AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

INDIVIDUAL RESEARCH CAREER DEVELOPMENT (K) AWARD PROGRAM

Evaluation Report

Agency for Healthcare Research and Quality

Evaluation Report

Agency for Healthcare Research and Quality Individual Career Development (K) Award Program

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Contents

Figures

Tables

Appendixes

Executive Summary

Evaluating the Impact of AHRQ Individual Mentored Career Development (K) Awards

The Agency for Healthcare Research and Quality's (AHRQ's) mission is to produce evidence to make health care safer, of higher quality, more accessible, equitable, and affordable, and to work within the U.S. Department of Health and Human Services (HHS) and with other partners to make sure that the evidence is understood and used.[1] As part of its mission, AHRQ provides a variety of extramural funding opportunities designed to support and enhance the education and career development of emerging health services researchers. Having supported several influencers and leaders in health services research and related domains, the AHRQ Individual Mentored Career Development (K) Award Program has been one of AHRQ's longstanding training support programs and constitutes the focus of the current evaluation. The purpose of this evaluation effort was to describe and understand the return on AHRQ's investment in supporting AHRQ K Awardees with respect to research career outcomes as well as post-AHRQ K Award research, practice, and policy impacts.

AHRQ's K Award offerings have included the K01 - Mentored Research Scientist Research Career Development Award; the K02 - Independent Scientist Career Development Award; and the K08 - Mentored Clinical Scientist Award. These grant award mechanisms provide salary, training, and research support to early career scientists for 3-5 years. Between 2000 and 2013, 106 researchers completed the training across these three program mechanisms, with the greatest number of awards being issued to K08 (clinician scientist) applicants.

Among other program eligibility criteria, applicants for the K Award Program must hold an earned clinical or research doctorate, identify a primary mentor with extensive relevant research and mentoring experience, and indicate their willingness to spend a minimum of 75 percent of full-time professional effort conducting research and engaging in developing a research career during the award period.

Atlas Research and Abt Associates (Atlas Team) conducted an independent assessment of this extramural research program that involved direct engagement with the AHRQ Division of Research Education (program office), AHRQ senior leadership, and AHRQ K Award recipients. The primary objective of the assessment was to learn directly from the Awardees about their reasons for applying to the AHRQ K Program, subsequent career choices, benefits of program participation, the role of K Awards in promoting AHRQ's priorities, and the program's influence on overall policies, best practices, and system capacity.

[1] Mission and Budget. Agency for Healthcare Research and Quality. http://www.ahrq.gov/cpi/about/mission/index.html. Accessed February 4, 2016.

Evaluation Methodology

The preliminary step of this evaluation involved the completion, aggregation, verification, and analysis of information contained within an existing AHRQ database of funded and unfunded K Award applicants. In addition, the Atlas Team conducted a literature review to find evaluation reports for similar career development programs and journal articles examining the outcomes of research funding opportunities, career characteristics of successful scientists, and challenges to research careers. The goal of this review was to identify comparison groups and additional performance measures not already included in the AHRQ database that could be collected from K Awardees or extant sources.

Building on this foundational and comparative information, the second component of the evaluation involved an IRB- and OMB-approved online survey administered to AHRQ K Awardees. The survey population included the K01, K02, and K08 program participants who completed the training between January 1, 2000, and December 31, 2009, (receiving funding in 2000–2013). The survey consisted of nine (9) open-ended and 18 multiple-choice questions, many of which had been validated in similar surveys. For several of the multiple-choice questions, respondents could provide an open-ended comment to elaborate on quantitative answers. The survey was sent to 102 of 106 Awardees (active emails could not be found for the remaining four), and 79 complete responses were received, which represents a 76 percent response rate. Additionally, post-application productivity for funded and unfunded applicants was examined using the PubMed database.

Notable Findings

A survey of 79 program participants revealed high levels of satisfaction with all aspects of the program, including clarity of program goals; preparation, and review of application; mentored research and career development experience; and assistance from AHRQ. All of these areas were given a score of four (4) or higher on a 5-point scale (4=satisfied). Weaknesses noted by respondents revolved around a complicated application format (N=8), obtaining information from AHRQ (N=7), mentor accountability (N=10), and low levels of salary support (N=7).

The survey captured Awardees' perceptions about their program experience as well as the perceived role of the funding to their development as independent health services researchers. Between 55 and 85 percent of respondents reported that that the funding had improved their ability to do the following:

- Gain additional and timely knowledge about their chosen field of study
- Interpret and analyze various types of data
- Design appropriate studies to test hypotheses based on best practices
- Use rigorous analytical approaches to define scientific questions
- Apply effective literature review/environmental scan approaches to inform study design
- Better understand and participate in the peer review process
- Manage and resolve conflicts associated with research efforts across diverse partners
- Mentor and serve as a role model to other researchers
- Motivate and inspire others to pursue similar research and/or AHRQ K Awards

- Create an overall vision for improving health and health care that mirrors the mission of AHRQ.

Further, Awardees reported making contributions to health research, policy, and clinical practice through informing guidelines and standards (65 percent), systematic reviews (44 percent), reports (42 percent), educational materials (39 percent), legal documents (37 percent), and expert testimony (19 percent). Many respondents indicated that their AHRQ-funded research led to the adoption of new or improved health service delivery methods (53 percent) and reduction in health care costs (38 percent).

The study also revealed that Awardees performed better than unfunded applicants on two key characteristics. First, Awardees received, on average, 2.7 grants following receipt of the AHRQ K Award, compared to 1.2 grants for unfunded applicants matched on the application year ($p<0.01$). Further, 38 percent of Awardees, compared to 13 percent of unfunded applicants, obtained a subsequent R01 grant ($p<0.001$). Finally, publication rates for Awardees were higher compared to unfunded applicants: 5.2 versus 4.5 papers per year, on average. Comparison of AHRQ and National Institutes of Health (NIH) K Awardees revealed that the two groups were similar in their ability to obtain subsequent R01 funding. AHRQ K Awardees performed differently in publication productivity, however: 5.2 versus 10.9 papers per Awardee, on average, although we have lower confidence in this comparison due to possible variation in how the data were collected and analyzed. With respect to Awardees' intentions to remain in a research career, 83 percent of survey respondents reported that they were very likely and another 8 percent somewhat likely to remain in the next 5 years. Nearly all (91 percent) reported that the AHRQ K Award had a significant and meaningful impact on their careers.

Finally, the study explored whether AHRQ Awardees have experienced and continue to experience various career challenges reported in the literature. Obtaining follow-up funding and balancing research, clinical, teaching, administrative, and family responsibilities appeared to be common, which is consistent with the challenges faced by the research community at large.

Conclusion

We concluded that the relatively modest K Award investment by AHRQ has resulted in a clear and measurable positive impact on Awardees' research career progression toward independence; further, the program has enriched the field of health services research via grantees' post-AHRQ K Award contributions to advancements in health care policy, research, and practice.

