Scholarly Activity in Family Medicine Residency Programs: A National Survey

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BACKGROUND AND OBJECTIVES: In 2006, the Family Medicine Review Committee (RC) began requiring resident scholarly activity. This study sought to (1) determine how resident scholarly activity requirements and productivity changed after this alteration, (2) delineate characteristics of scholarship within family medicine residencies, and (3) determine the factors within programs that are associated with resident scholarly productivity.

METHODS: We sent a 38-item electronic survey to all 450 US family medicine program directors. Multivariate analysis was performed to determine significant predictors of scholarship.

RESULTS: Fifty-five percent of surveys were returned; 42.8% of programs modified scholarship requirements after 2006, and 48.6% required resident scholarship in 1997 versus 89.6% in 2009. A total of 76.6% have research curricula versus 51.5% in 1997; 87.5% report that <25% of residents authored publications within 2 years, yet 46.1% of programs report >50% of residents conducted research during that same time. Three factors were associated with ≥25% of residents publishing within 2 years: "Residency director publishing" (OR=4.1, 95% CI=1.5–11.5), "≥6 faculty publications within 2 years" (OR=7.8, 95% CI=3.0-20.3), and "Residency opened before 1980" (OR=3.7, 95% CI=1.4–9.6). Five factors were associated with participation by ≥50% of program's residents in a research project: "Resident recognition for scholarship" (OR=2.2, 95% CI=1.1–4.1), "Dedicated resident time for research" (OR=2.3, 95% CI=1.2–4.4), "Local Research Day" (OR=2.5, 95% CI=1.3-5.1), "Academic advancement linked to scholarship" (OR=1.9, 95% CI=0.9-3.9), and "Residency director performs research" (OR=2.7, 95% CI=1.4-5.1).

CONCLUSIONS: Many family medicine residency programs have increased resident scholarly activity requirements since 2006. To date, these changes have not increased scholarly output, and most programs have low resident scholarship. This study confirms that dedicating resources and time to research combined with active faculty scholarship will likely increase resident scholarly production.

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Research and scholarly activity are integral parts of family medicine education. The Accreditation Council for Graduate Medical Education (ACGME) through the Core Competencies has emphasized incorporating scholarly activity into the patient care experience.[1] The Future of Family Medicine Report recommends increasing scholarly activity as a way to elevate prestige and desirability of family medicine training.[2,3] In 2006, the Family Medicine Review Committee made resident scholarly activity a requirement, stating "All residents must actively participate in scientific inquiry, either through direct participation in research or undertaking scholarly projects that make use of the scientific methods."

In a study of family medicine programs, DeHaven et al identified six ubiquitous characteristics of residency programs successful in research: program director support, time, faculty involvement in research, a research curriculum/journal club, an easily accessible research professional, and opportunities for residents to present their research. Other factors found to be extremely important included starting early in training, an integrated research curriculum, requiring a research activity, posting published efforts, and having a research committee at the residency training site.[4,5] It would be expected that programs would implement changes to incorporate these features into their curriculum to increase resident scholarly experience. Neale[6] found paradoxically that there was a non-linear association between number of full-time equivalent (FTE) physician faculty and resident research. Crownover and Crawford reported an innovative program designed to increase

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scholarly activity in reaction to this new requirement.[7]

This study was conducted to (1) determine whether change in scholarly activity requirements from the ACGME resulted in increased resident scholarly requirements and output, (2) delineate the current characteristics of family medicine residency programs regarding scholarly activity, and (3) determine what factors are associated with higher resident scholarly productivity.

Methods

We surveyed all 450 family medicine residency program directors in the United States who were listed on the ACGME Accreditation Data System Web site (http://www.acgme.org/adspublic/) in July 2009. Approval for this study was obtained from the Institutional Review Board of the Eisenhower Army Medical Center. Of 450 eligible programs, 248 submitted surveys, for an overall response rate of 55%.

