

## Creating a Research Culture: What We Can Learn From Residencies That Are Successful in Research

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**Background and Objectives:** *Despite a growing need for family practice to contribute to the national primary care research agenda, the specialty is ill-equipped to assume a more active role. Information about residency programs that are successful in research is a valuable resource for increasing family medicine's research capacity.* **Methods:** *A three-stage investigation was completed in May 1996, consisting of 1) a telephone survey of family practice residency program directors, 2) a mail survey of recent graduates from relatively successful programs identified in stage 1, and 3) in-depth interviews with the program directors or research directors identified by combining data from the first two stages.* **Results:** *Most residents in the programs included in stage 2 completed a research project (68.7%) and currently have an interest in practice-based research (57.2%). Residents from programs selected for the study's final stage were more likely to have published a research article (32% versus 20.3%) and to have completed a project while a resident (81% versus 60.1%) than those from the programs not selected. Virtually unanimous characteristics of successful programs include program director support of research, time for research, faculty involvement, a research curriculum, professional support, and opportunities for presenting research.* **Conclusions:** *Individual family practice residencies can be considered to be at one of three levels with respect to their level of research activity: 1) relatively undeveloped, 2) developing, or 3) relatively developed. Programs can expect successful results if they make research a priority, and means are needed for communicating successful strategies between programs.*

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Despite the lack of a research tradition in family practice, there has been a growing consensus among family medicine educators that research training is an important component of residency curriculum. The American Academy of Family Physicians (AAFP) has issued guidelines,<sup>1</sup> and the Program Requirements for Residency Education in Family Practice acknowledge the importance of scholarly activity.<sup>2</sup> Additionally, both the Society of Teachers of Family Medicine (STFM) and the AAFP provide a yearly forum for resident and student research, and the AAFP has recently announced a major initiative related to building the specialty's research capacity.

If family practice is to create a more viable research culture, it seems logical to begin the process during residency training. Unfortunately, little research exists

on ways to incorporate research training into the residency experience.<sup>3,4</sup> Family physicians who participate in research often feel that their research experience during residency was inadequate and that the experience should be improved.<sup>5</sup> However, numerous obstacles exist to improving the research training experience including, for example, lack of time and lack of suitable mentors.<sup>6</sup>

In May 1995, the AAFP Committee on Research funded several research and demonstration projects designed to build the research capacity of the specialty's training programs, and this study is part of that effort. This study 1) identified residency programs in which research training and involvement seemed to be practical, educational, and enjoyable and 2) ascertained how these residencies created and sustain their research program. The study's ultimate aim was to identify and describe successful and generalizable strategies for improving research training in family practice residency programs.

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## Methods

There was no way of knowing in advance which residency programs might have successful research programs. Since it was neither cost-effective nor desirable to conduct in-depth studies of all residencies, we designed a three-stage study to identify successful research training programs. The rationale for the study design was to identify what might be considered successful programs by asking residency program directors about research training in their programs and then asking residents about their actual experience in programs that appeared to be making an effort to provide research training. Once relatively successful programs were identified in this way, in-depth interviews could be conducted with the directors of these programs to ascertain how they were able to produce a viable and successful research training experience.

## Stage 1

Figure 1 provides a general summary of the way in which programs were identified before conducting in-depth interviews about their research training capacity. In the study's first stage, the 420 residency programs listed in the AAFP's 1995 *Directory of Family Practice Residency Programs*<sup>7</sup> were targeted for a survey (conducted by a survey research organization), along with eight additional programs that were not listed in the directory. The survey instrument addressed three broad areas: the program's research environment, program features that promote research, and the level of resident research productivity (Table 1). The methods and results of the first-stage survey (n=321, response rate 75%) are reported in detail elsewhere.<sup>9</sup>