1. Introduction

The Agency for Healthcare Research and Quality's (AHRQ's) mission is to produce evidence to make health care safer, of higher quality, more accessible, equitable, and affordable, and to work within the U.S. Department of Health and Human Services (HHS) and with other partners to make sure that the evidence is understood and used.[2] As part of achieving this goal, AHRQ has established a number of extramural research training programs that support promising clinical and research scientists who are committed to establishing independent health services research careers. The Division of Research Education (DRE) within AHRQ's Office of Extramural Research, Education, and Priority Populations manages these programs.

AHRQ Individual Mentored Career Development (K) Award Program Description

The AHRQ Career Development (K) Award program (also known as "K Awards") seeks to attract outstanding clinical and research scientists who are committed to a career in health services research; the program focuses on bolstering Awardees' development as independent researchers. Support features and requirements of the AHRQ K Award, which are detailed in each AHRQ K program Funding Opportunity Announcement[3], include the following:

- Opportunity to engage in didactic and experiential activities aimed at enhancing their abilities to conduct health services research;
- Provision of 3–5 years of protected time and other program-related expenses; and
- Application of newly acquired methodological skills to a topic of interest that aligns with AHRQ's mission.

AHRQ K program applicants must—

- Identify a primary mentor with extensive relevant research and mentoring experience who will be committed to the applicant's research training and career development goals during the Award period; and
- Express willingness to commit to spending a minimum of 75 percent of their full-time professional effort conducting research, engaging in research career development activities, or participating in a combination of these activities during the Award period.

Between 2000 and 2013, AHRQ funded three (3) programs under the K series: the Mentored Research Scientist Research Career Development Award (K01), the Mentored Clinical Scientist Award (K08), and the Independent Scientist Career Development Award (K02, Table 1). The evaluation focused on the researchers who had *completed* the training between 2000 and 2013.

[2] Mission and Budget. Agency for Healthcare Research and Quality. http://www.ahrq.gov/cpi/about/mission/index.html. Accessed February 4, 2016.
[3] Research and Training Education. Agency for Healthcare Research and Quality. http://www.ahrq.gov/funding/training-grants/index.html. Accessed February 2, 2016.

Because of the 3- to 5-year training period, only the applicants up to and including 2009 (N=106) met this criterion.

Table 1. AHRQ K Award program mechanisms

Mechanism and Active Period	Goal
Independent Scientist Career Development Award (K02): 1999 – 2009 Reactivated: 2012 – 2013	Salary and "protected time" for newly independent scientists who can demonstrate the need for a period of intensive research focus as a means of enhancing their research careers.
Mentored Clinical Scientist Award (K08): 2000 – Present	Support and "protected time" to individuals with a clinical doctoral degree for an intensive, supervised research career development experience in health services research.
Mentored Research Scientist Research Career Development Award (K01): 2008 – 2013	Salary and research support for a sustained period of "protected time" for individuals with research doctoral degrees.

AHRQ wished to examine its return on investment in the K Award Program by addressing the following questions:

- To what extent have the Awardees achieved their training goals?
- Have the Awardees received adequate mentoring?
- Have they gained or improved the skills necessary for a successful research career?
- What are the notable post-participation career outcomes, including retention in research, publication records, and attainment of funding?
- How do unfunded AHRQ applicants and a select comparable group of National Institutes of Health (NIH) K Awardees compare to AHRQ Awardees on publications activity and attainment of funding?
- What is the perceived contribution of the program to knowledge/best practices, health care policy, care delivery, and system capacity?
- What is the perceived role of program participation in supported and/or promoting professional achievements?
- How well does the funded research align with AHRQ priorities?

The Atlas Team implemented a mixed-method evaluation design to answer these questions with respect to AHRQ K Program participants as a group. Additionally, two comparison groups, i.e., unfunded AHRQ K applicants and NIH K Program Awardees from NIH Institutes that support health systems research, were included in the evaluation design to enable a comparative examination of these groups and AHRQ K Program participants on publication productivity as well as subsequent funding success characteristics. Data collection activities included a review of AHRQ DRE program-related documents and data, analysis of applicant publications reported in PubMed databases, analysis of data from NIH RePORTer database, and an online survey of AHRQ K Program Awardees.

This report presents our aggregated findings from these information sources and is organized as follows. In Section 2, we present our methodology. In Section 3, we describe our findings,

including trainee experiences; program role in career development, research, and career outcomes/impacts; challenges to research careers; and program alignment with AHRQ priorities. Conclusions and study limitations are summarized in Section 4.

2. Methods

This evaluation employs a mixed-method design, including literature review, analysis of administrative data, bibliometric analysis, and a survey of AHRQ K Program Awardees.

Study Sample

The study sample included researchers who completed the training under the K01, K02, and K08 programs between January 1, 2000 and December 31, 2013 (N=106) and a comparison group of unfunded applicants for the same time period (N=80). All K applicants were included in administrative data analysis.

Evaluation Design

We used a quasi-experimental design with two comparison groups. The first group included unfunded K01, K02, and K08 applicants for the same time period as Awardees. The second group included funded applicants under the NIH K01 and K08 programs. Data for this comparison were obtained from the National Institutes of Health Individual Mentored Career Development Awards Program evaluation report published by Discovery Logic in 2011 and from NIH RePORTer database.

2.1 Database Design and Development

2.1.1 AHRQ Database

AHRQ provided a database containing information for all applicants, which included grant number and title, funding year and amount, demographic characteristics of funded applicants, publications and follow-up funding, and education and employment data. The data were in various stages of completion and tended to be less complete for unfunded applicants. The list of fields included in the AHRQ database is included in Appendix A.

2.1.2 Identifying Additional Variables

We conducted a literature review to identify comparison groups and additional output or outcome variables not already included in the AHRQ database. These variables were shared with AHRQ, accompanied by recommendations for inclusion based on relevance and feasibility of collecting these data. The list of variables is included in Appendix A.

2.1.3 NIH Comparison Data

The NIH comparison data were obtained from a published NIH report entitled, *National Institutes of Health Individual Mentored Career Development Awards Program.*[4] Note that unlike AHRQ data that were available on the individual level, the NIH data were reported in aggregate. Fields that were included in this evaluation are indicated in Appendix A. The NIH

[4] Discovery Logic Report, 2011. https://grants.nih.gov/training/K_Awards_Evaluation_FinalReport_20110901.pdf

RePORTer database[5] was used to obtain the number of funded K01, K02, and K08 projects and success rates at NIH.

2.1.4 Populating the Database

After all variables were chosen, three data analysts verified and completed the database with oversight from a project manager. All analysts participated in a focused data abstraction training session, which included an overview of the evaluation's purpose and structure as well as instructions for using the *AHRQ K Award Evaluation Data Abstraction Manual* and *AHRQ K Program Database Codebook* developed for the evaluation. The analysts met at least once a week to review progress and discuss findings and challenges. After the data review and abstraction processes were completed, the lead data analyst and project manager conducted reliability checks on 10 percent of all Awardees. Each variable was verified against the source from which it was obtained.

