

Resident Research Forums Stimulate Novel Research Within General Surgical Training Programs

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BACKGROUND: Our surgery residency includes an annual Resident Research Day (RRD) for presentation of resident research. We hypothesized that RRD stimulates the development of novel research. We evaluated this among our residents and at other institutions.

STUDY DESIGN: An electronic survey was distributed to current and alumni residents at our institution. The survey questions addressed residents' perceptions of RRD and were graded on a 5-point Likert scale. Another electronic survey was distributed to Program Directors (PDs) or Associate Program Directors (APDs) for all U.S. general surgery residencies. Questions assessed type of RRD and impact on research productivity. Microsoft Excel (Microsoft Corporation, Redmond, Washington) and MedCalc (MedCalc Software, Inc, Mariakerke, Belgium) software were used for analyses.

RESULTS: The response rate was 76% (47/62) among residents and alumni. These 47 respondents submitted 98 projects to RRD, which included retrospective clinical studies (53%), basic science (35%), medical education research (6%), and prospective clinical papers (6%). Twenty projects (20%) were created expressly for RRD, of which 7 were presented at outside scientific meetings and 8 were published in peer-reviewed journals. The response rate was 47% among PD/APD (88/188). Most programs have an RRD or similar forum (78%) without difference between university and community programs ($p = 0.78$). Higher rates of resident submission were associated with dedicated research time for most residents ($p = 0.01$). Required submission was associated with novel projects created for RRD ($p < 0.001$). Thirty-seven percent of programs reported greater than 25% of submitted projects were created for RRD.

CONCLUSIONS: RRD and similar forums occur at most general surgery training programs. They stimulate research

activity and satisfy most residents' expectations. RRD leads to completion of novel research projects that are presented both internally and in peer-reviewed form. (J Surg 66: 146-151. © 2009 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

COMPETENCY: Professionalism, Interpersonal Skills and Communication Skills, Practice Based Learning and Improvement

BACKGROUND

The Accreditation Council for Graduate Medical Education (ACGME) Program Requirements for Graduate Medical Education in Surgery states that a surgical resident curriculum must advance residents' knowledge of the basic principles of research, including how research is conducted, evaluated, explained to patients, and applied to patient care.¹ In addition, the ACGME encourages the participation of residents in clinical and/or laboratory research.¹ Beyond the ACGME requirements, resident research may improve resident education, stimulate intellectual curiosity, improve clinical care, advance scientific knowledge, and develop essential life-long learning skills.²⁻⁶ Resident research may also serve as an indication that a program's service-education balance is appropriate.⁶ Last, research productivity is often an important component to fellowship and job applications.⁶

Although resident research is a key component of the surgical education process, the specific components of training residents to perform research are not defined. Limited literature addresses surgical resident research curricula. Furthermore, many barriers exist in the current residency and hospital climates that may make research more difficult. A lack of dedicated time and financial support for resident research, limited resident access to research support services, increasing time needed to receive Institutional Review Board (IRB) approval, along with clinical pressures of increasingly busy clinical services are obstacles to accomplishing research.^{2,7-9}

Efforts to stimulate resident research have included a broad spectrum of programs, from a single day dedicated to

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resident research to a year-long curriculum incorporating didactic components and manuscript requirements. Development of resident research teams in a community surgery program increased publications by 13% and presentations by 33%.¹⁰ Our surgery residency at the University of Virginia has a strong tradition of resident research productivity. In line with this culture, in 2001, we started an annual Resident Research Day (RRD) to provide a public forum for the display and discussion of resident research efforts and with the aim of supporting, encouraging, and rewarding resident research productivity.

