Building Capacity for Research in Family Medicine:
Is the Blueprint Faulty?

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Background and Objectives: This study compared the training programs and career paths of family medicine graduates in the National Research Service Award (NRSA) Program for Research in Primary Medical Care with general internal medicine and general pediatric peers. Methods: We mailed a survey to NRSA fellows graduating from 23 programs nationally between 1988–1997. Personal characteristics, fellowship experience, current professional activities, and academic productivity were compared among primary care disciplines. Results: Of 215 NRSA participants, 146 (68%) completed the survey. Of the 131 primary care respondents, 25% were family physicians. During the fellowship, family physician trainees spent significantly less time in hands-on research activity (32±12%) than internists and pediatricians (39±17%). Family physician graduates also had less post-fellowship mentoring and were less likely to hold clinician/researcher faculty positions in academic centers. Family physician faculty spent far more time on clinical work and less time on research. Only 12.5% of family physician fellowship graduates published one or more articles per year, compared with 36.5% of their peers, and 30% had published nothing since graduation. Conclusions: Family physician graduates of this research training program did not achieve academic success comparable to their peers. Family physicians need more protected time for conducting research in their faculty positions and more sustained mentorship.

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Over the past 30 years, primary care has had to struggle for academic recognition.1-2 Each of the major primary care disciplines (family medicine, general pediatrics, general internal medicine) has developed its own traditions of research, faculty development, and research capacity building. Family medicine, as the “youngest” primary care specialty, has emphasized training clinicians to deliver comprehensive health care services to all types of populations in all geographic locations. This emphasis on service and the lack of a well-articulated unique core of knowledge in the discipline have limited the development of productive researchers and research agendas.3-5

Recent initiatives to create research centers of excellence by the American Academy of Family Physicians supplemented the work of established programs sponsored by the Health Resources and Services Administration (HRSA), the Agency for Healthcare Research and Quality (AHRQ), and the Robert Wood Johnson Foundation. The Institutional National Research Service Award (NRSA) sponsored by the HRSA is the only federal program devoted exclusively to the development of primary care researchers.3-7

Few studies have investigated the career trajectory and productivity of research fellows in primary care or other clinical disciplines.8-13 We conducted a national survey of participants in the NRSA fellowship program in primary care research between 1988–1997, and in this report, we compare the data regarding NRSA fellowship-trained family physicians with that of general pediatricians and general internists, the two other major groups trained through the NRSA program.14

For this analysis, two questions seemed most pertinent. First, were the characteristics of the research fellowship programs and the family medicine fellows themselves on a par with those of general pediatrics and general internal medicine? Second, were there
specific issues, in terms of training and career trajectory, that differentiated family physicians from the other primary care disciplines?

Description of the NRSA Program

In 1988, 10 institutional NRSA programs within academic centers in the United States were funded. In 1993–1994, 23 awards were made, eight of which were renewals for institutions in the original funding cycle and 15 of which were to new institutions. In 1998, 28 awards were made for a third 5-year cycle, 20 to existing programs, and eight to new institutions.

Over this period of time, most programs enrolled two or three fellows per year for a median training of 2 years. Programs either were confined to one discipline or drew fellows from all of the three primary care disciplines (family medicine, general pediatrics, or general internal medicine). Occasionally, fellows from other disciplines (such as dentistry, nursing, obstetrics-gynecology, psychiatry) were accepted.

Programs generally encourage the completion of an advanced degree, such as a master’s degree in public health (MPH) and provide course work in epidemiology, biostatistics, health services research, and the medical social sciences or humanities. Some clinical work is allowed.12,14

Methods

Subjects

All participants who received NRSA support between July 1988 and June 1997 were eligible to receive the survey. Individuals who received support after June 30, 1997, were excluded because they were currently in training or lacked sufficient follow-up time for reasonable outcome assessment. We identified program participants from HRSA and from fellowship program directors. HRSA data were also used to compare survey respondents and nonrespondents. We located program participants using HRSA data, information from program directors, the directories of professional membership organizations, MEDLINE searches for citations authored by participants, and directories of academic institutions. There were two follow-up mailings at intervals of 3 weeks, followed by phone or e-mail contacts with individuals who had not responded. Individuals who did not return surveys were categorized as nonrespondents.

