



# Expectations and experiences of medical students in the surgery clerkship

Robert D. Shaw<sup>1</sup> · Matthew C. Carroll<sup>1</sup> · Andrew O. Crockett<sup>1,2</sup> · Meredith J. Sorensen<sup>1,2</sup> 

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## Abstract

**Purpose** The third-year surgical clerkship marks many students' first exposure to surgery. However, what students expect they will engage in during their clerkship compared to their actual experience is largely unknown. We aimed to compare the expectations and realities of medical students' experience during the surgery clerkship.

**Methods** A survey assessing how frequently students expected to perform certain fundamental tasks and skills was administered to all third-year medical students before their clerkship. A similar survey was administered at the conclusion of the clerkship exploring what activities students actually engaged in and if any barriers to engagement were encountered.

**Results** 83 students responded to the pre-survey and 69 responded to the post-survey (response rates of 97% and 80%, respectively). When examining fundamental tasks, 6/10 domains demonstrated marked discordance between student expectations and what was actually experienced. The greatest areas of discrepancy were writing orders (Pre: 64.5% perform 2–5x | Post: 73.9% never), writing brief operative notes (Pre: 38.7% perform 2–5x | Post: 91.3% never), and preparing the team list for rounds (Pre: 44.1% perform > 5x | Post: 75.4% never). With respect to fundamental skills, 3/10 domains demonstrated marked discordance: dissecting tissue during an operation (Pre: 50.5% perform 2–5x | Post: 36.3% never), placing a nasogastric tube (Pre: 53.8% perform 2–5x | Post: 46.4% never) and placing an IV (Pre: 44.1% perform 2–5x | Post: 84.1% never). On the post-clerkship survey, students rated seeing patients independently in clinic and the ED/inpatient setting as the most important tasks with mean Likert scores of 2.43 and 2.63, respectively (1 = most important, 9 = least important). Suturing a wound and interpreting radiology were considered the most important skills (Likert score 2.9 each). Common barriers to student participation were time constraints, conflicting responsibilities, lack of opportunities, and feeling unwelcome.

**Conclusions** Medical students expect to be engaged in fundamental tasks and skills of the surgery clerkship at a much higher frequency than they actually experience. These results will help us target the areas of greatest discrepancy, set realistic expectations and minimize the barriers to student participation during the surgery clerkship.

**Keywords** Surgery clerkship · Expectations · Barriers · Core competencies

## Introduction

The transition from the didactic to clinical years in medical school is an important milestone in the education of medical students. Knowledge, technical skills, and vocabulary are acquired through a steady process of enculturation. For many medical students, the third-year surgical clerkship marks their first exposure to surgery. Bringing with them preconceived notions of the field, they are often apprehensive about the fatigue, long hours, and less-than-pleasant surgeons they expect to encounter [1, 2]. Studies have also demonstrated that many medical students feel unprepared for their surgical clerkship with unclear expectations [3–5].

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✉ Meredith J. Sorensen  
Meredith.J.Sorensen@hitchcock.org

<sup>1</sup> Department of Surgery, Dartmouth-Hitchcock Medical Center, One Medical Center Drive, Lebanon, NH 03756, USA

<sup>2</sup> Geisel School of Medicine at Dartmouth, Hanover, NH, USA

Prior research has demonstrated that while there is overlap between the educational expectations of medical students and their educators, surgical residents and attendings may prioritize different learning objectives than medical students [4, 6]. These discrepancies may become points of frustration for students. While the need to educate future surgeons is clear, it is perhaps more important to edify those medical students not bound for a career in the OR, as the clerkship may be their only surgical experience. Aligning expectations prior to the commencement of the surgical clerkship may improve students' ability to meet those expectations and fulfill the learning objectives of this core clinical rotation [6].

Understanding the expectations of surgical clerks and where educators fall short will help to inform future focus on curriculum development and to identify common barriers students encounter while on their surgical clerkship. Therefore, we aimed to describe the expectations of third-year medical students as they entered their surgical clerkship and whether or not these expectations were met at the conclusion of the rotation.

## Materials and methods

This study was deemed exempt by the Dartmouth-Hitchcock Health Institutional Review Board.

### Study design

We surveyed third-year medical students before and after their 7.5-week surgery clerkship. The pre-clerkship survey assessed the frequency with which students thought they would participate in certain fundamental tasks and skills during their rotation. At the end of the clerkship, a similar survey regarding what they actually experienced was administered.

