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# Enhancing Interoperability Among Enlisted Medical Personnel

A Case Study of  
Military Surgical Technologists

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## Summary

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### Background and Purpose

Following the recommendations of the 2005 BRAC Commission, a joint medical education and training campus (METC) is being established at Fort Sam Houston, Texas, to provide training for enlisted medical specialties in the Air Force, Army, and Navy. Currently, the idea is to collocate the three service schools and to consolidate medical training for all services to the extent feasible. The shorter-term objective is efficiency—to reduce the overall costs of training; the longer-term objective is to increase the interoperability of the services by training service specialists to a common standard.

RAND is providing technical assistance to the Executive Integrated Process Team (EIPT) that is overseeing the implementation of the METC in a number of areas, including determining joint rather than service-specific standards of practice (SOPs) for medical specialties. An SOP encompasses a set of standardized tasks that individuals who are proficient at a given level must be able to perform. In addition, the SOP often delineates the knowledge, skills, and abilities such individuals need to be competent in the job.

It is useful to distinguish the work that RAND is doing from the work being done by the Health Care Interservice Training Office (HC ITO). This office uses the Interservice Training Review Organization (ITRO) process to examine commonalities in training curricula for enlisted medical specialties, whose training will come under the purview of the METC. The RAND tasking is broader than that currently being undertaken by the HC ITO—we have been asked to examine

more comprehensively what constitutes an occupation, to examine commonality of work across the services rather than commonality of training as currently provided, to address issues related to implementing a common SOP, and to analyze the implications of common work and common training for increased interoperability among individuals, units, and forces.

In July 2007, RAND was asked to focus on the surgical technologist/operating room technician specialty and to define an SOP for this specialty, which includes the Army's Operating Room Specialist (68D), the Navy's Surgical Technologist (HM 8483), and the Air Force's Surgical Services Apprentice (4N131) and Surgical Services Journeyman (4N151). We grouped these three specialties under the common term "surgical technologist."

This monograph documents the results of the study and makes three important contributions. First, it outlines a methodology for defining a common standard of practice that can be applied to any specialty and illustrates the use of that methodology by applying it to the surgical technologist specialty. Second, it offers a method for identifying and systematically evaluating the effect of different methods for training or obtaining qualified medical personnel on Department of Defense (DoD) and service objectives. Third, it examines the link between common work (SOP), common training, and interoperability. There is a commonly held misconception that common work and common training will, by themselves, ensure greater interoperability. Although common training enhances person-level substitutability, translating this micro-level substitutability into increases in overall system-level capability requires fundamental changes in areas related to service doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF).

## **A Methodology for Defining and Implementing a Standard of Practice for a Given Specialty**

Rather than simply focusing on the surgical technologist specialty, we began the analysis by developing a common methodology that could

be applied more broadly across different specialties. This methodology consists of the following three major analytical tasks:

- Define a common SOP for the specialty based on job descriptions in both the military and civilian sectors. The SOP needs to be pegged to a given proficiency level.
- Validate the SOP through subject matter experts (SMEs) from both the military and civilian sectors. This can be done informally or formally through well-tested methods (for example, the Delphi process) that are used to achieve consensus.
- Identify a set of training options for “making” or “buying” individuals with the given level of proficiency in the SOP. Evaluate the options against the criteria of cost and productivity and the effect on service culture, recruitment, and retention.

We then applied this methodology to the surgical technologist specialty across the three services.

## **Who Is a Surgical Technologist?**

The surgical technologist is an integral member of the team of medical practitioners providing surgical care to patients in a variety of settings. Some surgical technologists work in supply; for example, managing central supply departments in hospitals or working with firms that provide sterile supply services or operating equipment. Technologists can also specialize in a particular area of surgery, such as neurosurgery or open-heart surgery, or, with additional training, can advance to the higher level of surgical first assistant.

Surgical technologists working in the services have jobs that are very similar in scope to those of civilian surgical technologists, but they also need a separate set of military-related skills that do not fall under the SOP of a civilian surgical technologist, including working in forward-deployed settings, working with severe trauma cases and other war-related injuries, or operating in chemical, biological, radiological, nuclear, and explosive (CBRNE) environments.

In the civilian sector, most surgical technologists work in hospitals. Some work in outpatient surgicenters and clinics. In the military, surgical technologists are largely employed in military treatment facilities, where they may work in the surgical suite or in clinical settings; in the Navy, some are aboard Navy ships. During war, they may be with medical units, working in deployed settings.