Survey Instrument

We developed the self-administered questionnaire for NRSA program graduates to collect information on demographics (gender, race/ethnicity, and age) and the clinical background of the trainees. Most questionnaire items were developed for this survey, although some were adapted from prior research.11,15 Respondents reported the characteristics of their training experience, time allocation to different activities, and their evaluation of the program. To assess their model of research training, we characterized it as either an “apprenticeship” under the direction of a senior researcher, an “early independence” strategy in which they defined their own research area with the guidance of identified faculty advisors, or a combination of these approaches.1,14,16 We asked the respondents if they had a mentor during training, if they had a mentor who was “particularly influential” in their development, and whether they continued to receive mentorship from that individual at the time of the survey. Also, we asked them to give details of their current position and their current involvement in research.

As we were assessing the productivity of young researchers, we considered what might be regarded as reasonable outcomes after graduation from the NRSA program. Because of the complexity and high costs entailed, we did not evaluate and measure the quality of individual publications and research grants or the relevance and importance of every graduated fellow’s work. Instead, we defined outcomes of NRSA training in three measurable ways: obtaining a full-time academic position in which they had at least 40% time allotted to research (which we and others have viewed as the minimum to ensure consistent success in publication and funding), obtaining at least one extramural grant as a principal investigator, and publishing one or more scientific articles every year.13 We categorized the current positions of program graduates into three groups: (1) individuals who were full-time faculty with 40% or more research effort, (2) individuals who were full-time faculty clinician-educators, and (3) individuals who were not full-time faculty members.12,14 We asked for the number of first author papers and other, coauthored publications. We validated responses by checking CVs and citation databases. Using the same methods, we obtained details of up to a maximum of three grants from each respondent. Further details of the methodology have been reported elsewhere.13 The mail survey was approved by the University of Colorado Multiple Institution Review Board and initiated in June 1998.

Data Analysis

For the analyses reported here, NRSA participants who were not family physicians, general pediatricians, or general internists were excluded. Comparisons among the three career groups and between family medicine fellows and the combined data of pediatrics and internal medicine were performed using chi-square tests for categorical or ordinal variables and the non-parametric Wilcoxon rank-sum or Kruskall-Wallis tests for continuous variables, because many of these variables were not normally distributed. In the tables, we report comparisons among the three disciplines, while
two-group comparisons between family physicians and the combined group of general pediatricians and general internists are reported in the text, when they amplify important distinctions between family physicians and the two other disciplines.

To assess whether being a family physician was an independent predictor of publishing one or more papers per year, or of receiving a grant as a principal investigator, we conducted bivariate analyses to identify characteristics of the fellows and their training that predicted those outcomes. All variables significant on bivariate analysis at \( P<.10 \) were entered into a logistic regression model to identify independent predictors of those outcomes. None of the variables selected for these models were sufficiently collinear to require removal of a variable from the analysis. The variable of family medicine was also forced into the model even if it did not meet the \( P \) value criterion for inclusion. All analyses were performed using the Statistical Analysis System (SAS) Version 6.12® (SAS Institute, Cary, NC).

Results

Of the 215 fellows who participated in the NRSA program between July 1988 and June 1997, 146 (68%) completed the survey, 63 (29%) did not respond, and six (3%) could not be contacted. These 146 respondents represented 23 of the 25 NRSA programs funded prior to 1997. Survey respondents and nonrespondents did not differ in age, race, ethnicity, clinical, or the number of years since graduation from the program (3.9±2.3 years for respondents and 3.8±2.4 years for nonrespondents). The response rate was 63% for male program graduates and 75% for women (\( P=0.06 \)). Of these 146 respondents, the 15 who were not family physicians, general pediatricians, or general internists were excluded from subsequent analyses.

On average, the 131 primary care respondents had completed their NRSA training 4 years prior to the survey. Fifty-three (40%) of respondents were general internists, 45 (34%) were general pediatricians, and 33 (25%) were family physicians (Table 1). More than 57% of fellows in family medicine and internal medicine were male, while 62% of pediatric fellows were female (\( P=0.10 \)). Forty-six percent of family physicians trained in a program confined to their own discipline, much the same distribution as the other disciplines (\( P=0.56 \)).

The Process of Research Training

Characteristics of the training process are shown in Table 1. A majority of family physicians and internists (79% and 83%, respectively) trained in programs with funding in both cycles of the NRSA grant, compared with 51% of pediatricians (\( P=0.001 \)).

