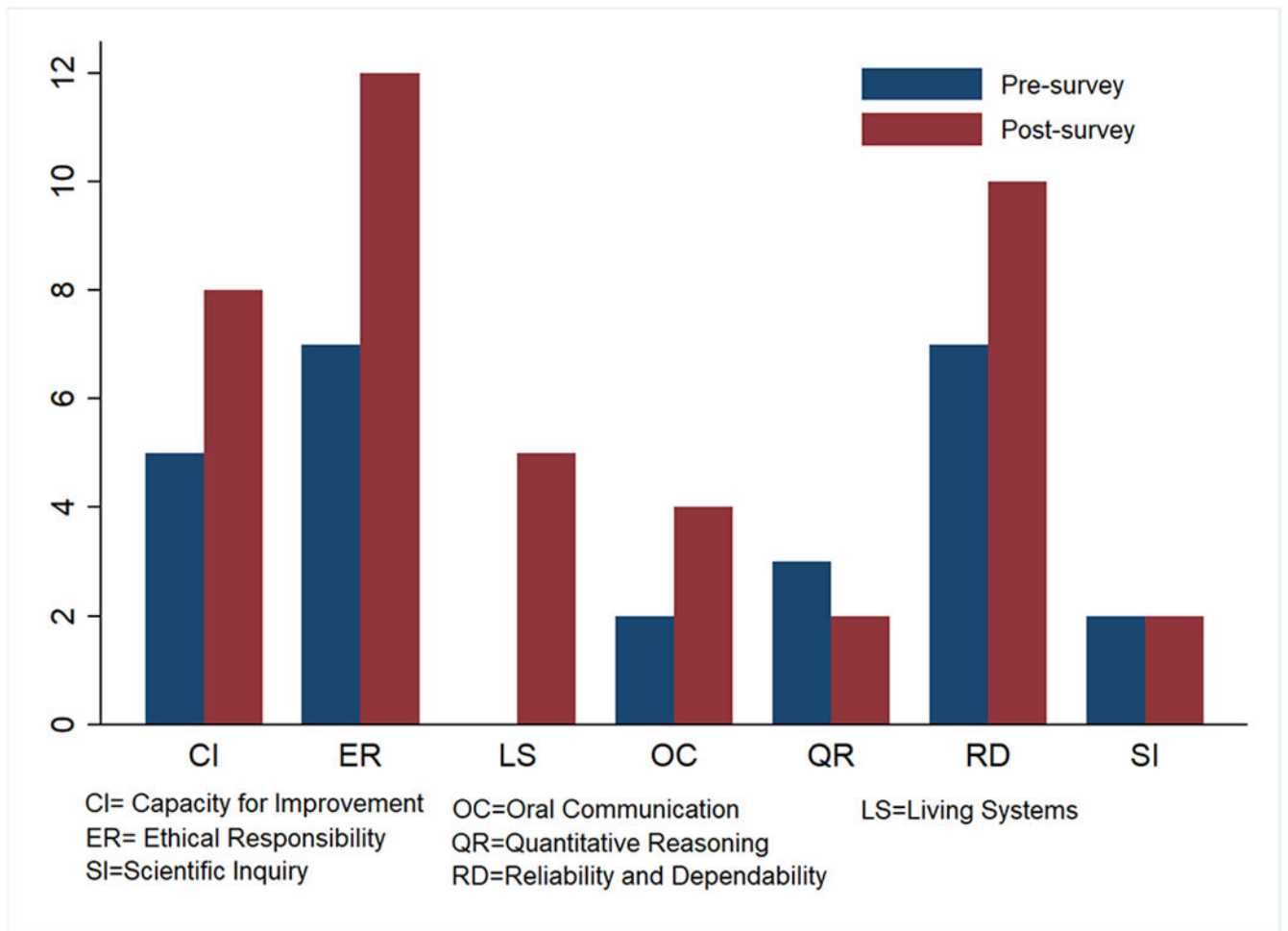


Figure 4. SOARR Student Participants' Self-Assessment Results: pre- and post-participation frequency of "Very Comfortable" responses.