The program is structured as follows: In October, each categorical resident is required to submit the title of a research project and his/her mentor. In February, each categorical resident is required to submit an abstract. In March, a committee of faculty and residents evaluates the abstracts, and the top 12 are selected for oral presentation. The selection for presentation is based on the quality of the abstract and not on the resident status; therefore, presentations range from intern to chief resident level and include representation of both clinical and laboratory residents. All remaining abstracts are presented in poster format. Although only categorical residents are required to submit research projects, we do include submissions from noncategorical residents, postdoctoral research fellows, and medical students. In March or April, the RRD takes place. A visiting professor who has displayed excellence in research is invited. All nonemergency cases and clinics are cancelled for the day, and attendance by residents and faculty is required. The day includes 2 poster sessions, twelve 10-minute oral presentations, and a talk by the visiting professor on a research-related topic. We also invite a discussant from outside the department for each oral presentation. The discussant leads a 5-minute question-and-answer session after each oral presentation. All faculty members are invited to evaluate the oral and poster presentations. The top 3 oral and top 3 poster presentations receive an award, which includes recognition at our annual award day and a monetary prize. The day culminates with a banquet for all participants and faculty.

We hypothesized that RRD would stimulate the development of novel research. We present results from a survey that measured research productivity and resident satisfaction with RRD over the last 8 years. We also present results from a survey to residency directors across the country assessing efforts to promote resident research.

STUDY DESIGN AND METHODS

Resident and Alumni Research Day Survey

The survey recipients included all current residents at our institution ($n = 34$) and alumni who participated in RRD during their residency training (total of 37) and for whom an active e-mail address was available ($n = 28$). An electronic survey that consisted of 9 questions was developed by the primary author.

The survey questions were evaluated by 5 other surgeons, 2 residents and 3 senior investigators, 1 of whom has survey experience. The survey was piloted to 4 resident surgeons who were selected as a convenience sample. Revisions were made based on the comments received from the survey review and pilot test.

The survey gathered information on the responder's year of graduation or year in residency, their overall research experience outside of RRD activity, and information on each project they submitted for RRD, which includes nature of subject, type of presentation (oral or poster), whether the project was initiated for RRD, and whether the project was presented in another forum. Residents' opinions of RRD were assessed by questions that related to resident satisfaction with various aspects of RRD on a 5-point Likert scale ranging either from "strongly agree" to "neutral" to "strongly disagree" or from "very satisfied" to "neutral" to "very dissatisfied." Results were stratified by alumni versus current residents, whether RRD was required at the time, and whether the project was initiated expressly for RRD.

The original survey was distributed electronically in March 2008 with 2 subsequent e-mail reminders in March and April 2008. The survey was completed anonymously. All responses were received by May 2008.

Survey of Other Institutions

A separate 18-question electronic survey was distributed to either the program directors (PDs) or the associate program directors (APDs) for all U.S. general surgery residencies listed with the Association of Program Directors in Surgery (total 251) for which an active e-mail address was available ($n = 188$). Only a single individual was contacted for each residency program. Questions assessed characteristics of the residency programs including university vs community, percent of residents who pursue fellowships and academic practice, the type of RRD held, and the impact of RRD on research productivity. For programs that did not have a RRD or similar program, the survey asked for the reason why not. The questions were developed and reviewed by the same group of surgeons as above. The original survey was distributed in May 2008, with e-mail reminders sent in May and June 2008. The survey was completed anonymously. All responses were received by July 2008.

Statistical Considerations

Proportions and Pearson χ^2 -test used for categorical data are reported. Likert scale data were viewed as categorical. All probability values reflect 2-sided tests and were considered statistically significant at 0.05 less. Analytic tests were performed using Microsoft Excel (Microsoft Corporation, Redmond, Washington) and MedCalc software (MedCalc Software, Inc, Mariakerke, Belgium). This study was approved for exemption by the University of Virginia Institutional Review Board.

RESULTS

Resident and Alumni Participation in RRD Results in Initiation of New Research at our Institution

Of 62 eligible resident and alumni participants, 47 responded (20 alumni and 27 current residents) for a response rate of 76%. Of the current residents, 9 were PGY-1 or PGY-2 and 18 were PGY-3 or above. Eleven current residents had completed or were in the middle of completing at least 1 year of research. Nine individuals completed no dedicated research time in residency, and 4 were planning on completing at least 1 year of dedicated research time. Of the alumni, 13 reported completing at least 1 year of dedicated research time, and 7 did not complete a dedicated research year. Among the respondents, 45% have published more than 4 manuscripts (32% of current residents and 60% of alumni) and 30% have no publications (39% of residents and 20% of alumni).