2.1.5 Final Database and Variables

The database included information on three groups: (1) funded AHRQ K Program Awardees, (2) unfunded AHRQ K Program applicants, and (3) NIH K Awardees. Appendix A includes all variables acquired and/or analyzed.

2.2 Survey Development and Administration

We conducted a 15-minute online survey of funded AHRQ K Awardees to obtain the following information:

- Experiences with grant application and management processes
- Challenges associated with their research career progression
- Notable research outcomes
- Impact of AHRQ K Award funding on career
- Broader benefits of AHRQ K Award funding.

The survey included nine (9) open-ended and 18 multiple-choice questions. For several of the multiple-choice questions, respondents were given the option to provide an open-ended comment to clarify or expand quantitative answers. Several items had been validated in previous surveys, including the surveys by the National Postdoctoral Association,[6] the NIH Diversity Supplement Program,[7] NIH Loan Repayment Program[8], and the U.S. Department of Education research program.[9] AHRQ staff reviewed the instrument and all recommended revisions were

[5] https://projectreporter.nih.gov/reporter.cfm. Accessed February 2016.
[66] Core Competencies of a Successful Scientist. National Postdoctoral Association. http://www.fhcrc.org/en/education-training/oscd/core-competencies.html.Accessed Dec 2014.
[7] Needs Assessment of the NIGMS Research Supplements to Promote Diversity in Health-Related Research: Final Report. Abt Associates. April 30, 2009.
[8] NIH Extramural Loan Repayment Program Evaluation. FY2003-2007. Discover Logic Report, April, 2009.
[9] Evaluation Plan and Toolkit for the National Institute on Disability and Rehabilitation Research: Final Report. Abt Associates. January 29, 2015.

incorporated into subsequent versions. The survey is provided in Appendix B. The survey instrument and data collection procedures were reviewed and approved by the Abt Associates' Institutional Review Board (#0789) and by the U.S. Office of Management and Budget (OMB) (#0935-0106).

We conducted two (2) pilot tests of the survey. For the first test, several Atlas Team members took the survey using various scenarios to mimic respondents with diverse backgrounds and perspectives. The second pilot included five (5) members of the Atlas Team and four (4) AHRQ staff members; all pilot test participants had no other involvement in the study. Based on the pilot tests, a few adjustments were made to the skip logic and instructional language.

All AHRQ K Program Awardees for 2000–2013 who completed the training (application submissions up to and including 2009) were invited to participate in the survey (N=106). The initial survey announcement was sent by the AHRQ Task Order Officer, indicating that a member of the Atlas Team would subsequently follow up with a unique survey link. A working email could not be found for four respondents, who were excluded from the study.

The survey was open between May 13 and June 26, 2015. During the survey period, four (4) reminder emails were sent (5/21, 5/28, 6/4, and 6/18). Survey respondents were provided with an email address to direct their questions or comments; a few that were received and mainly included concerns regarding the timeline for completing the survey.

2.3 Abstraction of Publication Data

We performed a batch query of the PubMed database using a string of applicant names. The resulting list of publications was matched back to the names, and only the articles published one year following K Award application were included and the average number per year calculated. For 11 applicants with common names, these average numbers were unrealistically high–up to several thousand per year. To account for these outliers, we removed any individuals whose annual publication counts fell outside of the 1.5x interquartile range for their group. This procedure resulted in no lower outliers for either group. There were five (5) upper outliers for the Awardees and six (6) for the unfunded applicants. These 11 individuals were removed from publication analysis. Additionally, we further extracted the total number of found AHRQ K Awardee publications to those that directly stemmed from grantees' AHRQ K Award support via an in-depth review of a K Award-related publications search results listing, provided by the AHRQ Information Resource Center.

2.4 Abstraction of Funding Data

Funding data were abstracted from the AHRQ Grants On-line Database (GOLD) and the NIH RePORTer Database by consolidating the Awards reported from each source for Awardees and unfunded applicants.[10] Follow-up funding was measured starting with the Award year for funded applicants and intended start year for unsuccessful applicants.

[10] AHRQ Grants On-Line Database. http://gold.ahrq.gov/projectsearch/. Accessed Feb 2016.

2.5 Analysis Procedures

For quantitative data originating from the survey and the AHRQ database, we performed descriptive statistics, such as calculating measures of central tendency (mean, mode, median), minimums, maximums, and standard deviations using the *Statwing* statistical suite. As appropriate, analyses were stratified by a range of characteristics, such as the K funding mechanism and Award year.

For qualitative survey data, we created a set of codes to capture the topics of interest, including Awardees' level of satisfaction, perceived program strengths and weaknesses, relative impact of K Awards on career development, and the challenges faced by Awardees. *NVivo 10.0* software was used to code and analyze all qualitative data.

3. Findings

In this section, we present our findings. We begin by describing program and applicant characteristics. Comparison data for NIH K Awardees and for AHRQ-funded versus unfunded applicants are included as relevant and available. Following, we discuss participants' satisfaction with the program; the role of AHRQ funding in career progression; and career outcomes, plans, and challenges.

3.1 Program Characteristics

AHRQ began offering the Independent Scientist Career Development Award (K02) in 1999; this mechanism was geared toward newly independent scientists seeking a period of intensive research focus as a means of enhancing their research careers. The Mentored Clinical Scientist Career Development Award (K08) funding opportunity, geared toward clinical doctorate holders seeking an intensive, supervised research career development experience in health services research, followed in 2000. In the years following, research doctorate holders increasingly inquired about the availability of mentored health services research training support for research scientists. As a result of this high interest level, in 2008, AHRQ added the Mentored Research Scientist Career Development Award (K01) to augment the K Award career development funding opportunities.

Between 2000 and 2013, AHRQ issued a total of 162 K01/K02/K08 Awards (Table 2); of these, 17 were under the K01, 29 were under the K02, and 116 were under the K08 Awards. Using the RePORTer database, we found that a select subset of four NIH institutes (NIDDK, NINR, NCI, and NHLBI) with K programs that support health services research was much larger with over 12,000 Awards issued for the same time period.

