



# SCORE – Leveling the Playing Field for Surgical Training Programs

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**OBJECTIVE:** The Surgical Council on Resident Education (SCORE) web portal provides a uniform, comprehensive, competency-based curriculum for general surgery residents. One of SCORE's principal founding goals was to provide equal opportunity for access of educational resources at programs across the United States which reported having a range of resources. We aimed to determine if there was a difference in portal usage by trainees in independent versus university programs, and across geographic areas.

**METHODS:** Using analytic software, we measured SCORE usage by trainees in 246 subscribing programs from August 2015 to March 2017. The primary outcome was the average duration of SCORE use per login. Secondary outcomes were the geographic region of each program, and university versus independent designation. Encounters lasting >8 hours (comprising 7% of the data set) were excluded to eliminate the likelihood of failure to log off the portal.

**RESULTS:** Over the study period, there were 669,501 SCORE sessions with 22% of these lasting 1 to 5 minutes, 33% lasting 6 to 30 minutes, and 28% lasting 31 to 120 minutes. Between the university (64.4% of encounters) and independent (35.6% of encounters) program types, there was no significant difference in average visit length overall, or in the normally-distributed designated time categories (*t* test -1.0, *p* = 0.3). When mean encounter length per program was compared by geographic

regions, there was also no difference in the three time categories (ANOVA *p* = 0.9, 0.2, and 0.5, respectively).

**CONCLUSIONS:** Most (50%) of SCORE encounters lasted 30 minutes or less, confirming prior work that shows trainees use the portal in relatively short bursts of activity. While there were more encounters from university program trainees (proportional with their greater numbers), the mean duration of an individual encounter did not significantly differ by program type as a whole or by region. These results suggest that SCORE is an equally accessible educational resource and is used by surgical trainees, regardless of program type or geographic region. (J Surg Ed 76:e146–e151. © 2019 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

**ABBREVIATIONS:** SCORE, Surgical Council on Resident Education; ABS, American Board of Surgery; ACGME, Accreditation Council for Graduate Medical Education; QE, Qualifying Examination; CE, Certifying Examination

**KEY WORDS:** SCORE, Curriculum, Resident education, Educational resources

**COMPETENCIES:** Medical Knowledge, Practice-Based Learning and Improvement

## INTRODUCTION

In 2004, seven organizations developed the Surgical Council on Resident Education (SCORE), with a goal of improving the education and training of surgical residents. These founding surgical organizations included the American Board of Surgery (ABS), the American College of Surgeons, the American Surgical Association, the Association of Program Directors in Surgery, the Association of Surgical Education, the Accreditation Council on Graduate Medical Education (ACGME), and the Society of American Gastrointestinal and Endoscopic Surgeons.<sup>1</sup>

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Dr. Klingensmith, Dr. Joshi, and Mr. Hickey serve on SCORE's executive leadership team. Dr. Malangoni previously served on SCORE's executive leadership team.

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The overarching goal of SCORE was to develop a standardized curriculum for surgical residents based on the 6 core-competencies defined by the ACGME, available on an online platform.<sup>2</sup>

The SCORE web portal formally debuted in 2008 and 274 general surgery programs (representing 95% of ACGME-accredited programs) now subscribe to it. The SCORE portal is organized around nearly 650 modules, each with embedded learning objectives, content, and self-assessment. The content on SCORE has subsequently been organized into a 2-year curriculum through This Week in SCORE to allow trainees and programs to review all of the content in a methodical manner. Given its widespread dissemination, the SCORE portal has become an important tool for residency programs to guide education and training of their surgical residents.

The primary goal of surgery residencies is to prepare trainees to function as independent surgeons. The ABS examinations—the Qualifying Examination and Certifying Examination—are designed to assess a graduating resident’s ability to do so. It has been previously shown that subscription to the SCORE web portal leads to an improvement in Qualifying Examination scores as well as a trend toward improved passing rates.<sup>3</sup>

The SCORE web portal provides a uniform, comprehensive, and competency-based curriculum for general surgery residents. One of SCORE’s principal founding goals was to provide equal opportunity for access of educational resources at programs across the United States which had previously reported having a wide range of resources.<sup>4</sup> We aimed to determine if there was a difference in portal usage by trainees in independent versus university programs, as well as across geographic areas.

## METHODS

### Measurement of SCORE Portal Usage

Following institutional review board approval, SCORE usage was obtained for each resident in all subscribing

ACGME accredited programs ( $n = 246$ ) from August 2015 to March 2017, using both Google Analytics and proprietary analytic software. Data included resident-level usage by program with each encounter time and date, as well as length of visit on the SCORE portal. All data were deidentified. The primary outcome was the average duration of SCORE use per individual login. Secondary outcomes included month of login.