We used a modified Dillman approach. Specifically, we first mailed a letter to the program directors explaining the rationale of the study and advised them that they would receive an e-mail with a link to a secure, anonymous survey 1 week later. The link to the survey was then sent by e-mail. Second, third, and fourth requests were e-mailed each of the subsequent weeks.

The questionnaire was largely based on a previously validated survey used by Neale[7] and was organized into five general areas relating to research education and residency requirements: (1) descriptive program information, (2) the research curriculum, (3) resident scholarship within the program, (4) resident scholarly productivity, and (5) faculty scholarship. Most questions were in a closed-ended format.

Descriptive data were tabulated on the characteristics of responding residency programs and on the nature of research requirements. Some ordinal variables were dichotomized to ensure adequate numbers of respondents in each category. Bivariate chi-square analysis was used to examine (1) resident research by program characteristics and faculty scholarship, (2) percent of residents publishing by program characteristics and faculty

Table 1: Descriptive Characteristics of Responding US Family Medicine Residency Programs

	#	%
Initial accreditation prior to 1980	164	66.1
PGY-1 residency class size		
5 or less	33	13.3
6–9	161	64.9
>10	54	21.8
Program affiliation		
Medical school based	26	10.5
Community based, medical school administrated	33	13.3
Community based, medical school affiliated	151	60.9
Community based, not affiliated	33	10.5
Military	12	4.8
FTE faculty		
Physician		
5 or less	55	22.2
6–10	127	51.2
11 or more	66	26.6
PhD		
0	79	44.1
1 or more	100	55.9
Behavioral science		
0	35	—
1	149	15.9
2 or more	36	67.7
Does department have a research director?		
No	121	48.8
Yes	127	51.2
Journal Club provided by residency?		
No	14	5.6
Yes	234	94.4
Research curriculum provided by residency?		
No	58	23.4
Yes	190	76.6
Venue to display scholarship within residency?		
No	108	43.5
Yes	140	56.5
Does residency have research rotation available?		
None	95	38.3
Elective	35	14.1
Required	118	47.6
Does residency have a Scholarship Review Committee?		
No	103	41.5
Yes	145	58.5
Does residency reward residents' scholarly accomplishments with a special prize?		
No	120	48.4
Yes	128	51.6
Do residents receive dedicated time to work on scholarly projects?		
No	107	44.6
Yes	133	55.4
Does residency have a Research Day in which graduating residents present their scholarly projects?		
No	82	34.2
Yes	158	65.8

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Table 1: (continued)

	#	%
Initial accreditation prior to 1980	164	66.1
Does residency program require residents to participate in scholarly activity?		
No	25	10.4
Yes	215	89.6
Does residency program link annual resident promotions to progress on their scholarly project?		
No	146	70.2
Yes	62	29.8
What percent of residency's residents have conducted research within the last 2 years?		
0%–49%	125	53.9
50%–100%	107	46.1
What percent of residency's residents have been authors on at least one publication in the peer-reviewed medical literature in the last 2 years?		
0%–24%	203	87.5
25+%	29	12.5
What percent of residency's residents have presented posters or given podium presentations at regional, national, or international medical conferences in the last 2 years?		
0%–24%	172	74.1
25%–49%	40	17.2
50%–74%	12	5.2
75%–100%	8	3.4
Total number of resident publications		
0–5	209	90.1
6 or more	23	9.9
Total number of resident presentations		
0	45	19.5
1–5	140	60.6
6 or more	46	19.9
Do faculty have at least some dedicated time to complete research?		
No	121	55.8
Yes	96	44.2
Department policy regarding faculty research or scholarship productivity		
Required	23	10.6
Encouraged, but not required	153	70.5
Not expected	41	18.9
How many faculty members have enough experience and/or training to adequately mentor residents in scholarly activities, to include research?		
0–3	143	65.9
4 or more	73	34.1
What percent of residency's faculty have conducted research within the last 2 years?		
0%–24%	123	56.7
25+%	94	43.3

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scholarship, and (3) total resident publications by program characteristics and faculty scholarship.

