

Effects of Funding Family Physicians for Advanced Research Training

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Background and Objectives: Beginning in 1998, the American Academy of Family Physicians (AAFP) initiated a 4-year funded Advanced Research Training (ART) program to increase the number of family medicine researchers in the United States. This study describes the extent to which ART recipients achieved the objectives they had set for themselves, barriers to achieving their objectives, and changes in their research capacity as reported by themselves and as observed by colleagues. **Methods:** We gathered data by examining 28 awardees' applications and semiannual reports, questionnaires sent to awardees, and reports from awardees' colleagues. **Results:** Only 13 recipients (48%) filed final reports. For awardees in the first two cohorts, the percentage of awardees who achieved their objectives ranged from 50% to 76%. Having only 2 years of funding, lacking sufficient protected time, and inadequate resources were cited as barriers to research productivity. Awardees' colleagues reported that awardees have improved research skills, improved grant and publication writing ability, and greater leadership skills. **Conclusions:** Fewer than half of awardees submitted reports at the end of the project to report on their achievements. Of those who did, research capacity was strengthened as a result of receiving an ART award. Barriers may have prevented the majority of awardees from achieving their objectives and completing their reports.

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Increasing research activity has been a recognized need for the specialty of family medicine.¹⁻⁴ Beginning in 1998, the American Academy of Family Physicians (AAFP) initiated a funded program with the explicit goal of increasing the mass of family medicine researchers. Twenty-eight family physicians each received a 2-year Advanced Research Training (ART) Grant to be used for improving skills in research methods. The grant competition closed after the fourth annual cycle of funding began in April 2001.

Others have shown that providing funding for personal research development and protected research time are effective ways to improve research productivity,⁵⁻⁷ especially if the research is done in a research-conducive environment.⁸ The present study describes outcomes of providing direct funding to individual family physicians through the ART program for training to improve research skills. To measure outcomes, we examined (1) the extent to which recipients achieved goals and objectives they had set for themselves in their ART Grant application, (2) the self-reported effect

that the grant had on awardees and their departments, (3) the changes in awardees' research expertise and productivity as reported by applicants' colleagues, and (4) the barriers that awardees reported that may have prevented them from achieving their objectives.

Methods

This study was approved by the University of Southern California Institutional Review Board.

The AAFP awarded 2-year ART grants to 28 family physicians over a 4-year period (four cohort cycles). In cycles 1-3, 24 grants were awarded (eight each year) to individuals selected from a pool of 295 applicants. In cycle 4, four grants were awarded from a pool of 69 applicants. The amount of each award ranged from \$92,876 to \$99,926. Recipients were asked to develop an evaluation plan as part of their ART Grant proposal and to submit to the AAFP three semiannual progress reports and one final report.

Data Sources and Instruments

Review of Grants. This study analyzed data at two different time periods: mid-cycle in the program by reviewing grant applications and an Impact Questionnaire (n=28), described below, and at the close of the

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study in December 2003 when all final reports submitted were reviewed (n=13).

We retrieved demographic data, goals, objectives, and evaluation plans from the original 28 ART Grant applications.

Impact Questionnaire. A newly developed Impact Questionnaire was individualized for each recipient and sent to all recipients mid-cycle in the grant process. The questionnaires contained an individualized list of objectives that recipients had set for themselves. We asked each person to indicate whether the objectives listed had been met, partially met, or not met. If the answer for an objective was either “partially met” or “not met,” recipients were asked to explain why the objective had not been met. To determine the influence of the grants on the awardees, the questionnaire also contained two open-ended questions: (1) Briefly describe the impact that the ART Grant has had on you and your research career and (2) What is the most valuable thing you have learned from your ART experience?

We also asked each recipient to identify two colleagues we could contact to ask about changes they saw in the recipient’s research skills and productivity as a result of receiving the ART award. Another questionnaire sent to awardees’ colleagues asked the colleagues to answer one open-ended question: “What changes have you seen in (name of awardee inserted) as a result of him/her having received the ART award?” Colleagues were assured that all information provided would remain confidential.

Final Reports. In their final reports, the AAFP asked recipients to answer 14 questions about the effect of the grant on them and their departments, their next goals, support they would still need, lessons learned, and the overall success of the program. They were also asked to report evidence of their research productivity in eight areas: publications, papers submitted for publication, grants and contracts awarded, grants and contracts pending, grants not awarded, research consultantships, and activity as peer reviewers.