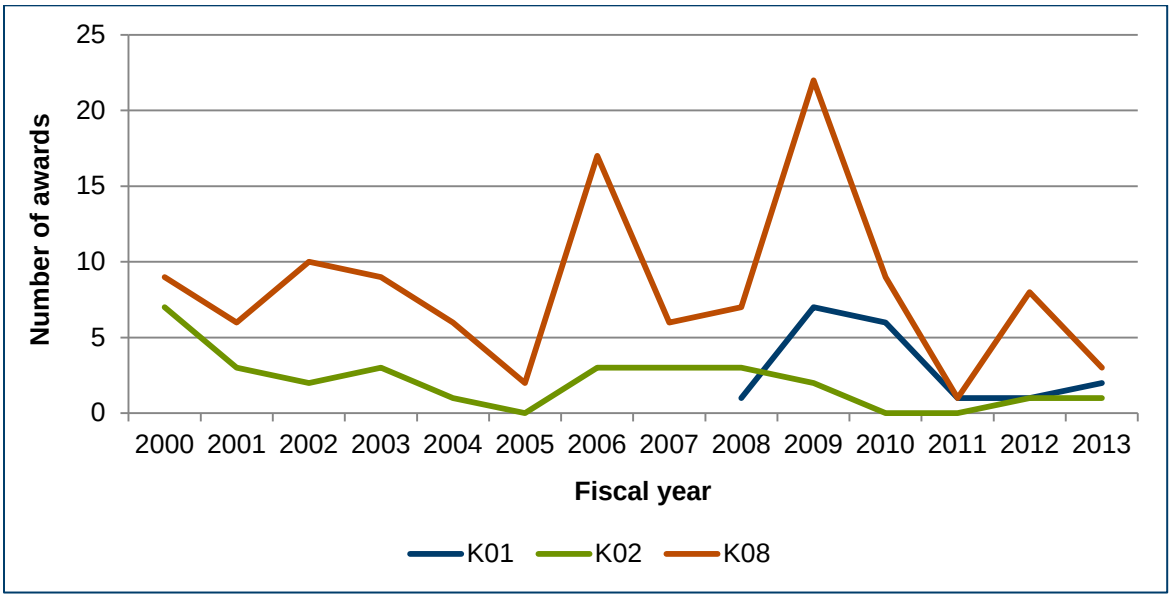
Table 2. Total annual number of K01, K02, and K08 Awards at AHRQ and NIH

FY	AHRQ K01/K02/K08	NIH K01/K02/K08* (NIDDK, NINR, NCI, and NHLBI)
2000	16	811
2001	9	841
2002	12	893
2003	12	972
2004	7	947
2005	2	981
2006	20	991
2007	9	915
2008	11	847
2009	31	972
2010	15	857
2011	2	761
2012	10	749
2013	6	714
TOTAL	**162**	**12,251**

*NIDDK: National Institute of Diabetes and Digestive and Kidney Diseases
NINR: National Institute of Nursing Research
NCI: National Cancer Institute
NHLBI: National Heart, Lung, and Blood Institute

The number of K08 Awards at AHRQ has fluctuated over the years, reaching a maximum of 22 in 2009, while the number of K02 Awards (now discontinued) has gradually declined (Figure 1).

Figure 1. Total annual number of K01, K02, and K08 awards at AHRQ by mechanism



Data source: AHRQ K Program Database

Finally, analysis of AHRQ administrative data revealed that nearly 50 percent of initially unsuccessful AHRQ K Award applicants resubmitted an application; of these, 31 percent were funded (see Appendix C). Resubmission success rate was 28 percent for K02 (25 repeat applicants) and 41 percent for K08 (78 repeat applicants). All K01-funded applications were funded on first submission.

3.2 Characteristics of AHRQ and NIH Awardees

3.2.1 Demographic Characteristics

The average age of the AHRQ Awardees at the time of application was 38 years. The K01 Awardees were slightly older than K02 and K08 Awardees, with an average age of 42 versus 37 and 39, respectively (Table 3). The average ages of AHRQ K Awardees were comparable to that of NIH. We also examined the number of years since terminal degree, which appeared to be the shortest for K01 Awardees (4 years) and the longest for K08 (10 years). The data for NIH were again similar (Table 3).

Analysis of Awardees by gender revealed that there were more males than females within the AHRQ programs (56 versus 44 percent). This difference was observed across funding mechanisms, but was especially pronounced for K01. We found significant differences in gender distribution between AHRQ and NIH: 67 percent of the AHRQ K01 Awardees were male compared to 47 percent at NIH, and 55 percent of K08 Awardees at AHRQ were male compared to 67 percent at NIH.

3.2.2 Terminal Degrees

The distribution of terminal degrees across the programs reflects the program's intended applicant pool. The majority of AHRQ K01 and NIH K01 Awardees were PhDs (67 and 88 percent, respectively) or MD/PhDs (33 and 7 percent, respectively). In contrast, most K08 Awardees were MDs (76 and 63 percent at AHRQ and NIH) or MD/PhDs (10 and 32 percent, respectively). For the AHRQ K02 program, 56 percent were PhDs, 32 percent MDs, and 8 percent MD/PhDs. Law degrees were the most common among dual and other terminal degrees (data not shown).

Table 3. Characteristics of AHRQ K program awardees versus NIH awardees

		Gender		Doctoral Degree				
Population	Avg. Age	percent Male	percent Female	MD	PhD	MD/PhD	Dual, Other	Avg. Years Since Degree
AHRQ K01 (2000-2009)	42	67%	33%	0%	67%	33%	0%	4
AHRQ K02 (2000-2009)	37	56%	44%	32%	56%	8%	4%	7
AHRQ K08 (2000-2009)	39	55%	45%	76%	8%	10%	6%	10
NIH K01 (2000-2005)	37	47%	51%	4%	88%	7%	1%	4
NIH K08 (1990-2005)	37	67%	30%	63%	2%	32%	2%	8

*Data across all NIH institutes and centers. No institute-level data were available.

3.2.3 Discipline of Study

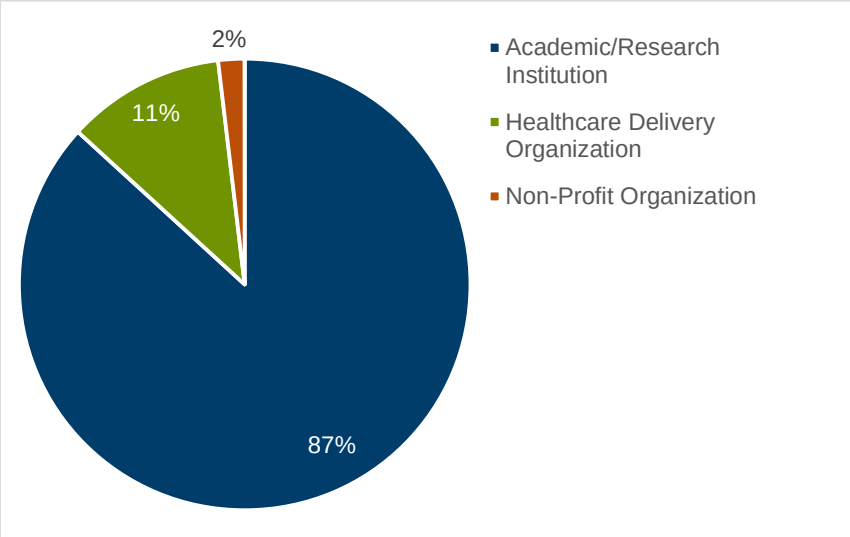
As shown in Table 4, 72 percent of AHRQ K Awardees identified their discipline as medicine at the time of application; health policy and nursing were a distant second and third (8 percent and 6 percent, respectively). Remaining Awardees had backgrounds in clinical and allied health sciences, pharmacology, social science, engineering, public health, and informatics. This distribution appears to reflect the AHRQ K Program's interest in supporting researchers from a range of disciplines.

