



# Resident Outcomes and Perspectives Over 2 Years of a New Scholarship Curriculum

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**BACKGROUND AND OBJECTIVES:** Scholarship is recognized as a challenge in many family medicine residency programs. Among evaluations of scholarship curricula, few describe resident experiences of such interventions. To bridge this gap in knowledge, we measured resident confidence, satisfaction, and participation before and after implementing a new scholarship curriculum.

**METHODS:** The redesigned curriculum included a structured project timeline, resident research in progress meetings, faculty mentorship, scholarly skills workshops, and mentored journal clubs. We conducted a curriculum evaluation via surveys of residents prior to implementation and after years 1 and 2, measuring satisfaction with the scholarly environment and opportunities, and confidence and participation in specific scholarly activities using Likert scales from 1 (least confidence) to 5.

**RESULTS:** Compared to baseline (n=28), after 2 years (n=27) of the curriculum, residents reported increased mean confidence in critical appraisal of scientific articles ( $2.6 \pm 1.1$  to  $3.3 \pm 0.7$ ,  $P=.007$ ), carrying out a scholarly project ( $2.5 \pm 0.8$  to  $3.4 \pm 1.0$ ,  $P=.005$ ), and writing an abstract ( $3.0 \pm 0.8$  to  $3.8 \pm 0.7$ ,  $P=.002$ ). As compared to the first year, more residents in the second year participated in quality improvement projects (7.1% vs 29.6%,  $P=.031$ ) and wrote conference abstracts (10.7% vs 37.0%,  $P=.022$ ). Over the same period, those very satisfied with the scholarly environment increased from 0 (0%) to 8 (29.6%,  $P=.017$ ). The June 2020 survey identified increased interest in scholarship because of the antiracism movement (51.9%) and COVID-19 pandemic (40.7%).

**CONCLUSIONS:** Implementation of a redesigned scholarship curriculum was associated with increases in family medicine resident scholarship confidence and satisfaction.

(Fam Med. 2021;53(6):461-6.)

doi: 10.22454/FamMed.2021.267781

Across disciplines, residency programs have implemented a variety of interventions to support resident scholarship and research training, many with documented success increasing scholarly output.<sup>8</sup> However, few of these studies report on resident experiences and satisfaction with scholarship curricula or confidence in scholarly activities.<sup>9</sup> This article addresses these gaps by sharing resident outcomes and perspectives over 2 years of a redesigned scholarship curriculum.

## Methods

At Boston University, family medicine residents' satisfaction with the scholarly environment and opportunities were the lowest measures on the 2017 ACGME annual resident survey. In response, residents expressed a desire for stronger scholarship training. In 2018-2019, a faculty member (R.S.) and postgraduate year-3 (PGY-3) resident (K.S.) led the design and implementation of a longitudinal curriculum based on resident feedback, discussions with departmental leadership, and review of published curricula and national guidelines.<sup>5,10-15</sup>

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Despite the pressing need for primary care physicians to investigate and address the many challenges in our health care environment, scholarship in family medicine continues to lag behind other specialties.<sup>1-3</sup> Great variation exists in how residency programs

meet scholarly activity training requirements.<sup>4,5</sup> In family medicine residencies, scholarly activity was slow to be incorporated,<sup>6</sup> and is a common deficiency cited by the Accreditation Council of Graduate Medical Education (ACGME).<sup>7</sup>

The curriculum included a 2-year project timeline, monthly research-in-progress meetings, monthly journal clubs, and periodic scholarly skills workshops (Table 1). The curriculum coordinators provided regular feedback to residents and facilitated connection to faculty mentors.

We administered anonymous resident surveys via email prior to curriculum implementation (baseline, July 2018) and after the first (May 2019) and second (June 2020) years of implementation. The survey assessed attitudes, confidence, and participation in scholarly activities and processes (eg, abstract writing regardless of conference acceptance). We included three questions from

the ACGME annual resident survey regarding satisfaction with scholarship. In June 2020 (year 2), we added questions regarding the effects on resident scholarship of the COVID-19 pandemic and antiracism movement, as these events were broadly affecting many domains of the residency program.

We treated each year as an independent sample, as residents entered and left the residency. We performed analyses of variance with a multiple comparisons procedure using Tukey's test to assess differences in means across three survey time points, *t* tests of independent samples across two time points, and  $\chi^2$  tests of independence for categorical variables. Significance was defined as  $P \leq .05$  for

all tests. We conducted analyses using SAS software (version 9.4, SAS Institute, Cary, NC). Though not designed as a mixed-methods study, we reviewed responses to open-ended questions to contextualize quantitative findings. The Boston University Institutional Review Board deemed the study exempt.