## **How the Services Currently Train Surgical Technologists**

Currently, each service trains its surgical technicians differently. The Air Force Surgical Services Apprentice (4N131) course consists of 368 hours of Phase I didactic training at Sheppard Air Force Base and 240 hours of Phase II clinical training at one of six sites. The projected FY 2007 throughput was 116 students. The Army's Operating Room Specialist (68D) course consists of 408 hours of Phase I didactic training at Army Medical Department Centers and Schools (AMEDD C&S), followed by 400 hours of Phase II clinical training at one of 14 sites. The projected FY 2007 throughput was 300 students. The Navy's Surgical Technologist (HM 8483) course, which is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP), consists of 456 hours of Phase I didactic training at the Naval School of Health Sciences (NSHS), San Diego and Portsmouth, followed by 600 hours of Phase II clinical training at one of five sites. The projected FY 2007 throughput was 312 students. Before coming to the surgical technology program, students must attend the HM (Corpsman) "A" school, a 14-week course mandatory for all Navy medical personnel. Additionally, all HM 8483 students must attend the six-week Field Medical Service School (FMSS).

The military has about 4,800 surgical technologists, more than half of whom are in the Army. Over 40 percent of all military surgical technologists are military reservists. It is interesting to note that data on the civilian employment of military surgical technologist reservists show that only 31 percent of Army, 39 percent of Air Force, and 16 percent of Navy reservists are employed as surgical technologists in



civilian life. Fifteen percent of Army reservists, 25 percent of Air Force, and 26 percent of Navy work in other health-related occupations.

## **Defining and Validating a Standard of Practice for the Surgical Technologist Specialty**

Before defining the SOP, we selected the proficiency level for the specialty to which the SOP would be pegged. We chose a level of proficiency that could be expected of someone who graduates from an accredited program with eligibility for professional certification, i.e., someone is eligible to become a certified surgical technologist (CST) by passing the professional examination. This proficiency level implies that the graduate can function relatively independently and as a productive member of the surgical team.

We developed the SOP for the surgical technologist specialty from job analyses and descriptions from a variety of civilian and military sources. We compiled a list of tasks performed by personnel in each service using service source documents as well as tasks performed by civilian surgical technologists. We grouped these tasks into broad activity categories. We went through the list of activities checking to ensure that the full list of activities created a robust description of the career field that focused on the medical standard of practice and was not redundant. We removed several activities from the full list that contained similar or overlapping work. We also deleted several activities that we deemed to fall outside the SOP for a surgical technologist (for example, more advanced work that a surgical first assistant might perform) or that were not medical work (such as training, career development, peer mentoring—activities often required of more senior personnel).

We validated the SOP with subject matter experts from each service and through informal feedback from civilian professional associations and accreditation bodies. The final SOP consists of 30 broad

activities grouped into three categories: patient activities, mixed patient and nonpatient activities, and nonpatient activities.<sup>1</sup>

## Identifying and Assessing Training Options

In identifying training options, we first examined the HC ITO reports. In its ITRO reviews, the HC ITO considered two options for consolidating training (a “currently achievable option” and a “following best practices option”) that closely resembled the current Air Force and Navy training paradigms. We selected four options for training or obtaining qualified surgical technologists. These options are shown in Table S.1.

Option 1, the “make” option, consists of comparing what the services are currently doing with the following best practices option. It was clear from the ITRO reviews that even if the services were to choose the more constrained training option, the Army and Navy would continue to train to their current levels. As a result, we decided to use the service-specific current training regimen as the baseline (which we refer to as the “current practice” option) and compare it with the following best practices option. For the Navy, which already trains to the following best practices option but also has a prerequisite HM 0000 course, we considered two options: with and without the HM 0000 course.

Options 2 and 3 are “buy” options—one involving lateral entry of trained surgical technologists and the other involving outsourcing training to civilian institutions. We also included a fourth option—civilianization of the military billets. Although further conversions of military medical billets have been halted by the National Defense Authorization Act of 2008, this option may be worth considering in the future.

Given the options, the next task was to assess their effect across a number of areas identified as important to the DoD and the services: effects on interoperability, costs, service culture, recruitment, and retention.

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<sup>1</sup> Table 4.1 in the main body of the report describes the complete RAND SOP.