In all, 99 projects were submitted to RRD by the 47 respondents. These projects included retrospective clinical studies (51%), basic science (33%), medical education research (6%), prospective clinical papers (6%), and other or unreported (4%). Overall, 20 projects (20%) were created expressly for RRD, of which 75% were clinical retrospective projects; the remaining projects were basic science (10%), clinical prospective (10%), and medical education (5%). The projects initiated for resident research day came from all levels of residents, with 70% being completed by residents in their PGY-3 year or greater. Most projects initiated for RRD were completed by residents with dedicated research time of at least 1 year (80%). Of the 20 projects initiated for RRD, 7 were presented at outside scientific meetings, and 8 were published in peer-reviewed journals.

A greater proportion of research projects were initiated specifically for RRD by our current residents compared to our alumni (30% vs 5%, respectively, $p = 0.01$). Participation in RRD became mandatory for categorical residents in 2005. Overall, 72 of the 99 projects reported were completed while RRD submission was required, and 18 (25%) of those were created expressly for RRD. Of the 27 projects completed before RRD submission was required, only 2 (7%) were initiated for RRD ($p = 0.1$).

Overall satisfaction with RRD was high, with 76% reporting that they were either very satisfied or satisfied with their RRD experience. Residents and alumni reported mentorship and the awards banquet as the top 2 areas done well, and the attendance by faculty and residents as the 2 areas that need the greatest improvement (Fig. 1). The most common reason cited for participation is that it is mandatory (60%). Other common reasons were the opportunity to investigate a question of interest (43%) and receiving prestige and recognition by the department (36%). Award money (4%) was selected least often as a reason (Fig. 2).

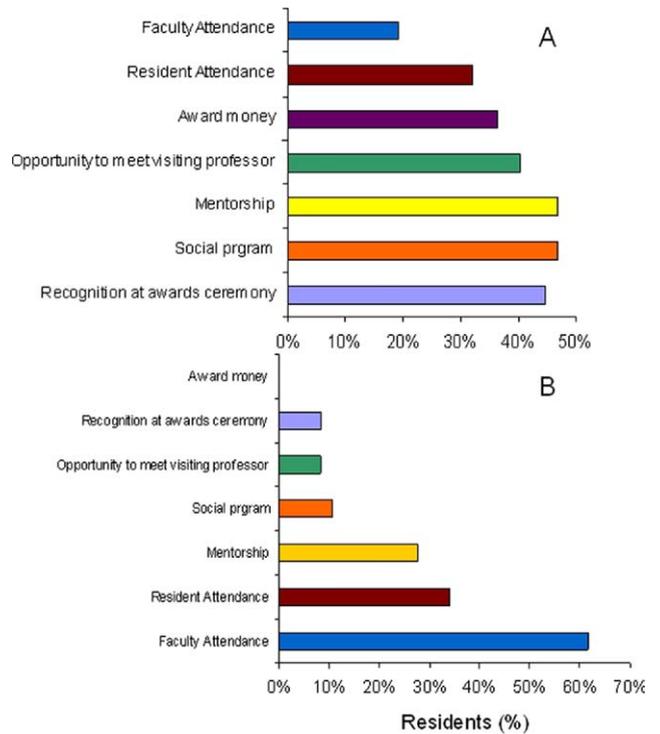


FIGURE 1. (A) Percent of respondents indicating satisfaction with aspects of Resident Research Day. (B) Percent of respondents indicating dissatisfaction with aspects of Resident Research Day.

RRD at Other General Surgery Residency Programs

The response rate was 47% among PDs/APDs surveyed (88/188). Most programs that responded were university based (65%), and most reported that greater than half of their residents go on to fellowship training (93%). RRD or similar forums exist in 69 of the 88 programs (78%) and exists at a similar proportion in university (77%) and community (81%) programs ($p = 0.78$).

