

Building the Research Culture of Family Medicine With Fellowship Training

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Background and Objectives: *The future of family medicine is closely tied to the strength of family medicine research. Physicians with fellowship training have been shown to be more productive researchers than those without fellowship training. This study's objectives are to (1) identify fellowship programs available to family physicians, (2) explore how family medicine fellows are taught research skills, and (3) identify obstacles to enhancing research training in fellowships.* **Methods:** *Fellowship programs available to family physicians were identified by Internet searches and confirmed by telephone or e-mail. Directors of identified fellowships received a 33-item survey exploring research training provided by their program. Descriptive statistics were used to evaluate the quantitative data. Survey comments were analyzed qualitatively to identify themes.* **Results:** *We confirmed that 247 of 328 identified research fellowships are available to family physicians. Survey response rate from those 247 fellowships was 65%. Fellowships with and without a research focus are providing research training. They are threatened, however, by weak research infrastructure, inadequate funding, and attitudinal biases against family medicine research.* **Conclusions:** *There are many fellowship and research training opportunities for family physicians. But in many programs, research training is tenuous, and support for researchers is low. We recommend expanding research advocacy efforts within family medicine, Congress, and funding institutions.*

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Research is a necessary catalyst for family medicine's continued evolution.¹⁻⁴ Since its inception, family medicine has struggled to create a research culture that fosters independently funded investigators and sustainable research teams.⁵⁻⁸ Successful investigators require coursework, mentorship, and protected time to develop research skills.⁸⁻¹⁴ Fellowship training, which may include these activities, has been shown to increase research productivity.¹⁵ Expanding family medicine research training opportunities would suggest that family medicine's research culture is advancing.

This study was conducted in response to the Association of Family Medicine Organizations' charge to the North American Primary Care Research Group (NAPCRG) Committee on Advancing the Science of Family Medicine (CASFM) to examine the health of research fellowships. The objectives of the study were

to (1) identify fellowship programs available to family physicians, (2) explore how family medicine fellows are taught research skills, (3) identify obstacles to enhancing research training in fellowships, and (4) compare fellowships with a research-focused curriculum to those with other concentration areas. The study was approved by the American Academy of Family Physicians (AAFP) Institutional Review Board.

We began this research in 2007 near the nadir of US medical graduate interest in primary care. At that time, family medicine residency programs were experiencing a net loss of residency positions, and Public Health Services Act Title VII Section 747 funds (Title VII), one of the main sources of family medicine fellowship funding, had been reduced to their lowest levels in the last decade.^{16,17} We expected to find decreasing family medicine fellowship research training opportunities.

Methods

Identification of Fellowship Programs

Information on fellowships obtained from professional organizations could not be verified. Therefore,

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the AAFP, Accreditation Council for Graduate Medical Education (ACGME), and primary care and specialty disciplines' Web sites were searched for fellowship programs. We investigated fellowships offered by departments of family medicine, internal medicine, pediatrics, obstetrics-gynecology, orthopedics, emergency medicine, and health policy. We searched university and health system Web sites by specialty to find fellowships that may accept family physicians. Search terms were fellowship, fellow, training, education, graduate medical education, family medicine, family practice, and specialties listed in Table 1. Findings were validated by telephone or e-mail to (1) confirm fellowship existence, (2) verify contact information, and (3) ask if the institution offered other fellowships that may accept family physicians.

Survey of Fellowship Directors

We developed a survey of 33 multiple choice and open-ended questions for fellowship directors. Answers

Table 1

Specialties Inventoried for Fellowships Available to Family Physicians

• Adolescent medicine	• Orthopedics
• Behavioral medicine	• Palliative care
• Emergency medicine	• Pediatrics
• Family medicine	• Rural medicine
• Geriatrics	• Sports medicine
• Internal medicine	• Women's health
• Obstetrics/gynecology	

were to reflect fellowship information as of June 2007. Respondents selected the best one or more descriptors of their fellowship type from a list of 21 options,

