

Duty Hours on Surgery Clerkship: From Compliance Nightmare to Leadership and Professional Development Opportunity

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OBJECTIVE: To evaluate the impact of an innovative leadership development initiative in the core surgery clerkship that addressed duty hours compliance and time-off requests.

DESIGN: A combination of deductive and inductive analysis of medical student reflections written after rotating on Acute Care Surgery over 2 academic years (2019-2020 and 2020-2021) was performed. Reflections were part of criteria to receive honors and a prompt was given to discuss their experience in creating their own call schedules. We utilized a combined deductive and inductive process to identify predominant themes within the reflections. Once established, we quantitatively identified frequency and density of themes cited, along with qualitative analysis to determine barriers and lessons learned.

SETTING: Dell Seton Medical Center, Dell Medical School at The University of Texas at Austin, a tertiary academic facility.

PARTICIPANTS: There were 96 students who rotated on Acute Care Surgery during the study period, 64 (66.7%) of whom completed the reflection piece.

RESULTS: We identified 10 predominant themes through the combined deductive and inductive processes. Barriers were cited by most students (n = 58, 91%), with communication being the most commonly discussed theme when cited with a mean 1.96 references per student. Learned leadership skills included: communication, independence, teamwork, negotiating skills, reflection of best

practices by residents, and realizing the importance of duty hours.

CONCLUSIONS: Transferring duty hour scheduling responsibilities to medical students resulted in multiple professional development opportunities while decreasing administrative burden and improving adherence to duty hour requirements. This approach requires further validation, but may be considered at other institutions seeking to improve the leadership and communication skills of its students, while improving adherence to duty hour restrictions. (J Surg Ed 000:1–9. © 2023 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

ABBREVIATIONS: ACS, acute care surgery AY, academic year CSC, core surgical clerkship DMS, Dell Medical School MS1/2/3/4 medical student, first year/second year/third year/fourth year

KEY WORDS: call schedule, working hours, negotiating, medical students, leadership

COMPETENCIES: Professionalism, Interpersonal and Communication Skills

INTRODUCTION

Undergraduate medical education is a longitudinal balance of traditional academic learning and experiential learning. Students are challenged to study for subject exams and perform clinical work as part of care teams, creating competing time demands. Burnout exists among attending surgeons,^{1,2} surgical residents,³⁻⁵ and

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medical students^{6,7} with duty hours contributing substantially. Specific to the Core Surgical Clerkship (CSC), medical students perceive that the CSC is associated with long hours, fatigue leading to mistakes, and harsh grading practices.⁸ Various strategies have been employed to achieve compliance with 80-hour duty limitations and reduce this burnout. One strategy—decreasing call frequency—may result in less burnout and improved academic performance on CSC⁹; however, other research claims duty hours on CSC do not correlate with academic performance.¹⁰

Even with hour restrictions, surgical teams have unpredictable schedules with emergency or prolonged elective surgeries. We found on anonymous end-of-clerkship evaluations that our students were hesitant to speak up about their hours when close to, or exceeding, 80 hours in a work week or when submitting time-off requests, citing anxiety over perceptions of laziness or lack of dedication that could hurt their grade. This resulted in additional frustration from faculty who felt penalized for something viewed as outside of their control and under the purview of adult learners.

Our solution was to reframe duty hours as a professional development exercise. We provided students on their Acute Care Surgery (ACS) block the responsibility to create their own duty hours schedule utilizing a professional development framework linked to skills taught in our first-year medical student (MS1) Leadership Course. The Leadership Curriculum spans the 4 years with the MS1 year focused on topics relevant to managing oneself and effective teamwork. Speaking up to advocate for oneself, engaging in difficult conversations around creating a clinical schedule, and building a team of students working together on the surgery services all map to the learning objectives throughout these sessions. Through this initiative, we hypothesized that the greater autonomy would decrease duty hour violations, simulate future responsibilities and tasks they will have to perform as residents (e.g. negotiating internally for specific time off, ensuring adequate patient coverage within duty hour requirements, etc.), and empower students to vocalize, and adhere to, their duty hours expectations.

Our goal in this study is to explore what aspects of leadership and professional development were described by students' reflective writing pieces on the experience of creating and managing their duty hours on the CSC. The findings of this study may help other programs facilitate leadership training during the CSC, decrease work hours violations, and promote student wellbeing by facilitating more autonomy and control over their learning experience.

