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Needs assessment can guide creation of a "resident-optimized clinic" in surgery

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ABSTRACT

Background: There is limited data on deliberate teaching of residents in the clinic setting; we sought to investigate the clinic experience at our institution and improve education through creation of a novel "Resident-Optimized Clinic" (ROC).
Methods: An online survey was sent separately to residents and faculty. Based on the results of this survey a modified ROC was developed to try to improve the obstacles to learning in clinic.
Results: Qualitative analysis revealed the barriers in clinic were inconsistencies in expectations, lack of autonomy, time, and facility limitations. The modified ROC was rated positively with 100% of participants expressing they had sufficient time and autonomy; and 90% felt the environment was optimized for teaching.
Conclusions: Multiple themes have been identified as problematic for the clinic education experience. The ROC was rated positively by trainees suggesting thoughtful intervention to improve clinic results in a better clinic experience and more educational gain from the clinic environment.

Introduction

Introduction of the graduate medical education clinical and educational work hours restrictions in 2003 (with subsequent revisions), alongside multiple curricular and assessment requirements, and increased complexity and breadth of required operative experience have resulted in significant changes to the delivery of surgery resident education. Serendipitous learning is insufficient; strategic teaching and graduated autonomy are now the focus of optimal surgical education and training. With these influences, most surgery residency programs have modified training and education in the operating room to allow for more directed and strategic learning. The outpatient clinic experience, however, has taken a much more secondary focus.

Despite recognition of the importance of deliberate education practices, there is a paucity of literature on optimizing learning outside of the operating room, particularly investigating ideal education practices within surgery clinic. Currently, residents are required to spend at least 4 h a week in clinic.[1] Despite this ACGME program requirement, there are no educational parameters guiding programs on how to best provide outpatient clinic education and in particular, how to optimize development of resident autonomy in the outpatient setting. Furthermore, economic pressures and patient-satisfaction metrics lead to administrative decisions to expedite or overbook clinic appointments and limit wait times as much as possible.[2] Increased roles of advanced practice providers, visit time limitations and the increasing need for timely documentation have eroded the role and autonomy of the resident in the outpatient environment. Faculty physicians are pressured to keep clinic moving, complete their electronic medical record workload, and educate many students or trainees simultaneously—thus limiting their ability to focus on individual resident experiences. Patients are also less tolerant of long appointment times and trainee involvement in their care. The transition from the physician-patient relationship to a more consumer-based relationship threatens trainees' opportunities for autonomy and growth. These pressures also discourage significant resident

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discourse and contemporaneous education in order to maintain an appropriate clinical pace.[3] Further, experiences of continuity from preoperative, intraoperative, to postoperative visits are becoming rare—limiting the resident's experiences in patient "ownership" and the longitudinal patient experience.[4]

Given these competing needs and likely suboptimal learning conditions, the purpose of this pilot project was two-fold. We sought to investigate the current state of surgery clinic education at our institution to further our understanding of both resident and faculty perspectives. We also sought to develop an improved clinic education experience to better prepare our graduates for future independent clinic practice.

Methods

Environment

This pilot took place within the Department of Surgery, Section of General Surgery, at Michigan Medicine, a large academic tertiary care center. The Department consists of seven sections, each with their own training program. There were a total of 142 trainees and 150 faculty surgeons at the time of survey distribution.

Needs assessment

After IRB exemption (#HUM00130675), an online survey was sent to all residents and practicing faculty in the Department of Surgery at Michigan Medicine in Spring of 2017. Two additional reminder emails were sent to increase participation. This qualitative descriptive study employed a five-question survey to collect data. The survey included multiple choice and open-ended questions asking about strengths and challenges with the current state of clinic education at our institution (Supp 1). Qualitative content analysis was performed on the open-ended responses by study team members (MB and GS) using NVivo (QSR International Pty Ltd, Los Angeles).[5,6] Through an iterative process, text was coded into meaningful units. Similar codes were then grouped into categories. Overarching themes were developed that accounted for the categories. Key themes were those identified by more than 10% of respondents. Any discordance in themes among reviewers was resolved through discussion with study team members.