### University Versus Individual Residency Program Designation

Programs were classified as university programs (UP) or independent-programs (IP) based on the presence of an on-site medical school. Approximately 2/3 of general surgery training programs in the US are UP.<sup>5-7</sup>

### Program Geographic Designation

All ACGME programs participating in SCORE over this time period were categorized by US Census Bureau geographic regions (Table 1).

### Method of Analysis

A paired *t* test was used to measure for differences in repeated measures. One-way analysis of variance with Dunnett’s multiple comparison test was used to determine differences between multiple normally distributed variables. Statistical analysis was performed using Graph-Pad Prism 7.02 (La Jolla, California) and STATA software (College Station, Texas).

## RESULTS

### Distribution of SCORE Usage by Duration of Visit

Of the 724,022 encounters extracted, there were 54,521 encounters where the visit duration was greater than 480 minutes (8 hours), representing 7% of the data. These encounters (>8 hours) were excluded as they

**TABLE 1.** Regional Locations of Surgical Residency Programs

Region	State
Mid-Atlantic	Delaware, New Jersey, New York, Pennsylvania
South Atlantic	District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
East North Central	Illinois, Indiana, Michigan, Ohio, Wisconsin
Pacific	California, Hawaii, Oregon, Washington
West South Central	Arkansas, Louisiana, Oklahoma, Texas
New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
East South Central	Alabama, Kentucky, Mississippi, Tennessee
Mountain	Arizona, Colorado, Nevada, New Mexico, Utah
Territory	Puerto Rico

**TABLE 2.** Distribution of SCORE Usage by Duration of Visit of Included Encounters

Visit Category	Time Period Definition (Minutes)	% of Total Encounters	Number of Encounters (n = 659,501)	Mean Visit Length +/- SD	Median Visit Length
Sign on/off	<1	8.3	55,497	0+/-0	0
*Quick reference	1-5	22.2	148,748	2.3+/-1.4	2
*Quick review	6-30	33.2	222,609	16.1+/-7.1	15
*Short study period	31-120	28.3	189,344	60.1+/-23.7	54
Extended study period	121-240	5.5	36,485	164.8+/-33.2	158
Full day study period	241-480	2.5	16,818	339.2+/-69.4	328

\*These time periods were used to compare UP vs IP by monthly usage and geographic regions.

likely reflected sessions where residents logged on but did not sign off. Included visit length categories were all normally distributed and were defined as seen in Table 1. The majority of the encounters (n = 669,501) fell into the “quick reference” (22.2% of encounters), “quick review” (33.2%), and “short study periods” (28.3%, Table 2).

### Visit Frequency by Program Type, Time of Year, and Geographic Regionality

Between the university (64.4% of encounters) and independent (35.6% of encounters) program types, there was no significant difference in average overall visit length or in the normally-distributed designated time categories (t test -1.0, p = 0.3).

The majority of encounters in both UPs and IPs occurred in January (15.6%). Frequency of encounters increased for the months of July through January with a drop off from February to June, regardless of program type (Fig. 1, p > 0.99).

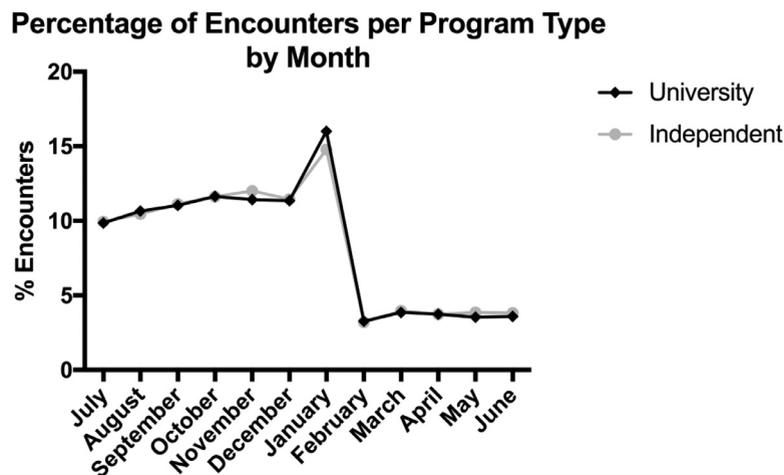
The median length of encounters in January for individual and UPs and IPs were approximately 28 (IQR 59) minutes and 31 (IQR 62) minutes, respectively. Given this large distribution, monthly time spent on SCORE was more closely examined in the 3 categories comprising the