MATERIALS AND METHODS

This study was approved by the Institutional Review Board of the Dell Medical School (DMS) at The University of Texas at Austin, STUDY00002003, approved November 2, 2021.

Study and CSC Structure

This is a single-center, retrospective review of medical student written reflection pieces after the CSC during the academic years (AY) of 2019 to 2020 and 2020 to 2021. At DMS, the CSC is taken during the MS2 year. The MS1 year is largely didactics, MS2 year is when students undergo core clinical rotations including the CSC, MS3 is a professional development year tailored to a student's specific interests (examples of activities include performing dedicated research or obtaining a Master's degree), and MS4 involves electives, acting internships, and other clinical rotations preparing for a student's chosen residency. There are 6 terms per AY. The CSC consists of 8 weeks: half of the cohort rotates on ACS for 4 weeks while the other half rotates on sub-specialty services, then the groups switch for the second 4 weeks. ACS consisted of ~12-hour day, night, and/or 24-hour "shifts" to provide continuous MS2 coverage and assistance. A 24-hour shift was treated as two 12-hour shifts. While the Liaison Committee on Medical Education does not have work-hour restrictions under Standard 8.8,¹¹ DMS has an institutional policy of an 80-hour work week limit that largely reflects the Accreditation Council for Graduate Medical Education common program requirements (section VI.F.1).¹²

Description of Intervention

After the 2018-2019 AY, the responsibility of creating a call schedule during ACS was shifted from the Program Coordinator to the students utilizing a professional development framework linked to skills taught in the MS1 Leadership Course at DMS.

Instructions for creating the schedule included: 1) All 12-hour shifts must be covered (at least 2 students on week days and at least 1 on weekends and nights), excluding school-wide holidays, 2) Students must have 1 full day off weekly, no more than 80 hours scheduled per week (including requirements outside the CSC such as a Longitudinal Primary Care Clinic), and at least 14 hours free of any academic activity following a 24-hour shift, 3) When students have academic requirements such as Longitudinal Primary Care Clinic, they could work a shift and leave for the external commitment, and 4) All final schedules must be approved by CSC leadership. An example of a student call schedule is

shown in [Appendix 1](#). Students did not need to submit time off requests for activities occurring on days they were not scheduled to work. Once approved, students could work amongst themselves to exchange shifts, if needed. For example, students could trade an extra call or work a 24-hour shift for additional time off for outside engagements, even if the number of shifts was uneven for a particular week. Unequal calls or hours worked were resolved amongst themselves. Of note, no other core clerkships perform this exercise: it was developed as part of the CSC and specifically ACS.

Reflection Pieces

Students striving for Honors completed weekly reflections around different leadership skills, one of which addressed the ACS call schedule. Prompts were given and the writing piece was marked as completed/not completed ([Appendix 2](#)). These were collected and anonymized.

Qualitative Methods

A mixed deductive and inductive methodology was utilized to identify themes for analysis. Deductive themes were derived from the prompt itself. An inductive process was then applied for additional themes using the following framework: 1) Authors read 5 random reflection pieces each a priori without a codebook, identifying themes or topics by personal interpretation. 2) Differences in themes and interpretations were discussed and reconciled collectively. 3) These themes were then tested by coding 10 of the same reflection pieces to assess for similarities or differences between coders using NVivo (QSR International, Burlington, MA, USA). 4) Differences in interpretation were further reconciled as a group, further consolidating themes, and establishing a final list. 5) All reflections were coded using the final code list. 6) Any differences in final coding were reconciled by direct conversation between authors.

Statistical Analysis

Descriptive statistics were applied to quantify thematic analyses. Fisher Exact Test was used to compare the number of duty hours violations before and after the innovation was implemented. NVivo was used for the thematic analysis and R and RStudio (RStudio, Boston, MA) for statistical analyses.¹³

RESULTS

Student Population

There were 96 MS2 students during the study period, with 50 students in the 2019 to 2020 AY and 46 in the

2020 to 2021 AY. Sixty-four (66.7%) students completed the written reflection piece and were included in the analysis. All quotes represented were from this cohort.

Administrative Considerations

During the AY preceding the intervention, 5 out of 50 (10%) students incurred duty hour violations as reported on CSC evaluations. Violations occurred because students were unwilling to speak up to be dismissed when they were approaching 80 hours or students worked more than 24 hours continuously because they did not want to speak up at the end of morning report to remind attendings and residents that they were supposed to be dismissed. This became a point of contention when surgeons were informed of duty hour violations and they felt they were not being told in real-time and therefore not given a chance to prevent the duty hour violations. Once the intervention began, violations decreased to only 1 out of 46 students (2.2%), though this did not amount to statistical significance ($p = 0.206$). Program Coordinator time spent creating and changing call schedules decreased from an estimated 8 hours per term to less than 1 hour per term.

