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# Defining the acute care surgeon: American Association for the Surgery of Trauma (AAST) panel discussion on full-time employment, compensation and career trajectory

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## SUMMARY

Since its inception, the specialty of acute care surgery has evolved and now represents a field with a broad clinical scope and large variations in implementation and practice. These variations produce unique challenges and there is no consistent definition of the scope, intensity or value of the work performed by acute care surgeons. This lack of clarity regarding expectations extends to surgeons and non-surgeons outside of our specialty, compounding difficulties in advocacy at the local, regional and national levels. Coupled with a lack of clarity surrounding the definition of full-time employment, these challenges have prompted surgeons to develop initiatives within acute care surgery in collaboration with the American Association for the Surgery of Trauma (AAST). A panel session at the AAST 2023 annual meeting was held to discuss the need to define a full-time equivalent for an acute care surgeon and how to consider and incorporate non-clinical responsibilities. Experiences, perspectives and propositions for change were discussed and are presented here.

## INTRODUCTION

Acute care surgery can be considered either the oldest or the youngest surgical specialty, depending on one's perspective.[1 2] In the late 1990s and early 2000s a crisis of unmet need for emergency surgical patients was recognized.[3] This was part of a perfect storm: trauma surgery had become increasingly non-operative, and the subspecialization of surgery led to fewer surgeons willing or able to meet the growing emergency general surgery (EGS) clinical demand.[4]

In 2003, a joint meeting of the American College of Surgeons, American Association for the Surgery of Trauma (AAST), Eastern Association for the Surgery of Trauma and Western Trauma Association was held to address the future of trauma surgery.[5] Already adept at caring for physiologically deranged patients, trauma surgeons naturally expanded their practice to include EGS and surgical intensive care. While the idea of trauma surgeons expanding their practice to include EGS was not necessarily novel, it had not been formally codified previously.

The 2003 meeting formally canonized the specialty of acute care surgery (ACS), which includes trauma, EGS and surgical critical care. It has since been expanded to include two additional pillars: surgical rescue and elective surgery.[6] Understanding this history helps frame the challenges faced by the specialty in defining itself and appreciate the relevant stakeholders, including administrative and academic pursuits. It also allows development of workforce planning strategies to meet the clinical and non-clinical demands of these five pillars.

The AAST ACS and Patient Assessment Committees held a joint panel on defining the acute care surgeon during the September 2023 meeting in Anaheim, California. The panel discussion was titled 'Defining the Acute Care Surgeon: FTE's, Compensation and Career Trajectory'. The panel was comprised of several trauma and acute care surgeons of different backgrounds, junctures of career and leadership roles. The aim was to address the need for an accepted definition of acute care surgeons' work scope and intensity, both clinical and non-clinical. There was an engaging discussion from panelists and audience members who highlighted the need for consistency across the specialty, guardrails for workload and identified areas for future research and position papers from leaders within ACS.

## THE WORK PERFORMED BY ACUTE CARE SURGEONS

Defining the work of acute care surgeons requires consideration of the type, volume and intensity of their responsibilities. Broadly, the primary role of acute care surgeons is caring for physiologically compromised patients who require urgent or emergent surgical intervention, resuscitation or critical care management. This is classically described under the three pillars of ACS: EGS, trauma surgery and surgical intensive care.[6] These three pillars are the core activities of acute care surgeons. The nature of the work presents unique challenges—irregular and often undesirable hours (nights, weekends, holidays), high intensity but potentially inconsistent volumes and the need for continuous, year-round coverage. Traditional measures of work, such as the work relative value unit (wRVU), inadequately capture the value of the acute care surgeons' work and availability.[7–9] Unlike other surgeons, non-procedural work represents nearly 50% of the work performed by acute care surgeons, which wRVUs fail to accurately represent.[8] Importantly, there has

been no value assigned for the relief of challenging off-hour work and truly emergent surgical rescues only made possible by virtue of immediately available and oftentimes 'in-house' acute care surgeons.[10]

The concept of an full-time equivalent (FTE) for acute care surgeons has not been fully defined.[11 12] Traditionally, clinical schedules distribute work by taking the total clinical workload of the Division and dividing it by the number of surgeons in a group, without any consideration of what defines full-time clinical work. This results in high variability between practice locations and does not account for non-clinical work such as leadership roles, educational responsibilities or research activities.[13 14] It may also lead to burnout and career dissatisfaction.[15] Similarly, wRVU targets reflect a failure to understand the scope of acute care surgeons who neither control work type, volume or intensity. Other specialties with similar unpredictable workloads, such as emergency medicine and medical intensivists, have established FTE definitions not based on wRVUs.[16] To ensure appropriate staffing models, high-quality patients care, and a sustainable workforce model, the ACS specialty needs to determine what constitutes 'reasonable' work.