**Results**

Overall, 48 residents participated in the curriculum over 2 years. Compared to year 1, at year 2 more residents conducted a quality improvement project (29.6% vs 7.1%  $P=.031$ ) and wrote an abstract for conference submission (37.0% vs 14.8% vs  $P=.022$ , Table 2). Compared to baseline, residents at the end of

**Table 1: Components and Timeline of Scholarship Curriculum and Scholarly Project, Boston Medical Center Family Medicine Residency Program**

<b>Curriculum Objective</b>
Promote the acquisition of the scholarly skills physicians need to effect change and promote health equity in the communities, institutions and systems in which they work.
<b>Common Components Over 3-Year Residency</b>
<ul style="list-style-type: none"> <li>• Bimonthly protected half day for scholarship</li> <li>• Attend monthly resident research in progress</li> <li>• Attend bimonthly journal clubs (led by PGY2)               <ul style="list-style-type: none"> <li>• Focus on study design and critical appraisal</li> <li>• Preselected articles reviewed with faculty prior to session</li> </ul> </li> <li>• Attend quarterly scholarly skills workshops:               <ul style="list-style-type: none"> <li>• Quality improvement methods</li> <li>• Data access, collection and management</li> <li>• Online survey design and implementation</li> <li>• Abstract writing</li> </ul> </li> </ul>
<b>Year-Specific Curriculum and Project Timeline</b>
<b>PGY1</b>
<ul style="list-style-type: none"> <li>• Introduction to scholarship for health equity</li> <li>• Community-based exploration of health equity topic</li> <li>• Literature review, writing annotated bibliography</li> </ul>
<b>PGY2</b>
<ul style="list-style-type: none"> <li>• Brainstorming projects and objective-writing workshop</li> <li>• Define a project: writing aims, approach,</li> <li>• Connection to faculty mentors (via directory with faculty scholarship and availability)</li> <li>• Submit project proposal and annotated bibliography to curriculum directors</li> <li>• Begin project implementation</li> <li>• Present work in progress #1</li> </ul>
<b>PGY3</b>
<ul style="list-style-type: none"> <li>• Continue project/data collection</li> <li>• Submit abstract to local or national conference</li> <li>• Present work in progress #2</li> <li>• Present final results at departmental grand rounds</li> <li>• Submit final abstract or manuscript to curriculum directors</li> </ul>

**Table 2: Participation and Confidence in Scholarly Activities, BU FM Residents, 2018-2020**

	Baseline n=28 (%)	Year 1 n=28 (%)	Year 2 n=27 (%)	P Value <sup>a</sup>
<b>Residency Year Among Survey Respondents<sup>b</sup></b>				
PGY1	9 (32.1)	11 (39.3)	10 (37.0)	
PGY2	12 (42.9)	9 (32.1)	8 (29.6)	
PGY3	7 (25.0)	8 (28.6)	9 (33.3)	
<b>Confidence in Scholarly Activities (Mean±SD)</b>				
Critically assess peer reviewed article	2.6±1.1	3.2±0.9 <sup>c</sup>	3.3±0.7 <sup>c</sup>	.007
Carry out literature review	2.7±1.1	3.1±1.2	3.7±0.7 <sup>c</sup>	.002
Conduct quality improvement project	2.2±0.9	2.5±1.0	3.0±0.7 <sup>c</sup>	.008
Conduct scholarly project	2.5±0.8	3.0±1.1	3.4±1.0 <sup>c</sup>	.005
Develop research question and protocol	2.4±1.0	3.0±0.9	3.2±0.9 <sup>c</sup>	.004
Write conference abstract	3.0±0.8	3.5±1.0	3.8±0.7 <sup>c</sup>	.002
Write manuscript for peer review	2.3±1.1	2.6±1.0	2.9±1.0	.15
<b>Scholarly Activity Participation Reported by Residents<sup>d</sup></b>				
Lead a journal club		15 (53.6)	16 (59.3)	.67
Participated in research		11 (39.3)	9 (33.3)	.65
Participated in quality improvement		2 (7.1)	8 (29.6)	.03
Submitted a conference abstract (whether or not accepted)		3 (10.7)	10 (37.0)	.022
Drafted a paper for peer review (whether or not accepted)		4 (14.3)	2 (7.4)	.41

Abbreviations: BU FM, Boston University Family Medicine; SD=standard deviation.

<sup>a</sup>  $\chi^2$  P values are provided for categorical data (participation in scholarly activities) and analysis of variance (ANOVA) was performed for continuous data. For ANOVA, the asterisk indicates significant difference between baseline and the starred year.