Family medicine graduates spent significantly less time in research during their training. Over the 2-year training period, aside from coursework, clinical practice, and teaching, family medicine NRSA fellows allocated 32%±12% of their time to hands-on research activity, compared with 39%±17% for general internal medicine and pediatrics fellows (\( P=0.02 \)).

Early independence in conducting research was the dominant training model for pediatrics (75.6%) and

<table>
<thead>
<tr>
<th>Variable</th>
<th>Family Medicine</th>
<th>General Pediatrics</th>
<th>General Internal Medicine</th>
<th>PValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years since completed fellowship</td>
<td>4.1±2.6</td>
<td>3.4±1.8</td>
<td>4.1±2.6</td>
<td>.056</td>
</tr>
<tr>
<td>Trained in program funded for both NRSA cycles (%)</td>
<td>78.8</td>
<td>51.1</td>
<td>83.0</td>
<td>.001</td>
</tr>
<tr>
<td>Proportion of fellowship time spent in: (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coursework</td>
<td>32±16</td>
<td>29±18</td>
<td>27±16</td>
<td>.40</td>
</tr>
<tr>
<td>Clinical practice</td>
<td>1±13</td>
<td>20±15</td>
<td>17±11</td>
<td>.71</td>
</tr>
<tr>
<td>Clinical or research teaching</td>
<td>11±10</td>
<td>12±9</td>
<td>7±6</td>
<td>.03</td>
</tr>
<tr>
<td>Conducting research</td>
<td>32±12</td>
<td>33±15</td>
<td>44±18</td>
<td>.0003</td>
</tr>
<tr>
<td>Other activities</td>
<td>5±5</td>
<td>5±5</td>
<td>4±5</td>
<td>.37</td>
</tr>
<tr>
<td>Total years of hands-on research during fellowship</td>
<td>.7±.3</td>
<td>.8±.5</td>
<td>1.0±.5</td>
<td>.004</td>
</tr>
<tr>
<td>Feels that fellowship provided excellent preparation for current job (%)</td>
<td>24.3</td>
<td>42.2</td>
<td>39.6</td>
<td>.22</td>
</tr>
<tr>
<td>Training model:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apprenticeship</td>
<td>9.7</td>
<td>13.3</td>
<td>17.0</td>
<td>.09</td>
</tr>
<tr>
<td>Early independence</td>
<td>67.8</td>
<td>75.6</td>
<td>50.9</td>
<td></td>
</tr>
<tr>
<td>Combination</td>
<td>22.6</td>
<td>11.1</td>
<td>32.1</td>
<td></td>
</tr>
<tr>
<td>Wrote extramural grant during fellowship (%)</td>
<td>24.2</td>
<td>37.8</td>
<td>37.7</td>
<td>.37</td>
</tr>
<tr>
<td>Had a mentor during fellowship (%)</td>
<td>87.9</td>
<td>93.3</td>
<td>94.2</td>
<td>.54</td>
</tr>
<tr>
<td>Had a “particularly influential” mentor during fellowship (%)</td>
<td>66.7</td>
<td>69.1</td>
<td>76.0</td>
<td>.61</td>
</tr>
<tr>
<td>Remains affiliated with training site (%)</td>
<td>45.5</td>
<td>60.0</td>
<td>56.6</td>
<td>.42</td>
</tr>
</tbody>
</table>

NRSA—National Research Service Award
family medicine (67.7%). There was a trend for more internal medicine fellows to conduct research only in the apprenticeship model (17%) or in a combination of both the apprenticeship and independent models (32.1%) \( (P=0.09) \).

Compared to internists and pediatricians (73.5%), more family physicians (90.9%) \( (P=0.04) \) completed an advanced degree (usually an MPH), but only 24.2% wrote an extramural grant during the fellowship, compared with 37.7% of internists and pediatricians \( (P=0.16) \). More than 75% of graduates from all disciplines reported having an influential mentor during the fellowship, but family physicians were much less likely to continue receiving mentorship from this individual after graduating from the NRSA program (30.3% versus 52.6%, \( P=0.03 \)).