## MEETING THE CLINICAL DEMAND

Given the wide clinical scope and practice settings for acute care surgeons, it is unsurprising that factors determining appropriate clinical loads need to be considered on a local level. Each hospital system has unique clinical needs and culture, which must be navigated to adequately hire a group of surgeons tasked with caring for trauma, EGS and critically ill surgical patients. There is no agreed-upon national standard for the expected clinical work of an acute care surgeon.[11 12] While acknowledging local differences is important, many commonalities exist between systems. All systems caring for EGS, trauma and critically ill patients aim to provide high-quality care and must meet regulatory requirements such as Trauma and EGS accreditation. Furthermore, systems face resource constraints and must justify financial expansion and compensation for surgeons. Academic centers must address and include academic missions and expectations, many of which are not revenue generating.[13] Finally, acute care surgeons must acknowledge a fundamental fact: the need to define workload is not an admission of weakness, but a necessity to ensure maintenance of surgical skills, safe staffing models for patients, sufficient resources for patient care and the health of individual surgeons and a profession as whole. For years, organizations have taken advantage of the altruistic culture of acute care surgeons, who spend countless hours in the hospital caring for the critically ill. By establishing guardrails for our specialty, we will ensure a sustainable future.

A 2021 survey of ACS division chiefs in the USA revealed that, on average, acute care surgeons worked 26 clinical weeks annually and 4–5 call shifts per month.[11] However, there was large variability, with as few as 18 weeks and up to 44 weeks of clinical service reported. Interviews with 14 Division Chiefs identified nighttime work as a common driver or workforce planning, often becoming the major variable in determining the number of faculty needed. Conversely, day-time work must be present to justify increased human resources for call coverage, but the amount of daytime work necessary per FTE is ill-defined. For example, limiting surgeons to four in-house calls per month requires at least 7.5 FTEs. Two in-house surgeons limited to four in-house nights of call a month requires at least 15 FTEs. From a human resource perspective, the number of surgeons required to provide clinical care can be determined by assessing the clinical needs of the local patient population and applying reasonable limitations. To maintain an average of 26 weeks per year, there must be day-time services, which may include any combination of elective general surgery, ACS, trauma, burn or surgical critical care.

## THE PHYSIOLOGY OF ACUTE CARE SURGEONS

Working night shifts, irregular or non-standard and prolonged hours can significantly impact health and well-being.[17–20] Studies consistently show a relationship between this type of work and disrupted circadian rhythms, leading to increased risks of chronic disease.[21–23] Staying awake at night and sleeping during the day deviate from the innate diurnal nature of humans and it is no surprise there are significant health consequences. Obesity, metabolic syndrome, diabetes, cancer and cardiovascular disease are significantly more common in those who work nights compared with those working standard hours. Similarly, mental health can be severely impacted, especially over years of work.[21–23]

The sleep debt and fatigue from frequent night work lead to disruption of the circadian rhythm and chronic health issues. Our physiologic need for sleep is based on our biology as humans, not on our occupations as surgeons. To preserve surgeons' health, we must reconcile the 24/7/365 nature of our careers with our physiology. Surgery itself is stressful, as demonstrated by intraoperative measurements of increased heart rate, decreased heart rate variability and a surge in cortisol, which peaks approximately 30–45 min after an operation begins.[24–26] The addition of emergency operations at times of night when one normally should be asleep adds an additional stress to the surgeon. In a recent study of 224 acute care surgeons over a 6-month period, 87% of in-house calls were associated with either an operation or a trauma activation, with a mean of 5 activations and 2.6 operations per night of in-house call.[18] The average duration of call was 18.3 hours, with large variability in the number of hours spent in the hospital on the post call day, ranging from 1 to greater than 14. In-house call was associated with significant sleep loss (about 3 hours), and surprisingly, there was no evidence of recovery sleep. In fact, acute care surgeons in this study averaged less than the recommended minimum of 7 hours of sleep on non-call nights. Beyond the physical demands, there are emotional demands as well. In this same study, surgeons reported an increase in feelings of burnout associated with being on call and an additional increase in burnout if the surgeon self-reported a particularly stressful case, bad outcome or patient death while on call. Sleep deprivation has been known to be associated with increased feelings of burnout, but on multilevel modeling, the increased amount of burnout reported by surgeons was only partially attributable to sleep loss, highlighting both physical and mental contributors to burnout.[15]