Data Analysis

All data were entered into an Excel spreadsheet, and descriptive statistics are reported.

Results

Characteristics of Awardees

Table 1 shows the characteristics of the award recipients.

Eleven of the 28 (39%) family physicians had advanced academic degrees—nine with master’s degrees and two with PhDs. Cohort 2 had the greatest number of those with advanced academic degrees (six out of eight). Eleven recipients (39%) were women. The years since recipients received their MD degree to when they received the ART award ranged from 6 years to 26 years. Individuals in Cohort 4, on average, were the most recent graduates, with a mean of 10 years since receiving the MD degree (Table 1). ART awards were well distributed across the United States (19 states) and across institutions (24 institutions). One institution had three recipients, and two institutions had two recipients each.

Goals of Awardees

Table 2 summarizes the award recipients’ goals. Nearly all recipients (n=27, 96%) stated that they planned to participate in either an ongoing research program or would initiate their own research project. Other plans, in order of frequency, included seeking a mentor (n=21, 75%), writing a grant to procure funding (n=20, 71%), publishing research findings (n=15, 54%), and taking university research courses (n=11, 39%). Six recipients planned to study for advanced degrees, all in master’s programs, and two planned to enter non-degree programs for certification. Other training methods included fellowship programs and individual university courses. Six recipients stated that they would seek research training but did not specify a strategy. One person from the first cohort planned to write a research manual, and another planned to design a curriculum. Recipients named 32 specific research projects that they were either developing themselves or were undertaking in collaboration with others.

Table 1

Characteristics of ART Grant Recipients

| | Gender | | Academic Degrees Beyond MD | | Mean Years Since MD Awarded |
|--------------------|--------|--------|-------------------------------|-----|-----------------------------------|
| | Male | Female | MS | PhD | |
| Cohort 1 (1998) | 5 | 3 | 0 | 0 | 17.8 |
| Cohort 2 (1999) | 6 | 2 | 5 | 1 | 15.5 |
| Cohort 3 (2000) | 4 | 4 | 1 | 1 | 16.9 |
| Cohort 4 (2001) | 2 | 2 | 3 | 0 | 10.0 |

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Table 2

Goals Listed by Awardees in Their ART Applications, by Type and Number of Individuals Who Chose the Goal

| | | Cohort 1 (n=8) | Cohort 2 (n=8) | Cohort 3 (n=8) | Cohort 4 (n=4) | Total # | (%) |
|----------|---------------------------------------|-------------------|-------------------|-------------------|-------------------|---------|------|
| Research | Conduct research (specified area) | 7 | 8 | 8 | 4 | 27 | (96) |
| | Write a grant | 6 | 4 | 6 | 4 | 20 | (71) |
| | Publish | 4 | 4 | 4 | 3 | 15 | (54) |
| | Present at a conference | 3 | 4 | 0 | 2 | 9 | (32) |
| Training | Attain MS degree* | 2 | 2 | 2 | 0 | 6 | (21) |
| | Complete a fellowship | 3 | 1 | 0 | 1 | 4 | (14) |
| | Take university courses | 3 | 3 | 3 | 2 | 11 | (39) |
| | Seek research training | 2 | 3 | 1 | 0 | 6 | (21) |
| | Take courses for certification | 0 | 0 | 1 | 1 | 2 | (7) |
| Other | Seek a mentor | 5 | 6 | 8 | 2 | 21 | (75) |
| | Design a teleconference | 0 | 0 | 0 | 1 | 1 | (4) |
| | Write a research manual or curriculum | 2 | 0 | 0 | 0 | 2 | (7) |

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* 11 awardees already had a Master's or PhD degree

Impact Questionnaire Results

At the time the Impact Questionnaire was sent, 16 people had just completed their 2-year grant, eight were in their second year, and four were in their first year. Twenty-two people (79%) answered both open-ended questions. For those who had completed their grant period (Cohorts 1 and 2), females reported a higher mean percentage of research objectives met than males reported (63.3% compared to 57.4%), and males reported a higher percentage of training objectives met than females reported (73.0% compared to 66.7%). Cohort 2 reported a higher mean percentage of research objectives met (72.2%) than Cohort 1 (50.0%) and also a higher mean percentage of training objectives met (76.2%) than Cohort 1 (65.2%).