A majority of internal medicine fellows (60.4%) rated the overall quality of their NRSA fellowship training as excellent, compared with 40% of family physicians and pediatricians \( (P=0.07) \). There were no significant differences between disciplines in quality rating of the specific components of training (Table 2). Even after controlling for single versus multidisciplinary programs, multivariate analysis showed no significant differences in the perceived quality and training characteristics among family medicine, general pediatrics, and general internal medicine.

### Research Training Outcomes

The current positions of NRSA graduates from the three primary care disciplines differed in several important ways (Table 2). Family physicians were less likely to be in full-time faculty positions than general internal medicine or pediatrics physicians \( (P=0.06) \) or to follow a clinician/researcher career path \( (P=0.04) \). In contrast, they were more likely to be clinician-educators or in a nonacademic position. These findings are validated by current employer data, which show that family physicians were less likely than their pediatric and internist peers \( (P=0.01) \) to be employed in health professions schools \( (P=0.03) \) and more likely to work for nonprofit organizations, such as community health centers.

Although faculty respondents from all three disciplines reported almost exactly the same numbers of hours per week of work, there was a striking difference in the proportional commitment to research and clinical teaching. General internists spent a far greater proportion of time on research activity (42±29%), compared with general pediatricians (26±23%) or family physicians (18±24%) \( (P=0.0004) \). Family physicians spent 50±28% of their time in clinical work, compared with 41±26% for general pediatricians and only 26±23% for general internists \( (P=<0.0001) \).

A comparison of academic productivity since graduation (Table 3) shows that family medicine fellows published a mean of .6 papers/year, a rate similar to pediatrics (.7/year) but significantly less than internal medicine (1.0/year, \( P=0.03) \). Only 12.5% of family medicine NRSA graduates published more than one article per year, compared with 36.5% of the other graduates \( (P=0.01) \), and 30.3% of family medicine fellows reported no publications since graduation. However, there were no significant differences in the proportion of graduates reporting being a principal investigator on at least one grant from any source.

### Table 2

**Outcomes of Research Training: Comparison of Current Job Characteristics Among Primary Care Disciplines**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Family Medicine ( (n=33) )</th>
<th>General Pediatrics ( (n=45) )</th>
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<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career path</td>
<td></td>
<td></td>
<td></td>
<td>.05**</td>
</tr>
<tr>
<td>Faculty clinician/researcher (%)</td>
<td>18.2</td>
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<td>20.8</td>
<td></td>
</tr>
<tr>
<td>Employer*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health professions school</td>
<td>51.5</td>
<td>77.3</td>
<td>67.9</td>
<td>.06</td>
</tr>
<tr>
<td>Private nonprofit organization</td>
<td>30.3</td>
<td>6.8</td>
<td>15.1</td>
<td>.02</td>
</tr>
<tr>
<td>Government agency</td>
<td>12.1</td>
<td>15.9</td>
<td>15.1</td>
<td>.89</td>
</tr>
<tr>
<td>Private medical practice</td>
<td>12.1</td>
<td>4.6</td>
<td>3.8</td>
<td>.34</td>
</tr>
<tr>
<td>Current institution has excellent commitment to primary care (%)</td>
<td>18.5</td>
<td>23.5</td>
<td>25.6</td>
<td>.79</td>
</tr>
<tr>
<td>Very satisfied with current job (%)</td>
<td>24.2</td>
<td>27.3</td>
<td>26.9</td>
<td>.95</td>
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* Respondents could make more than one response.
** \( P \) value reported for full-time versus other faculty status.

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<td>27.3</td>
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Multivariate analysis of the predictors of academic productivity in the family physician NRSA graduates (Table 4) revealed that being a male, training in a program funded in both cycles, having an influential mentor, and spending more than 40% of time conducting research during the fellowship were significant factors associated with publishing more than one research paper a year. Being a family physician was a strong predictor of publishing less than one paper a year (odds ratio [OR]=3 (95% confidence interval [CI]=1–1.0), after adjusting for these other factors.

Multivariate analysis of the fellowship characteristics associated with obtaining grants (Table 5) showed that being older (>40 years), writing a grant during the fellowship, having an influential mentor, and spending more than 40% of time conducting research in the fellowship were bivariate predictors for all of the primary care NRSA graduates. Older age and influential mentorship remained significant on multivariate analysis, but there were no differences between family medicine and the other two disciplines in this analysis (OR for family medicine=9, 95% CI=4–2.2).