There are solutions. We can be mindful of how coverage is provided, recognizing the difference between concentrated and spread-out in-house call. The intensity of work matters, though this has yet to be objectively quantified meaningfully. Related is the culture surrounding rest after a period of highly intense work, or work performed at non-physiologic times. Recently, the impact of in-house call on acute care surgeons was studied, with unsurprising but important results—call is not good for your sleep, particularly with short intervals between consecutive calls.[18] This is compounded by bad outcomes (death of a patient, stressful case). The impact of work and call on the physiology of acute care surgeons is profound. Acute care surgeons sleep less than age-matched cohorts and do not have a recovery sleep.

Layering of sleep deprivation leads to burnout and decreased cognitive performance, even when not on-call.

The objective evidence supports the need for a change in addressing work schedules. The clinical demand is a known quantity, improvements are possible. This includes scheduling recovery from work—time free from clinical and non-clinical responsibilities in a responsible way. Developing workforce planning to ensure adequate clinical coverage and intentional leadership regarding culture is crucial. Establishing consistency across our specialty, workplace policies and cultural change around the work of acute care surgeons is vital for sustainability, personal health and high-quality patient care.

## WORKFORCE PLANNING

Despite the unpredictable nature of ACS, clinical demand can be measured. Using a data-driven approach, the clinical demand of EGS, trauma and surgical critical care can be established either using registries or through the electronic medical record. Additional demands (such as elective surgery or burn surgery) unique to certain systems can be added to fully quantify the clinical work for a Division of ACS. Traditional methods of calculating an FTE by simply dividing work by available surgeons are outdated and fail to acknowledge surgeon value and physiological limits.

Working from a more systematic framework offers various ways to determine reasonable workloads for acute care surgeons, similar to other specialties such as Emergency Medicine, Hospitalist Medicine and Pulmonary Critical Care.[16] This may include hours per week, shifts per month or weeks per year. While some evidence exists for what is reasonable, it lacks a nuanced assessment of the day-to-day work of a surgeon.[11 12] A number of common methods have emerged to establish a 1.0 clinical FTE: the first is an–hour per week approach where reasonable hours (40–60) are established. The second method is a week per year approach, typically 26 weeks of 7 days per week (26×7 ×10 hours per day=1820 hours per year). Adding call-shifts gives 2588 total hours per year. The work year is 45 weeks (4 weeks vacation and 2 CME weeks). This converts to 57.5 hours/week. A final approach is a shift-based approach. Using similar logic this results in 180–204 shifts/year, where a shift ranges from 10 to 14 hours and a 24 hour call is two shifts. This approach inherently accounts for vacation. Regardless of approach, working with administration and leadership, *reasonable work hours/shifts must be defined before the number of FTEs and surgeons required to cover clinical demand can be decided*.

Determining a reasonable workload has three profound advantages: first, the math relatively straightforward. Once clinical demand is established, basic math will determine the number of FTEs required. Second, when there are changes in staffing, particularly losses, compensation is clear. Any overage is paid out at an hourly rate for the existing staff as an internal locum. Rates vary between $225USD and $350USD/hour for in-house work. Finally, compensation for non-clinical work is clear. For example, if the Trauma Medical Director receives 0.25 protected time, their average hours per week or shifts per year would be 75% of full time and overages would be paid at the internal locum rate. This rewards additional hiring to provide protected time.