majority of usage (quick reference: 1-5 minutes, quick review: 6-30 minutes, and short study period: 31-120 minutes). There was no significant difference in average length of encounter in the quick reference category, which ranged from 2.2 to 2.4 minutes in the UPs and 2.2 to 2.4 minutes in the IPs over the months (p = 0.60). In the quick review category, the average length of encounter ranged from 15.5 to 16.8 minutes and 15.4 to 16.7 minutes, respectively (p = 0.94). Lastly, in the short study period category, UP and IP's range of average length of encounter per month was 57.1 to 62.8 minutes and 57.1 to 62.0, respectively (p = 0.71).

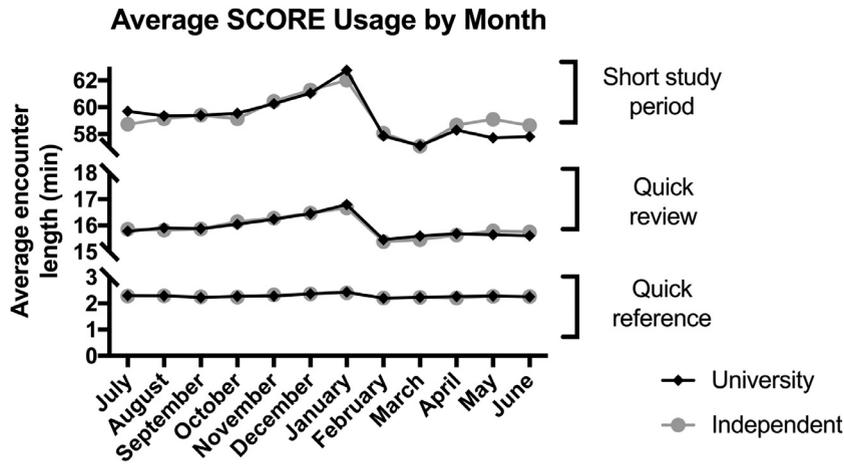
All average encounter categories mimicked the number of encounters per month, with a peak occurring in January (Fig. 2). When mean encounter length per program was compared by geographic regions, there was also no difference in the 3 primary time categories (analysis of variance p = 0.9, 0.2, and 0.5, respectively; Fig. 3).

## DISCUSSION

One of the founding principles of SCORE was to provide a standardized national curriculum for surgical training



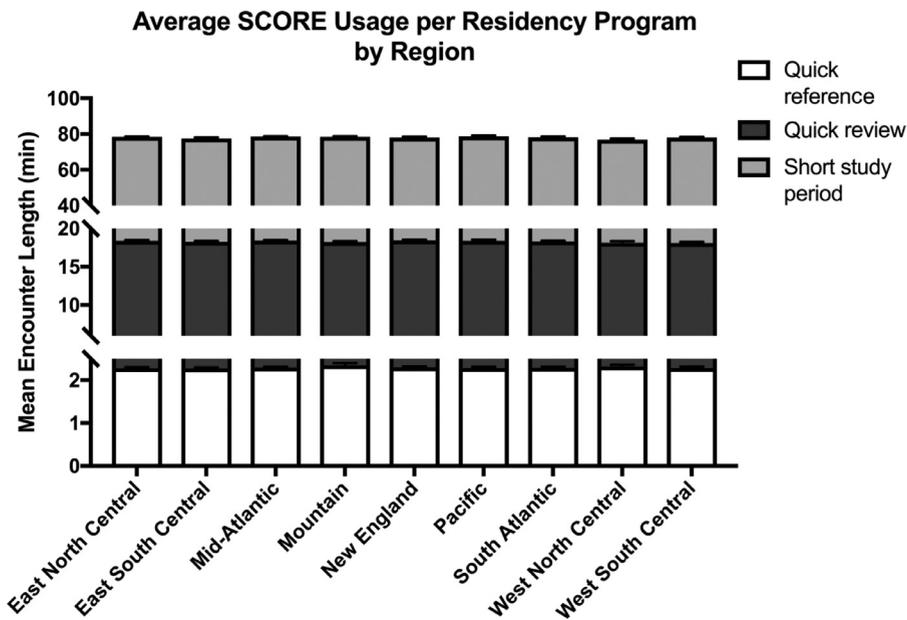
**FIGURE 1.** Percentage of encounters by program type and month. Frequency of encounters increased from July to January and decreased over February to June, independent of program type (p > 0.99).