### Survey design

The surveys (Appendices A and B) were designed in accordance with the AMEE-87 guide [7]. Following demographic questions and creation of a unique identifier to link the pre- and post-survey, participants were asked to report what frequency they expected to perform (pre-survey), or actually did perform (post-survey), certain tasks and skills essential to the surgery clerkship. The tasks and skills investigated in the survey were adapted from the learning objectives outlined in the essential clinical skills, conditions, and diagnoses of the surgery clerkship which was approved by our institutional Medical Education Committee (Online Appendix C). On the post-clerkship survey, students were also asked to rate how beneficial each task and skill was to their overall learning and if they encountered any barriers

to their learning during the clerkship. Free-entry responses were allowed for students to expand upon any barriers they did encounter. The survey was pilot tested for content and usability with four fourth-year medical students at our institution who were not among the subjects surveyed.

### Subjects, survey distribution, and data analysis

The pre- and post-clerkship surveys were administered to third-year medical students at the start and end of their surgery clerkship. Student exposure to surgery in the pre-clinical curriculum is relatively limited. Surgery faculty do intermittently lecture and lead a few small group sessions, but this is at the discretion of pre-clinical course directors, none of whom are surgeons. Students do participate in a required longitudinal "On-Doctoring" course throughout the pre-clinical phase, during which there is one session dedicated to giving surgical oral presentations. There is a student-led surgical interest group. The survey was administered between May 2021 and April 2022. At the start of the clerkship during the orientation period, a brief presentation was given outlining the purpose of the study. Clerkship directors left orientation while the presentation and survey were administered to maintain anonymity and reduce coercion. A QR code was displayed, and participants were directed to an online survey using the Qualtrics platform (Qualtrics International Inc., Provo, UT/Seattle, WA). At the conclusion of the clerkship during the student's final simulation session, a link to the post-clerkship survey was provided. The survey data were then analyzed with STATA (Version 15.1, STATA Corp, College Station, TX). There was no incentive offered for completion of the survey. Participation was voluntary and anonymity was maintained.

### Primary and secondary objectives

Our primary objective was to describe the differences between the expectations and realities of the third-year medical students during the surgery clerkship. Our secondary objective was to describe common barriers medical students encounter in trying to meet their expectations during the surgery clerkship.

## Results

### Response rate and demographics

86 medical students participated in the surgery clerkship over the course of the study period. 83 (97%) responded to the pre-clerkship survey with 69 responding to the post-clerkship survey (80%). Of the respondents, 50 were females (62.5%) on the pre-survey and 42 were females (60.9%) on

the post-survey. The vast majority of students had completed previous clerkships prior to starting the surgery clerkship (80%), with internal medicine and OB/GYN being the most commonly completed before.

### Pre-clerkship survey

Students generally felt positively toward the surgery clerkship with 47% reporting feeling positive or extremely positive about the surgery clerkship prior to starting. 24% reported feeling negative or extremely negative with 33% remaining neutral. When asked how interested students were in pursuing a surgical career after medical school (1 = not interested at all, 5 = extremely interested), students largely remained neutral with a median score of 2.9. The majority of students (56%) had not decided what specialty they were planning to enter prior to the start of the surgery clerkship. This was followed by internal medicine (20%) and any surgical specialty (12%). In general, students expected to perform the fundamental tasks and skills of the surgery clerkship a few times (2-5x) over the course of their 6-week rotation (Table 1). Areas where students felt like they would be performing the tasks and skills more often (> 5x over the 6-week clerkship) were: writing inpatient progress notes,

preparing the list for rounds, orally presenting patients, suturing a wound, and interpreting radiology. There were no tasks or skills where the most common response was “never” or “once.”