<sup>b</sup> Baseline and end of year 1 survey response rates were both 77.8%, among 36 residents in the program AY 2018-2019. The end of year 2 survey response rate was 67.5%, among 40 residents in AY 2019-2020.

<sup>c</sup> Significantly different from baseline in multiple comparisons analysis using Tukey's test

<sup>d</sup> Data on scholarly activity participation reported by residents was not available at baseline. Most projects were conducted individually; in year 2 one resident pair did a quality improvement project together.

year 2 reported greater confidence in critical appraisal of scientific articles (3.3±0.7 vs. 2.6±1.1,  $P=.007$ ), carrying out a scholarly project in residency (3.4±1.0 vs 2.5±0.8,  $P=.005$ ), and writing an abstract (3.8±0.7 vs 3.0±0.8,  $P=.002$ ).

More residents reported that faculty were very/extremely effective at creating an environment of scholarship in years 1 (17.9%) and 2 (29.6%) than at baseline (0%,  $P=.017$ , Table 3). Most PGY-2 and PGY-3 residents reported satisfaction with mentorship, however approximately one-quarter did not feel their mentor had relevant scholarly expertise. In year 2, 62.9% stated they would like more interaction with research faculty, a sentiment echoed in narrative survey responses (Table 4). Residents

reported increased interest in scholarship because of the antiracism movement (51.9%) and COVID-19 pandemic (40.7%), and these events caused over one-third of residents to change projects or protocols.

### Discussion

This is one of only a few studies that report a positive association between a new scholarship curriculum and confidence in scholarly skills,<sup>16,17</sup> particularly those skills emphasized by the curriculum.<sup>18,19</sup> Unlike other programs,<sup>4,8</sup> we identified no increase in writing manuscripts, but did observe increases in abstract submissions, possibly paving the way for later publication. Strong research mentorship may be the missing ingredient for increasing manuscript output,<sup>4,9</sup>

however, increased participation and interest are also important intrinsic motivations for scholarship.<sup>20</sup> Reflecting the wider impact on research in 2020, the COVID-19 pandemic and renewed focus on race impacted residents as their interest in scholarship increased and many shifted to studying pandemic-related disparities. Residents reported mixed satisfaction with faculty mentorship, citing in narrative responses a desire for more faculty availability, expertise, and a departmental culture of scholarship. Despite these reported shortcomings, resident satisfaction with the scholarly environment increased, which may reflect satisfaction with the curriculum, although opportunities for faculty-sponsored scholarship remained low.<sup>21</sup>

**Table 3: Attitudes and Satisfaction With Scholarship and Mentorship, BU FM Residents, 2018-2020**

	Baseline n=28 (%)	Year 1 n=28 (%)	Year 2 n=27 (%)	P Value
<b>Scholarship and Curriculum</b>				
<b>Faculty effectiveness in creating an environment of scholarship and inquiry<sup>a</sup></b>				.017
Not or slightly effective	14 (50.0)	9 (32.1)	5 (18.5)	
Somewhat effective	14 (50.0)	14 (50.0)	14 (51.9)	
Very/extremely effective	0 (0.0)	5 (17.9)	8 (29.6)	
<b>Satisfaction with opportunities program provides to participate in scholarship<sup>a</sup></b>				.30
Not or slightly satisfied	12 (42.9)	10 (35.7)	9 (33.3)	
Somewhat satisfied	13 (46.4)	13 (46.4)	7 (25.9)	
Very/extremely satisfied	3 (10.7)	5 (17.9)	9 (40.7)	
<b>Importance of scholarship and research in residency curriculum<sup>a</sup></b>				.60
Not at all/slightly important	9 (32.1)	4(14.3)	6 (22.2)	
Somewhat important	11 (39.3)	8 (28.6)	8 (29.6)	
Very/extremely important	8 (28.6)	16 (57.1)	13 (48.1)	
<b>Likelihood scholarship/research will be part of career after residency</b>				.31
Very unlikely/unlikely	9 (32.1)	6 (21.4)	7 (25.9)	
Neither unlikely nor likely	10 (35.7)	13 (46.4)	6 (22.2)	
Likely/very likely	9 (32.1)	9 (32.1)	14 (51.9)	
<b>Satisfaction with new scholarship curriculum</b>				.23
Not or slightly satisfied		5 (17.9)	4 (14.8)	
Somewhat satisfied		11 (39.3)	6 (22.2)	
Very/extremely satisfied		12 (42.9)	17 (63.0)	
<b>Mentorship</b>				
<b>Mentor is family medicine faculty (vs other department)</b>		12 (70.6)	11 (64.7)	.25
<b>Mentor has relevant scholarly expertise</b>		13 (76.5)	10 (71.4)	1.00
<b>Desires more interaction with research faculty</b>			17 (62.9)	.43
<b>Satisfaction with mentorship</b>				
Not at all satisfied		3 (17.7)	1 (7.1)	
Somewhat satisfied		6 (35.3)	8 (57.1)	
Very satisfied		8 (47.1)	5 (35.7)	
<b>Satisfaction with faculty availability for mentorship</b>				
Not at/slightly all satisfied			10 (37.0)	
Somewhat satisfied			11 (42.3)	
Very/extremely satisfied			5 (18.5)	
<b>Impact of Antiracism Movement and Pandemic on Scholarship</b>				
<b>Impact of antiracism movement on interest in scholarship in residency/career</b>				
More interested			14 (51.9)	
Less interested			2 (7.4)	
Unsure/no			11 (40.7)	