Figure 1

### Selection Process for Identifying Family Practice Residencies That Are Active and Successful in Research Training

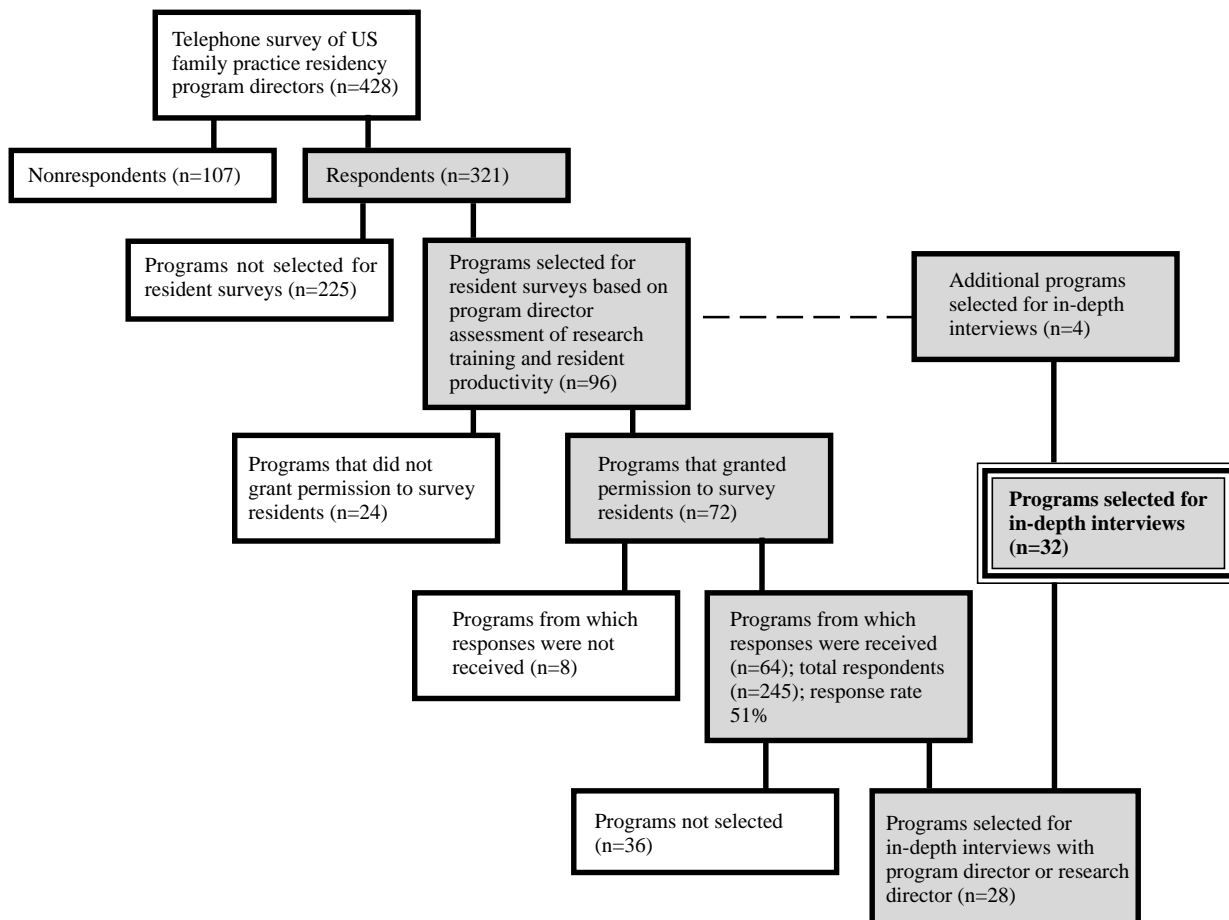


Table 1

## Comparison of Programs Selected for Stage 2 and Those Not Selected\*

	Not Selected (n=225)	Selected (n=96)	All Programs (n=321)
<i>Program's research environment</i>			
We teach basic study designs.	69.3	94.8	77.0
Involving residents in research is a goal.	68.4	93.8	76.0
We actively promote research.	40.4	84.4	53.6
Residents have a favorable attitude toward research.	38.2	82.3	51.4
Faculty have a favorable attitude toward research.	76.0	96.9	82.2
We teach reading and understanding medical literature.	87.6	100.0	91.3
We teach understanding elementary statistics.	48.9	79.2	58.0
We teach performing elementary statistics.	7.6	40.6	17.4
Our graduates can design projects.	20.9	68.8	35.2
<i>Our program has the following research-related features:</i>			
Research assistance**	58.2	72.9	62.6
Dedicated time	33.3	58.3	40.8
Project requirement	20.0	49.0	28.7
Organized curriculum	42.2	79.2	53.3
Research elective†	55.6	71.9	60.4
Research awards	48.0	76.0	56.4
Research director	25.8	52.1	33.6
<i>On a 5-point scale (5=very frequently), how often do residents:</i>			
Present research outside of the program††	Mean (SD) 2.1 (.75)	Mean (SD) 3.2 (.75)	Mean (SD) 2.4 (.91)
Receive competitive grants††	1.4 (.50)	2.0 (.79)	2.1 (.78)
Publish in referenced/non-referenced outlets††	1.9 (.68)	2.7 (.66)	1.6 (.67)

\* Differences significant at the  $P=.001$  level unless otherwise indicated

\*\*  $P=.011$

†  $P=.006$

††  $P=.0001$

## Stage 2

In the study's second stage, the most recent year's graduates from programs seemingly more involved in research training were asked about their research training experience. Programs were identified for this stage using information from the first-stage program director's survey. The nine items addressing the director's assessment of their research environment were combined ( $\alpha=.69$ ) and treated as a summated rating index (range=0–9, mean= 5.4). The three items related to resident research productivity also were combined ( $\alpha=.71$ ) and summed (range=3–13, mean=6.1).

Since the study was designed to identify mechanisms that successful programs use to encourage research activity, placing too much weight on these features initially might bias the study; merely having mechanisms to encourage research is no guarantee of success, and little is known about which mechanisms are more successful than others. Therefore, a decision rule was developed that gave programs enacting six or more features 1 point and all other programs no points. Using this system, each program was assigned a score that was the sum of the two indices,

weighted by the features the program put in place to support research (range=4–23, mean=11.7).