Table 1.

The Association of American Medical Colleges (AAMC) Core Competencies for Entering Medical Students and Their Descriptions.*

AAMC Core Competency	Description
<i>Interpersonal Competencies</i>	
<i>Oral Communication</i>	Effectively conveys information to others using spoken words and sentences; listens effectively; recognizes potential communication barriers and adjusts approach or clarifies information as needed.
<i>Teamwork</i>	Works collaboratively with others to achieve shared goals; shares information and knowledge with others and provides feedback; puts team goals ahead of individual goals.
<i>Cultural Competence</i>	Demonstrates knowledge of socio-cultural factors that affect interactions and behaviors; shows an appreciation and respect for multiple dimensions of diversity; recognizes and acts on the obligation to inform one's own judgment; engages diverse and competing perspectives as a resource for learning, citizenship, and work; recognizes and appropriately addresses bias in themselves and others; interacts effectively with people from diverse backgrounds.
<i>Social Skills</i>	Demonstrates an awareness of others' needs, goals, feelings, and the ways that social and behavioral cues affect peoples' interactions and behaviors; adjusts behaviors appropriately in response to these cues; treats others with respect.
<i>Service Orientation</i>	Demonstrates a desire to help others and sensitivity to others' needs and feelings; demonstrates a desire to alleviate others' distress; recognizes and acts on his/her responsibilities to society; locally, nationally, and globally.
<i>Intrapersonal Competencies</i>	
<i>Ethical Responsibility</i>	Behaves in an honest and ethical manner; cultivates personal and academic integrity; adheres to ethical principles and follows rules and procedures; resists peer pressure to engage in unethical behavior and encourages others to behave in honest and ethical ways; develops and demonstrates ethical and moral reasoning.
<i>Reliability and Dependability</i>	Consistently fulfills obligations in a timely and satisfactory manner; takes responsibility for personal actions and performance.
<i>Resilience and Adaptability</i>	Demonstrates tolerance of stressful or changing environments or situations and adapts effectively to them; is persistent, even under difficult situations; recovers from setbacks.
<i>Capacity for Improvement</i>	Sets goals for continuous improvement and for learning new concepts and skills; engages in reflective practice for improvement; solicits and responds appropriately to feedback.
<i>Thinking and Reasoning Competencies</i>	
<i>Quantitative Reasoning</i>	Applies quantitative reasoning and appropriate mathematics to describe or explain phenomena in the natural world.
<i>Scientific Inquiry</i>	Applies knowledge of the scientific process to integrate and synthesize information, solve problems and formulate research questions and hypotheses; is facile in the language of the sciences and uses it to participate in the discourse of science and explain how scientific knowledge is discovered and validated.
<i>Critical Thinking</i>	Uses logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
<i>Written Communication</i>	Effectively conveys information to others using written words and sentences.
<i>Science Competencies</i>	
<i>Living Systems</i>	Applies knowledge and skill in the natural sciences to solve problems related to molecular and macro systems including biomolecules, molecules, cells, and organs.
<i>Human Behavior</i>	Applies knowledge of the self, others, and social systems to solve problems related to the psychological, socio-cultural, and biological factors that influence health and well-being.

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* These competencies were created and endorsed by the AAMC Group on Student Affairs Committee on Admissions. Further information on their development can be found through the AAMC website.

Table 2.

Median Pre- and Post-participation Comfort Levels among SOARR First-year Perioperative Surgical Liaisons across 15 AAMC Core Competencies (n=16).

