

Supporting early-career military general surgeons: an Eastern Association for the Surgery of Trauma Military Committee position paper

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SUMMARY

Early-career surgeons must be exposed to a sufficient number of surgical cases of varying complexity in a mentored environment to allow them to solidify, sustain and build on the skills gained in training. Decreased operative volumes at military treatment facilities and assignments that do not include strong mentoring environments can place military surgeons at a disadvantage relative to their civilian counterparts during this critical time following training. The challenge of lower operative volumes in the current interwar lull has been exacerbated by the decline in beneficiary care conducted within the Military Healthcare System. These challenges must be addressed by ensuring early-career surgeons maintain exposure to a large volume of complex surgical procedures and deliberate mentoring from senior surgeons. The purpose of this position statement is to provide actionable methods to support early-career military surgeons to effectively transition from training to independent practice.

BACKGROUND

The transition to practice is a uniquely demanding time in a surgeon's career as they pivot from the relative safety of 'trainee' status to that of 'attending'. Successfully navigating this transition requires confidence to apply the skills learned during training while learning how to accept responsibility for the outcomes attached to their decisions. This transition can be particularly challenging for the military surgeon, who must also navigate the complexities of the Military Health System (MHS) and deployments.¹ Providing an environment with robust clinical experience as well as the opportunity for mentoring from senior surgeons is crucial to a successful transition.

Military or civilian, the professional development of early-career surgeons' benefits from exposure to a high volume of operative cases of varying complexity and mentoring from senior partners. As one author notes, surgical confidence in transitioning surgeons is directly related to the accumulation of successful cases and experience in managing complications. As early-career surgeons gain clinical experience, they become both more competent and more confident. This is reflected in increased comfort with complications and unexpected findings in the operating room.² Increased case volume and comfort in the operating room likely lead to better outcomes. In a sweeping observational

study by Birkmeyer *et al* using civilian Medicare data, the authors note a significant relationship between surgeon volume and outcomes.³ These findings corroborated earlier published data from Memorial Sloan Kettering that showed lower risk-adjusted mortality rates for high-volume surgeons performing gastrectomy, lung lobectomy, and colectomy for cancer.⁴ Although this effect has not been studied specifically in military surgeons, it is reasonable to expect that early-career military surgeons would benefit from high case volumes.

While high volume and complex cases are vital components in the transition to practice, they must be accompanied by mentorship.⁵ A joint American College of Surgeons (ACS) and Accreditation Council for Graduate Medical Education conference on assisting surgeons transitioning to practice noted that mentoring of early-career surgeons was a key component in their transition and strongly urged departments of surgery to establish programs to promote mentoring of early-career surgeons by experienced faculty members.⁶

Intraoperative mentoring from senior surgeons may help avoid technical complications; mentors can also assist early-career surgeons in navigating the sequelae of complications. Complications have a significant impact on surgeons, though coaching from senior surgeons may help restore confidence, in junior surgeons.^{7–10} Surgical coaching from more experienced colleagues may help restore confidence after complications, something especially challenging for early-career surgeons.¹⁰ Mentorship is especially important for early-career military surgeons as they adjust to military medicine with its unique bureaucracy and structure. In addition, mentors can provide guidance on how to manage complex patients in austere, resource-limited environments while deployed. Senior military surgical mentors also help junior surgeons navigate the military assignment system including professional development and military career planning.¹ Finally, if the mentor is part of the same institution, they can help facilitate integration into the culture of the institution and provide in-person support; however, telementoring may play an important role when in-person mentoring is unavailable.^{5,6}

The challenges of transitioning to practice, even in civilian medicine, are well recognized, to the point that the ACS launched a Transition to Practice Program (now known as the Mastery of General Surgery program) in 2013. This program

pairs graduating trainees with senior surgeons with the goal of easing the transition to surgical practice.¹¹ Given the widespread recognition of the difficulties surgeons face early in their career, it is vital to consider how military assignments and policies can be improved to support the transition to independent surgical practice.