**FIGURE 2.** Average SCORE usage by month per encounter category. There was no significant difference in average length of encounter in the quick reference, quick review, and short study period categories ( $p = 0.60, 0.94, 0.71$ , respectively). Peak encounters occurred in January over all category periods.

programs regardless of size, type, or location.<sup>4</sup> The 2004 report of the American Surgical Association Blue Ribbon Panel highlighted the importance of developing standard educational resources available to all training programs.<sup>8</sup> Programs with fewer resources, such as smaller, safety-net hospital, rural, and/or independent programs may not have easy access to authoritative references, journals, and online curricula.<sup>9-11</sup> To that end, SCORE's subscription pricing has always been set to allow these potentially at-risk programs to have access to a robust, peer-reviewed curriculum. This study was designed expressly to measure the extent to which that goal has been met.

Our data validated prior findings that most trainees access SCORE in short bursts of activity and in a predictable pattern through the academic year oriented around the ABS In-Training Examination.<sup>12</sup> This pattern appears to be independent of program type or geography. There was no significant difference in SCORE usage between university and independent programs over all the time categories. SCORE usage increases from July into the fall months, and peaks in January, although "quick reference" appears to be fairly consistent throughout the academic year. The majority of SCORE usage occurs within 1 to 120 minutes. Subdivision of programs by geographic location also does not significantly alter SCORE usage.



**FIGURE 3.** Average SCORE usage per program by region. There was no significant difference in the three primary category periods over geographic regions (ANOVA  $p = 0.9, 0.2, 0.5$ , respectively).

The ACGME has, through its specialty-specific requirements, held all programs accountable to uniform standards for curriculum and resources. Specifically, program directors must prepare and implement “a comprehensive, effective, and well-organized educational curriculum.”<sup>13</sup> Furthermore, they must “ensure the availability of adequate resources for resident education” including “electronic medical reference resources for education and patient care at all participating sites.”<sup>13</sup> Some meaningful conclusions can be drawn from the data in this study. That SCORE is used equally across the spectrum of programs suggests not only parity in access to the nationally adopted surgical curriculum, but also a high degree of similarity in usage. This should be reassuring to historically disadvantaged institutions contemplating starting a new residency program and those striving to maintain an existing one. These include programs that have fewer resources dedicated to supporting resident education, often in care delivery systems with a disproportionate share of indigent and/or uninsured patients, smaller programs, and those whose faculty are either voluntary or nonacademic.

The SCORE resident advisory group comprises several volunteer trainees, and has, since SCORE’s inception, given valuable strategic insight and user-feedback that has stimulated many important changes in the portal. Their input suggests several types of usage of the portal. Shorter bursts of activity tend to represent point-of-care reference and review of multiple-choice questions (MCQs). Longer sessions still include MCQs, but also include dedicated review of modules with their learning objectives, embedded content, and licensed textbooks. Over time, as the content within modules has become more robust and thorough, we expect more usage focused on the curriculum, rather than just MCQ review. It is widely understood and accepted that adults learn best with clear objectives, a focused review of content, and subsequent reinforcement of that content with self-assessment. Too often, trainees tend to focus on the self-assessment without having invested time and effort in the actual curricular content. It is important that local program leadership reinforce best practice in SCORE usage. This includes programmatic didactic review and discussion in conjunction with regular self-study and self-assessment.

There are several important limitations of this study. It is almost impossible to accurately ascertain how much time trainees actually spend studying versus just being logged on to the SCORE portal. Additionally, the exclusion of sessions longer than 8 hours was an arbitrary cutoff. Certainly, it is possible that there were some study sessions that lasted greater than that time. Similarly, it is possible that some sessions lasting fewer than 8 hours represented a failure to log off. Also, study times which

form the basis of the 3 categories are not linked to each trainee; therefore, the same trainee may have been in multiple categories over the course of the study period.

## CONCLUSIONS

Most (50%) of SCORE encounters lasted between 1 and 30 minutes, confirming prior work that shows trainees use the portal in relatively short bursts of activity. While there were more encounters from university program trainees (this difference is accounted for by their greater numbers of residents), the mean duration of an individual encounter did not significantly differ by program type as a whole or by region. This suggests that SCORE as an educational resource is equally accessible and used by trainees, regardless of program type or geographic region.

## DISCLAIMER

SCORE provided data for this study. This study does not necessarily reflect the opinions or policies of SCORE.

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## SUPPLEMENTARY INFORMATION

Supplementary material associated with this article can be found in the online version at doi:[10.1016/j.jsurg.2019.07.009](https://doi.org/10.1016/j.jsurg.2019.07.009).