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Faculty perceptions of resident skills decay during dedicated research fellowships

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ABSTRACT

Background: Residents engaging in dedicated research experiences may return to clinical training with less surgical skill. The study aims were 1) to evaluate faculty perceptions of residents skills decay during dedicated research fellowships, and 2) to compare faculty and resident perceptions of residents skills decay.

Methods: Faculty and residents were surveyed on resident research practices and perceptions of resident skills decay.

Results: Faculty thought residents returning from research demonstrate less technical skill (Median = 4; 5-point Likert scale, 1 = Strongly disagree, 5 = Strongly agree), demonstrate less confidence (Median = 4), and require more instruction (Median = 4). Both faculty and residents perceived the largest skill reduction in complex procedures, technical surgical skills, and knowledge of procedure steps ($p < 0.05$).

Conclusion: While dedicated research experiences provide valuable academic experience, there is a cost to clinical skills retention and confidence specifically in the areas of complex operative procedures and technical surgical skills.

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1. Introduction

General surgery is one of the few graduate training programs that offer residents the opportunity to pursue dedicated research fellowships during the middle of their five year clinical training program.^{1–3} The majority of surgery residents pursuing dedicated research fellowships take between one and three years away from clinical training.⁴ Prior program evaluations on this curricular approach have focused on the outcomes of successful matching into fellowship training, pursuit of academic careers, and attainment of grant funding.^{4–6} There is a paucity of research investigating clinical skill retention during this research time. General investigations of skills retention from outside of medicine indicate that time away from clinical training would be associated with skills loss. More specifically, that the amount of time away from task performance, level of knowledge mastery prior to time away, and task characteristics are important identifying factors for

vulnerable skills.^{7–10} Our preliminary work examining skill retention in surgery residents engaged in research experiences demonstrated a perceived loss of technical skill by trainees.^{11,12} Likewise, work by Jamshidi & Reilly (2008) evaluating clinical activity during research fellowships found 93.3% of participants were motivated to engage in moonlighting activities to maintain and develop clinical skills.¹³ This suggests these residents perceived a reduction in clinical competence during research fellowships.¹³

This prior work helps to identify a relationship between time spent doing research and decay in skill level; however, it does not completely define the scope of the problem. It was limited as it was based entirely on self-reported measures,^{11,12} which may not reflect true changes in performance and the general limitations of self-assessment in medical education are well-established.¹⁴ In the area of procedural skills, it has been shown that participant self-efficacy can influence self-reporting measures¹⁵ and may cause participants to over or under-estimate the impact of time away from task on performance. Faculty members likely have a valuable alternative perspective of the phenomenon of skills decay in surgery residents as they are not limited by the biases that complicate self-assessment. Additionally, some faculty members have the

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added advantage of having accumulated an experience of observing several residents transition back into clinical training after a dedicated research experience. Thus, faculty may provide information regarding more specific knowledge or skills deficiencies of residents returning to clinical practice. Likewise, their perspective may inform the overall scope of the problem in the setting of residency training.

The aim of this study was to 1) investigate faculty members' perceptions of skill decay for residents engaged in dedicated research fellowships, and to 2) compare faculty members' perceptions of skills decay with residents' perceptions. We hypothesized that faculty members would perceive a reduction in clinical and procedural skills of residents who take time away from clinical training to pursue dedicated research fellowships. Additionally, we hypothesized that faculty members and residents would perceive greater skills reduction for technical and procedural skills than clinical skills.

2. Methods

2.1. Setting and participants

Program administrators at nine Midwestern institutions were contacted to distribute the electronic survey to general surgery faculty members. The institutions were selected based on their participation in an ongoing simulation based longitudinal study in our laboratory investigating resident skill decay during dedicated research fellowships. Five institutions agreed to distribute the electronic survey to their faculty members and the survey was sent by email in September of 2016. The electronic survey was generated and stored using Qualtrics software (Qualtrics, Provo, UT) hosted at the University of Wisconsin. A second follow up email was sent after two weeks and the survey was closed after one month. Participation in the electronic survey was voluntary.