**Table S.1**  
**Options for Obtaining Qualified Surgical Technologists**

<b>Option</b>	<b>Service Basic Training (weeks)</b>	<b>Consolidated and Service- Unique Training (Phase I) (hours)</b>	<b>Other Training</b>
<b>In-House Training</b>			
Current practice			
Air Force	8	368	240 hours Phase II + OJT
Army	8	408	400 hours Phase II
Navy	8	456	600 hours Phase II
Navy with HM 0000 course	8	456	600 hours Phase II; additional 14 weeks of HM 0000 course before surgical technologist training
Following best practices	8	456	600 hours Phase II
<b>Lateral entry of trained surgical technologists</b>	8		2 weeks orientation
<b>Civilian-provided training</b>	8		~50 weeks civilian training + 2 weeks orientation
<b>Conversion to civilian positions</b>	N/A	N/A	N/A

### **Effect on Individual Interoperability**

To foster interoperability, any training option that trains individuals to a common standard will necessarily rank higher on the interoperability criterion than current service-unique training. Although it is difficult to argue that one option ranks higher than another on the interoperability criterion, one could argue that longer consolidated programs are likely to increase standardization in both quality and capability sets than are programs with a large component of service on-the-job training (OJT). This may also be a concern with civilian-provided training (if it is done at

multiple sites) or with lateral entry but probably less of a concern if the programs are accredited and result in the CST credential.

### **Effect on Cost and Productivity**

In our analysis, we focused largely on Option 1 and its variants because training in-house appears to be the most viable in the short-term. However, we did some simple calculations for Options 2 and 3 as well.

With respect to in-house training, we compared the increase in proficiency estimated to result from a longer training period with the increase in costs attendant on lengthening the training. We surveyed supervisors in the services and asked them to assess the proficiency of graduates against a fully mission-effective surgical technologist, defined to be 100 percent effective. We then developed a measure of the overall effectiveness of the surgical technologist workforce by combining the number of surgical technologists at each year of service and their levels of effectiveness. For example, if the services were all to adopt the following best practices option, we estimate that the total number of effective man-years in the surgical technologist workforce would increase by 3.7 percent in the Army, 6 percent in the Air Force, and 1.9 percent in the Navy and could lead to similar decreases in manpower authorizations. This also means that, holding the retention profile constant, the number of students to be trained to support that workforce could also eventually decline, as the workforce becomes staffed by more productive members.

The medical sector has certain characteristics that may hinder translating these gains in workforce effectiveness into savings in manpower and student throughput. For example, most members work in teams with fixed proportional representation (for example, one surgeon, one nurse, and one surgical technologist), so opportunities to reduce manpower may be limited, without major changes in the way teams are authorized and employed. However, if graduates are more fully trained at the outset, this would imply less need for a supervisor to be overseeing the graduate's work in initial assignments and could lead to a reduction in required manpower at the larger facilities.

On the other side, we need to balance the increased costs associated with a considerably longer training period under the following

best practices option. The costs of training increase for both the Army and Air Force as they move to the longer training option: by about \$220,000 per year or 14 percent over the current practice option for the Army and by about \$330,000 per year or 33 percent for the Air Force. If the Navy decided not to train its surgical technologists in the HM 0000 course, it could save about \$1 million or 33 percent in total training costs.

As for the other options, hiring trained surgical technologists may prove an attractive viable “buy” option because civilian surgical technologists appear to earn less, on average, than military surgical technologists. It would be important to do a pilot test of recruiting to test the feasibility of this option.

The other option we considered—civilian-provided training of enlisted members—is expensive because of the length of the civilian training (almost double the length in the following best practices option). Too much career time is devoted to training; there are likely to be higher direct costs and high administrative costs. However, it might be possible to team with the civilian institution to offer shorter, more tailored courses targeted at military students.

### **Effect on Service Culture**

In-house training, given that it reflects what the services are doing, is unlikely to have large differential effects on service culture compared with the status quo. However, one could argue that the reality of consolidated training means more limited opportunities for exposure to one’s own service culture. The other two options—lateral entry of trained civilians and outsourcing training—will reduce the opportunities for service acculturation and thus rank lower than in-house training on this criterion.

### **Effect on Propensity to Enlist and to Remain in the Service**

Compared with the other options, METC-provided training is likely be neutral in its effects on the propensity to enlist. If all trainees are offered the opportunity to obtain the CST credential (as under the following best practices option), this may increase the propensity to enlist; it may also lead to higher retention if being credentialed results

in faster advancement. This may also cause some individuals to leave if they perceive better opportunities in the civilian sector (although average civilian wages are currently somewhat lower than overall military compensation).

Lateral entry of trained civilians may increase enlistment if older trained individuals are attracted by the benefits package or job security of the military. In addition, it could increase retention if these individuals came in at higher pay grades or with increased promotion opportunities.

Outsourcing training to civilian institutions may increase the propensity to enlist as other students are exposed to military students and become aware of potentially immediate job opportunities within the military. However, greater exposure to the civilian labor market might cause lower retention, especially if service members have not had an opportunity to be fully acculturated to their service culture and values.