At each stage of the investigation it was necessary to include enough programs to ensure adequate representation without surveying all programs. Thus, around 30% of the programs were included in the second stage, and about 30% of this group participated in the study's final stage. The most recent year's graduates from the 30% of programs (n=96) with the highest scores on the program director's survey index (range=14–23, mean=15.7) were targeted for the second stage's survey, with questions related to their research training experience. Seventy-two programs agreed to participate. Surveys were mailed directly to graduates of 56 programs (n=361). In 16 programs, surveys were mailed to

the residency coordinators (n=118) for distribution. Residents from 64 programs responded after two mailings (n=245, response rate=51%).

The core of the resident survey consisted of nine items that addressed the graduates' research experience (a summary of the items appears in Table 2). Using their graduates' responses, each program was assigned a score reflecting their residents' mean responses across all nine items ( $\alpha=.92$ , range=2.36–4.69, mean=3.57). The six programs with only one response were ruled ineligible. Programs with only two respondents (n=10) were included if the coefficient of variation (CV) (CV=standard deviation divided by the mean times 100) for the two surveys was smaller than the mean CV (16.65) among residencies having more than two respondents (six of the 10 qualified).

Selecting programs for the final stage of the investigation required finding programs in which the directors thought they were providing a good experience and in which residents agreed. Therefore, a single index was created that combined the directors' scores on the assessment of their research environment with their graduates' mean level of agreement with the core

Table 2  
Difference Between Program Graduates, Stage 2 Versus Stage 3

	Stage 2 Mean (SD) (n=143)	Stage 3 Mean (SD) (n=102)	Total Mean (SD) (n=245)
<i>Responses to Likert Scale items (5=agree strongly)</i>			
As a resident:			
I learned the importance of scholarship in FM.*	3.7 (.9)	4.2 (.8)	3.9 (.9)
I learned the role of research in clinical care.*	3.6 (1.0)	4.1 (.9)	3.8 (1.0)
I learned to evaluate research articles.*	3.6 (1.2)	4.1 (1.0)	3.8 (1.1)
I learned the methods used in FM research.*	3.2 (1.2)	3.9 (1.0)	3.4 (1.2)
I learned the research designs used in FM.*	3.2 (1.2)	3.8 (1.1)	3.4 (1.2)
I learned excellent research skills.*	2.8 (1.2)	3.6 (1.1)	3.1 (1.2)
I learned appropriate resources for literature searches.*	3.8 (1.1)	4.2 (1.0)	3.9 (1.1)
I feel comfortable undertaking my own project.*	3.0 (1.2)	3.6 (1.2)	3.2 (1.2)
My research interest increased.*	3.0 (1.2)	3.5 (1.1)	3.2 (1.2)
<i>Characteristics</i>			
	% Yes	% Yes	% Yes
Complete project during training*	60.1	81.0	68.7
Interest in practice-based research	56.1	58.8	57.2
Published anything	35.0	42.4	38.0
Interest in academic position	33.8	35.7	34.6
Present at professional meeting	28.0	37.0	31.7
Published research article**	20.3	32.0	25.1
Involved in research now	15.4	24.0	18.9