CHALLENGES FACING EARLY-CAREER MILITARY SURGEONS

Early-career military surgeons often begin their practices with low clinical volume characterized by lower complexity operations, sparse local mentorship, and frequent interruptions in clinical practice. In 2019, US News and World Report noted that military surgeons typically perform fewer than 100 cases a year, typically on healthy patients with few comorbidities.¹² Within the US Army Military Treatment Facilities (MTFs), a study from 2012 to 2016 demonstrated that the average army surgeon performed 108 cases a year, spending only 122 hours per year operating.¹³ During the same time period, civilian general surgeons applying for recertification with the American Board of Surgery performed a mean of 533 cases a year; subspecialists applying for recertification performed a mean of 401 cases a year.¹⁴ A 2021 study by Dalton *et al* suggested that case volumes have continued to decrease, noting a 25% decrease in all general surgical procedures at MTFs from 2015 to 2019 with a concurrent increase in care provided at civilian hospitals suggesting outsourcing of care from MTFs. The authors noted that only 10% of military general surgeons could be considered 'ready' to deploy by the Defense Health Agency's (DHA) Knowledge, Skills, and Abilities (KSA) metric.¹⁵ This metric, assigns predefined scores assigned to each current procedural terminology (CPT) code billed in the past year. These scores, based on the applicability of the procedure to wartime injuries are then summed and the resultant score is used to determine readiness for deployment.¹⁵ In addition to low readiness as measured by KSA, the proportion of high complexity cases performed at MTFs decreased approximately 25% between 2005 and 2019.¹⁵

Case volumes are further impacted in the weeks leading up to deployments as well as following redeployment as deploying surgeons take part in predeployment training. For several weeks before deployment, there is a significant decrease in operative volume, which persists for another 7 weeks following return from deployment.¹⁶ This is especially apparent for Naval surgeons deploying to sea. In the 6 months prior to deployment aboard a ship Naval surgeons perform on average less than one case per week. This is due to a period of ship-specific or field-specific training or medical planning that precludes the surgeon from continuing a clinical workload.¹⁶ During deployment, elective cases are minimized in case of emergencies and due to limited supplies. During the postdeployment period, postdeployment leave and administrative issues associated result in challenges scheduling clinic, and consequently, elective cases. This decrease in case volume prior to, during and after deployment may represent over a year of time away from the operating room and result in decreased operative proficiency.

During deployment, surgeons can expect minimal operative volume.^{14, 16} Unpublished data from 2018 suggest that forward deployed surgeons had, on average, less than one patient encounter or operation per month.¹⁴ Since that time, deployed case volumes have remained stagnant. During the waning years of the conflict in Afghanistan, the largest Role 2 MTF was performing a median of 2 operations per month. Less than 1% of patients were evaluated for battle-related injuries between 2016 and 2019.¹⁷ A recent study of general surgeons deployed

to Africa from 2016 to 2020 noted a median of 4–6 cases during a 6-month deployment period.¹⁸ During a similar period from 2017 to 2020, a survey of Air Force Ground Surgical Teams (GST) surgeons revealed 4 of 22 GSTs performed no surgery during a 6-month deployment. Among those teams who performed surgery, a median of six cases was reported. The GSTs who deployed to Role 3 facilities performed a median of seven cases over the duration of the deployment.¹⁹ Similarly, Navy surgeons deployed at sea performed an average of 0.6 cases per week while deployed. Those deployed on land performed an average of 1.5 cases per week.²⁰ Yet despite low operative volume and case complexity during deployment, many military surgeons can expect to deploy within a year of graduating from training, interrupting ongoing development of clinical competency.¹⁴

In addition to these well-established concerns, military medicine frequently places early-career surgeons into positions without mentorship or as the sole surgeon in a location with known low volumes, a practice known as a utilization tour. The proportion of early-career surgeons assigned to utilization tours is unclear. These assignments may include overseas tours to remote bases with minimal operative volumes or as the sole surgeon on an aircraft carrier during a 6 month cruise. Alternatively, early-career surgeons may be assigned to a base with relatively low operative volume and little support from staff or no senior partners.²¹ This lack of mentorship may result in a more difficult transition to practice. While some of this may be alleviated by mentoring from civilian colleagues, there are benefits of having a military surgical mentor to help adapt to the unique culture of military medicine. In a 2021 survey of 226 active-duty Army surgeons, more than half identified the lack of mentors as a factor contributing to the decision to continue a military career after their service obligation. While this survey included all ranks of surgeons within the US Army, a majority of respondents were junior officers in the grade of O-3 or O-4 (US Army Surgical Consultant, Unpublished Data, 2021). The combination of low surgical volume at home, on operational tours, and abroad, combined with fewer opportunities for mentorship from more senior surgical staff results in a challenging transition to practice for early-career military surgeons, which likely contributes to low retention. While low retention primarily affects senior military surgeons, it can cause additional struggles for early-career surgeons. When more senior surgeons leave the military in the middle of their surgical career, the wisdom and expertise they developed are less accessible to more junior military surgeons. A shrinking pool of experienced senior military surgeons causes a trickle-down effect, as less experienced surgeons must fill the roles of mentoring early-career surgeons and trainees.