Significant variables were entered into a multiple logistic regression models to determine variables associated with measures of resident scholarly productivity. Non-significant variables were removed from these models in a stepwise fashion until all remaining variables had a significance of $P<.1$ or less or until only three variables remained.

Results

Descriptive Program Characteristics

Table 1 shows the descriptive characteristics of the responding residency programs (n=248). Most (64.9%) of the responding programs had between six and nine PGY-1 residents, and 83.7% were community based. There was considerable variation in residency faculty size. A total of 22.2% of programs had less than six full-time equivalent (FTE) physician faculty, and 26.6% had 11 or more FTE physician faculty; 44.1% had no PhD faculty; and 84.1% responded that they had at least one behavioral science faculty member.

Scholarly Activity Educational Components

Almost half (48.8%) of programs reported that they had no research director. Most programs provided a resident research curriculum (76.6%), and 94.4% had a resident journal club. A total of 47.6% of programs required a research rotation, while 14.1% offered an elective research rotation. More than half (55.4%) of programs provide protected time for residents to complete research.

Resident Recognition for Scholarship

A total of 56.5% of programs have a venue to display scholarship within residency (Wall of Fame), and 51.6% award residents' scholarly accomplishments some form of formal recognition or prize. Almost two thirds (65.8%) of programs have a

Table 1: (continued)

	#	%
Initial accreditation prior to 1980	164	66.1
What percent of residency's faculty have been authors on at least one publication in the peer-reviewed medical literature in the last 2 years?		
0%–24%	135	62.2
25+%	82	37.8
What percent of residency's faculty have presented posters or given podium presentations at regional, national, or international medical conferences in the last 2 years?		
0%–24%	102	47.0
25%–49%	79	36.4
50%–74%	29	13.4
75%–100%	7	3.2
Total number of faculty publications		
0–5	161	74.2
6 or more	56	25.8
Total number of faculty presentations		
0	21	9.7
1–5	117	53.9
6–10	51	23.5
11 or more	28	12.9
Has program director participated in research in the last 2 years?		
No	47	21.7
Yes	170	78.3

Research Day for residents to present their projects.

Response to 2006 RRC Changes

A total of 42.8% of programs reported that they modified their requirements due to the 2006 RRC update; 89.6% now require resident scholarly activity as compared to 48.6% in 1997. A total of 76.6% of programs reported having a research curriculum, compared to 51.5% in 1997.

Resident Scholarly Productivity From July 2007 to July 2009

When asked to describe the participation and productivity of their residents in regard to scholarly activity, 46.1% of programs state that >50% of residents have conducted research in the last 2 years. Only 12.5% of programs report that >25% of their residents published a paper, and only 25.9% of residencies had >25% of their residents give a poster or oral presentation at a national or international medical conference. Almost all (90.1%) programs had less than six resident publications in the preceding 2 years, and 80.1% had less than six resident presentations at medical conferences during the prior 2 years.

Faculty Scholarly Productivity From July 2007 to July 2009

Of respondents, 10.6% said faculty were required to engage in research or scholarly activity, and 70.5% reported that faculty were encouraged but not required to be involved in research. Most programs (65.9%) have less than four faculty that are able to mentor residents in research. A minority (37.8%) of programs have >25% of faculty who have published in the past 2 years, and a slight majority (53%) have presented scholarly work during that time frame. A total of 74.2% of programs report that faculty have less than six total publications, and 63.6% have less than six total presentations in the last 2 years. A total of 78.3% of program directors have participated in research in the last 2 years.

Significant Predictors of Resident Research Activity

As seen in Table 2, multiple variables are associated with resident participation in research. Factors associated with increased odds of participation of ≥50% of a program's residents in a research project within 2 years were "Resident recognition for scholarship," "Dedicated resident time for research," "Local Research Day, "Academic advancement linked to scholarship," and "Residency director involved in research." When controlling for other variables, variables significantly associated with a higher percentage of residents participating in research included formal recognition for scholarship, dedicated resident time, a local Research Day, and having the program director involved in research (Table 3).