Inductive Thematic Process

Four authors (MFM, MT, ZB, and KMB) contributed to the inductive methodology, corresponding to multiple levels of training: a medical student who had completed the MS2 year at DMS (MT), a general surgery resident originally from another institution in a research fellow position (MFM), and 2 attending surgeons: 1 in congenital cardiac surgery (ZB) and 1 in surgical oncology who also serves as CSC Director (KMB). The 4 authors contributed to the initial list of themes in step 1 and in consolidation steps 2 and 4. MFM and MT performed steps 3 and 5 to 6.

Twenty-five themes were initially identified: 15 based on the prompt using the deductive methodology and 10 using step 1 of the inductive methodology. These were consolidated to 18 after step 2 and merged to a final list of 10 themes ([Figure 1](#)).

Thematic Analysis

The number students referencing each theme and the frequency of references per student are outlined in [Table 1](#). The theme referenced by the greatest number of students was Barriers, which included those experienced by creating the call schedule or those encountered during ACS ($n = 58, 91%$). It was also the theme most frequently cited from the deductive methodology. The theme referenced by the greatest number of students from the inductive method was communication in 51 (80%) students. The greatest density of references

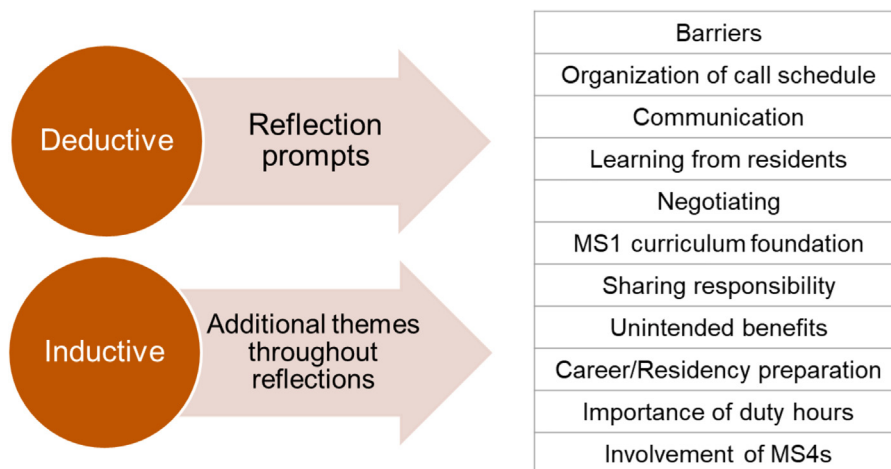


FIGURE 1. Deductive and inductive processes informing final themes.

was also communication with a mean number of references per student of 1.96. Representative quotes for each theme, based on perceived importance of the quote by the authors, are presented in [Table 2](#). All quotes collected for each theme are found in [Appendix 3](#).

DISCUSSION

Transforming Barriers to Opportunities

Barriers, the theme cited most commonly (91% of students), was an important component of the student reflections. However, students were able to transform these initial perceptions into constructive learning. Examples included comments on communication, independence, teamwork, negotiating skills, and happiness immediately after Barriers.

Students were hesitant to speak up about their hours. Concerns over perceptions of laziness that could impact their grades and future residency applications were seen

repeatedly, such as “Speaking up about duty hours was very challenging because it could suggest a lack of commitment to the care team and can give off a connotation that personal interests are placed at a higher priority than the duties of the team.” However, students learned from the experience in many facets, including being clear in communication such as “[with regards to duty hours] the only way to avoid issues in the first place, is to be open and upfront about potential conflicts way in advance.” This upfront communication, the most frequently cited theme per student when referenced, allowed them to practice conflict resolution. They additionally recognized best practices by residents such as “When I observed the residents, I learned the importance of time management and honest communication with the team regarding where they stood in their workflow.” Lastly, they reflected that communication facilitates independent, mature learners. One student remarked, “Perhaps the greatest advice I got from one of the residents. . . was to stand up for myself. Whether that