### Post-clerkship survey

67% of students felt positive or extremely positive about the surgery clerkship after completion. Student interest in a surgical career remained neutral after the rotation with a mean rating of 3.1 (1 = not interested at all, 5 = extremely interested). 46% of students remained undecided in future career direction while 21% were now interested in pursuing surgery. In general, students performed the fundamental tasks and skills of the surgery clerkship at a lower frequency than expected with 4 out of 9 tasks and 3 out of 10 skills having the most common response be “never.” These areas included: writing orders, writing ED H&Ps or consult notes, writing brief operative notes, preparing the list for rounds, dissecting tissue during an operation, placing a nasogastric tube, and placing an IV. One area, seeing patients independently in clinic, exceeded the expectations set by the pre-survey. When students were asked to rank which fundamental tasks were most beneficial to their overall education,

**Table 1** Pre/post-survey comparison of frequency of engagement with select tasks and skills during the surgery clerkship

“How frequently do you expect to or did you perform the following task?”	Pre-survey (% of respondents)				Post-survey (% of respondents)			
	Never	Once	A few times (2–5)	Often (> 5)	Never	Once	A few times (2–5)	Often (> 5)
Write orders	18.3	5.4	<b>64.5</b>	11.8	<b>73.9</b>	2.9	23.2	0.0
Write inpatient progress notes	0.0	1.1	35.5	<b>63.4</b>	7.3	10.1	<b>44.9</b>	37.7
Write H&P in clinic	3.2	2.2	<b>53.8</b>	40.9	23.2	13.0	<b>34.8</b>	29.0
Write H&P in ED/consult capacity	7.5	4.3	<b>62.4</b>	25.8	<b>53.6</b>	18.8	23.2	4.4
Write brief operative notes	22.6	10.8	<b>38.7</b>	28.0	<b>91.3</b>	4.4	2.9	1.5
See patients independently in clinic	3.2	2.2	<b>52.7</b>	41.9	11.6	4.4	37.7	<b>46.4</b>
See patients independently in ED/inpatient	2.2	7.5	<b>47.3</b>	43.0	10.1	10.1	<b>47.8</b>	31.9
Prepare team list for rounds	14.0	8.6	33.3	<b>44.1</b>	<b>75.4</b>	4.4	4.4	15.9
Orally present a patient	0.0	0.0	16.1	<b>83.9</b>	4.4	1.5	23.2	<b>71.0</b>
<i>“How frequently do you expect to or did you perform the following skills?”</i>								
Inject local	3.2	16.1	<b>59.1</b>	21.5	2.9	20.3	<b>69.6</b>	7.3
Use a scalpel to make an incision	10.8	21.5	<b>50.5</b>	17.2	29.0	15.9	<b>49.3</b>	29.0
Dissect tissue during an operation	16.1	17.2	<b>50.5</b>	16.1	<b>36.2</b>	29.0	29.0	2.8
Use electrocautery during an operation	15.1	28.0	<b>39.8</b>	17.2	13.0	14.5	<b>63.8</b>	8.7
Suture a wound	1.1	5.4	35.5	<b>58.1</b>	1.5	2.9	26.1	<b>69.6</b>
Be primary assistant in an operation	24.7	33.3	<b>38.7</b>	3.2	17.4	18.8	<b>53.6</b>	10.1
Place a foley	3.2	23.7	<b>46.2</b>	26.9	7.3	<b>44.9</b>	40.6	7.3
Place nasogastric tube	8.6	33.3	<b>53.8</b>	4.3	<b>46.4</b>	37.7	15.9	0.0
Place IV	21.5	28.0	<b>44.1</b>	6.5	<b>84.1</b>	13.0	2.9	0.0
Interpret radiology	1.1	1.1	21.5	<b>76.3</b>	0.0	5.9	37.7	<b>56.5</b>

Key: Bold highlighted cells indicate most common response

seeing patients independently (in clinic and the ED) and orally presenting patients were the most highly rated with mean Likert-scale ratings of 2.43, 2.63, and 3.4, respectively (1 = most beneficial, 9 = least beneficial). With respect to the fundamental skills, suturing a wound, interpreting radiology, and being the primary assistant in an operation were most highly rated with mean Likert-scale ratings of 2.9, 2.9, and 3.5, respectively (Table 2).

## Barriers

Medical students were asked what aspects of the clerkship negatively impacted their ability to perform the fundamental tasks and skills of the surgery clerkship. Areas where ~50% of students responded “yes this negatively impacted me” included: Feeling unwelcome (while not being explicitly told they were unwelcome) (42%), pressure to finish an operation quickly (56.5%), negative interactions with residents and attendings (43.5%), fear of making a mistake (53.6%), lack of opportunities (52.1%), and other clerkship responsibilities (52.1%). A representative sample of the free-text entries regarding the barriers encountered in the surgery clerkship are summarized in Table 3. Common themes to

emerge were: unclear expectations, negative interactions, other clerkship responsibilities/work hours, and lack of opportunities.