Results

Needs assessment

40 (28%) residents and 42 (28%) faculty surgeons completed the online survey. Faculty were more likely to state that clinic was either extremely important or very important (90%) whereas residents were less likely to agree with the importance of the clinic experience (71%) (Fig. 2) Four themes were identified from the open-ended responses as barriers to clinic education: autonomy (supervised independence perceived by residents), clear expectations (how to prepare for clinic, which patients to see in clinic, what documentation to complete), lack of time (limited time for education and teaching), and limited space/resources (physical working space, computers) (Table 1).

Implementation of resident-optimized clinic (ROC)

We developed an intervention within existing system constraints, informed directly by the four themes identified from the online survey. Based on the results of this needs assessment, we developed a novel clinic educational model, the modified Resident Optimized Clinic (ROC), that allows for resident education without introducing significant clinic delays. We sought to focus the ROC implementation on the three themes identified through the needs assessment: increasing autonomy, clarifying expectations, and increasing time for evaluation and assessment. The fourth theme of limited resources was more challenging to address, given the limited physical space already shared by multiple providers and learners, and therefore was felt to be beyond the scope of the current clinic modifications. We did provide the ROC participants a defined working space but did not specifically assess this modification in our post intervention survey.

We piloted a revised schedule to allow a focused resident experience within a larger specialty clinic. One attending (PG) volunteered to reorganize one of his clinics into the ROC format. Given it was a pilot we elected to focus our efforts on one clinic, therefore, the specialty studied—endocrine surgery—was utilized out of convenience for proof of concept. We hypothesize that this model could be utilized in varying specialties. Certain referring diagnoses were identified which were concordant with the learning goals and objectives of the endocrine surgery service. The call center schedulers were instructed to fill the slots in the faculty clinic schedule set aside for ROC only with new patients with these diagnoses. The clinic was hosted within the usual clinic hours of the faculty surgeon and the individual time slots were extended (Fig. 1). This parallel flow was crucial for allowing for increased time for the resident in ROC without creating a bottleneck for the attending surgeon. Each week, one resident (all levels PGY1-PGY7) was assigned to and notified of participation in this clinic, chief residents who make the schedule were encouraged to ask different people to go each week. Not all residents attended the clinic, but attempts were made to not have the same resident participate twice. In total, twenty different residents participated in our pilot program. The identified resident was instructed to pre-read on the patients and their diagnoses, see the patients independently, perform a cervical ultrasound, and develop a plan for discussion with the faculty surgeon. After completion of the clinic visit the resident performed the clinic documentation and communication with the patient and appropriate caregivers. Documentation was edited by the attending surgeon as usual. Residents would also see additional return visits or post-operative patients depending on schedule flow or familiarity with the patients. Residents were emailed a post-clinic survey at the end of the day (Supp 2) with both Likert and open-ended responses.

ROC reviews and lessons learned

The goals of this modified ROC were to optimize resident autonomy and improve the resident experience. Residents who participated in the ROC had very positive opinions of the clinic modifications. One hundred percent of residents stated they had sufficient time to develop their plans and appropriate autonomy during their clinic experience. Over ninety percent felt the faculty utilized clinic for discussion/teaching of perioperative patient management and 80% percent felt the expectations for clinic were clear.

Open ended responses further described the clinic experience and reinforced the three themes of graduated autonomy, clearer resident expectations, and increased working time (Table 1). Residents very much appreciated the autonomy experienced in their education, stating, "It was clear that this organizational scheme was more for education than just getting work done". This indicated that residents found the modified ROC to be supportive of individual growth. Clearer expectations were noticed and welcomed by trainees. A resident expressed, "… Having these patients reserved for me made my pre-charting and reading worthwhile." Established expectations, for example in the form of care for pre-

Table 1
Themes in clinic evaluation Pre- and Post-Implementation of Resident Optimized Clinic.