Table 4. Grantee discipline at the time of application (N=102)

Discipline	Percent Respondents
Medicine	72%
Health policy and administration	8%
Nursing	6%
Clinical and allied health science	3%
Pharmacology	3%
Social science	3%
Engineering	2%
Public health	2%
Informatics	1%

At the time of application, as seen in Figure 2, 87 percent of Awardees were employed by academic and research institutions, and the remaining 13 percent by health care delivery organizations (11 percent) or non-profits (2 percent).

Figure 2. Employment sector at the time of award



Data source: AHRQ K Program Database

3.3 Training Experience

We conducted an online survey of AHRQ K Awardees to examine their satisfaction with the program, its role in career development, and career status and plans. This section describes our findings.

3.3.1 Survey Response Rate

The survey was sent to 106 AHRQ K Awardees. We were unable to obtain working emails for four (4) individuals and two (2) declined to participate. We received 79 complete responses, which yielded a 76 percent response rate.

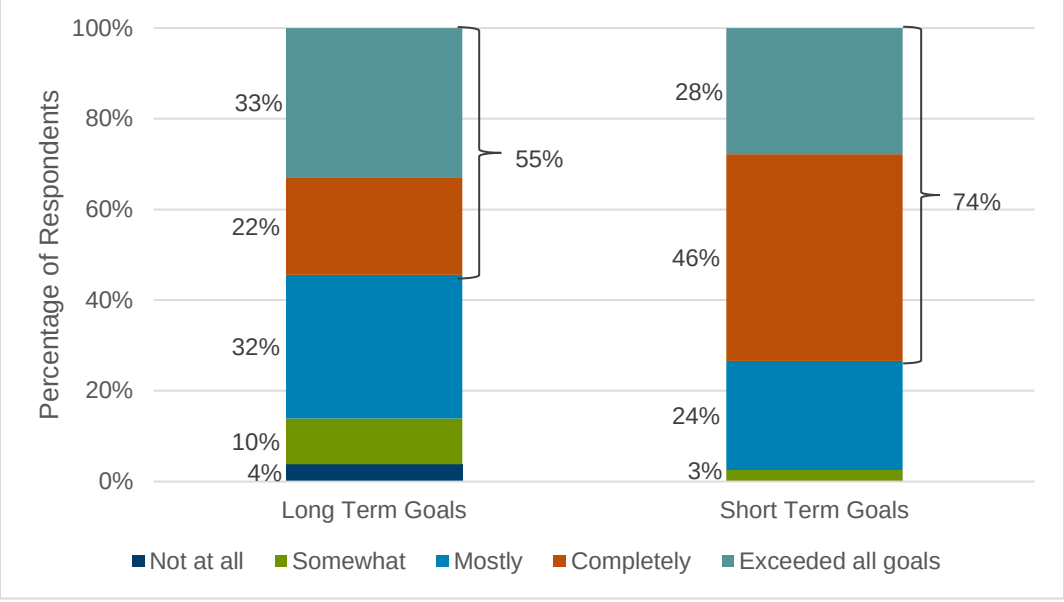
3.3.2 Training Goals

> *"The most important contributions of the AHRQ K Award were by far my mentor's guidance and time dedicated to the project."*

Survey respondents were asked about their short-term and long-term training goals using a pull-down menu of options. Reported short-term goals included developing or improving research skills (99 percent), publishing papers (81 percent), gaining knowledge (75 percent) and guidance (49 percent), and developing leadership (28 percent) and communication (20 percent) skills. Long-term goals included advancing their field of study (95 percent), obtaining follow-up funding (80 percent), obtaining (62 percent) or maintaining (59 percent) an independent research position, and improving overall quality of care (76 percent). Three-quarters of survey respondents had met or exceeded their short-term goals and 54 percent their long-term goals (Figure 3).

Figure 3. Achievement of goals by survey respondents (N=79)

Q: To what extent were you able to achieve the short-term and long-term goals that you set?



Data source: AHRQ K Program Grantee Survey. Data rounded to the nearest full percent.

3.3.3 Mentoring Experience

The K01 and K08 programs are mentored Career Development Award mechanisms, and thus, program applicants must identify a primary mentor with relevant expertise in the applicant's

proposed area of health services research. Further, a detailed career development plan of didactic and experiential training activities must be outlined, clearly demonstrating the applicant's need for K Award training support. The applicant might also identify additional co-mentors with relevant expertise in areas the applicant seeks to strengthen (e.g., biostatistics, intervention design, etc.).

We examined AHRQ K Awardees' level of satisfaction with their mentored research and career development experience and found that 85 percent of respondents were either satisfied (33 percent) or very satisfied (52 percent) (Appendix C). Approximately 80 percent of respondents reported receiving mentoring in publishing their work, study design, and data analysis and two-thirds reported receiving mentoring in generating and implementing project ideas (Figure 4). The percentage of respondents who were mentored in presentation skills or in the research areas outside of their project was lower, at 40-50 percent. Only about 10 percent of respondents received assistance with job searches. Note that we cannot determine from the data whether this form of mentoring was not sought, or was sought but not received.

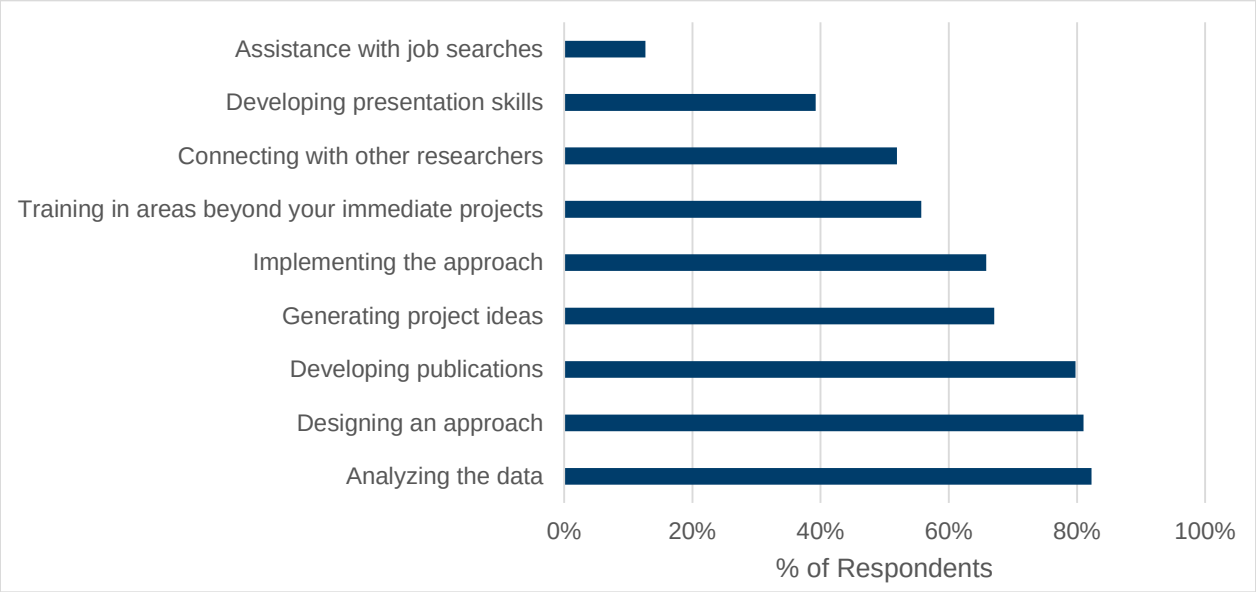
A few comments provided by respondents highlight the importance of mentoring to their career development:

> *"Dr. [NAME REMOVED] was an excellent mentor, and invaluable resource on topics ranging from grantsmanship to AHRQ funding priorities."*
>
> *"Without the protected time, mentoring, and resources from the K Award, my track record would be inconsistent, fragmented, and side-tracked with multiple little projects of little importance, or loss of an academic career."*
>
> *"My mentors are who I aspire to be as a mentor now myself-not only did they guide me in my career development but in my growth as a human being and professional adult. Their advice and support has allowed me to be successful despite many different personal challenges."*
>
> *"I am grateful beyond words for the K08 Award. It has allowed me time to pursue my goals and perform good research with excellent mentorship. It is also true that "when it rains it pours"--getting this K08 helped me achieve promotion, national speaker invites, continued emergence as a leader, and collaborations that I otherwise would not have been invited to."*

Several respondents (N=7) recommended that AHRQ provide more support in mentor identification and matching, and greater oversight of mentors and Awardees during the project period; respondents also recommended developing and disseminating information on best practices in mentoring.

Figure 4. Types of mentoring received by K01 and K08 awardees (N=79)

Q: In which of the following aspects of your training experience did you receive adequate help and mentoring? Select all that apply.



Data source: AHRQ K Program Grantee Survey

3.4 Impact of AHRQ K Award on Awardees' Career

"The K Award has provided me with the ability to attend key classes and meet with key individuals who have shaped and influenced my thinking, approach and area of study like no other grant has done."

"This Award allowed me to immerse myself in child health informatics and the child health EHR at a critical time for my professional career as well as the emerging technology. I would not be a full professor or national expert today if not for this Award."

3.4.1 Experience Gained

Using the survey, we measured self-reported acquisition or improvement of skills identified by the National Postdoctoral Association as important for successful careers.[3] Table 5 shows that respondents reported *improvement* at a minimum rate of 40 percent and *acquisition* within a range of 16–53 percent, of all skills presented in the survey. Importantly, not only did the AHRQ K Program Awardees became better scientists and communicators, which is expected from a research training experience, they also acquired or improved leadership and management skills, which are typically not taught in graduate or medical schools (Appendix C).

Quantitative survey data were supported by open-ended comments, in which respondents wrote that they learned how to manage and resolve conflicts, mentor and motivate others, work with individuals from different disciplines and cultural backgrounds, delegate responsibilities, and set goals.

3.4.2 Contribution of the Program to Grantee's Careers

When asked to estimate the role of the AHRQ K Award in career success, 91 percent of respondents reported significant and meaningful impact. Survey respondents said that the program contributed to their professional growth, research skill development, and career progression. Specific examples of benefits mentioned in the survey were protected time for research, recognition in professional communities, opportunities to increase training and learning, a "stepping stone" to other funding sources, and opportunities to pursue new areas of research. For example:

> *"The grant enabled me to have protected time from clinical responsibilities and seed funding to launch my research career- I now have two R01 grants - the preliminary data to justify these awards came from the K08."*

> *"I felt that the K08 put me on the map as an investigator, and it gave me time to improve my knowledge and skills. It led directly to an R01."*

Table 5. Knowledge and skills improved or acquired while funded by the AHRQ K Award

Q: Which of the following knowledge and skills have you acquired or improved while you were funded by the AHRQ K Award? Select all that apply.

Scientific Knowledge	Improved	Acquired
Using analytical approaches to define scientific questions	85%	49%
Designing appropriate studies to test scientific hypotheses	85%	46%
Interpreting and analyzing data	82%	49%
Gaining knowledge about my area of study	80%	53%
Research Skills	**Improved**	**Acquired**
Applying effective literature search strategies and critical evaluation of the scientific literature	85%	27%
Carrying out data analysis and interpretation	84%	43%
Implementing experimental design/protocols	78%	38%
Understanding principles of peer review process	76%	42%
Communications Skills	**Improved**	**Acquired**
Developing publications	91%	25%
Presenting research	86%	27%
Developing grant proposals	84%	41%
Developing career-related documents	82%	27%
Networking	75%	23%
Interacting with patients and other study participants	61%	20%
Teaching	56%	19%
Interviewing for jobs	43%	16%

Table 5. Knowledge and skills improved or acquired while funded by the AHRQ K Award (continued)

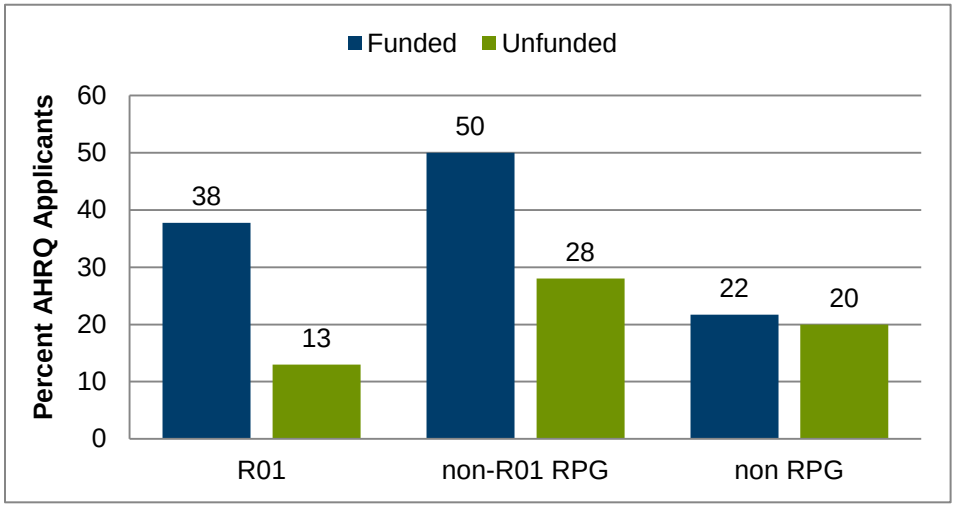
Leadership and Management Skills	Improved	Acquired
Creating a vision and setting goals	67%	39%
Delegating responsibilities	65%	28%
Motivating and inspiring others	61%	25%
Working with individuals of diverse gender, ethnic, cultural, and religious backgrounds	58%	25%
Running meetings	57%	30%
Mentoring and serving as a role model	57%	33%
Managing and resolving conflicts	54%	27%

3.5 Reported Career Outcomes

3.5.1 Follow-Up Post-AHRQ K Award Funding

Follow-up funding is critical to maintaining a research career and we examined the AHRQ K applicants' success in receiving grants. An application year or funding year was used as a starting point for counting grants for unfunded and funded applicants, respectively. Figure 5 shows that 38 percent of funded applicants received an R01, 50 percent received a non-R01 research project grant (RPG), and 22 percent received a non-RPG grant. Success rates for the first two types of grants were significantly better for funded than for unfunded AHRQ applicants (χ^2 test, p=0.0001 for R01 and p=0.0025 for non-R01 RPG); the difference for non-RPG grants was not significant (χ^2 test, p=0.39). In addition to the R01, the most commonly received grants included Exploratory/Development Research (R21) grants (12 percent of funded and 6 percent of unfunded) and Small Grant Program (R03) grants (8 percent of funded and 6 percent of unfunded). The AHRQ K Awardees also received significantly more grants, on average, than unfunded applicants: 2.7 versus 1.2 (ranked t-test, $p<0.01$). Finally, funding success rates were slightly higher for AHRQ than for NIH K Awardees (38 versus 31 percent), but the differences were not statistically significant.