None of the associations reported in Tables 4 or 5 changed substantially when the number of years since completion of the program was added to the model.

Table 3

Outcomes of Research Training: Comparison of Academic Productivity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Family Medicine (n=33)</th>
<th>General Pediatrics (n=45)</th>
<th>General Internal Medicine (n=53)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of papers published per year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Published more than one paper per year (%)</td>
<td>12.5</td>
<td>28.9</td>
<td>43.1</td>
<td>.01</td>
</tr>
<tr>
<td>Published no papers at any time (%)</td>
<td>30.3</td>
<td>22.2</td>
<td>13.2</td>
<td>.15</td>
</tr>
<tr>
<td>Has a grant from any funding source as principal investigator (%)</td>
<td>42.4</td>
<td>37.8</td>
<td>51.9</td>
<td>.36</td>
</tr>
<tr>
<td>Has a federal grant as principal investigator</td>
<td>24.2</td>
<td>17.8</td>
<td>32.7</td>
<td>.24</td>
</tr>
</tbody>
</table>

Discussion

Previously published results from this study and the findings reported here provide a detailed inspection of the training components of the NRSA Primary Care Research Fellowship over a 9-year period, with a particular emphasis on the self-assessments by family physician graduates of the quality of their training and their academic outcomes.14,15

Graduating NRSA fellows who are family physicians were less academically productive than their generalist peers and showed career trajectories that were dissonant with their research training. The reasons for this disparity are unclear, but the data offer some clues. Compared to the other disciplines, fewer family physician

Table 4

Bivariate and Multivariate Associations Between Being a Family Physician and Publishing One or More Papers Per Year

<table>
<thead>
<tr>
<th>Variable</th>
<th>≥One Paper/Year</th>
<th>&lt;One Paper/Year</th>
<th>P Value</th>
<th>Bivariate OR (95% CI)</th>
<th>Multivariate OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trained in program funded for both cycles</td>
<td>87.2</td>
<td>62.9</td>
<td>.006</td>
<td>3.6 (1.5–8.8)</td>
<td>2.7 (1.8–9.0)</td>
</tr>
<tr>
<td>Had an influential mentor (%)</td>
<td>88.6</td>
<td>64.4</td>
<td>.008</td>
<td>4.7 (1.5–14.3)</td>
<td>4.0 (1.1–14.1)</td>
</tr>
<tr>
<td>Spent &gt;40% of fellowship time conducting research</td>
<td>71.8</td>
<td>39.5</td>
<td>.0007</td>
<td>4.4 (2.0–9.5)</td>
<td>2.9 (1.1–7.7)</td>
</tr>
<tr>
<td>Family physician versus GIM/GP (%)</td>
<td>10.3</td>
<td>31.5</td>
<td>.01</td>
<td>3 (1.1–8)</td>
<td>.3 (1.1–1.0)</td>
</tr>
</tbody>
</table>

OR—odds ratio
CI—confidence interval
GIM/GP—general internal medicine/general pediatrics

Three individuals had no data from survey or CV about number of publications. C index for model=.82
fellows had training and experience in grant writing, fewer spent more than 40% time actually conducting research, and fewer had continuing support from their mentor after graduating.

Overall, the proportion of NRSA fellowship graduates entering academic medicine was comparable to that in the 1980s in two Robert Wood Johnson Foundation-funded fellowship programs in which 58% and 66% of program alumni entered full-time academic positions.\(^1\)\(^2\) However, significantly fewer family physicians entered full-time faculty positions or ended up in academic institutions than did general pediatricians and general internists. And, those family medicine positions were of a different type, emphasizing clinical practice, teaching, and administration, rather than research. This could be explained by a lack of formal research positions in family medicine or by the pressure of heavy demands for clinical time by family medicine departments with limited resources. In addition, the departmental leadership and other faculty might not understand or endorse the time and resources for research activities. Finally, the fellowship graduates might also be more comfortable choosing clinician-teacher or community-based positions rather than pursuing research in a difficult environment, where like-minded colleagues might be scarce. So, despite receiving little training in administration and clinical teaching during the research fellowship, many NRSA family medicine fellows became clinician-teachers. This type of mismatch of training and subsequent careers in primary care has been reported elsewhere.\(^1\)\(^3\)

These data suggest that an important resource, family physicians intensively trained in research, is being squandered by placement into academic or clinical positions that are unlikely to support the development of productive research careers. This study was not designed to determine whether this problem is an active or an unintended choice of program directors, department chairs, or the fellows themselves. However, the consequences are damaging to the attempts of family medicine as a discipline to establish its academic base and to build a core of accomplished researchers.