TABLE 1. Quantitative Analysis of Student Prompts

Theme	Students n (%)	References n (%)	Mean number of references per student
Total	64	534	-
Barriers	58 (91%)	102 (19%)	1.76
Organization of call schedule	52 (81%)	77 (14%)	1.48
Communication	51 (80%)	100 (19%)	1.96
Learning from residents	42 (66%)	47 (9%)	1.12
Negotiating	40 (63%)	51 (10%)	1.28
MS1 curriculum	37 (58%)	38 (7%)	1.03
Sharing responsibility	25 (39%)	32 (6%)	1.28
Unintended benefits	24 (38%)	27 (5%)	1.13
Career-residency preparation	23 (36%)	26 (5%)	1.13
Importance of duty hours	17 (27%)	19 (4%)	1.12
MS4 involvement	12 (19%)	15 (3%)	1.25

TABLE 2. Selected Student Quotes for Each Theme Identified

Theme	Quotation
Barriers	<p>One thing that surprised me while creating the schedule was that ensuring adequate coverage for a service isn't as simple as just creating a schedule as there are always variables that must be adjusted for (meetings, didactics, people being sick or needing off for appointments, etc.) Something I learned from this experience that will benefit me in future is remembering there will rarely be a schedule that is perfect for everyone.</p> <p>When we sat down together, each of us assumed it would take about 30-45 minutes to finalize the schedule. When it began to go longer than expected, one challenge was staying patient with the process and working methodically rather than sporadically to ensure that everyone understood why shifts were being structured in certain ways.</p> <p>Speaking up about duty hours was very challenging because it could suggest a lack of commitment to the care team and can give off a connotation that personal interests are placed at a higher priority than the duties of the team.</p>
Organization of call schedule	<p>As an initial approach, our group decided to start by naming specific days they would like off based on prior commitments. Using those days as a framework, we extrapolated schedules that would accommodate the specific requests, effectively creating initial shift assignments.</p> <p>Starting out, we began the process with help from our classmates who had previously worked on ACS during the first 4 weeks of the rotation. This already put us in a position for success because they let us know the obstacles they ran into and provided us with solutions from the start. In addition, they walked us through their process in drafting a schedule, and we were able to quickly adjust this to fit our specific group's needs.</p> <p>I think skills that helped as well were having attention to detail and demonstrating time management, as we were proactive and created formulas in excel to ensure we had created equal and satisfactory schedules. Using such organizational skills I think will be helpful as time requirements become more and more strenuous.</p>
Communication	<p>I found this experience to be a realistic representation of the complexity of scheduling call coverages in a surgical team. One thing that I learned from this experience is that communication and organization is absolutely vital to the process of making the schedule. It was important to make individual requests known to the team ahead of time.</p> <p>I've also observed that residents and attendings work out their duty hours by effectively and openly communicating with others. In matters like these, frequent and early communication is key.</p> <p>In the context of surgical training, I can very much see how in a setting that's face-paced, high-acuity, and has little room for error or mistakes, the best culture of communication is one that is preemptive and direct. Specifically with regards to duty hours, the only way to avoid issues in the first place, is to be open and upfront about potential conflicts way in advance.</p>
Learning from residents	<p>When I observed the residents, I learned the importance of time management and honest communication with the team regarding where they stood in their workflow. I also noticed how eager the residents were to help each other when one was falling behind or was being dealt an uneven workload. I have tried to emulate the strategies I see used by residents in order to save time and work efficiently. From what I have observed, residents are experts at utilizing every pocket of time they are awarded. If they have 15 minutes in between surgeries they find a computer near the OR and continue working on their notes. As soon as surgery is over and they are able to have an intern or med student help close the body they immediately start up their notes. This also involves prioritization of tasks and valuing your time and energy.</p> <p>Perhaps the greatest advice I got from one of the residents when it came to the surgery rotation was to stand up for myself. Whether that was asking for feedback or managing duty hours, she told me that no one was going to look out for me and that I needed to look out for myself.</p>
Negotiating skills	<p>I learned that voicing your concerns can lead to resolution of a challenge rather than a conflict. We all had certain days that we needed off for personal, religious, or health reasons and we worked together to ensure all of us were able to have the days off that we wanted and have at least 2 other students covering the shift.</p> <p>Another challenge we faced in creating the schedule consisted of differing priorities among our members, and having to accommodate a fourth member who would not be participating in the second half of the rotation. We overcame this challenge by each laying out one overarching goal we had personally for the schedule, and trying to prioritize this goal in the scheduling decisions we made. We demonstrated positive attributes of teamwork by working collaboratively and compromising to set the schedule.</p>

(continued)

TABLE 2 (continued)