Figure 5. Percent of AHRQ applicants receiving follow-up funding



Data source: AHRQ Gold Database and NIH RePORTer
Non-R01 RPGs: P01, P20, P30, P41, P50, P60, R03, R13, R15, R18, R21, R24, R25, R34, R43, R49, RC2, U01.
Non- RPGs: G08, G13, H79, I01, K01, K12, K18, K23, K24, K25, KM1, M01, U18, U24, U38, U48, U54, U59, UC1, UC4, UH2, T32, T35.

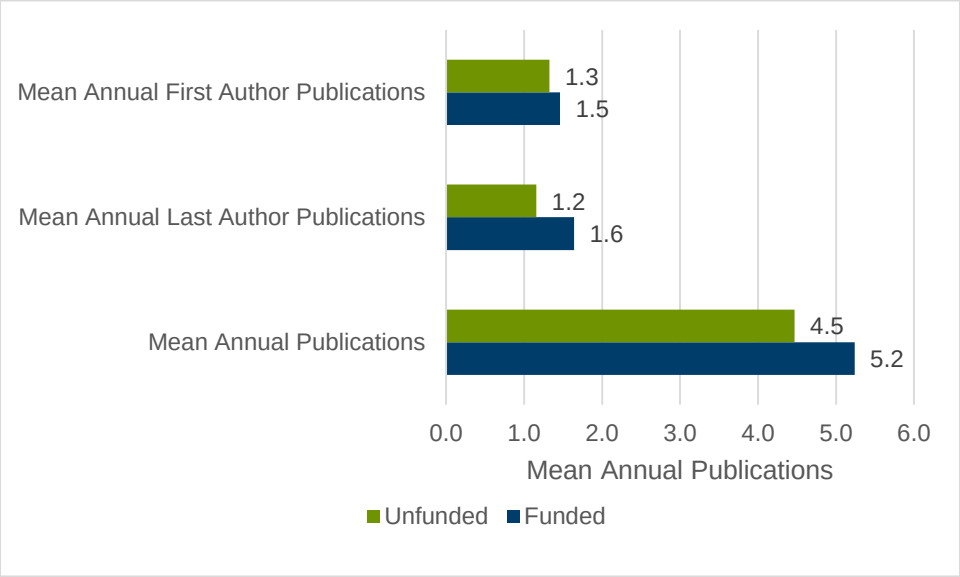
3.5.2 Plans to Apply for Additional Funding

Despite the competitive funding environment, 78 percent of survey respondents said that they were very likely and another 10 percent somewhat likely to apply for additional sources of support (see Appendix C). Respondents were particularly interested in applying for an independent research grant, such as an R01 (82 percent). About half also planned to apply for center grants, contracts, and cooperative agreements (Appendix C). Anticipated source of future funding included Federal Government (89 percent), foundations (81 percent), universities (41 percent), State or local governments (39 percent), and industry (32 percent) (Appendix C).

3.5.3 Publication Productivity

To examine whether funded and unfunded applicants differed in post-AHRQ K Award application publication productivity, we conducted PubMed searches using the applicants' names as queries. Because of the nature of the data available, the number of publications was counted starting with the application year for unfunded applicants and Award year for funded applicants through December 2014. During this timeframe, we found that the average number of publications per year was 5.2 for the AHRQ Awardees compared to 4.5 for the unfunded group, although the difference was not statistically significant (Figure 6). The Awardees were also more likely to be first authors (1.5 compared to 1.3, on average) and last authors (1.6 compared to 1.2). Publication productivity for those funded by AHRQ appeared to be lower than what has been reported for NIH (average of 10.2 per year); however, we are unsure whether the process for publication abstraction was the same between the two studies. Specifically, we do not know whether the NIH study excluded the outliers as we did and which significantly lowered the average in our analysis. Furthermore, the NIH study covered a different time period, which might have affected publication rates.

Figure 6. Mean number of publications for funded and unfunded AHRQ K program applicants



Data source: NCBI PubMed

Further, an AHRQ Information Resource Center query of Awardees' publications stemming from their AHRQ K Award-supported work revealed that a total of 1,332 publications acknowledged AHRQ K Award support; this finding yielded an average of eight (8) resulting publications and a per-grantee count ranging from 0 to 54 publications (24 grantees had no publications). AHRQ K Award-supported work, during the period of analysis, is published in excess of 300 peer-reviewed journals (Appendix D).

Open-ended comments provided in the survey offered some insights about Awardees' attitudes toward publishing. Some viewed the K Award as the time to focus on their research and writing, while others as an opportunity to explore new research avenues:

> *"Since this is a new area of study, and there was a lot of formative work to be done that doesn't necessarily lead to immediate publications, the K Award was critical in providing me with the salary support that I needed to continue research in this area."*

Awardees also commented about publishing challenges:

> *"I tried publishing a manuscript in six different journals and enrolled in a post-doctorate elective course which allowed me to finish the analysis and present the findings but this wasn't enough to ensure publication of our results."*

3.5.4 Contribution to Research, Policy, Practice, and System Capacity

The survey examined the impacts of training experience beyond publications and skill acquisition and significant findings emerged. Three-quarters of survey respondents said that the

training enabled them to apply their expertise in a multi-disciplinary environment (Appendix C). Virtually all reported having advanced their own field and nearly 60 percent reported having influenced another field. Respondents also appeared to have made a contribution to policy, through guidelines and standards (65 percent), systematic reviews (44 percent), reports (42 percent), educational materials (39 percent), legal documents (37 percent), and expert testimony (19 percent) and clinical practice, including adoption of new/improved service delivery methods (53 percent) and reduction in health care costs (38 percent). The most noteworthy examples of these contributions provided in the survey are included in Table 6.

Table 6. Examples of contributions to policy, practice, and system capacity as reported by survey respondents

Q: What would you consider your most important contribution to health services research, health care-related policy, practice, or system capacity to date? Please describe.