Most Frequently Stated Effects of ART Grant. The three most frequently stated effects reported by recipients of the ART Grant were improved research methods, ability to publish, and ability to obtain funding. Additional stated benefits included academic promotions, institutional recognition, and improved ability to teach using evidence-based medicine. In answer to the effect that the grant had on them as researchers, all 22 respondents made positive statements about having received the grant. Examples of comments included “A phenomenal experience,” “Very beneficial,” “Crucial in establishing my professional identity as ‘research’ rather than as administrative,” “The ART Grant has dramatically

revitalized my research interest and greatly increased my desire to redirect my career to a strong/dominant research focus,” and “The ART Grant has been pivotal in ‘kick-starting’ my research career.”

Reasons for Objectives Not Being Met. Reasons given on the Impact Questionnaire for not completing objectives were change in research plan, lack of time, inability to find new funding through grant writing, inability to find collaborators, lack of institutional support, timeline too short, and clinical responsibilities. Examples of reasons people gave for changing their research plans included “The original proposal was way too big” and “The original topic did not work.” Statements about lack of time included “Work demand during fall/winter/spring precluded doing this part of the plan,” “Time conflict between grants and clinical duties,” and “Focus on completing other objectives took time away from completing this particular one.” Two other explanations for not meeting objectives included “Unavailability of classes” and “Lack of resources.”

In answer to the most valuable things learned, 22 respondents indicated that they learned having a mentor was important or essential, 18 said they had learned to value the support of professional colleagues and others with whom they networked, and 12 recipients mentioned the importance of having “protected time” to pursue research activities while employed in a clinical setting. Mentioned twice was the importance of focusing down

on a specific problem (ie, narrowing the question down to something that is answerable but still “significant”). One person said, “I learned the importance of ensuring adequate financial resources and having a research team and support staff so everything doesn’t have to be done by me.” One person found the experience “humbling” and admitted, “I need to learn a lot more.” Another person said, “Securing grant funding is a wonderfully empowering experience,” and still another replied, “What you plan is not necessarily as good as what happens.”

Reports of Colleagues on All Awardees’ Progress as Researchers. Two colleague reports were received for each of 15 recipients, and one report was received for each of eight recipients. The open-ended question allowed colleagues to answer at any length.

As expected, comments of colleagues were centered primarily on improvement of research skills (19 people receiving 45 comments), but colleagues also included comments in the areas of heightened career development and recognition (18 people receiving 27 comments), improved grantsmanship (16 people receiving 22 comments), greater ability to collaborate/network (11 people receiving 15 comments), improved ability to publish (11 people receiving 14 comments), and leadership (9 people receiving 18 comments). The overwhelming majority of comments from colleagues about the awardees were positive.

Colleagues of seven recipients reported that they saw no change in the recipients as a result of receiving the ART award. However, one person’s reason for reporting no change was that “The recipient was very interested in research and had a strong desire to improve skills and contribute to the collective body of knowledge prior to receiving the grant, and those qualities had not changed.” One person said that the recipient “struggled with the multiple demands of

an academic position in family medicine and, therefore, had not been able to submit any major grant proposals.” Still another said, “Some change seen but not as much as desired due to workload.” This person also said, “More time and money was needed to carry out the study on a full scale.” Four colleagues provided no explanatory comments with their rating of “No change.”

Analysis of Final Reports

Only 13 of the 28 recipients (46%) submitted final reports within 10 months of the end of the program—five in Cohort 1 (n=8), five in Cohort 2 (n=8), and three in Cohorts 3 and 4 (n=12). Ten of the 13 people (77%) reported completing all of their educational objectives, and six (46%) reported meeting or exceeding their research objectives (Table 3).

Effect on Recipients. All 13 respondents reiterated in their final reports much of what they had reported earlier on the Impact Questionnaire regarding the impact of the ART Grant on themselves as researchers. Additional comments in the final reports included those listed in Table 4.