Factors that increased the odds of ≥25% of residents having published within 2 years were "Residency director publishing," "≥6 faculty publications within 2 years," and "Residency opened prior to 1980." Not surprisingly, the more the faculty and program director publish, the higher percentage of residents publishing (Table 4). When controlling for other variables, the program director being published within the last 2 years, total faculty publications, and the residency having been opened prior to 1980 were the only three variables that remained statistically significant. Of those, total faculty publications was the most significant (OR=7.8, CI=3.0–20.3, $P<.001$).

Variables associated with having a greater raw number of resident publications were also analyzed. Having faculty mentors present ($P=.019$), having a research curriculum ($P=.005$), having a research rotation ($P=.026$), having a venue to present work ($P=.044$), having 25% or more faculty published within the last 2 years ($P=.001$), total faculty publications ($P<.001$), and having the program director published within the last 2 years ($P=.008$) were all associated with having six or more resident publications during

that same time frame. When these variables were subjected to logistic regression, only total faculty publications was statistically significant ($P<.001$) when controlling for the other variables.

Discussion

The resident scholarly activity requirements from the ACGME have become stricter, and programs have changed their curricula in response. However, the percent of residents involved with research and resident output of presentations and publications remains relatively low. This finding represents the reality of how difficult it is to support residents conducting research and scholarly activity while maintaining the teaching and clinical missions of residency programs.

Why Programs Succeed

Those programs in which completion of scholarly activity is both required and tied to academic advancement have a higher percent of residents involved in research. This indicates that if the specialty of family medicine continues to deem resident scholarly activity important, then ACGME requirements should be continued.

Additionally, programs where more residents are actively involved in research and publishing have put resources and forethought into how to comply with both the letter and the spirit of the ACGME requirements. Providing research curricula and oversight by a research director or scholarly activity review committee helps residents by giving structure to what can be difficult principles to master.

Canadian graduates from programs with formal research curricula were more likely to report that their residency research project was a positive learning experience.[8] Participation in a research project must not be the curriculum—it should be the culmination of a diverse educational process.[9]

Many of the results of the current study are consistent with prior research and commentary on resident scholarly activity.[10] Active program director support, research participation, and publishing were highly associated with increased publications from residents. Availability of research mentors allows residents to identify concretely with a researcher and learn from this mentor. Support and role modeling send the message that research is valued within the program.

Faculty involvement in research and publishing was highly correlated to resident involvement and publishing. This represents a significant barrier for many family medicine programs. While prior research has shown that individual faculty members need 40% or more protected time for successful research productivity,[11] only 1.5 faculty members per medical school-based residency program have this much of their time protected for research, and community-based programs are far lower.[12]

Our study confirmed that dedicated research time for residents is an indispensable factor in developing a productive resident research program.[13] Lack of time is often cited as a reason for not participating in or completing research. A survey of graduates from a Canadian program

Table 2: Resident Research Participation by Residency Program Characteristics

	0–49	50–100	χ^2	*P* Value
Research curriculum				
No	37 (67.3)	18 (32.7)	5.2	.023
Yes	88 (49.7)	89 (50.3)		
Scholarship review committee				
No	63 (64.3)	35 (35.7)	7.4	.007
Yes	62 (46.3)	72 (53.7)		
Research director				
No	70 (61.4)	44 (38.6)	5.1	.024
Yes	55 (46.6)	63 (53.4)		
Faculty research participation				
No	80 (65)	43 (35)		
Yes	35 (37.2)	59 (62.8)	16.5	<.0001
Program director research participation				
No	75 (67.0)	37 (33.0)	18.1	<.0001
Yes	40 (38.1)	65 (61.9)		
Resident recognition for scholarship				
No	74 (68.5)	34 (31.5)	17.4	<.0001
Yes	51 (41.1)	73 (58.9)		
Research Day within residency				
No	57 (72.2)	22 (27.8)		
Yes	68 (53.9)	5 (55.6)	16.1	<.0001
Protected resident time for research				
No	68 (66.7)	34 (34.3)	12.0	.001
Yes	57 (43.8)	73 (56.2)		
Scholarly activity required				
No	20 (83.3)	4 (16.7)	9.3	.002
Yes	105 (50.5)	103 (49.5)		
Scholarship connected to academic progression				
No	82 (56.2)	64 (43.8)	6.3	.012
Yes	23 (37.1)	39 (62.3)		