The goal of this Eastern Association for the Surgery of Trauma position paper is to provide consensus statements that should be used to support military surgeons transitioning from training to their first post-training clinical assignment.

POSITIONS

Position statement number 1: continued refinement of the KSA methodology is necessary to better assess clinical competency and deployment readiness

Several metrics have been contemplated to objectively assess the military surgeon's competence for deployment to active combat zones. The total number of cases performed may be utilized, however, this metric fails to account for varying levels of complexity. The Clinical Readiness Program was developed through a collaborative effort between the Uniformed Services University of the Health Sciences and the ACS.²² The explicit

purpose of this program is to assess military surgeon readiness to address the complex injury patterns and unique tempo of the combat setting. The program features four core elements: (1) periodic assessment of knowledge specifically aligned with combat casualty care; (2) competency in critical procedural skills likely to be needed in deployed settings; (3) training cycles tailored to the knowledge gaps exposed by the two previous elements and (4) the development of objective measures of practice relevance to military readiness. Experienced surgeons were surveyed to develop a set of critical skills relevant to deployed practice and peacetime CPT codes were mapped to each skill. Expert opinion was used to weight the scores for each skill with the goal of increasing complexity and variety of procedures. Low acuity procedures can make up a maximum of 50% of the cap and a diversity adjustment is applied.²² The program has established a threshold of 14 000 procedural KSA points annually as the minimum required for deployment readiness for general surgeons. However, the ability of this metric to reliably capture all relevant experience has come under some scrutiny.²³ While no metric is entirely suitable to measure an early-career surgeon's readiness for a combat deployment or judge their progress in the transition to practice, the KSA represents a starting point for assessment. We recommend continuous refinement and reassessment of the KSA score methodology including assessment of procedural weighting and score thresholds required to be considered deployment ready. Additionally, consideration should be given to setting score thresholds for critical procedures, such as trauma laparotomies.

Position statement number 2: early-career surgeons should be assigned to MTFs or integrated military civilian partnerships (MCPs) with sufficient volume and senior surgical support to support continued development when possible. If early-career surgeons are unable to be assigned to MTFs with sufficient volume or integrated MCPs, skill sustainment MCPs should be established and leveraged. For surgeons in assignments without skill sustainment MCPs, every effort should be made to promote other MCP models such as training affiliation agreements (TAAs), training with industry (TWI), external resource sharing agreements (ERSA) and off duty employment (ODE)

Assigning early-career surgeons either to MTFs with sufficient volume and senior surgical support to foster continued development or integrated MCPs should be prioritized. Military-civilian partnerships have existed in some form for decades and continue to evolve. Several authors have highlighted the importance of MCPs in maintaining clinical readiness for military surgeons.²⁴⁻²⁸ Integrated MCPs represent the most effective strategy for maintaining readiness while mitigating the deterioration of surgical skills during peacetime. In an integrated MCP model, military surgeons are assigned to a full-time clinical role at a civilian trauma center, as opposed to an MTF.²⁴ These partnerships may be aligned with just-in-time training platforms, such as the United States Air Force Center for Sustainment of Trauma and Readiness Skills (C-STARS) or solely represent skills sustainment platforms such as the Navy partnership at the University of Pennsylvania.²⁹⁻³⁰ Significant expansion of integrated MCPs resulted following the recommendations of the National Academies of Sciences, Engineering and Medicine for the MHS to develop permanent partnerships fostering joint civilian and military trauma system training platforms.³¹ Congressional legislative action under the Mission Zero Act provided the funding to the DOD to pursue these initiatives beginning in 2018.³² However,