## Discussion

We surveyed third-year medical students before and after their surgery clerkship to better understand medical student expectations and experiences. Our results demonstrate that medical students expect to be engaged in the fundamental tasks and skills of the surgery clerkship at a much higher frequency than they actually experience. Common barriers to engagement in the surgery clerkship included unclear expectations, negative interactions, other clerkship responsibilities, and lack of opportunities. However, despite the discrepancy in expectations and realities, a higher proportion of students report wanting to pursue a surgical career after completion of the clerkship. In addition, on the 2023 AAMC Graduate Questionnaire (GQ), which represents the same cohort that was surveyed for this study, 86.2% of our institution’s graduates rated their surgery clerkship “good” or “excellent” compared with a national average of 83.1%.

**Table 2** Student ranking of the fundamental tasks and skills of the surgery clerkship with respect to overall benefit to their learning

Fundamental tasks and skills of the surgery clerkship	
Tasks	Mean Likert-scale rating (1 being most, 9 being least)
Write orders	6.3
Write inpatient progress notes	4.9
Write H&P in clinic	4.9
Write H&P in ED/consult capacity	5.3
Write brief operative notes	7.5
See patients independently in clinic	<b>2.43</b>
See patients independently in ED/inpatient	<b>2.63</b>
Prepare team list for rounds	7.52
Orally present a patient	<b>3.4</b>
Skills	Mean Likert-scale rating (1 being most, 10 being least)
Inject local	5.15
Use a scalpel to make an incision	5.9
Dissect tissue during operation	5.9
Use electrocautery during operation	6.5
Suture a wound	<b>2.9</b>
Be primary assistant in an operation	<b>3.5</b>
Place a foley	7
Place NGT	7.8
Place IV	7.4
Interpret radiology	<b>2.9</b>

Key: Bold highlighted cells indicate top 3 ranked areas for tasks and skills

**Table 3** Representative free-text entries surrounding common barriers encountered

Student comments	Themes
<p>"In an environment whereas students we feel like we need to always be "on" and never screw anything up, it was frustrating that we couldn't count on clear instructions to know that we were meeting expectations."</p> <p>"Unclear expectations at times"</p> <p>"Anatomy: unclear how much they wanted us to know"</p> <p>"Residents providing unclear expectations but not clarifying the expectations when asked to"</p> <p>"An additional day or half day of orientation to more thoroughly outline expectations and practice skills would have been incredibly useful"</p> <p>"NP and other advanced practitioner not familiar with medical students and their expected clinical learning objectives"</p> <p>"The amount of crap-talking about other specialties (by both residents and attending surgeons) really turned me off."</p> <p>"I had a few really negative interactions with an attending."</p> <p>"Wasn't informed timely of events"</p> <p>"I felt like despite multiple attempts to engage with residents/nurses, many did not engage back. For example, asking them to text me when they had tasks and checking in and finding out later they did not include me when seeing a patient."</p> <p>"No time to study for shelf"</p> <p>"Not enough didactics/intentional teaching"</p> <p>"Honestly just the hours, I think it can be pretty brutal but that's just how it is and we all understand that's part of medical school. It wasn't ungodly, I just do poorly on little sleep but that's a me thing"</p> <p>"Being pulled away from surgery to attend didactics was really disruptive to my learning, especially when they were scheduled midday"</p> <p>"Just not enough cases per learner! Also the mid-level providers at my site had no interest in my being there"</p>	<p>Unclear expectations</p> <p>Negative interactions</p> <p>Other clerkship responsibilities/work hours</p> <p>Lack of opportunities</p>

The 2021 AAMC report on physician supply and demand predicts a 15,800–30,200 shortage in all surgical specialties by 2034 [8]. Furthermore, applications to general surgery residency programs have been stagnant worldwide and graduation rates have remained unchanged at ~1000 new graduates annually over the past decade [9–17]. Unfortunately, previous studies have demonstrated that many medical students are unwilling to consider a surgical career [18] as a result of strongly held preconceived notions and stereotypes about surgery and surgeons [1]. Surgeons and surgery as a field have an obligation to medical students to encourage participation in surgery in order to dispel these negative stereotypes. However, as elucidated in this study, one of the common barriers medical students encounter is unclear expectations. We report a stark contrast between the expectations and realities of medical students with respect to the fundamental skills and tasks of surgery clerkship. Interestingly, despite these differences, a higher proportion of students did wish to pursue a surgical career after the clerkship. If the field of surgery could work to bring the expectations and experiences of medical students in the surgery clerkship closer together, perhaps this could improve engagement and begin to dispel commonly held stereotypes and increase interest in surgery further.