Table 3: Odds of 50% or More of a Program's Residents Having Participated in a Research Project Within the Last 2 Years

Variable	OR*	CI	*P* Value†
Resident recognition for scholarship	2.2	1.1–4.1	.02
Dedicated resident time	2.3	1.2–4.4	.01
Local Research Day	2.5	1.3–5.1	<.01
Academic advancement linked to scholarship	1.9	0.9–3.9	.07
Residency director involved in research	2.7	1.4–5.1	<.01

* Odds ratio adjusted for other variables in model

CI—95% confidence interval

† All variables with significance of $P<.1$ were left in the model

Table 4: Percent of Residents Publishing by Residency Program Characteristics

	0–24	25–100	χ^2	*P* Value
Residency start date				
Prior to 1980	139 (90.8)	14 (9.2)	4.6	.032
After 1980	64 (81.0)	15 (19.0)		
Research rotation				
No	76 (87.4)	11 (12.6)	6.5	.039
Yes	23 (74.2)	8 (25.8)		
Venue to display publications				
No	91 (94.8)	5 (5.2)	8.0	.005
Yes	112 (82.4)	24 (17.6)		
Faculty publishing				
0%–24%	128 (94.8)	7 (5.2)	17.3	<.0001
25%–100%	62 (75.6)	20 (24.4)		
Total faculty publications the last 2 years				
0–5	152 (94.4)	9 (5.6)	26.9	<.0001
6+	38(67.9)	18 (32.1)		
Program director has published last 2 years				
No	115 (95.0)	6 (5.0)	14.1	<.0001
Yes	75 (78.1)	21 (21.9)		

from 1990–1997 found that a lack of time was the most common reason why residents did not attempt to publish their projects.[14]

Even within research fellowships, there are struggles and hurdles to research success and productivity.[15] These programs feel threatened by weak research infrastructure, inadequate funding, and attitudinal biases against family medicine research. These biases are not all external--many family physicians feel that research is a waste and look down on researcher colleagues.

Limitations

There is still debate about what is research and scholarly activity. We made no attempt to differentiate or define this in our survey because we chose to use the same language and the original questionnaire, which allowed us to make direct comparisons to Neale's findings.[6] This may have confused some respondents or led them to answer more liberally or more conservatively than what is actually happening at their residency.

We also made no attempt to measure the quality of research output or the quality of available mentors. We did not explicitly define "participate in research," "protected time for research," or "research training," and we left it up to the interpretation of the respondent to define precisely what was meant by these terms. We believe that whatever bias resulted from this lack of precise definition would probably lead to an inflated report of research participation and output. We also did not inquire about order of authorship or how extensive the faculty involvement was for each paper.

Finally, the results of this study may be biased by a relatively low response rate of 55%. Furthermore, those programs that are better at research may be more predisposed to answer this survey, so this may further skew results.

Future Research

These findings suggest that a handful of variables are associated with increased resident participation in research and with higher levels of resident scholarly production.

It will take prospective studies of educational interventions incorporating these variables into resident research curricular to validate these findings. Successful programs should be queried in depth about their strategies for success.

Conclusions

Resident participation in scholarly activity is a frequently stated goal of family medicine educators. The increased emphasis by the ACGME has led to an increased emphasis by programs on resident scholarly activity. Despite these improvements, the great majority of residencies continue to produce little resident scholarly output as measured by publication in the peer-reviewed literature and presentations at medical conferences. Family medicine organizations should be proactive at identifying methods that lead to increased scholarship.

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