each of the services have utilized the funding and initiative to institute partnerships independently. Each service branch has found local and national efforts that serve their independent interests including the Army's AMTC3, Air Force's C-STARS and the Navy's partnerships. Significant variability remains within each service's lines of effort, to include varying strengths and weakness within each AMTC3 site and lines of efforts within C-STARS sites.²⁸ A recent analysis of a mature, integrated MCP at a busy academic trauma center found that at 14 weeks of clinical service a year, assigned military surgeons were able to surpass 14 000 KSAs and still maintain military teaching responsibilities.³³ This suggests that assignments to MCPs allow junior military surgeons exposure to complex, high-volume trauma. At the same time, integrated MCPs allow mentorship of early-career military surgeons by both senior civilian surgeons and colocated military surgeons. Historically, many MCP assignments were limited to fellowship-trained trauma surgeons. This may limit opportunities for general surgeons to participate in integrated MCPs. There is emerging evidence that such limitations may not be warranted. Recent data have demonstrated successful integration of general surgeons into trauma programs at existing MCPs.³⁴ Further opportunities for placement of general surgeons into integrated MCPs should be encouraged.

While MCPs are promising endeavors, they require continued monitoring to ensure they are providing the experiences necessary to develop early-career surgeons.

For surgeons assigned to MTFs without adequate volume, skill-sustainment MCPs provide an alternative opportunity to maintain exposure to complex operative cases. In this model, military surgeons are primarily assigned to an MTF but spend a portion of their clinical time at a civilian trauma center. When effectively structured, these partnerships can maintain adequate MTF staffing while allowing increased clinical readiness. Recent work demonstrated that two trauma calls per month at a busy level I trauma center in a skill sustainment MCP generated 11 000 of the 14,000 KSAs needed for deployment readiness.³⁵ Similarly in a recent analysis of a skill sustainment MCP between a level II trauma center, a Naval MTF, and an Army MTF, a single surgeon spent 20% of his time at the civilian trauma center and generated approximately 6000 KSA points.³⁶ Together, this suggests that effective MCPs can support adequate staffing of MTFs while also improving surgical readiness.

While formal MCPs appear to be ideal, not all military surgeons will have access to them. In these situations, TAAs, TWI or External ERSAs may be options for skills sustainment. If none of these options is available, ODE should be authorized. ODE involves a military surgeon seeking out opportunities to work at a civilian hospital to increase their operative exposure. In its current model, there are several downsides, including requiring the surgeon to take leave, the absence of an established partnership to promote oversight, and the lack of established mentorship opportunities. Recent analysis has suggested that ODE may be less effective at increasing readiness than formal training agreements and there are challenges with the reporting of ODE volume.²³ Surgeons must also sacrifice their leave to perform ODE, which can disincentivize the pursuit of ODE. Therefore, we recommend that early-career surgeons be preferentially assigned to MTFs with adequate volume and senior surgical support or integrated MCPs. If these assignments are not feasible, we recommend assignments to MTFs with established skill sustainment MCPs. If none of these assignments are possible, then TAAs, TWI or ERSAs should be utilized. We recommend that ODE be made available for surgeons not assigned to MCPs and where TAAs, TWI or ERSAs are not

available. Consideration should also be given to standardizing these agreements between MTFs and civilian partners to the greatest extent possible to reduce the administrative burden on surgeons.

Position statement number 3: a ‘visiting surgeon’ model, which in its current form is widely used in predeployment rotational training, is inadequate to maintain combat readiness but may have applications in building familiarity

The current model for maintaining deployment readiness for surgeons is frequently based on the ‘visiting surgeon’ model. In this strategy, surgeons rotate through major trauma centers for a finite interval, most commonly 12–14 days at a time. However, the adequacy of these limited exposures has come into considerable doubt. Utilizing a predictive model, Hall and colleagues demonstrated that visiting general surgeons would require a total of 26 peak-season (summer) 24-hour shifts at an academic level 1 trauma center to gain exposure to 10 operative trauma cases. This number increases to 67 during low-volume season (winter).³⁷ As currently structured, this model predicts that an individual surgeon could anticipate somewhere between 3 and 8 cases (depending on the season) if the surgeons were to spend all 12 days of a ‘visiting surgeon’ rotation on continuous call. With call scheduled every other day, the model predicts exposure between 1 and 3 operative traumas.³⁷ Neither of these call structures provides adequate operative experience to maintain competence, much less achieve competence for the average general surgeon who does not see significant trauma otherwise. Furthermore, these cases are of variable clinical utility as operative experiences vary widely from center to center. Because visiting surgeons are generally not credentialed at the sites, they cannot operate independently. As such, they may be relegated to first assist or observer roles for operative trauma, further degrading the utility of these rotations. While participation in trauma resuscitations and observation of cases is valuable, this is insufficient on its own to maintain or build readiness for early-career surgeons and as such should not be the only method employed to maintain surgical readiness.