In terms of publication productivity, there are few established benchmarks against which to measure generalist researcher performance. For example, these NRSA program graduates published a median of three papers over a 4-year period, compared with a median of 8.5 papers over a 14-year period reported for PhDs who had received predoctoral or postdoctoral NRSA support in basic science training programs.\(^7\) Of concern, 30% of family physician NRSA fellows published no articles after graduation from the fellowship program, a finding that might be linked to inadequate time available in their work and lack of sustained mentoring after graduation.

These data are concordant with reported evidence of a 34% decline, over the past 8 years, in publication rates of family medicine research.\(^17\) Recent commentators suggest that the discipline still seems uncertain about whether research is really a core value of family medicine.\(^18\)

### Table 5

Bivariate and Multivariate Associations Between Being a Family Physician and Having Any Grant as a Principal Investigator

<table>
<thead>
<tr>
<th>Variable</th>
<th>Has Grant As PI (n=58)</th>
<th>No Grant As PI (n=72)</th>
<th>P Value</th>
<th>Bivariate OR (95% CI)</th>
<th>Multivariate OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt;40 years (%)</td>
<td>43.1</td>
<td>27.8</td>
<td>.07</td>
<td>1.5 (.8–3.0)</td>
<td>2.5 (1.1–5.9)</td>
</tr>
<tr>
<td>Wrote grant for extramural funding during fellowship (%)</td>
<td>41.4</td>
<td>27.8</td>
<td>.10</td>
<td>2.0 (1.0–3.9)</td>
<td>2.0 (.9–4.6)</td>
</tr>
<tr>
<td>Had influential mentor (%)</td>
<td>83.9</td>
<td>60.9</td>
<td>.005</td>
<td>3.4 (1.4–7.8)</td>
<td>3.1 (1.3–7.6)</td>
</tr>
<tr>
<td>Spent &gt; 40% of fellowship time conducting research</td>
<td>58.9</td>
<td>44.4</td>
<td>.10</td>
<td>1.6 (.8–3.2)</td>
<td>1.6 (.7–3.4)</td>
</tr>
<tr>
<td>Family physician (versus GIM/GP) (%)</td>
<td>24.1</td>
<td>26.4</td>
<td>.77</td>
<td>.9 (.4–2.0)</td>
<td>.9 (.4–2.2)</td>
</tr>
</tbody>
</table>

OR—odds ratio
CI—confidence interval
GIM/GP—general internal medicine/general pediatrics

One individual had no data on grants.
C index for model=.70
Limitations

Limitations of the study include a moderate response rate (68%), a small number of respondents that reduced the statistical power of the study, relatively short career follow-up that may particularly bias the assessment of academic outcomes in women, and lack of information about graduates’ personal career goals and motivation. Our data would have been greatly enriched if we had been able to study the quality of the research products and document perspectives from the respondents through interviews. This might be feasible and desirable in another follow-up study. Finally, because of the observational nature of this study, we could document the associations between components of fellowship training and subsequent outcomes but cannot conclude that these associations are causal.

Implications and Conclusions

Although we were unable to factor into this analysis the important personal characteristics and career goals of NRSA graduates, evidence from the more successful internal medicine programs suggest that several key strategies need more emphasis in the blueprint to build research capacity in family medicine. Within research fellowship training, we need to assure the presence and active involvement of influential mentors during and after graduation to help complete research projects and publications, to emphasize practical research experience rather than advanced degree coursework, and to place a higher priority on the preparation of grant applications during the fellowship. The blueprint for building a better pathway to research capacity and productivity in family medicine must also include protected time and support for young faculty members from the leadership of departments of family medicine.19

The culture of family medicine creates substantial direct and indirect pressure for faculty members to be generalists in clinical and academic spheres—and the experiences of the NRSA family physician graduates highlight this important issue. For family medicine to thrive as an academic discipline, it is time to reexamine our current blueprint for developing and supporting researchers.

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