Two other considerations we took into account as we crafted and assessed options were accreditation and professional certification.

### **Program Accreditation and Professional Certification**

Our interviews with the professional associations and the certification and accreditation organizations highlighted the importance of accreditation as an external validation of the program, ensuring both the quality of the program and the quality of the practitioners graduating from that program.

Generally, professional certification is regarded as providing evidence that the certified individual has met the national standard for the knowledge that underlies practice in that field. Despite this, only 31 percent of surgical technologists are certified. The evidence from an informal survey of job openings across the country suggests that lack of certification is not a bar to employment. Individuals can and do work as surgical technologists without being certified. However, this may change in the future as demand for surgical technologists increases and the nature of the work changes to include some tasks currently undertaken by nurses.

## Recommendation

Overall, we find that the following best practices option has a number of advantages. First, it offers a higher level of interoperability because individuals are trained to a higher standard. Second, it offers both an accredited program and the opportunity to obtain professional certification—both avowed goals of the METC. Third, although training costs are higher, there is likely to be a gain in overall workforce productivity in the steady state with a small potential for long-term savings in manpower authorizations and student throughput. However, the potential savings in manpower reductions and reduced student throughput will come about only if manpower authorizations are actually reduced.

Implementing the following best practices option and gaining its benefits are not straightforward tasks. There are questions about the timing of the increased costs and the benefits and to whom they accrue. In terms of timing, there is a real upfront and continuing budget cost to the METC to begin and maintain the new longer training program for all services. The savings, resulting from needing fewer personnel to perform the same amount of surgical technologist work, accrue only over time as manpower surveys reduce the number of personnel required. These savings will be recouped by the services or the defense health program overall.

We also recognize that a number of other factors would need to be resolved before moving to the following best practices option, including changes in DOTMLPF; concerns about not being able to meet training program requirements in the Air Force; issues about qualifying Air Force and Army faculty as certified surgical technologists to meet accreditation requirements; ensuring that a sufficient number of clinical sites can offer the longer Phase II training; and policies on what to do with individuals who fail to pass the certification examination.

As suggested by the Army, one way to move ahead would be to establish a tri-service task force that builds on the work done by the HC ITO to translate commonalities in the standard of practice into portions of the overall training curricula and also resolves some of the

issues identified above.<sup>2</sup> Common training with a fully consolidated training curriculum should be seen as a long-term goal.

## **From Common Training to Interoperability**

Establishing a common SOP is a necessary prerequisite to common training, which, in turn, is seen as the way to achieve interoperability. For the medical arena, the basic essence of interoperability can be captured in a working definition espoused by the Joint Interoperability Test Command as “the ability of people, procedures, and equipment to operate together effectively and efficiently under all conditions of battle.”<sup>3</sup>

Interoperability can occur at several levels. For example:

- Interoperability at the person level refers to the increase in capability that can occur when a service member from one service can be substituted for a service member from another service in their military role. Interoperability at the person level requires that all trained personnel in a specialty are trained to a common level and a common SOP although a service may choose to train beyond that common SOP.
- Interoperability at the unit level refers to the increase in capability that can occur when a unit from one service can be substituted directly for a unit from another service in its military role.
- Interoperability at the forces level refers to the increase in capability that can occur when services operate jointly in the same theater of operations, on the same mission.

At the person level, characteristics (occupational attributes or specifications) can be specified more precisely with less-needed tolerance around the specification. It is possible to have a common standard of practice and common training. Being functionally or occupationally

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<sup>2</sup> Army comments on initial draft report, July 2008, unpublished.

<sup>3</sup> Joint Interoperability Test Command (2001).



interchangeable does not mean an exact replica in every other way—individuals would still wear different uniforms, be inculcated into their own service’s values, and have career and retention patterns unique to their service. At this stage, it may only be up to some level (e.g., E-5) or in some settings that mutual substitutability works. As individuals become more senior—particularly, as they move into petty officer and noncommissioned officer leadership roles—it becomes more complex to substitute one for another because conditions change significantly and different tasks emerge (supervision, leadership, and management) even if all the functional surgical technologist tasks remain the same.

For the Military Health System, developing common SOPs and common training offers the means (technical capability), but taking advantage of this technical capability to operate effectively together to enhance overall operational capability requires addressing several DOTMLPF issues.

Achieving common training and training efficiency is a necessary but not sufficient condition for achieving interoperability. It may be that interoperability will be more easily achieved in future years as other “transformational” initiatives are implemented (e.g., use of equipment and systems that are “born joint”).