Position statement number 4: surgeons on their first tour after training should not be given assignments as the sole surgeon, nor should they be assigned to operational billets where they can expect low operative volumes. These assignments should be preferentially filled by more experienced surgeons. Also, early-career surgeons stationed in locations where they are the sole surgeon should have access to telementoring from senior military surgeons

In a 2022 *Military Medicine* commentary, Lt Col Mary Carnuff and LTG Ronald Place offer a strikingly inarguable opinion: ‘to remain competent, the surgeon requires volume adequate to maintain accurate diagnostic and technical skills. *The surgeon must operate.*’³⁸ Indeed, surgical volumes have long been tied to surgical outcomes. In a 2016 ‘systematic review of systematic reviews,’ Morche and colleagues found clear, direct relationships between surgeon volume and a variety of outcome metrics in the management of 11 separate surgical diseases.³⁹ In a similar paper published in 2015, Maruthappu and colleagues recognized years of practice as a suitable proxy for case volume in determining individual surgical performance. This is based on their observation that 11 out of 12 evaluated studies that measured experience in terms of years of practice showed significantly improved performance in a wide array of traditional outcome measures with increasing experience. For the newly-minted surgeon,

volume *must* drive performance until sufficient years of practice has been achieved to serve as the primary driver of outcomes.⁴⁰ Although not studied to date, the availability of a more senior colleague might conceivably mitigate the deleterious effects of inexperience. However, no such mitigation exists for the early-career surgeon assigned as the sole practitioner (or one of a few early-career surgeons) at a low-volume MTF. This represents a ‘worst-case scenario’ for the early-career surgeon’s development and can adversely affect patient outcomes.

For those surgeons assigned to locations as the sole surgeon, the early-career surgeons should have access to remote mentoring. Ideally, mentors would be part of the same institution as mentees to facilitate integration into the culture of the institution as well as to assist with surgical skills and judgment. However, telementoring may be the only option for surgeons stationed in remote positions.^{5,41} While surgical telementoring is still in its infancy, a recent Society of American Gastrointestinal and Endoscopic Surgeons review noted that there is little evidence to support telementoring in surgical practice.⁴¹ Nonetheless, surgical telementors can offer assistance with medical decision-making, nontechnical skills and adaptation to military practice.^{1,6} We recommend that junior surgeons stationed in locations where they are the sole military surgeon have access to telementoring from senior military surgeons. In addition, early-career military surgeons at integrated MCPs who are not stationed with senior military surgeons should also have access to telementoring. Ideally, this program would be voluntary with senior surgeons volunteering to be ‘matched’ with an early-career surgeon. We further recommend avoiding operational tours as a surgeon’s first tour and limiting deployments during an early-career surgeon’s first tour. This must be balanced with operational tempo and with care taken not to over task senior surgeons with deployments.

Position statement number 5: every attempt should be made to improve case volume and complexity at MTFs. This may include enabling MTFs to accept and care for emergency medical, surgical and trauma patients with the civilian communities where feasible

From 2015 to 2019, the number of surgical cases provided at MTFs decreased by 25%, despite the total number of cases provided to beneficiaries remaining the same, suggesting increased care being provided outside of MTFs.¹⁵ Senior leaders should focus efforts on recapturing care at MTFs to increase operative volume and complexity. One component of this effort should include integrating selected MTFs into civilian trauma systems. In a 2022 paper, Lee and colleagues identified 10 MTFs that would offer proximity advantages to population centers compared with the closest civilian trauma center if the MTFs were to achieve trauma center verification.⁴² While it is not feasible to make all inpatient MTFs trauma centers, in selected centers where there is a community need and the MTF can acquire the staffing and processes, it may improve case volumes and provide additional exposure to trauma care while aiding the local community. However, this requires an enterprise approach from the DHA and the services to determine where to best position resources. The DHA Trauma Services Sub Working Group was able to formalize a DHA process for consideration of trauma center development, remaining consistent with the ACS Committee on Trauma recommendations for trauma center designation. This process ensures that the MHS can maximize the readiness benefit of trauma care and make appropriate decisions on resources.⁴³ By appropriately selecting and advising

MTFs with the highest possibility to increase local readiness through trauma center verification, the military medical systems can enhance surgeon and overall readiness while providing a service to the local population. Recapturing care could further diminish reliance on MCPs for maintaining readiness.