Table 3

Research Activity Reported by 13 ART Grant Recipients in Their Final Reports

| Peer-reviewed Research Publications | | Research Papers Submitted | Papers and Presentations | Grants and Contracts Awarded | Grants and Contracts Pending | Grants and Contracts Submitted But Not Awarded |
|-------------------------------------|-------------------------|---------------------------|--------------------------|------------------------------|------------------------------|--|
| Pre-ART* Award | Final Year of ART Award | | | | | |
| 0.5 | 3 | 3 | 2 | 1 | 0 | 1 |
| 0.9 | 8 | 5 | 2 | 2 | 3 | 3 |
| 0.7 | 2 | 1 | 1 | 0 | 2 | 0 |
| 0.9 | 5 | 4 | 1 | 1 | 0 | 1 |
| 1.0 | 2 | 1 | 2 | 1 | 0 | 1 |
| 1.0 | 4 | 1 | 5 | 0 | 2 | 0 |
| 0 | 3 | 2 | 2 | 0 | 0 | 0 |
| 1.2 | 0 | 2 | 0 | 0 | 1 | 0 |
| 0.9 | 4 | 4 | 1 | 2 | 0 | 2 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 1.1 | 1 | 2 | 1 | 0 | 2 | 1 |
| 1.0 | 2 | 0 | 10 | 1 | 0 | 2 |
| 1.7 | 1 | 2 | 0 | 0 | 2 | 0 |

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* Average publications per year from time of first publication to ART award.

Table 4

Comments From Award Recipients
About Benefits of the Grant

- "Provided time and structure. Led to successful grant applications and first primary manuscript."
- "Moved from clinical to tenure track."
- "Invaluable. Educational and mentoring activities not otherwise possible."
- "Established lasting collaborative relationships."
- "Gained qualitative research skills; finished under-funded research project."
- "Without the ART Grant I would have no research career."
- "Feel much better equipped to design and conduct clinical research studies, to mentor other faculty and residents in research, and to evaluate proposals and manuscripts."

Effect on Department or Clinical Practice. Three people answered that they believed their departments had a greater appreciation for the challenges of doing research since they were awarded the ART Grant. These individuals reported that the award "helped department realize how difficult it is to succeed as a family medicine researcher without a research environment and when dependent on soft money," that "Research time meant that clinical work had to be picked up by colleagues," and that "Leadership understands protected time and funding is needed to nurture researchers but can't provide it."

Others stressed additional ways that their department or practice had been influenced. Two people said they had become resource people for their department, two others mentored junior faculty, and one each mentioned improved departmental funding capability, bringing prestige to the department, and appreciation by the department for those who bridge clinical and research work.

Departmental Support Received. Four of 13 people said they received the 10% "protected time" required by the ART Grant. Two people received 50% protected time,

another received 40% protected time, and six people did not state a percentage. They reported support from their department to include the items listed in Table 5.

Lessons Learned From the ART Award Experience.

Respondents discussed challenges they had faced and candidly reported suggestions for future recipients, the AAFP, mentors, and department chairs. Suggestions from awardees are shown in Table 6.

In regard to challenges, one person said, "In the research world, there is currently a significant bias against family physicians—at NIH for competing grants and from other specialties for publication in their journals." Two mentioned time difficulties: "Every-

Table 6

Suggestions From Grant Recipients

Suggestions to future recipients:

- "Keep the research simple. Don't underestimate the time required for course work. Schedule days out of clinic for research."
- "Getting NIH funding is extremely challenging."
- "Planning and flexibility are essential. Get good mentors."
- "Good mentorship is critical. Must have intrinsic motivation. Practice research regularly."
- "Protect your time and focus on top priorities. Even 50% time is too little if project is too ambitious. Plan ahead. Surround yourself with experienced successful people."
- "Seek future funding before the grant expires."

Suggestion to American Academy of Family Physicians (AAFP):

- "Extend the grants for a longer period. Improve networking/mentoring/collaborating. Part of the award should be for participation in a major funded study that could lead to developing one's own research in the future."
- "Consider a 3-year program for clinicians who have no prior research training. Difficult to do in 2 years (acquire training, develop and do research, and be partially funded at end of period.)"
- "I suggest AAFP explore models to support primary researchers at the 50% level in settings that don't already have a research foundation."