Barrier	Pre-Intervention (Needs Assessment)	Post-intervention (Post-Clinic Survey)
Autonomy (supervised independence perceived by residents)	"Currently, I have only seen residents in clinic that act more as a **shadow** of the attending which allows them to see more patients, but I worry that they lose out on the autonomy."	"Felt as close to an independent clinic as I have experienced."
Clear Expectations (how to prepare for clinic, which patients to see in clinic, what documentation to complete)	"Not being aware of overall flow, such as which other staff the patient needs to see this visit, space, access to supplies."	"It was certainly less stressful. It was clear that this organizational scheme was more aligned for education than for just getting the work done."
Lack of Time (limited time for education and teaching)	"The biggest factor - almost the only factor - that influences the educational value of the clinic is time; it is difficult to make the experience valuable for the trainee when things are pressed for time."	"The time allowed for clinic evaluation was excellent. I was able to take time doing a history and physical and very much appreciated the opportunity to have more time to work on my ultrasound skills." "I had little exposure to endocrine clinic prior to today, and this was the perfect set up so that I could read about patients, generate a plan ahead of time, then have an informed discussion with Dr. G about uncertain spots. It was particularly useful because almost all of our patients today were complex enough to require some discussion to make an appropriate plan."

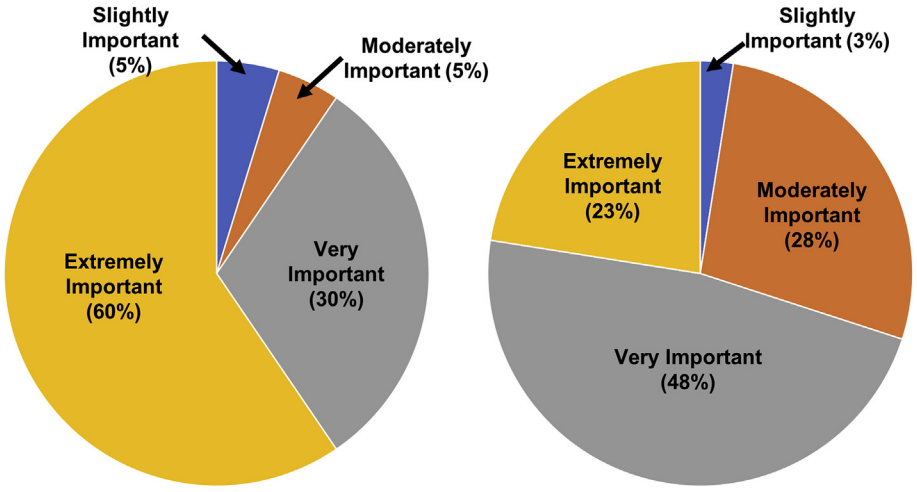

Fig. 1. Trainee vs. Attending Opinion on the Importance of Clinic in Surgery Education.

assigned patients, helped residents be better prepared for the optimized learning experience. Finally, the theme of increased working time, pointed to the efficiency of the clinic for residents. One participating resident shared, "I had to spend several hours at home the day prior to prepare the new patients (without knowing which ones they would actually see) so that clinic could run smoothly. In the modified ROC instead, things were much more manageable, and I didn't have to do as much homework in an already busy schedule." Modified ROCs appear to reduce the logistical burden and, thereby, enable resident to increase their patient engagement time.

Though the majority of comments were positive, areas for improvement were also revealed in the comments of this pilot program. One challenge was incorporating medical students into the mix as evidenced by the comment, "The only recommendation for improvement is to come up with a more active role for medical students rather than just shadowing." This sentiment was expressed by multiple participants. Residents also found the preparation for some of the patients to be challenging when there was minimal documentation of their past medical history and medical work-up, although the authors note this is reflective of the experience of faculty surgeons who are often left to work up patients with incomplete information.

Discussion

Optimization of resident education to allow for progression to relative autonomy is imperative for the training of our surgical residents. Clinical and educational work hour restrictions limit the time residents have in the hospital, with ambulatory hours decreasing significantly.[7] A commendable amount of work has been done in the realm of intraoperative teaching to progress residents to autonomy but there is limited study of optimizing the clinic environment.[8,9] Our residents identified their clinic experience as an aspect of their training in need of enhancement so we modified the clinic experience to allow for greater autonomy and consistency. Overall, participating residents had a positive assessment of the experience and the time given to assess their patients and develop care plans.