In 63% of programs, fewer than half of their residents complete 1 year of more of research. Higher rates of resident submission to RRD were associated with dedicated research time of at least 1 year for most residents. In all, 93% of programs who have a majority of residents complete dedicated research time reported more than 25% of their residents submit to RRD, compared to only 67% in programs where a minority of residents complete dedicated research time ($p = 0.01$).

Of the 69 programs that have a resident research forum, 63 reported on the format of their RRD. Most popular (65%) was a dedicated day or half day for oral and poster presentations by residents, whereas a minority of programs (24%) holds regular presentations throughout the year. Five programs (8%) reported that they have a combination of these types of forums, and 2 respondents (3%) reported that they have weekly teaching conferences on research methodology along with more formal research presentations to their departments.

Sixty-five programs reported on the organizer and the requirements for participation in their RRD. The Department of

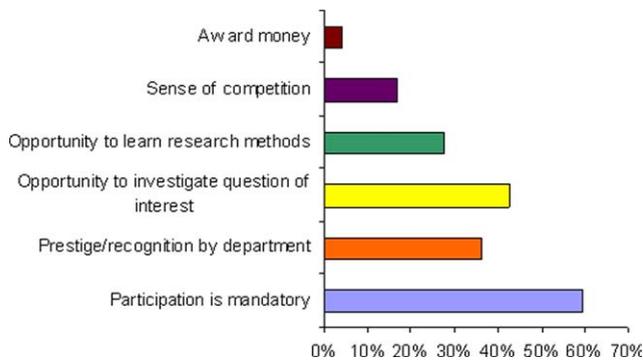


FIGURE 2. Influence of factors motivating Resident Research Day participation 7.

Surgery organizes the RRD in most programs (66%), followed by the hospital or GME Office (25%), industry (5%), and other (5%). Forty-one of the 65 programs (63%) require participation from at least a subset of their residents (eg, categorical residents, laboratory residents, senior residents).

Thirty-seven percent of programs reported that more than 25% of submitted projects were created for RRD. The creation of novel projects for RRD was associated with required submission ($p < 0.001$) but not with an increased proportion of residents completing dedicated laboratory years ($p = 0.79$).

For programs that do not have a RRD or similar forum, the most common reason cited was a lack of resident enthusiasm and time (33%). Additional reasons were that it is not consistent with residency top priorities (22%), a lack of faculty support/time (17%), financial (6%), and administrative constraints (6%). Other reasons reported by 3 respondents included that their residents present at national meetings or other forums and thus believe it is not needed. A single program reported poor attendance as the reason for not having a RRD.

DISCUSSION

The Residency Review Curriculum specifies that general surgery residency training “must advance residents’ knowledge of the basic principles of research, including how research is conducted, evaluated, explained to patients, and applied to patient care.”¹ Furthermore, training in research methodology in residency establishes a foundation for residents to build on throughout their training and professional careers.

Disciplines other than general surgery have reported on resident research programs; however, we are not aware of prior reports on resident research programs from a university-based general surgery training program. Among obstetrics and gynecology residency programs, a formal research program was reported to contribute significantly to the overall education of the residents.⁵ Medicine, psychiatry, and other disciplines also have reported on resident research curricula.^{6,9,11} Many of these programs, however, include month-long electives in research training and weekly instruction in research methodology.^{5,6,9} In the age of work-hour restrictions and increasing clinical demands,

this type of time commitment may not be feasible in most general surgery training programs. Our RRD does provide a yearlong timeline, with program title and mentor selection occurring 6 months before RRD, but we do not incorporate formal instruction or dedicated time toward completion of the research requirement. However, our department does offer residents access to analytic support with a biostatistician, financial support for the cost of poster presentation and publication, and access to resources from our surgical clinical research center, which includes assistance with IRB submissions. These services have been added for residents since the creation of RRD.

