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Strategies for New Skill Acquisition by Practicing Surgeons

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OBJECTIVE: To understand how practicing surgeons utilize available training methods, which methods are perceived as effective, and important barriers to using more effective methods.

DESIGN: Online survey designed to characterize surgeon utilization and perception of available training methods.

SETTING: Two large Midwestern academic health centers.

PARTICIPANTS: 150 faculty surgeons.

METHODS: Nominal values were compared using a McNemar's Test and Likert-like values were compared using a paired t-test (IBM SPSS Statistics v. 21.0; New York, NY).

RESULTS: Survey response rate was 81% (122/150). 98% of surgeons reported learning a new procedure or technology after formal training. Many surgeons reported scrubbing in expert cases (78%) and self-directed study (66%), while few surgeons (6%) completed a mini-fellowship. The modalities used most commonly were scrubbing in expert cases (34%) and self-directed study (27%). Few surgeons (7%) believed self-directed study would be most effective, whereas 31% and 16% believed operating under supervision and mini-fellowships would be most effective, respectively. Surgeons believed more effective methods "would require too much time" or they had "confidence in their ability to implement safely."

CONCLUSIONS: Practicing surgeons use a variety of training methods when learning new procedures and technologies, and there is disconnect between commonly used training methods and those deemed most effective. Confidence in surgeon's ability was cited as a reason for this discrepancy; and surgeons found time associated with more effective methods to be prohibitive. (J Surg Ed ■:■■■-■■■. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

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ACGME COMPETENCIES: Patient Care, Medical Knowledge, Practice Based Learning and Improvement, Systems Based Practice

INTRODUCTION

Surgical practice is rapidly evolving. New surgical procedures (e.g., sleeve gastrectomy and oncoplastic lumpectomy) and technologies (e.g., laparoscopy and robotics) are developed and introduced regularly.[1-4] Practicing surgeons adopt these new techniques to stay current in their field and to improve patient outcomes.[5] However, many new procedures and technologies have substantial learning curves which may lead to suboptimal patient outcomes early in the surgeon's experience.[6] There is clear evidence of harms associated with the introduction of new techniques in diverse practice settings.[7-10] This data suggest that the existing process of the diffusion of new procedures and technologies into practice could be improved.

How surgeons choose to learn new procedures may play a role in the suboptimal outcomes achieved as they navigate their learning curve. During residency training, surgeons

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learn and develop their skills under the supervision of senior surgeons and are granted progressive responsibility as they demonstrate improvement.[11,12] In contrast, practicing surgeons seldom have access to these structured training methods when learning new procedures or technologies.[13] The training methods used by practicing surgeons and surgeons′ perceptions of their relative strengths and weaknesses are poorly characterized.[14] In addition, little is known about the practical barriers faced by surgeons when choosing among training modalities.

We surveyed practicing surgeons to understand how they learn new procedures and technologies. We first assessed how practicing surgeons use available training methods and the factors that inform their choices. We then examined how those same surgeons believe training could be most effectively used to facilitate improved learning and safer diffusion. Finally, we explored the factors accounting for any discrepancies between current usage and beliefs about most-effective training.

MATERIALS AND METHODS

Survey Design and Development

We first conducted interviews with 9 practicing surgeons on faculty in the department of surgery at the University of Michigan Health System to understand the most significant questions to ask surgeons about learning new procedures and technologies (T.J., S.H., and M.K.). Interview topics were analyzed and thematically coded. Based on the themes that emerged from the interviews, an initial survey was created using Qualtrics Software (Version 08.2015; Qualtrics, Provo, UT). The preliminary survey was presented to initial interviewees within the department of surgery for feedback. Cognitive interviews were conducted with these surgeons in which they read through the survey instrument with members of the research team. These cognitive interviews provided an opportunity to recognize survey participant comprehension and alignment with question intent.[15,16] Feedback from those surgeons was again analyzed and coded, then used to refine the survey. Primary themes generated from interviews fell into 4 general categories: (1) motivations and pressures to innovate; (2) variability in educational modalities available and used; (3) safe introduction and diffusion of new procedures/technologies in to surgical practice; and (4) ethics of consenting and performing new procedures on patients. From these themes, we designed a 22 question survey to evaluate how practicing surgeons use available training methods when learning new procedures and technologies and the safety and ethical considerations associated with their implementation.

This article discusses the variability in educational modalities available and used by practicing surgeons. Participants were asked to select the training methods they used to learn a new procedure or technology after completing their formal training. Answer choices were created to be inclusive of the most common training modalities, and respondents were asked to select all the methods used in a "select all that apply" format. The training modalities were chosen based on the initial interviews with surgeons and were refined from feedback during cognitive interviews. To promote consistency among respondent understanding, the definitions of these learning modalities were reviewed during cognitive interviews.[17] One such example is the definition of a "mini-fellowship," which was defined as putting one's practice "on hold" to pursue a full time, immersive training program (several weeks to months) that includes hands-on operative and clinical training as outlined in surgical literature.[18] Respondents then selected which one modality they used most commonly to learn a new procedure or technology. The modalities available for surgeons to select for their single most commonly used modality were automatically populated from their answer to the previous "select all that apply" question. Surgeons next indicated which modality they perceived would be most effective. Surgeons who had discordance between what they perceived to be most effective and what they most commonly used were asked to identify specific factors that accounted for this discordance. Answer options for these factors were also chosen based on initial interviews and refined from cognitive interviews. The question prompts and training modality response options are included in Table 1.

Survey Administration and Study Population

Surgical specialties to be surveyed were those within the department of surgery at these institutions and were reviewed during initial interviews. These specialties included general surgery, thoracic surgery, colorectal surgery, vascular surgery, pediatric surgery, minimally invasive surgery/bariatric surgery, transplant surgery, endocrine surgery, surgical oncology, and trauma/acute care surgery. From August 2015 to July 2016, the survey instrument was distributed via e-mail to 150 surgeons on faculty in the department of surgery at 2 large Midwest academic health centers. With the specific intention of maximizing response rate, these e-mails were drafted with input from a faculty member in each respective department of surgery, and distribution e-mails were sent using that faculty member's name in the e-mail address. The research team sent 2 follow-up e-mails at 2-week intervals from that same e-mail address using the faculty members' names with the goal of further improving response rate. Although e-mails were sent with the faculty members as the "sender," all distribution and response monitoring was contained within the Qualtrics software. Respondent characteristics are included in Table 2.