n=245

FM—family medicine

\*  $P=.001$ \*\*  $P=.038$ 

survey items (range=8.45–13.56, mean=10.93), and the top 30% of programs were selected for in-depth interviews (n=28). A decision rule was generated to include additional programs into the final stage of the study, even though resident surveys were not available, to address a concern that there might be programs that provide excellent training in research but were not able to provide resident surveys. Four additional programs were included because they had a research requirement in the AAFP directory (publicized commitment to research) and a perfect score on the director's assessment of their program's research environment (director's commitment to research). One program director declined to participate, and the study's final stage included 31 interviews.

### Stage 3

The in-depth interviews of the third stage primarily consisted of a structured interview schedule with open-ended questions. It was conducted in March and April 1996. Interviews ranged from approximately 20 to nearly 90 minutes, had an average length of approximately 35 minutes, and yielded 203 pages of transcribed narrative data. The analysis presented here is based on responses to four questions that asked the directors to describe 1) their research training curriculum, 2) the process by which they began provid-

ing research training in their program, 3) how they manage time constraints, and 4) how they provide faculty research training.

### Data Analysis

The data were analyzed by the primary investigator and an experienced research assistant, using a two-step process.<sup>8</sup> Each investigator coded the transcript data independently and derived a set of categories corresponding to specific ways in which residency programs were able to create and sustain a successful research environment. Then, specific bits of transcript data were assigned to one of the categories.

During each step of the analysis, the two investigators compared codings and assignments, respectively, for validation and resolution of different interpretations.

The analysis produced a number of features or themes that were common to many or most programs and suggest possible guidelines for creating and sustaining a successful research program. All quantitative data were analyzed using SAS<sup>®</sup> version 6.1. Differences between categorical variables were evaluated by chi-square tests, and differences between continuous variables were tested using Student's *t* test.

### Results

Stage 1 survey results indicate that in the more research-oriented programs, residents are likely to receive more research training, have a better attitude toward research, and be more productive than those in less research-oriented programs (Table 1). Additionally, although research-related program features only were used indirectly in selecting programs for stage 2, programs not selected for the second stage were significantly less likely to have the respective features asked about in the survey.

Graduates from programs identified in the first stage (n=245) indicated that as residents they learned about the importance and role of research in family practice, and they tended to agree that they learned excellent research skills (Table 2). Additionally, more than two thirds (68.7%) had completed a project, and almost six out of 10 (57.2%) indicated having an

interest in practice-based research. A comparison between graduates selected for the study's final stage and those who were not selected reveals that the former were more likely to have completed a research project while a resident (81% versus 60.1%,  $P=.001$ ) and to have published a research article (32% versus 20.3%,  $P=.038$ ).

The programs selected to participate in the final in-depth interview stage of the investigation varied in size, location, age, and other features related to their training environment and setting (Table 3). As a group, however, military programs tended to be overrepresented when compared to all other programs (16.1% of military programs were included versus 2.3% of other programs) and community programs—either university administered or unaffiliated—were underrepresented when compared to all others (6.5% versus 23.9%).

Program directors who participated in the final stage of the study were asked a number of fixed-response and open-ended questions. Generally, all of the programs assist residents in various ways by teaching basic research methods, providing funds for resident research, and having a structured research curriculum. Responses to the four open-ended questions indicated much overlap in the characteristics perceived to be important for creating a successful research environment. In general, these characteristics can be considered either virtually unanimous characteristics or extremely important characteristics (Table 4).