AAMC Core Competency	Pre-Survey Median Score (IQR)	Post-Survey Median Score (IQR)	Change in Median Score
Interpersonal Competencies			
<i>Oral Communication</i>	3 (2,4)	4 (4,4.5)	+1
<i>Teamwork</i>	4 (4,4.5)	4 (4,4)	0
<i>Cultural Competence</i>	4 (3.5,4)	4 (4,4.5)	0
<i>Social Skills</i>	4 (4,5)	4 (4,4.5)	0
<i>Service Orientation</i>	4 (3,4)	3.5 (3,4)	-0.5
Intrapersonal Competencies			
<i>Ethical Responsibility</i>	4 (4,5)	5 (4.5, 5)	+1
<i>Reliability and Dependability</i>	4 (4, 5)	5 (4, 5)	+1
<i>Resilience and Adaptability</i>	4 (3.5, 4.5)	4 (4, 5)	0
<i>Capacity for Improvement</i>	4 (4, 5)	4.5 (4,5)	+0.5
Thinking and Reasoning Competencies			
<i>Quantitative Reasoning</i>	3 (2, 4)	4 (3,4)	+1
<i>Scientific Inquiry</i>	3 (2,4)	3.5 (3,4)	+0.5
<i>Critical Thinking</i>	4 (3,4)	4 (4, 4)	0
<i>Written Communication</i>	4 (3.5,5)	4 (3,4)	0
Science Competencies			
<i>Living Systems</i>	3 (3,4)	4 (4, 4)	+1
<i>Human Behavior</i>	4 (3,4)	4 (3.5, 4)	0

Table 3.

Median Pre- and Post-participation Comfort Levels among SOARR First-year Perioperative Surgical Liaisons across 15 AAMC Core Competencies Stratified by Gender (n=16).

AAMC Core Competency	Female (n=8)			Male (n=8)		
	Pre-	Post-	Change	Pre-	Post-	Change
Interpersonal Competencies	Median (IQR)			Median (IQR)		
<i>Oral Communication</i>	3 (2,4.5)	4 (4,5)	+1	3 (2,4)	4 (4,4)	+1
<i>Teamwork</i>	4 (4,5)	4 (4,4)	0	4 (4,4)	4 (4,4.5)	0
<i>Cultural Competence</i>	4 (4,4)	4 (4,4)	0	4 (3,4)	4 (4,5)	0
<i>Social Skills</i>	4 (4,4.5)	4 (4,4.5)	0	5 (4,5)	4 (4,4.5)	-1
<i>Service Orientation</i>	4 (3,4)	3 (2.5, 4)	-1	4 (3.5,5)	4 (3,4)	0
Intrapersonal Competencies						
<i>Ethical Responsibility</i>	4 (4,4.5)	5 (4,5)	+1	5 (4,5)	5 (5,5)	0
<i>Reliability and Dependability</i>	4 (4,5)	5 (3.5,5)	+1	4.5 (4,5)	5 (4,5)	+0.5
<i>Resilience and Adaptability</i>	4 (3,4)	4 (3.5,4.5)	0	4.5 (4,5)	5 (4,5)	+0.5
<i>Capacity for Improvement</i>	4 (4,4)	4 (4,5)	0	5 (4,5)	5 (4,5)	0
Thinking and Reasoning Competencies						
<i>Quantitative Reasoning</i>	2 (2,3.5)	3.5 (3,4)	+1.5	3.5 (2.5,4.5)	4 (4,4.5)	+0.5
<i>Scientific Inquiry</i>	3 (2,4)	3 (3,3.5)	0	3 (2,4.5)	4 (3.5,4.5)	+1
<i>Critical Thinking</i>	4 (3,4)	4 (3.5,4)	0	4 (3,4.5)	4 (4,4.5)	0
<i>Written Communication</i>	4 (3.5,5)	4 (2.5,4)	0	4 (3.5,4.5)	4 (3.5,5)	0
Science Competencies						
<i>Living Systems</i>	3.5 (2.5,4)	4 (2.5,4)	+0.5	3 (3,4)	4 (4,5)	+1
<i>Human Behavior</i>	3.5 (3,4)	4 (3,4)	+0.5	4 (3,4)	4 (4,5)	0