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Table 3: Continued

	Baseline n=28 (%)	Year 1 n=28 (%)	Year 2 n=27 (%)	P Value
<b>Impact of Antiracism Movement and Pandemic on Scholarship</b>				
<b>Desire more training on history of racism in research</b>			19 (70.4)	
<b>Changed topic or protocol due to antiracism movement (PGY1-2 only)</b>			10 (37.0)	
<b>Impact of pandemic on interest in scholarship in residency/career</b>				
More interested			11 (40.7)	
Less interested			2 (7.4)	
Unsure/no			14 (51.9)	
<b>Changed topic or protocol due to pandemic (PGY1-2 only)</b>			11 (40.7)	

Abbreviation: BU FM, Boston University Family Medicine.

<sup>a</sup> Question used in the Accreditation Council of Graduate Medical Education Annual Resident Survey

**Table 4: Narrative Responses Regarding Curriculum and Mentorship, Boston University Family Medicine Residents, 2018-2020**

<b>Curriculum and Scholarship Environment</b>
“I appreciate that there is now built in scholarship learning topics, [that are] informative and interactive, so that they feel like useful learning opportunities.” (PGY2)
“Currently, it doesn’t feel like research is an expectation or a normal part of the culture of our FM residency program--it feels like a shoehorned ACGME requirement that we MUST do in order to graduate.” (PGY1)
“I think the faculty need to step up and be excited about projects and such to do with us. The residents can’t carry this!” (PGY3)
“Having a faculty and resident champion is key because of people like me who are feeling less interested in research right now. If these things were not required or not getting critical feedback I would be less likely to put effort in to them.” (PGY2)
“Having a sense of what your minimum expectation is and then also robust support for those who are interested, so there is an obvious low bar and also a high bar to motivate those who are interested to see the quality of work that could be done.” (PGY2)
<b>Mentorship</b>
“[My mentor] is very knowledgeable and took the time to teach me basics of research and the many ways that I could provide input.” (PGY3)
“My faculty mentor does not have research experience—makes it difficult to advance the project.” (PGY3)
“My mentor had a lot of experience in the process, but is very busy and less involved” (PGY3)

This evaluation has several limitations. It is an uncontrolled intervention in a single residency, implemented over only 2 years, resulting in a small sample size and 67%-77% response rate. However, our program shares many similarities with other urban, academic programs. Inclusion of ACGME survey questions enhances generalizability and narrative responses contextualize findings. We were unable to link individual responses from year to year, and we do not have complete data on scholarly activity prior to

implementation, limiting our ability to identify change at the individual or program level. However, we are tracking scholarly output for future evaluation, as increases in conference submission and QI project participation may be early signs of more global output increases.

In conclusion, this study provides evidence that resident interest, confidence and participation in scholarly activity may be influenced by a scholarship curriculum that is longitudinal, driven by residents, and able to incorporate resident-identified

topics in health research.<sup>18</sup> As resident scholarly pursuits increase, our findings highlight the need for faculty to enhance their own scholarly portfolios. To that end, endeavors at the national level to address faculty scholarship and research training pipelines are encouraging.<sup>22-25</sup> The rising interest in scholarship as we confront health inequities laid bare by COVID-19 reinforces the need to train family physicians in the scholarly skills required to achieve health equity.

**PRIOR PRESENTATIONS:** Standish K, Gonzalez S, McGuire C, Saper R. "Increased resident confidence in scholarly activities after year one of a redesigned scholarship curriculum." Accepted oral presentation presented as virtual prerecorded presentation, Society of Teachers of Family Medicine Annual Conference, August 24-27, 2020.

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