Due to the survey design of this study, we were unable to elucidate why students felt they were given unclear expectations. At orientation, presentations are given by both the clerkship directors and a senior resident to outline the role

of medical students during the clerkship. Each surgical service has a designated faculty learning director charged with sending an introductory email addressing service-specific expectations when students start their rotation. They also must meet with each student three times over the course of their rotation (at the beginning, middle, and end). These faculty learning directors participate in bimonthly clerkship advisory board meetings and an annual retreat, all of which include aspects of faculty development. An annual department-wide grand rounds is offered to all surgical faculty and residents regarding medical student teaching, during which expectation setting is specifically addressed. Despite this, students still feel that expectations are unclear. Further research, likely qualitative in nature, is needed to understand this disconnect.

One of the common themes to emerge from this study was negative interactions with residents, advance practice practitioners, and attendings adversely impacting medical student ability to engage in the fundamental tasks and skills of the surgery clerkship. Approximately 20% of medical students will experience mistreatment during their clinical years with an even higher incidence of mistreatment occurring during surgery rotations [19, 20]. Additionally, medical student dissatisfaction with the surgery clerkship is a long-standing problem for medical educators [21]. Castillo-Angeles et al. delineated 5 themes of mistreatment: passive mistreatment in the form of neglect of medical students needs to be acknowledged; expectations

for students on clerkship are unclear to those in a teaching role and at times, to the medical students; failure to integrate students into the surgical team during the rotation impacts their learning; and negative attitude of residents toward medical students' lack of knowledge undermines the educational framework [5]. Additionally, active mistreatment, unclear expectations and negative attitudes have an undeniable impact on the student's learning environment [19, 20]. While our data did not allow us to delineate the different types of mistreatment, it does reinforce the findings that unclear expectations are associated with perceived negative interactions. These negative interactions and mistreatment likely perpetuate the negative stereotypes of surgeons and surgery. There are small tangible things that staff and residents alike can improve upon. Higgins et al. previously described the concept of mattering, or the perception that students make a difference, in the surgery clerkship [22]. Several things that can improve mattering are: acknowledging the student's presence, maintaining eye contact, offering undivided attention, getting to know the students as individuals, taking time to teach, setting expectations early, and providing timely feedback. Focusing on a few of these entities may improve a sense of mattering, decrease the perception that interactions are negative, and help to improve the discrepancy between the expectations and realities of medical students in the surgery clerkship.

Medical students also identified other clerkship responsibilities as having a negative impact on their ability to perform well during their clerkship. Free text entries revealed that these other responsibilities influenced their experience by limiting time for self-study and detracted from intraoperative learning by having to leave cases early to attend didactic teaching sessions. It has previously been recognized that medical students desire intentional teaching and that surgical residents may be the best suited to provide this instruction [23]. While it is undoubtedly challenging to balance the contending responsibilities of managing a surgical service, there are certainly opportunities for residents to dedicate time to intentional teaching. Doing so would likely help to minimize educational barriers and improve medical student experience on surgical services [22]. Long work hours were also felt to be detrimental to the clerkship experience. Medical students on clinical rotations are restricted to an 80-h work week by LCME regulations. A recent single institution study found that third-year medical students work a median of 57.7 h a week during their surgical clerkship [24]. Mindfulness of medical students' time and their other academic responsibilities by both house staff and attendings may allow the students more time for self-study as well as rest. Minimizing these barriers and fostering a deliberate educational environment may be an avenue to improve student experience.

## Limitations

This is a single institution study and results may not be generalizable to other institutions. Medical schools structure clerkships in variable ways and this likely influences students' perceptions and expectations. Additionally, these results are reflective of one academic year and may not be representative of previous or subsequent cohorts. Finally, by design, a survey format cannot capture all the preconceptions study participants may hold, although this was somewhat mitigated by the ability to add free-text answers. Future investigations could address these limitations by using a multi-institutional design and study multiple academic years.

## Conclusion

Medical students expect to be engaged in fundamental tasks and skills of the surgery clerkship at a much higher frequency than they actually experience. These results will help us target the areas of greatest discrepancy, set realistic expectations and minimize the barriers to student participation during the surgery clerkship.

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## Declarations

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