Two important questions were raised during the session. The first question was around clinical work intensity. Clinical work varies in intensity between the three pilars. Particularly high emotionally and physically taxing tasks are often overlooked in scheduling, despite their significant impact on clinician wellbeing. This is a complex issue that depends on factors such as volume and type of work (eg, operative vs non-operative), and the availability of advanced practice providers and trainees. Currently, the most common solution is an equitable distribution of the different clinical jobs available locally. Future research is needed to determine whether a different approach is needed and how the intensity of work impacts patient and surgeon outcomes. The second important question that arose was the minimum clinical work required for acute care surgeons to maintain competence. This is particularly relevant for surgeons with time-consuming non-clinical responsibilities such as those engaged in funded research or holding leadership positions. Limited evidence exists to guide decision-making in this area, and the prevailing approach is individualized, considering each surgeon's strengths and weaknesses within the local practice setting. Determining the optimal balance between clinical and non-clinical duties for acute care surgeons is a crucial area for future research and must be considered within the broader context of workforce planning.[12]

## NON-CLINICAL WORK

Once reasonable work hours and clinical responsibility have been outlined, non-clinical work must be factored in. While clinical work of a physician can be objectively captured (although imperfectly) with the wRVU, a similar approach can be taken for non-clinical work to capture the effort, expertise and time required. Non-clinical work typically falls into one of several categories and is not limited to academic/university-affiliated hospitals: administrative, education, research, global health, community outreach, innovation and advocacy, table 1. Like clinical productivity, non-clinical goals of the division and individuals must be defined, measurable and transparent.[13 14] However, these non-clinical goals, outside of specific items such as grant funding, are not inherently tied to compensation and may distract surgeons from generating wRVUs. That said, non-clinical work is critical to accreditation, Division/Departmental academic success, personal and professional growth and overall career satisfaction.

With proper stakeholder alignment, an academic RVU may help incentivize and reward important non-clinical work in an objective manner. Prior studies within and outside of surgery have established potential frameworks to shape non-clinical or academic RVUs.[13 14]An important step in creating this system is engaging leadership to develop non-clinical RVUs that support the mission of the enterprise's mission, which may range include traditional academic pursuits (ie, research, innovation and education) to more recently emphasized areas of injury/illness prevention, community partnerships, global health and advocacy, table 1.

The final step involves funding and outlining financial compensation. Again, this should be a decision for local leadership, ideally using an annual iterative process and that refines institution and faculty goals and measures outcomes achieved through non-clinical RVU implementation. Metrics may include number of publications, grant applications/awards, patents received, education achievements, administrative quality improvement efforts and legislation passed. This approach can promote diversity in surgeon phenotypes and thereby diversity of faculty by not only rewarding traditional phenotypes (eg, the researcher). Finally, studies on implementation of non-clinical RVUs have demonstrated great satisfaction without significant financial investments as faculty 'feel seen' and appreciate 'even a small recognition' for the immense non-clinical work they routinely perform.[13 14]

**Table 1** Examples of non-clinical work performed by acute care surgeons

| Non-clinical work | Examples |
|---|---|
| Administrative | ► Serving on committees and task forces locally, regionally and nationally<br>► Departmental leadership including service line directorships<br>► Hospital-based leadership |
| Educational | ► Teaching and mentoring medical students, residents and fellows including roles such as program/fellowship director<br>► Developing curricula and educational materials<br>► Facilitating workshops and seminars<br>► Providing feedback and evaluations |
| Research | ► Conducting clinical and translational research including publication of peer-reviewed articles and conference presentations<br>► Writing grant proposals and securing funding<br>► Supervising research staff and trainees<br>► Developing new technologies, devices and interventions<br>► Engaging in entrepreneurship and business development |
| Community advocacy | ► Global health including work in resource-limited settings<br>► Partnering with local organizations and stakeholders and providing community-based health education/interventions<br>► Health policy and advocacy |

## CONCLUSION

The future of ACS as a specialty requires a thoughtful approach to workforce planning to ensure a robust and sustainable workforce capable of meeting growing clinical demand. To achieve this, the value of ACS must be established at the local, regional and national levels. This includes defining reasonable clinical work, establishing norms of clinical expectations, and rewarding important non-clinical work. Success will require coordinated efforts from all stakeholders, including institutional leadership. A balanced approach will not only enhance patient care but also promote career satisfaction and longevity among acute care surgeons, ultimately strengthening the specialty as a whole.

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