

# Surgical Skills Acquisition: Performance of Students Trained in a Rural Longitudinal Integrated Clerkship and Those From a Traditional Block Clerkship on a Standardized Examination Using Simulated Patients

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**OBJECTIVES:** Rural longitudinal integrated clerkship (LIC) programs for third-year medical students provide strong educational curricula and can nurture interest in rural surgical practice. Students learn technical skills in an apprenticeship model. Variability in instruction and patient experiences across sites, coupled with a lack of simulation facilities, raise some concerns about technical skill development. To explore the adequacy of skills acquisition for students in the University of Minnesota Rural Physician Associate Program (RPAP), this study compared RPAP students' performance on a scenario-based Objective Structured Assessment of Technical Skills (OSATS) with that of traditional surgery block clerkship students (Course 7500).

**DESIGN, SETTING, AND PARTICIPANTS:** This is a nonexperimental post-only study. All enrolled students ( $n = 254$ ) completed the OSATS examination. Students in the Course 7500 ( $n = 222$ ) completed 15 hours of simulation skills training and supervised practice during their 6-week clerkship. RPAP students ( $n = 32$ ) completed 3 hours of skills training before their 9-month rural assignment. Both groups had access to comprehensive online materials. Mean OSATS checklist, global rating, and total scores were compared at the end of training using  $t$  tests ( $p < 0.05$ ). Self-reported OR and clinical experiences were explored.

**RESULTS:** Both groups did well on the OSATS. There were no statistical differences in completion time, checklist

scores, mean global ratings, or total scores. RPAP students reported significantly more days in the OR, surgery cases, and first assists. Experience with OSATS tasks reported by RPAP students during clinical rotations correlated with their OSATS performance.

**CONCLUSION:** This study supports the viability of the LIC model for fundamental skills acquisition when augmented with introductory simulation skills training and online resources. It also suggests that simulation fills a training gap for students in a traditional surgery block clerkship program. It opens a dialog about the potential partnership of surgery departments with rural LICs to address rural general surgery shortages. Further research in this aspect is needed. (J Surg 71:246-253. © 2014 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

**KEY WORDS:** clerkship, longitudinal integrated clerkship, general surgery, curriculum, clinical competence, educational measurement

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

## INTRODUCTION

Rural physician workforce projections indicate a developing undersupply of rural general surgeons.<sup>1,2</sup> These clinicians are integral to rural health care systems. Without their presence, community members are forced to seek surgical care in distant settings, which disrupts the local care delivery systems and risks adverse outcomes. General surgical

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practice requires training in a breadth of procedures and current surgical resident graduates who choose rural practice are likely to feel ill prepared to replace existing surgeons.<sup>3,4</sup> As rural communities lose their general surgeons to retirement, surgical residency programs are not producing enough surgeons to replace them. Thus it is important to consider pipeline models in education that provide early opportunities for trainees to discern interest in rural general surgical practice.

The literature in primary care disciplines suggests that medical school exposure to rural health care successfully nurtures interest in future rural practice.<sup>5,6</sup> Medical schools worldwide are implementing rural-distributed model programs, where students are placed in small communities across a large geographic base (such as a state or province) and are taught through collaboration with academic and community faculty. These programs are created to address rural physician workforce shortages by offering strong clinical experiences in rural settings to nurture student interest in future practice in such locations. Doty et al. noted that a survey of practicing rural surgeons showed that 40% had rural exposure in medical school whereas just 11% had rural experience during residency.<sup>7</sup>

Such programs typically employ the longitudinal integrated clerkship (LIC) educational model, which is being adopted in medical schools for both rural and urban programming. LICs are organized to maximize longer-term continuity relationships with patients, faculty, and health care teams so as to implement a developmentally progressive curriculum during the core clinical clerkship year.<sup>8-17</sup> Students are placed in 1 system with 1 set of patients and multidisciplinary faculty for an extended period of time, typically 9 to 12 months.

Although there are known benefits for students in the rural LIC model in terms of experiencing the spectrum of patient care, engaging in a significant amount of hands-on practice, and forging apprenticeship relationships, there are some questions about the potential strengths and limitations of this model for helping students acquire fundamental surgical skills. The number of rural general surgeons is declining, thus potentially limiting students' exposure to surgical procedures. Additionally, opportunities for simulation-based training and standardized testing of such skills vary from limited to nonexistent in the rural setting. As a result, we do not actually know if students who are trained in a rural LIC setting are similar to students trained in a more traditional, block-style clerkship in terms of technical skill acquisition. Students' failure to master the fundamental technical skills that are expected of all medical school graduates would represent a concern for any medical school and also for surgery program directors hoping to recruit rural LIC graduates.

Simulation skills training has become a well-recognized approach for pretraining students and residents on basic skills to enhance their learning and performance in the

operating room and ensure patient safety.<sup>18</sup> Clerkship students enrolled in traditional clerkship models, and especially those located in tertiary care academic settings, often have the benefit of simulation centers. Given the declining opportunities for practice (duty-hour restrictions, concerns for patient safety, etc.), simulation training provides needed hands-on experience for learners. This is especially true in academic settings where care is specialized and residents and fellows have seniority over medical students, thus limiting student hands-on experiences.

Rural LIC students do not face the same competition for patient care opportunities with residents and fellows, as the medical student is typically the only trainee in the site. Thus they potentially have greater opportunities for hands-on experiences with guided practice and individualized feedback. However, rural LIC models may also create potential disadvantages related to instructor variability and patient variability when a student is placed in 1 rural community for 9 months.

The purpose of this study was to explore the differences in technical skills performance between students in a rural LIC program and those enrolled in a surgery block clerkship program that had an established 6-week simulations skills curriculum and a comprehensive online course website. The study was conducted after the LIC program had been augmented to incorporate an abbreviated simulation skills training session and access to the aforementioned online resources. Performance data for both groups were collected on a previously established, scenario-based Objective Structured Assessment of Technical Skills (OSATS). We also sought to better understand the effect (for LIC students) of experience with OSATS-related tasks in the field and their performance on the OSATS, and the variation in the amount of experience gained by both groups in the operating room. Our study included the following questions:

1. Do LIC students perform comparably on the OSATS as traditional surgery block clerkship students?
2. For LIC students, to what extent is hands-on experience with OSATS tasks in their rural clinical setting predictive of their OSATS performance?
3. Do LIC and traditional block clerkship students report similar amounts of OR experience during their rotations?

## METHODS

### Description of LIC and Traditional Surgery Block Programs

Most University of Minnesota students (approximately 190 per year) enroll in Course 7500, a 6-week block surgery clerkship, and rotate on our Minneapolis urban campus or in 1 of several affiliated hospitals in the metropolitan area.

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