Table 3

### Comparison of Programs Selected for In-depth Interviews and All Other Programs

Program features from 1995 <i>Directory of Family Practice Residency Programs</i> <sup>7</sup>	Stage 3	All Other
	Programs (n=31) %	Programs (n=389) %
<i>Survey Item</i>		
Residency program location		
Suburban	45.2	36.4
Urban	38.7	38.3
Inner city	12.9	15.0
Rural	3.2	10.3
Program type*		
Community hospital, univ. affiliated	61.3	59.7
University hospital	16.1	14.1
Military hospital	16.1	2.3
Community hospital, univ. administered	6.5	18.5
Community hospital, unaffiliated with univ.	—	5.4
Research*		
Required	58.1	16.7
Not required	41.9	83.3
	<i>Mean</i>	<i>Mean</i>
# of positions within program	22	22
Program age (year of initial approval)	1976	1977

\*  $P=.001$

Table 4

### In-depth Interviews From Programs Active and Successful in Research Training

<i>Fixed response items</i>	<i>% Yes</i>
• Is there assistance available to help residents identify suitable research topics?	100.0
• Are computers and office space available for residents for research purposes?	100.0
• Is there a forum for residents to present research in your program?	96.8
• Are residents taught to conduct a computerized literature search?	93.5
• Do you offer conferences and seminars related to the goals and methods of research?	90.3
• Are residents introduced to research concepts early in their training, during their first year?	87.1
• Is there funding available to support resident research?	87.1
• What best describes the curriculum you use for teaching residents about research; is it:	
• Unstructured	6.5
• Loosely structured	32.3
• Well structured	61.3
<i>Virtually unanimous characteristics of successful research environments</i>	
• Program director support	
• Time	
• Faculty involvement	
• Didactic curriculum/journal club	
• Professional support and guidance	
• Forums/opportunities for presenting	
<i>Extremely important characteristics of successful research environments</i>	
• Start early	
• Integrative curriculum	
• Required projects	
• Define research broadly	
• Clinically applied research	
• Evidence-based medicine	
• Visibility	
• Research committee	

*Virtually Unanimous Characteristics of Successful Research Environments*

**Program Director Support/Committed Faculty Member.** Most of those interviewed indicated that a successful research program requires the enthusiastic support of the program director. In many programs, one faculty member was often the catalyst for encouraging others, including the program director, to take the first steps toward research. The need for a strong proponent or champion was articulated most succinctly by the director who noted that when it comes to producing a successful research environment, "No doc, no deal."

**Time.** Most directors mentioned the lack of time as the greatest obstacle to providing research training. As one respondent noted, "It is difficult for a research project to get born, grow up, and die within a 4-week period." Strategies used to address the time problem ranged from providing protected half days monthly on an ad hoc or routine basis (in at least one program, residents do not carry their beepers during this time) to providing as many as 4 months of research time during 3 years or offering a research elective. Other programs reduce the amount of time needed to conduct research by providing research assistance or by using a group project format to distribute the workload among two or three residents.

**Faculty Involvement.** According to the program directors, participation of faculty in research activities is necessary for creating a successful research environment. Many programs attributed their success to attrition of faculty who had no research interests and replacement with fellowship-trained faculty. Others received faculty development grant money and trained their own faculty or encouraged faculty to participate in faculty development workshops. Faculty involvement was seen as essential for role modeling and mentoring. As one director noted, "It is difficult to convince residents that research is valuable if their physician role models are not involved in research."

**Curriculum/Journal Club.** In most programs, critical evaluation skills and research methods are taught in a journal club setting. Although most favored a single journal club, others promoted research discussion by making journal club smaller and more interactive or by having multiple journal clubs divided by resident year or clinical team membership. Regardless of journal club type, the first several meetings of the year usually focus on research skills and knowledge. Many of those interviewed relied on the McMaster series on reading medical literature that was published in the early 1980s, the more current series published in the *Journal of the American Medical Association* in the 1990s, or materials from the Michigan State University Office of Medical Education, Research, and Development.