Although lack of time was cited by programs in our survey and is commonly reported as a barrier to resident research productivity,^{8,12,13} the importance of protected time in other disciplines has not been independently associated with an increase in research productivity among residents.¹³⁻¹⁵ We did find in our survey of general surgery residency programs that programs in which most residents spent at least 1 year in dedicated research had a greater percentage of residents participating in their resident research programs. Although these 2 data points are not directly comparable, this study does suggest that dedicated time to research is associated with greater research participation by resident, which may be because programs with dedicated research time have a stronger research culture and more substantial infrastructure. Alternatively, it may be that in a general surgery training program, the demands and lack of elective time during the clinical rotations make it more difficult for residents to accomplish research during their clinical rotations than is observed in other disciplines.

Among our residents, the creation of novel research was greater among current residents than among alumni. At other general surgery programs, required submission was associated with a greater proportion of residents completing research projects for the resident research forums. Although requiring RRD was not independently associated with increased creation of projects for RRD at our program, required submission in the more recent years is likely a contributing factor in the increase in creation of novel research. Additionally, it is possible, as our RRD program has grown in size and prestige over time, that this has motivated residents to initiate novel research for presentation at this forum. This growth in our RRD has likely contributed to a greater focus on resident research in our department. Last, as the faculty and residents in our department have also evolved in the last several years, it is possible that interest in research has increased independent of the changes in RRD. As this study did not evaluate other changes in the department that may have increased resident research activity during this period, it is possible that this study’s findings reflect changes beyond the creation of a RRD. Nonetheless, the generation of 20 projects and 8 peer-reviewed publications over 8 years expressly because of RRD is a valuable addition to our department’s research productivity.

Mentoring is a key component of any successful resident education component,^{9,15} but it is often difficult to implement because of time constraints for faculty. In our RRD program, in

an attempt to overcome the barrier of time constraints, we require faculty participation in 2 ways. First, faculty are required to cancel all elective cases and clinics during RRD. Second, residents are required to submit a project title along with their faculty mentor in October. This requirement was introduced in 2004 and has likely contributed to the increasing success of our RRD in recent years. Requiring a project title and mentor several months in advance ensures the residents have selected a realistic and appropriate project and instills accountability for the mentor. Although the official mentor is a faculty member, in many cases that faculty member's research resident or a senior resident pursuing that field will serve as a hands-on mentor for junior residents. In addition to the direction the junior resident receives, this model provides a mentoring experience for our senior residents. Other programs have created similar models by instituting a team approach to their resident research curriculum, consisting of faculty and all levels of residents.^{10,16} Last, the formal and structured nature of our RRD, complete with guest speaker, invited discussants, and awards banquet reinforces the departments' emphasis on research and has helped contribute to its success.

We found that RRD and similar forums occur at most general surgery training programs, including both university and community based training environments. It has been reported previously in obstetrics and gynecology and radiology programs that association with a university or medical school increases resident research.^{5,17} We would have expected a similar trend in general surgery residencies, as university programs are often considered geared more toward training for a future in academic medicine, which is one of the motivating factors toward teaching resident research skills.⁶ In agreement with our findings is a report on internal medicine residencies, which found a greater number of non-university-based programs had a research curriculum than did university-based programs.⁹ Our study did not assess the overall publication productivity of residents at other institutions, and this deserves future study. It is also possible that there was some response bias in our study, if programs with a form of RRD were more likely to respond. Although our overall response rate to the survey was in an acceptable range for physician surveys,¹⁸ a response rate of 47% does limit the generalizability of these findings and possibly introduces bias to favor programs that are more actively interested in promoting resident research activities.

Resident research is an important component of a general surgery training program. The presence of a resident research day or similar forum satisfies most residents' expectations and may stimulate research activity among all levels of residents. To the best of our knowledge there has not been a previous report of a university-based resident research forum or an assessment of resident research programs in general surgery residencies nationwide. Resident research forums may be performed within the constraints of a busy general surgery residency program and may lead to the completion of novel research projects that are presented both internally and in peer-reviewed form.

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