Table 2

Fellowship Type as Described by Respondents

Fellowship Category	n ¹	Fellowship Subcategory	n	Fellowships With Research Requirements (n) (No Response) ²
Research-focused Fellowships				
Research	43 ³	Primary care	32	32 (0)
		Research	14	14 (0)
		Faculty Development-Clinical Researcher	19	19 (0)
Non-research-focused Fellowships				
Faculty Development-Clinical Educator	31			16 (3)
Other Academic	7			0 (3)
Adolescent Medicine ⁴	18	Adolescent Medicine-Accredited	17	10 (3)
		Adolescent Medicine-Not Accredited	1	0 (1)
Behavioral Medicine	3			0 (1)
Emergency Medicine	2			0 (0)
Geriatrics ⁴	35	Geriatrics-Accredited	34	28 (0)
		Geriatrics-Not Accredited	1	0 (0)
Health Policy	4			0 (1)
Inpatient Medicine	5			1 (2)
Integrative Medicine	3			0 (1)
Obstetrics/Women's Health	19			1 (2)
Other	14			2 (3)
Palliative Care	4			0 (0)
Preventive Medicine	4			0 (0)
Rural Medicine	6			1(1)
Sports Medicine ⁴	68	Sports Medicine-Accredited	68	0 (0)
		Sports Medicine-Not Accredited	0	0 (0)

¹ The total number of reported fellowship types (288) is greater than the number of respondents (214) because fellowships were able to select more than one descriptive category.

² Not all fellowships responded to each survey question.

³ The total number of reported research fellowship subcategories (65) is more than the number of undifferentiated research fellowships (43) because some respondents selected more than one research subcategory to describe one fellowship program.

⁴ Accreditation status is only noted for those fellowships for which it is available.

provided in Table 2. Program age, duration, number of available positions, and positions filled were assessed. The survey asked about the research exposure offered by the fellowship, defined as critiquing published research, learning research methods, or conducting research. Respondents were asked to quantify and describe research training, available faculty, and funding sources. Curricular components, program requirements, and obstacles to expanding research training were assessed with multiple-choice questions, whose answer options were determined by expert opinion. Data were also collected on opportunities for additional education or degrees and products such as manuscripts and presentations required for successful completion of the fellowship. The survey was pilot tested by three fellowship directors who were not included in the study sample and is available by request.

The survey was e-mailed to the director of each fellowship that we identified. The AAFP distributed the survey and collected and de-identified responses. Two follow-up e-mails were sent to nonrespondents at 2-week intervals. After reviewing preliminary results based on a 44% response rate in October 2007, the CASFM requested that nonrespondents be contacted once more. With IRB approval, a research assistant was hired to telephone nonrespondents, distribute the survey, and collect and de-identify results in January 2008.

Data Analysis

Pre-survey power calculations suggested that 90 responses would yield a power of 0.824 and a standard error of 0.05 to address the key items in the survey. We compared responses between the fellowships that declared a research-specific focus (RF) by selecting “research,” “primary care research,” or “faculty development-clinical researcher” to describe their fellowship type and those that did not select any of these three descriptors, referred to collectively as non-research-focused fellowships (non-RF). Quantitative data were nonparametric and analyzed using SPSS version 15.0 to calculate descriptive statistics. We also measured fellowships’ fill deficit: number of offered positions minus number of filled positions.

Open-ended survey question answers were copied into Microsoft Word. Both authors independently reviewed the qualitative data. They then met via phone meetings to reach consensus on the prominent themes using the editing method, in which themes are derived from the data themselves.¹⁸ The themes were reviewed with fellowship directors to ensure data analysis accuracy.

Results

Identification of Fellowships

We identified 346 fellowships in the United States that may accept family physicians. Eighteen programs

could not be reached by e-mail or telephone and were excluded, decreasing the sample size to 328. A total of 214 surveys were returned (65% response rate), representing 21 fellowship types in 40 different states (Table 2). Four responding programs do not accept family physicians. Thirty-seven additional fellowships indicated that they accept family physicians but did not complete the survey. We, therefore, verified 247 fellowships available to family physicians. Forty-three described their fellowship as RF, and 30 of these indicated additional clinical or academic focus areas. A total of 171 responding fellowships were non-RF.