General surgery residents at nine Midwestern programs were recruited to participate in a simulation based longitudinal study. Study participants were residents engaged in dedicated research fellowships. Residents currently in their clinical training were excluded from this study. Participation was voluntary. Survey responses from only the first point of contact with the study were included to prevent retesting bias. This article evaluates data from the 2014 through 2016 data collection period of the longitudinal study. Our prior work focused on data from the 2014¹¹ and 2015¹² data collection and did not include faculty. Data presented here is an expansion of that prior work, addresses new research questions, includes additional new resident data from year 2016, and includes the first time collection of data from faculty members.

This study was reviewed and approved by the University of Wisconsin Institutional Review Board.

2.2. Surveys

The electronic survey distributed to faculty members was designed to collect data on demographics, research practices of residents, and faculty perceptions of resident skill decay during dedicated research fellowships. *Demographic* items collected data on sex, institution type, surgical specialty, years in practice, and time instructing residents. *Research practices of residents* items collected data on average length of resident research fellowships and after which post-graduate year (PGY) residents engaged in research fellowships. *Perceptions of resident skill decay* items collected data on perceived reduction in global and procedure specific skills (5-point Likert scale, 1 = no reduction, 5 = very large reduction), and performance decay in comparison to peers not engaged in research fellowships (5-point Likert scale, 1 = strongly

disagree, 3 = neither agree nor disagree, 5 = strongly agree) (Appendix A). Prior to distribution, the survey was reviewed by a statistician not directly involved in the project to assess item validity and by surgical education researchers not directly involved in the project to assess item clarity and understandability.

As part of the simulation based longitudinal study, residents completed a general survey prior to performing the simulated procedures. This survey was designed to collect information on demographics, years of general surgery training, clinical practices during the research experience, and years of dedicated laboratory work. This survey used a 5-point Likert scale (1 = no reduction, 5 = very large reduction) to assess perceived reduction in global and procedure specific skills. Study data were collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tools hosted at the University of Wisconsin.

2.3. Data analysis

Statistical analysis was performed in SPSS Statistics 23 (IBM Corp., Armonk, NY) software. Item responses were averaged and compared using independent samples t-tests. Perceived reductions in procedure-specific and global surgical skills were compared using analysis of variance (ANOVA). Multiple regression was used to assess predictors of resident perceptions of technical skills decay. A multivariate analysis of variance (MANOVA) was conducted to assess the differences between faculty and resident perception of skill loss during research years.

3. Results

3.1. Faculty survey

Out of a total of 368 faculty members across the five institutions, 77 faculty members participated in the survey (21% response rate). Eleven participants were excluded from the study secondary to incomplete survey responses defined as completing less than 90% of the survey questions. Faculty members (68% male) were well experienced with a median of 11–15 years in practice. All of the faculty respondents interacted with residents at least once a month and the majority (71.2%) interacted with residents on a daily basis.

Faculty reported residents primarily spent two years engaged in dedicated research time (Median = 2 years, Range 1–3 years) after entering the research fellowships following their 2nd post-graduate year (71%).

When compared to peers of similar clinical training who did not complete research fellowships, the majority of faculty agreed or strongly agreed that residents returning from dedicated research fellowships *demonstrate less technical skill* (67.2%, 43/64, Median = 4 (Agree)), *demonstrate less confidence* (69.2%, 45/65, Median = 4 (Agree)), and *require more instruction* (67.7%, 44/65, Median = 4 (Agree)) (Fig. 1).

Faculty members perceived reduction (5 point Likert scale, 1 = no reduction, 5 = very large reduction) in both procedure-specific and global surgical skills is displayed in Fig. 2. Among procedure-specific skills, faculty perceived a greater reduction in bowel anastomosis (M = 2.7, SD = 0.96) and LVH repair (M = 2.7, SD = 0.98) compared with subclavian central line insertion (M = 2.3, SD = 0.94) and urinary catheterization (M = 1.4, SD = 0.78, $F(1,183) = p < 0.001$, all pairwise comparisons $p < 0.05$). The largest perceived reduction in global clinical skills was in technical surgical skills (M = 2.8, SD = 0.90), knowledge of procedure steps (M = 2.6, SD = 0.82), and intra-operative decision making (M = 2.7, SD = 1.03, $F(6, 366) = 37.66$, $p < 0.001$, all pairwise comparisons $p < 0.05$).

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