Theme	Quotation
MS1 curriculum foundation	<p>The lesson learned from this particular experience was that while it is important to accommodate personal preferences, it can't be at the expense of creating a viable schedule. We learned to compromise, and the final product is a schedule that we are all satisfied with.</p> <p>...in terms of helpful skills from the MS-1 curriculum, I feel that all the teaching around crucial conversations played a large role in my ability to properly manage my duty hours. I feel that if I was to get asked about my duty hours by a resident or an attending that I would have any answer ready that would not make me look like I am not committed or that I have poor work ethic but instead an answer that would allow me to stand up for myself while still looking like an engaged, committed member of the team.</p>
Sharing responsibility	<p>The MS1 curriculum – particularly IPE [<i>Interprofessional Education</i>]—helped prepare me for this because I learned quickly that you need to know your team well in order to have one another's backs. Duty hours may seem like an individual problem, but every shift you are not there, someone from your team is. Making sure that everyone agrees and are satisfied is paramount.</p> <p>My MS1 curriculum taught me time management skills and multitasking that allow me to get my work done as far as patient care while focusing on my time in the OR. My MS1 leadership curriculum helped develop the skills and confidence to have conversations with residents and attendings about my duty hours and my other commitments such as my primary care clerkship.</p> <p>From the start, it was obvious that we all were looking out for each other and had each other's back. If an emergency came up and someone needed someone else to cover their shift/surgeries, there was no shortage of support and help.</p> <p>From there, we had every person on the team review the schedule to ensure that they followed duty hour rules and had their appropriate days off. In doing so, everyone was responsible for their individual schedule, and we mutually agreed on the group calendar. The entire process was relatively easy as each team member was accommodating and agreed to distribute the work hours as evenly as possible.</p>
Unintended benefits	<p>One workaround to this was to switch days with another person and remain flexible so that other players on the team could experience different surgeries during our time in ACS. This helped demonstrate the team effort needed to make sure that everyone was getting the most out of our rotation. By remaining flexible, our team was better able to work around issues such as this.</p> <p>The portion of the schedule process that surprised me was how much I liked being in charge of creating my own schedule. It made the ability to communicate with every member involved in the schedule creation process easy and open in regards to changing aspects of the day to day flow to accommodate other aspects of your schedule.</p> <p>I really enjoyed creating my call schedule because I knew my availability in advance for the whole month. I could plan out activities, events, and be able to anticipate challenging days in advance. I was surprised by how much I enjoyed knowing my schedule for the next month, down to the exact hour.</p> <p>What surprised me the most about creating the duty hours schedule was how willing we were to help our fellow students. When one member had a family emergency, everyone was willing to double up shifts indefinitely without a second thought. The most important thing I learned was to be very honest about WHY we wanted certain changes in the schedule.</p>
Career/Residency preparation	<p>Aspects of this process that I can apply to future call schedule creation include things such as the importance of establishing personal priorities when balancing a schedule, the importance of open communication with all members included in the schedule and understanding that there will be shortcomings of every schedule and being flexible with your expectations.</p> <p>I know that duty hour limits have not always been something that was a part of undergraduate and graduate medical education. For us going through training now, I believe that best practices in maintaining duty hours involves practicing task efficiency and effective communication while on shift.</p> <p>Moving forward, and especially as a resident having to manage the teams' duty hours, I will be sure to initiate such conversations early to resolve any possible conflict around common priority days off to ensure a fair distribution of time off. And although it worked in our favor to have communicated via GroupMe, I think it is always best to speak in person; therefore, I will also try to find a way to ensure face-to-face discussion.</p>
Importance of duty hours	<p>Duty hours have been put in place in order to curtail total working hours and promote overall wellbeing. Students and doctors cannot perform at their best if they are overworked, exhausted, and tired. When healthcare providers become sloppy and inefficient due to fatigue and burnout, patient care ultimately suffers. It is important for students to try to avoid duty hour violations because it is difficult for managers to closely follow and enforce the duty hour rules. In addition, violating duty hours is</p>

(continued)

TABLE 2 (continued)

Theme	Quotation
Involvement of MS4s	<p>now against ACGME rules, so repeated violations of duty hours could put the validity and accreditation of a program at risk.</p> <p>In order to serve your patients, you need to be able to function correctly, which my residents have reiterated is paramount importance. They try to help one another balance their schedules and take shifts when each other needs them.</p> <p>Not only does this stave off potential burnout but allows surgeons to be more optimally rested before operating and thus reducing potential errors due to fatigue.</p> <p>However, (MS4) took the lead in helping us to become oriented which allowed all of us to take the lead and help to formulate the schedule.</p> <p>Our biggest challenge was finding how to ensure each shift was covered as we didn't have an MS4 or acting intern for our time on ACS.</p> <p>We also had the challenge of incorporated an acting intern into our clerkship schedule. Thus, we made sure to contact her to note her requirements.</p>

was asking for feedback or managing duty hours. . .no one was going to look out for me and that I needed to look out for myself.”