The importance of such efforts is multifactorial. Clearly, assessing patients in the outpatient setting and developing surgical plans is important in autonomous practice. Prior to board certification, The American Board of Surgery requires that residents must complete observed outpatient interactions. Evaluation tools including CAMEO and Mini-CEX have been recommended for assessing the competence of residents prior to graduation but these evaluations are often perceived as awkward and forced.[10–13] Further, these evaluations do not assess the resident in a

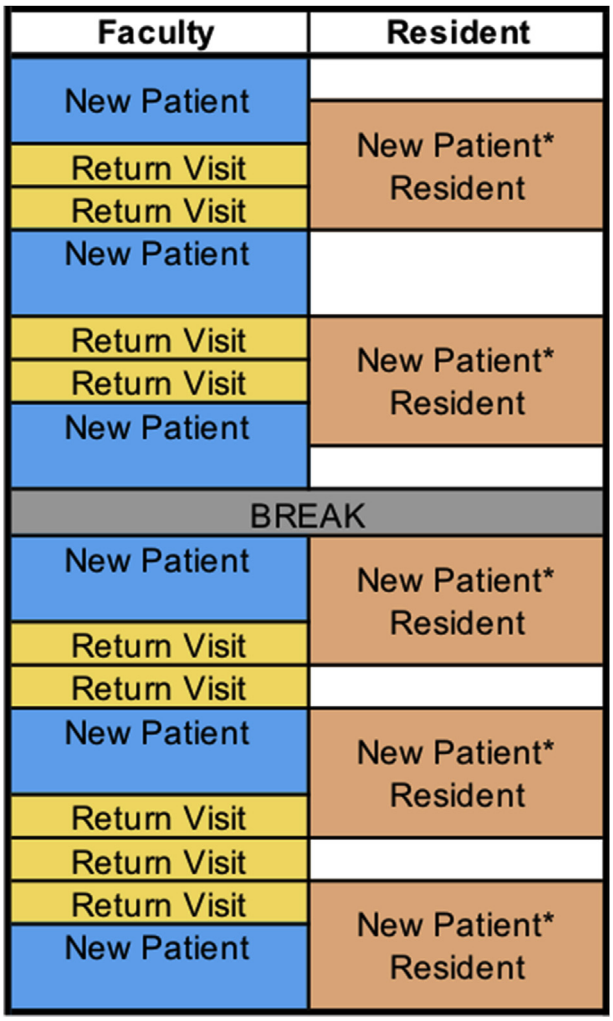

Fig. 2. Parallel clinic visit scheduling for the resident optimized clinic.

longitudinal manner and therefore are of limited effectiveness for feedback and growth.

Beyond the limited focus on assessing trainee's clinic skills, residents face competing interests in the outpatient clinic, with time limitations being paramount. Most outpatient surgery clinic visits are allotted 15–30 min, too brief a period of time to allow a resident to see a patient autonomously and develop a care plan as well as have a supervising physician perform a similar task.[3] With hospital systems encouraging surgeons to see more and more patients and limit appointment waiting times, this limitation is unlikely to change.[14,15] Given this, many institutions have added advanced practice providers to the clinic environment to allow more patients to be seen in less time, but this often leads to an environment where the volume creates chaos and the resident's role is poorly defined. The constant pressure to see more patients per day disincentivizes teaching. Residents may not specifically prepare for clinic because of the overwhelming number of patients to be seen or may prepare for clinic and feel their time was wasted as the advanced practice providers see a large majority of the scheduled patients. With current ACGME regulations requiring recording clinical work done from home as clinical and educational work hours, increasing the learning impact and efficiency of this process becomes even more important.[1]

We created a modified schedule which allowed for parallel patient visits under the same faculty physician. This allowed for continued flow of patients for the resident without slowing down the other visits. Further, faculty were able to influence the scheduling of patients that would be most educational for the resident learner and add diversity to the clinic experience. The defined number of patients allowed residents to be informed of their specific patient load and pre-read on the patients, allowing the residents to time to further develop their clinical reasoning skills and increase the likelihood of an effective visit with the patient. Of critical importance for our learners is utilizing their basic science and clinical knowledge base to develop diagnostic reasoning, a skill which takes time, practice and strategic teaching—all components of our resident-optimized clinic.[16]

We hypothesized that the modified clinic structure would optimize resident education but were unsure if it would cause significant delays in patient evaluations and clinic wait times. We were pleased to find that clinic access metrics suggest that this model does not result in any loss of clinic visits and that the parallel clinic model, in which residents and faculty see patients in parallel instead of series, has the potential to improve overall activity and access. At most institutions in which advanced practice providers are participating in clinic, it is likely that multiple visits are occurring in parallel already, so we do not feel this detracts from patient care. Perhaps scheduling such visits strategically and allowing providers and trainees greater clarity with regard to scheduling allows for more efficient visits. Since implementation of the modified ROC, wait times for the participating faculty member have decreased compared to his partners, with the only significant change during this time period being the parallel schedule and implementation of the resident-primary extended patient visits. Further investigations and longitudinal study are required to see if the improved efficiency of clinic visits is sustainable.