Suggestions for mentors:

- "Take as much time with recipients as possible."
- "Meet regularly to provide external motivation."
- "Provide support time and continued support after grant."
- "Help mentees network. Look for ways the relationship can benefit the mentor."

Suggestions for department chairs:

- "It may take more than 6 months after completion of the ART Grant for it to pay off. Seek ways for the ART Grant recipient to get sufficient time to continue research and scholarly work."
- "Expectations for a junior investigator to write grants, conduct research, and write manuscripts must be balanced with research staff support that the department could supply."
- "Be sure to nurture your recently trained ART graduates by giving them protected time. Give them a reasonable amount of time to write a grant, and help them find funding and people with whom to collaborate. Help them assemble a team of individuals to assist them in writing grants."
- "Get other faculty involved."
- "Identify long-term strategies to support family physician researchers."

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Table 5

Departmental Support Received by Grant Awardees

- "Relieved of some clinical duties."
- "Excellent support."
- "Became member of mentor's research team and coauthored a paper."
- "Tremendous support. Department provided full support for travel and living expenses during some training. Additional support from training facilities."
- "Protected time and a credible mentor."
- "Mentors reviewed manuscripts."
- "Received support from other faculty and task force members."
- "Department has efficient research team that assists in research design, grant writing, and publishing."

thing seems to take longer than you think” and “Time lines always stretch out.” One person said, “Use great caution in agreeing to take on someone else’s research assistants.” Another person stated “Nothing” had been learned but then went on to list how the ART funds were used, followed by, “. . . it was the culmination of these events/experiences (plus the contacts made) that was beneficial.”

When asked about barriers to research, eight of 13 people emphasized difficulty in finding new funding before their ART Grant expired. Other barriers mentioned two or more times were not enough protected time, lack of collaborators, lack of departmental support, and 2 years being too short for the ART grant.

Indicators of Research Activity

Of 13 people who submitted final reports, 11 (84.6%) reported having published in peer-reviewed journals within the past year, 12 (92.3%) had papers they planned to submit to peer-reviewed journals, 11 (84.6%) had presented at meetings, six (46.2%) had received at least one grant, six (46.2%) had grants pending, and seven (53.8%) had submitted grants that were turned down. For the 13 people who filed final reports, the average number of publications was higher during the final year of the ART Grant for each individual than during their previous years as a researcher (Table 3). Seven recipients had served as a research consultant, and 10 served as reviewers for one or more peer-reviewed journals.

Discussion

Although 28 family physicians received ART Grants, only 13 submitted final reports. Even with funding that was meant to ensure protected time, resources, and training, many ART Grant recipients reported challenges that prevented them from fulfilling their objectives. Recipients found, like others,⁸ that protected time, mentor support, and adequate funding are critical, but these were not guaranteed even with the ART Grant. Because ART recipients were free to choose (1) the type of training they needed and how they would get that training, (2) the type and extent of research projects to pursue, and (3) the mentors who would guide their efforts, there was a large variation in level of success.

Those who were most successful midway through the program reported that the ART award had helped them improve their research methods, publish and write grants, and also that it had provided them with personal recognition and promotion within their institutions. Many of these self-reported benefits were corroborated by colleague reports.

The 13 award recipients who submitted final reports reported many positive outcomes, even though they may have had some challenges, and all of their objectives may not have been met. They reported a greater number of publications, on average, after receiving the

ART award than before the award. As a group they also showed continued productivity by reporting additional papers and grants in various stages of preparation or acceptance. However, because only 13 people filed final reports, the success of the program for more than half the recipients is in question, and conclusions should be viewed cautiously.

There is some evidence that funding for advanced research training can stimulate research productivity in family physicians, especially those who have adequate institutional support and sufficient mentoring. For others, it does not appear that short-term funding can overcome the problems of conducting research in isolation, inadequate mentoring, lack of departmental support, or difficulty finding additional funding. Providing funding for a more extended period, placing young researchers with established funded researchers, or establishing groups of researchers within a department or practice may improve research outcomes. Adding a research director to stimulate and monitor research activities^{9,10} may also prove beneficial.

Only by measuring all 28 ART Grant recipients’ research productivity (presentations, publications, grants) over time will we be able to determine the long-term effectiveness of the ART program in accomplishing its mission of increasing the number of family physicians conducting research.

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