**Easily Accessible Research Professional.** Although some programs designate a physician faculty member to be the research director and provide dedicated time to that person, in most programs, the research director was not a physician. The research director typically has a social science, behavioral science, or epidemiology background. In programs with limited resources, some have found that having a research assistant, even one without extensive research experience, can be valuable if they have some research training and good communication skills.

**Opportunities for Presenting.** Almost all of the programs provide a research forum, usually in the form of a spring research day. Most felt that a forum provides an endpoint for the research experience while allowing residents to share the results of their investigations with colleagues. Forums are sometimes coordinated within the hospital setting or among several family medicine programs.

Many directors noted that when residents present research at professional meetings, it demonstrates to them that what they produce is valuable to others. And, as one director noted, "The experience of traveling to a nice city, staying in a nice hotel, and providing a presentation or poster to a national audience is itself an important incentive to participate in research."

*Extremely Important Characteristics of Successful Research Environments*

**Start Early.** There was general agreement that it is possible to create a culture of expectations about research by informing residents about the research requirements when they apply to the residency program, providing research training as part of orientation, and providing training during their 3 years of residency.

**Integrated Research Curriculum.** In most of the programs, research activity and requirements tended to evolve over several years and were frequently integrated with other rotations and activities. Discussions of research are sometimes incorporated into morning report or community medicine and family medicine rotations.

**Require a Project.** Most of those interviewed felt that a research requirement demonstrates to residents the importance of research and can motivate those not interested in research. The few programs without a requirement relied on the example of the faculty to get residents involved.

**Define Research Broadly.** Most programs consider research to be case reports, literature reviews, educational interventions, the creation of patient education materials, community projects, chart audits, and other types of population-based studies.

**Clinically Applied Research/Evidence-based Medicine.** Respondents endorsed the need for a research curriculum to promote good clinical practice and good research by emphasizing to residents that understanding research will improve patient care. Most tried to develop a questioning attitude among residents by teaching evidence-based medicine and constantly asking residents, "How do you know this works?"

**Visibility/Bulletin Boards.** There was general consensus that the successful research activities of a program's faculty and residents can be motivational, and many programs use a bulletin board for keeping research accomplishments visible, tracking the progress of individual projects, or sharing general research-related information.

**Research Committee.** Since research projects develop over time, many programs monitor residents' progress with a research committee that meets regularly, by having the research director or program director maintain contact with residents about their projects, or through advisors during periodic evaluations.

## Discussion

By using a three-stage study design, it was possible to identify programs that have created successful research environments, interview those responsible for the environments and those who have received training in these environments, and identify features the programs have in common. Based on the findings of the investigation, we suggest that there are three levels of development characterizing research in family practice residencies: relatively undeveloped, developing, or relatively developed.

The research environments in programs in the latter two levels reflect what is possible in family practice programs. In the developing and the developed programs, 93.8% of the directors interviewed feel that involving residents in research is a program goal. Similarly, 84.4% of the directors feel that their program actively promotes research, and 82.3% feel that their residents have a favorable attitude toward research.

In an earlier article, we concluded that research seemed to be evolving in family practice residencies.<sup>9</sup> Compared to an earlier study,<sup>10</sup> a greater percentage of residency programs provide course work for their residents related to research (16% versus 60.4%) and research assistance for residents (10% versus 62.6%). When combined with the present findings, it seems reasonable to conclude that not only is research evolving but that some programs are already relatively evolved.

The findings of this study suggest two recommendations about research activity in family practice residencies. First, if programs expect to be successful in

research and scholarship, they must make research a priority. Minimally, success requires the commitment of the program director, time for research, faculty involvement, professional support, and presentation opportunities. Second, family practice as a specialty probably would benefit by developing a formal means for facilitating communication among programs interested in resident research activity. Regardless of level of development, information about successful strategies would be of value to any residency program that holds research productivity as a goal.

Increased communication about research will facilitate developing a broader base of physicians who understand the importance of scholarly activity to the future of the specialty. Additionally, by providing more guidance related to research training, it will be possible to involve more family physicians in the research process. Finally, addressing these concerns should allow the discipline to more adequately address the growing need for primary care researchers.<sup>11,12</sup>

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