The ROC model can present significant challenges for the teaching attending surgeon. One unintended consequence we did not fully anticipate when developing this clinic was the challenge of integrating medical students despite overall increased learner competition. The ROC model presented significant challenges for the faculty teaching faculty surgeons who were forced to divide their attention and titrate teaching and autonomy between residents and students. Overall the residents found the teaching experience was optimized but both residents and faculty struggled with focusing on the resident having the most autonomous experience while also trying to teach medical students in the same clinic setting. Given the heightened expectations nationwide amongst medical students and medical schools alike, limiting the student role may not be an appropriate option if the ROC is scaled up. However, with flexibility, the student may see patients with/for either resident or faculty member which may increase direct teaching opportunities for the resident as well.

Implementing a similar clinic for medical students or splitting up the patients allotted extended visits between one resident and one medical student are both potential solutions but need further vetting prior to implementation. This will lead to additional limitations of space conducive for educational discussions. The vagaries of parking, patient flow and delayed arrivals had the potential to disrupt the overall schedule significantly, which increased the stress upon the faculty surgeon managing the parallel modified ROC. Lastly, the electronic medical record has substantially increased the real time documentation load. As the faculty surgeon is required to complete billing elements and case order sets in real time for both parallel clinics, this can further encroach on teaching time for both residents and students.

Generalizability and implementation at other institutions

Based on this experience, implementation of an ROC is feasible

and appreciated by participating residents. Crucial for our implementation was first, determining the needs of residents and faculty. Development of learner autonomy and efficiency are likely to be universal goals, but the clarity of goals for the clinic experience and inherent logistics and resources obviously vary across the nation. In order to implement the ROC, we sought out the aid and advice of clinic administrators. This is vital in any reorganization of the clinic experience and made the transition of resident expectations smooth for all parties involved. Finally, we initiated this work with one attending in one specialty clinic. The logistics of switching around schedules and insuring patient care is at a high level while trying to optimize resident teaching are not trivial. We recommend an initial trial in a few clinics to insure feasibility and that teaching can be provided to all learners, including students and fellows. This is reflective of an agile implementation which seeks regular and incremental feedback from participants (faculty and residents) whose insights inform optimization of the process. Finally, it would be beneficial to launch wider adoption of ROC with both faculty and residents participating together in an education development session. This supports dissemination of a consistent educational goal and clinical process. A surgeon champion and a resident champion who participated in the ROC trial would be well positioned to lead education development and focus on preparing for clinic, establishing expectations, and structuring the debrief. Simulated patient videos could be development to augment the faculty and resident development.

Limitations

Our work is not without limitations. As a pilot, our results are limited by short follow-up and a small sample population. As stated above, we recognize that not all institutions have the resources to modify clinic schedules to allow for this resident experience. Finally, if implemented widely at our institution, there is concern that the gains in residency education may detract from the medical student experience. We are currently working on how to best modify the model to allow for the most robust experience for both learner populations. Of course, this reflects an experience at a single institution with a single faculty surgeon and thus generalizability has not been demonstrated. However, these strategies are available to other motivated surgical educators.

Conclusion

The clinic educational experience is ripe for modification and optimization. Residents desire increased autonomy and clarity of expectations, which is a challenge in the time-limited clinic environment. Our pilot program in which residents staff an integrated and supervised resident-optimized clinic was rated positively by participating trainees. This was accomplished with reorganization of existing resources alone. Increasing resident autonomy and teaching in the clinic environment through programs such as ours may increase the confidence of graduating residents, achieving the goal of surgeon educators: graduating confident, competent, and safe trainees.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amjsurg.2019.02.005.

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