Fellowship Demographics

Fellowships are most commonly 10–20 years old. RF fellowships are longer (mode=2–3 years) than non-RF (mode=1–2 years). The maximum time non-RF fellowships allocate to research was 50%, with 15 spending at least 30% time (RF mode=40%, minimum=10%, maximum=100%). From 2002 through 2007, 36% of non-RF fellowships graduated fewer than five fellows (family medicine and other specialties) and 33% of RF fellowships graduated five to nine fellows. The 2006–2007 fill deficits do not correlate with fellowship type (range of Spearman ranks per fellowship type: -0.233, 0.204), program age (Spearman rank=0), or funding source (range of Spearman ranks per funding source: -0.117, 0.227).

Nearly half of RF fellowships reported years when they accepted no fellows. Explanations for why no fellows were accepted included fellowship candidates’ lack of interest in research and academics with statements such as “Faculty academic lifestyle is not always appealing to fellows.” Despite being open to family physicians, one fellowship reported that no family physician has applied. Another described how despite receiving stipends and moonlighting opportunities to supplement their fellowship salary, family physicians were significantly more resistant than pediatricians (who did not receive these supplements) to spend 3 years at a fellow’s salary learning the skills needed to become a successful researcher. Insufficient applicant quality and quantity is not shared by all fellowships, however. One fellowship finds “a tremendous amount of interest from family physicians... We fill as many slots as we have funding for.”

Teaching Research Skills

Only seven fellowships reported no research exposure. Table 3 summarizes how programs teach research skills. Most RF and non-RF fellowships teach fellows to develop a research question, study design and methods, and obtain IRB approval. Eighty-four percent of RF fellowships require fellows to develop a research question (47% non-RF). More than half (56%) of RF fellowships require fellows to join a research team, as do 27% of non-RF fellowships. Two-thirds (67%) of RF fellow-

Table 3
Teaching Fellows Research Skills

	<i>Research Focused</i>	<i>Non-Research Focused</i>
Available Teachers/Mentors (n)	n=43	n=158
Basic science researcher	33	32
Clinical researcher	38	108
Health services researcher	33	32
NIH grant-funded principal investigator	32	28
Other grant-funded principal investigator	33	55
Biostatistician	26	46
None of the above	1	34
Topics Taught (n)	n=43	n=153
Develop research question	39	119
Select study design	37	111
Obtain IRB approval	38	101
Develop methods	39	105
Perform statistical analysis	38	81
Create poster	37	87
Presentation	39	103
Additional Opportunities (n)	n=43	n=153
Masters degree	24	37
Journal club	26	131
Attend conferences	36	140
Work with IRB	24	42
Journal reviewer	8	21
Mock study sections	21	5
Grant writing course	27	10
Required Research Activity (n)	n=43	n=153
Develop a research question	36	72
Join an existing research team	24	41
Optional participation	11	68
Submit manuscript	29	46
Peer-reviewed presentation	27	50
Thesis	14	5
No requirement	2	49

ships require manuscript submission (30% non-RF). Communicating research through presentations and manuscripts is commonly required by RF and non-RF fellowships. Two programs require fellows to submit a grant, and another requires literature reviews. Fifty-

six percent of RF fellowships offer the opportunity to obtain a masters degree during fellowship, as did 24% of non-RF. More than half of RF fellowships offer IRB experience (26% non-RF), and 56% of RF fellowships offer grant writing courses (7% non-RF). One-third (32%) of non-RF fellowships cite no requirement to participate in research.

Obstacles to Teaching Research Skills

Eight of the 19 RF fellowships who reported years in which available positions were not filled cited lack of funding as a cause. Directors described funding as “in great peril,” “completely inadequate,” “the critical problem,” “disappearing,” and a “major challenge.” Some programs reported relying fully on Title VII funds. Some fellowships would not offer positions in 2007–2008 because they were unsuccessful in renewing their Title VII funding or they were deterred by Title VII’s uncertain future.