Another barrier was the time commitment of making the schedule. Students “assumed it would take about 30 to 45 minutes. . .When it began to go longer than expected, one challenge was staying patient with the process and working methodically rather than sporadically to ensure that everyone understood why shifts were being structured in certain ways.” While the time commitment and organizational difficulties were emphasized in several reflections, the sense of teamwork it created was significant. If close to hours limits, “. . .it was obvious that we all were looking out for each other and had each other's back. If an emergency came up and someone needed someone else to cover their shift/surgeries, there was no shortage of support and help,” or the ability to “switch days with another person and remain flexible. . . demonstrate[d] the team effort needed to make sure that everyone was getting the most out of our rotation.”

It has been shown that students have mixed feelings about schedules imposed upon them,^{8,9,14} but this innovation allowed students to become agents, rather than victims, of their schedule. For example, reflections stated that “the portion of the schedule process that surprised me was how much I liked being in charge of creating my own schedule,” or, “I really enjoyed creating my call schedule because I knew my availability in advance for the whole month. I could plan out activities, events, and be able to anticipate challenging days in advance. I was surprised by how much I enjoyed knowing my schedule.” This is not surprising, as autonomy, positive psychology, and choice are strongly associated with happiness and internal motivation in psychology and business literature.¹⁵⁻¹⁸ While preferences could not always be honored, the students' negotiation skills were nourished in a controlled environment: “We learned to

compromise, and the final product is a schedule that we are all satisfied with.”

Professional Development

The end goal of most medical education is to create independently practicing physicians—either clinically or professionally, otherwise. Therefore, emulating the next step of training can be a crucial component of fostering successful residents. With this shift in schedule paradigm, DMS created a realistic professional development activity that is scalable to other programs. Additional skills learned through this exercise included: development of independence while still maintaining a team dynamic, improving negotiating skills, sharing responsibility both in the direct task of creating the schedule and in covering for each other to maintain their hours, and improving communication—between each other and between different levels of the hierarchy such as with MS4s, residents, or all the way up to attendings. Medical students and residents are adult learners, and the exercise reinforced the need to manage their professional obligations and be empowered to obtain feedback independently. This was counterbalanced by the collaborative nature of the task: collaboration that will be a necessary component of working together as residents.

Limitations

This study has limitations from its retrospective nature and secondary use of reflection pieces. While not mandated, physical completion of the reflection piece was necessary to achieve Honors in the CSC and not all students completed the reflection, which could invoke a selection bias. Students could be considered coerced into writing the pieces, potentially skewing what was written. Additionally, students were given a prompt. Answering the specific questions could reasonably skew the number and frequency of themes identified in the

reflection pieces in favor of those created primarily from the deductive methodology.

CONCLUSIONS

The approach of transferring duty hour scheduling to medical students on the CSC resulted in students gaining multiple professional development skills in a structured learning environment. It gave students autonomy over their external priorities and allowed them to gain valuable leadership, communication, and negotiating skills that will be required in residency. Lastly, it decreased administrative burden and may have had improved adherence to duty hour requirements. This scalable and easily-implemented innovation requires further investigation, but it may be considered at other institutions seeking to improve the leadership and communication skills of its students while improving adherence to duty hour restrictions.

DECLARATION OF INTEREST

The authors have no competing interests to declare.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

ETHICAL APPROVAL

This study was approved by the Institutional Review Board of the Dell Medical School at The University of Texas at Austin, STUDY00002003, approved November 2, 2021.

PREVIOUS PRESENTATIONS

The abstract from this work was presented at the Southern Group on Educational Affairs Regional Conference as a virtual oral presentation on March 28, 2022.

ACKNOWLEDGMENTS

We would like to extend sincerest thanks to Andrew Well, MD, MPH, MSHCT for his assistance in structuring the inductive process for the identification of themes.

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SUPPLEMENTARY INFORMATION

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jsurg.2023.03.005](https://doi.org/10.1016/j.jsurg.2023.03.005).