Outside of trauma volume, it is imperative for MTFs to recapture the volume and complexity currently being diverted to civilian hospitals. This is pivotal to ensure that MTFs remain ready to deliver optimal stateside care for service members and to train future military surgeons. In a survey of over 226 Army surgeons in 2021, case volume and complexity were the most influential factors impacting a surgeon's decision to remain on active duty (US Army Surgical Consultant, Unpublished Data, 2021). The importance of this cannot be overstated—active duty surgeons must be clinically active, or they are likely to consider leaving the military. The Department of Defense has recognized this as a significant area of interest with the recent publication of a memorandum from the Deputy Secretary of Defense regarding stabilizing and improving the MHS.⁴⁴ This initiative not only focuses on bringing additional personnel back into MTFs to support healthcare delivery but also looks to reattract care from the private sector to military treatment teams. Surgeons must remain involved in this process to ensure that recaptured patients provide for readiness. We recommend developing selected facilities into civilian emergency care and trauma centers and continuing to reattract care into MTFs.

Position statement number 6: services should expand clinical track positions to allow progression of rank and retention of senior surgeons

Serving in a leadership position is a common prerequisite for promotion for senior military surgeons. The additional responsibilities associated with leadership roles demand a shift away from clinical practice and result in lower retention. A recent instruction from the Assistant Secretary of the Navy noted that to consider a Naval Physician 'best and fully qualified' to promote to the rank of Captain (O-6), the physician should have demonstrated 'sustained and superior leadership'. They further note that clinical accomplishments should be given 'at least' as much consideration as leadership skills.⁴⁵ Perhaps unsurprisingly, on Navy Officer Performance Reports for general surgeons, only one of six categories directly assesses clinical performance. Board certification generally earns the officer the maximum score for this category, regardless of volume, outcomes or other markers of clinical skill (Personal Communication, Commander Andrew Kung, Jan 2024). In the Army, the Surgeon General can bestow the Army Medical Department 'A' proficiency designator to physicians who have demonstrated professional excellence and national prominence in their field. This designator can be used as a discriminator for promotion to Colonel (O-6), however none of the 8 criteria required for promotion to Lieutenant Colonel (O-5) directly focus on the clinical skills of the physician.⁴⁶ All services place significant emphasis on completion of professional military education, including the Captain's Career Course, Squadron Officer School, Command and General Staff College, Air Command and Staff College and the Naval Command and Staff Program. These courses, designed for non-medical officers as they advance their careers, can remove surgeons from clinical practice for months. Promotion policies that do not emphasize the importance of clinical skills can hinder career progression for surgeons who desire to maintain a robust clinical practice.

In contrast, the Air Force has four distinct career paths for physicians. These paths are command, integrated operations,

academics and a dedicated clinical track. The dedicated clinical track terminates in a 'master clinician program' with clinical subject matter expert responsibilities.⁴⁷ We recommend that service-specific career paths be developed and that clinical track positions be expanded. This will improve the clinical experience of senior physicians and create a pool of surgeons who can mentor early-career surgeons. Since surgical leadership will always be vital to advocate for surgeons and surgical patients, we recommend that surgeons who seek command and administrative responsibilities be identified early in their careers across all services.

CONCLUSION

The transition to practice is a challenging time, particularly for military surgeons. High volume, complex cases coupled with mentorship and guidance from senior surgeons may ease the transition to practice. Multiple aspects of current military policy can be adjusted to better facilitate this transition. Carefully selecting first assignments for graduating surgical trainees, gradually increasing operative volumes at MTFs, and developing mentoring programs for transitioning surgeons may ease the transition to practice. While some proposals such as recapturing care at MTFs require service-level or DHA approval, other proposals, such as increasing mentorship should be the responsibility of surgeons at all levels.

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