The lack of consistent funding for fellowship training has led to competition for available funds, and some programs are taking creative approaches. More fellowships received funding from sources outside of their institution in 2007 than in prior years, including six with new Title VII grants (Table 4). Programs described multiple, simultaneous funding sources. Funding specific fellowship components individually was a successful strategy. One fellowship reported receiving grant funds from the biostatistics department to support the curriculum’s biostatistics component. Other funding sources include clinical revenue, private and corporate sponsors, affiliated departments or organizations, fellows’ home institutions, collaborations with more resource-rich institutions, and specialty-specific training grants. Some fellowships also reported receiving tuition from fellows’ primary clinical departments.

In non-RF fellowships, the most frequently cited obstacles to expanding research training were insufficient time, fellow interest, and faculty issues (Table 5). Nearly two thirds of RF fellowships cited at least one obstacle to expanding research training, most commonly fellow interest and faculty and university support. One respondent described how an inadequately supportive environment discourages fellows with research interests from applying, making it even more difficult for the program to develop research infrastructure. Logistical obstacles include IRB processes and lack of pilot study funding, research support staff, and board certification research requirements.

Additional Comments

Comments from respondents described respondents’ experiences providing research training in fellowships. A summary of these comments with selected quotes from the data follows.

Table 4

Comparison of Funding Sources

Funding Source	Research Focused <i>n</i> = 43		Non-research Focused <i>n</i> = 169	
	2007	2006 and earlier	2007	2006 and earlier
Institution	7	4	70	20
Hospital or health system	3	1	76	31
Department	17	5	60	13
Practice plan	2	1	14	2
County	1	1	7	0
State	1	1	14	4
Federal (other)	4	2	19	4
CTSA	0	0	0	0
HRSA Title VII	19	13	12	12
NRSA T32	16	6	3	1
Other	8	1	22	7
None	2	6	7	25

CTSA—Clinical and Translational Service Awards
 HRSA—Health Resources and Services Administration
 NRSA—National Research Service Awards

The short duration (usually 1 year) of clinical fellowships precludes meaningful research activity. Grant proposal development, including literature review and obtaining IRB approval, leaves little time to execute a study in the course of 1 year. More time on research means less time generating patient care revenue. Aligning fellows with research projects and mentors is difficult in programs not already doing research. Faculty lack time, skills, and money to support their own investigations. “We help [the fellows] the best we can.”

Research is not a priority. “There is no business plan for research.” A multidisciplinary research fellowship director described how pediatricians and internists have had more success in the program than the family physicians due to the small value family medicine departments place on research. Multiple respondents described a distinctly negative attitude toward research from family medicine fellows compared to other primary care physicians.

Faculty members have little incentive to pursue needed research training if family medicine leadership does not value and encourage family physician researchers. Respondents requested opportunities to develop grantsmanship and research skills outside of full-time

Table 5

Obstacles to Expanding Research Training in Fellowships

Obstacles to Research in Fellowship	Research Focused <i>n</i> = 41	Non-research Focused <i>n</i> = 156
Fellow interest	8	68
Faculty support	6	47
Faculty not comfortable teaching research	0	40
Inadequate faculty conducting research	3	64
Department support	4	37
University support	6	28
Health system support	2	35
Insufficient time	5	94
Insufficient resources	2	38
Other	13	23
No obstacles	15	16

fellowships and degree-granting programs and to have their employers support these pursuits. “Most residents are not interested in research fellowships. Programs should be modified to address the needs of practicing physicians and/or faculty who wish to train in research, perhaps on a part-time basis.” “Our best hope for the future is to change academic culture in our residency programs, with our department chairs, and in our clinics.” “I believe research productivity in family medicine is not a training issue. I believe it starts with clear expectations for family medicine faculty to produce research, hiring people who have shown an ability to do scholarly work, provide these faculty with a supportive environment so they can be productive, and reward these faculty for their successes.”

Recruiting fellows is further complicated by poor communication about family medicine fellowships. “There are limited choices with a variety of different levels of training available but little to no generalized organization available to potential fellows to find information.” Uncertain funding for primary care research makes it difficult to recruit future investigators. “It is hard to sell the notion of primary care research in an inhospitable funding environment.” Successful recruitment strategies suggested include participating in online fellowship listings, attending NAPCRG and Society of Teachers of Family Medicine conferences, cultivating candidate interest on a one-to-one basis, working with other institutions to promote the fellowship, internal recruitment, and advertising in relevant

journals. Respondents desired a more concentrated effort to recruit residents and medical students with research interests.

Ideas to improve family medicine research culture include allowing fellows to extend their fellowships to complete their research, requiring publishing, and purposefully recruiting faculty with research skills. "Despite the completely inadequate funding and many challenges in developing research skills, it is essential that family physicians and others develop these skills if they are to have careers in academic medicine." Comments revealed frustration and desire to expand fellow and faculty research. "Assistance from your organization for strongly clinical programs of 1 year would help." "Need help with resident research and fellow research. Where is this help?"

Discussion

Contrary to our expectation that research training for family physicians would be shrinking, we found more opportunities than anticipated in 43 RF fellowships and in the impressive amount of research training occurring in non-RF fellowships. Many fellowships struggle with funding, particularly those dependent on Title VII grants. The budget proposed by the Obama Administration is the first in almost 2 decades to recommend funding Title VII but still at levels too small to support many fellowships. New mechanisms linked to the National Institutes of Health (NIH) are the best options for primary care research fellowships. Much as NIH researchers were trained in the General Clinical Research Centers, primary care research fellowships could be incorporated into Clinical and Translational Science Award sites. Also, the Howard Hughes Medical Institute and similar programs could develop a primary care focus for students and early-career researchers. Diversifying funding sources is an important, teachable strategy for sustaining fellowships and research training.

Lack of research faculty is a major hurdle to teaching, mentoring, and involving fellows in research. Family medicine departments' struggles to support research infrastructure obstruct recruitment and faculty development. Despite a decade of growth and investment in family medicine research by the AAFP, family medicine remains relatively shut out of the NIH.¹⁹ Family medicine's problems are not all external. Respondents described prevailing cultural and attitudinal biases against research in family medicine that are reflected by fellows' attitudes. Our results suggest that there is an association between a weak research culture and low levels of research training in fellowships. Developing family medicine research culture should remain the focal point of efforts to improve research capacity.

Family medicine research areas are aligned with the NIH focus on translating research to practice and Con-

gress' interest in comparative effectiveness research. These focus areas will require a cadre of primary care researchers. Family medicine fellowships, faculty, investigators, and fellows must be supported to develop the needed research workforce. NIH conferences on community engagement to support translating research into practice are important for educating NIH staff and basic researchers about practice- and community-based research. We propose to expand these discussions to include training primary care researchers. We also recommend a focused advocacy effort to have Congress be more prescriptive about supporting primary care research and fellowships.

After a decade of support, the AAFP recently surrendered much of its critical role in promoting family medicine research. We believe that the AAFP must continue to lead family medicine research advocacy because academic family medicine organizations lack the resources and name recognition in Congress to be effective. In the 111th Congress, the academic family medicine organizations and AAFP partnered well to help shape health reform legislation and should now do so to increase family medicine research capacity, particularly in fellowships. Losing the recent gains in family medicine fellowships could set the discipline back more than a decade.

Limitations

This exploratory survey has limited ability to capture details of research training available to fellows. Additional research will be required to fully understand fellowship curricula, additional education opportunities, funding sources, and obstacles to strengthening research training. We are currently unable, therefore, to make specific recommendations on how fellowships can become more successful producers of family physician researchers. Despite our efforts to be as inclusive as possible, we do not presume to have identified every fellowship available to family physicians in the United States. By allowing respondents to select more than one description of their fellowship, the distinction between RF and non-RF programs is not exclusive or likely reproducible. The power calculation was not based on comparisons of RF and non-RF fellowships, thus increasing the risk of a type 2 error. The survey tool is not a validated instrument.

Conclusions

If fellowship research training opportunities are a measure of family medicine's research culture, the discipline has come a long way. The enhanced capacity we found for such training and the creative ways it is being funded suggest a maturation of thinking by family medicine department chairs and faculty. This effort is threatened most urgently by reductions in Title VII funding but also by a cultural legacy of low interest in

research and inadequate infrastructure to support newly trained family medicine researchers. Making sure that research training bears fruit will require that family medicine organizations build research infrastructure and learning communities of existing fellowships and a strong research advocacy effort, particularly with NIH.

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