Policy and Practice Change
I evaluated treatment guidelines for the state of California's workers' compensation system, and our recommendations were put into practice, with ripple effects across the country.
My work on community health workers was the basis for a section in President Obama's Children's Health Insurance Program Reauthorization Act (CHIPRA) legislation.
Evidence for the high costs of homelessness on the health care system and the development of novel interventions that have now become standard policy.
Informing and influencing medication prescribing policy and practices in US, Canada, and EU.
Evidence for the high costs of homelessness on the health care system and the development of novel interventions that have now become standard policy.
Gout treatment guidelines and quality measures.
Use of venous access devices in hospitalized patients.
Use of clinical decision support standard called the "Infobutton Standard," which allows the delivery of information within Electronic Health Record (EHR) systems. Now required for EHR certification.
Establishment of community health infrastructure in New Orleans.
Implementing strategies to decrease inappropriate antibiotic prescribing.
Cost effective practice and appropriate use of medical imaging.

3.5.5 Challenges to Research Career

Challenges to sustaining a career in science are well-documented in the literature.[11] The survey explored whether AHRQ K Program Awardees have experienced and continue experiencing similar challenges by offering a menu of options.[12] Table 7 shows percent of respondents who have never experienced a given challenge, experienced it in the past, currently, or both. The table also shows whether the challenges have become more or less pervasive over time. We found that virtually all respondents have experienced and continue to experience all of the challenges that they were asked about and the challenges appeared to be consistent with the changes in career stage and personal life. Obtaining research funding was one of the most common challenges, reported by about a quarter of respondents; this challenge persisted over time. In contrast,

[11] For example, A.E. Preston. Leaving Science: Occupational Exit from Scientific Careers. Russell Sage Foundation. New York. 2004.
[12] Survey items were validated in the survey of participant in the NIH Extramural Loan Repayment program.

balancing research and administrative, teaching, clinical, and family responsibilities have dramatically increased from past to present. For instance, percent respondents who began experiencing challenges in balancing work and family has increased by 21 percent, from 11 percent in the past to 32 percent currently. On the other hand, the number of respondents with mentoring challenges decreased from 20 to 9 percent, which is also consistent with gaining independence. Reassuringly, fewer respondents are experiencing doubts about their ability to succeed as researchers than in the past.

Table 7. Challenges in establishing or maintaining research career. Presented in decreasing order for current challenge (N=79)

Q: Which of the following challenges have you experienced since receiving the AHRQ K Award in establishing or maintaining your research career? Select all that apply.

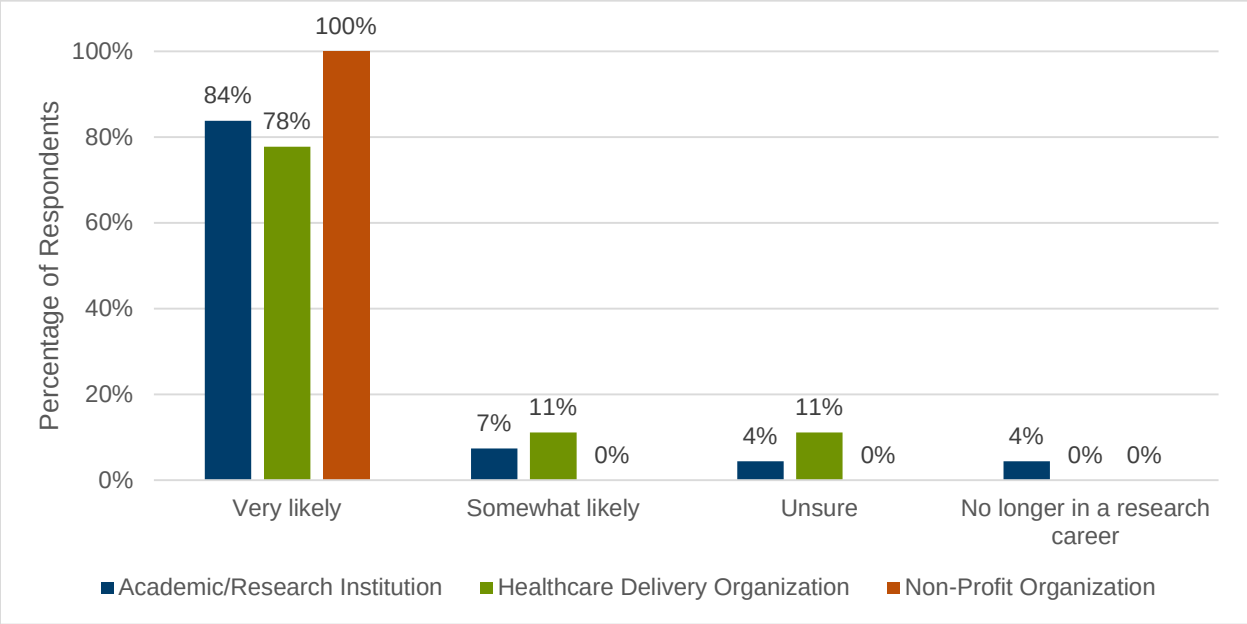
Challenge	Percentage of Respondents Experiencing Challenge				
	In the past A	At present B	Past and present C	Never D	Change over time B-A
Obtaining continued funding to support your research	28%	25%	23%	24%	-3
Finding a suitable position	16%	16%	11%	56%	0
Establishing collaborative relationships	8%	11%	13%	68%	+4
Finding/connecting with good mentors	20%	9%	10%	61%	-11
Recruiting talented students/postdocs	18%	27%	9%	47%	+9
Balancing research and clinical duties	19%	24%	18%	39%	+5
Balancing research and teaching responsibilities	14%	19%	14%	53%	+5
Balancing research and administrative duties	15%	39%	15%	30%	+14
Balancing work and family responsibilities	11%	32%	32%	25%	+21
Accommodating partner's career	8%	22%	18%	53%	+14
Inadequate pay	16%	15%	8%	61%	-1
Self-doubts about your ability to succeed in a research career	15%	10%	14%	61%	-5
Loss of interest in or motivation for a research career	4%	10%	1%	85%	+6
None	1%	3%	0%	5%	+2

3.5.6 Research Career Retention

Almost all respondents expressed intent to remain in a research career in the next 5 years: 83 percent said that it was very likely, 8 percent that it was somewhat likely, and 5 percent were unsure. We found no differences in the intent when the data were stratified by participants' organizational affiliations (Figure 7).

Figure 7. Plans to continue in a research career

Q: How likely are you to continue in a research career in the next 5 years?



Data source: AHRQ K Program Grantee Survey

Respondents who were no longer in a research career (4 percent or N=3) were asked to explain their decision to leave. The reasons provided included an inability to obtain a research position or additional funding and lack of necessary skills, support, or financial stability:

> *"It felt like falling off a cliff when my K Award ended. I always thought that my chances of an R01 after my K08 were good, but federal funding has become so difficult to obtain. It is hard to even encourage young people to even apply for the K, knowing that the R is unlikely. We need better support systems in place, and/or different models to assist young investigators…I adore research and miss my 'dream job' everyday, but until funding becomes realistic, we will continue to lose good investigators."*

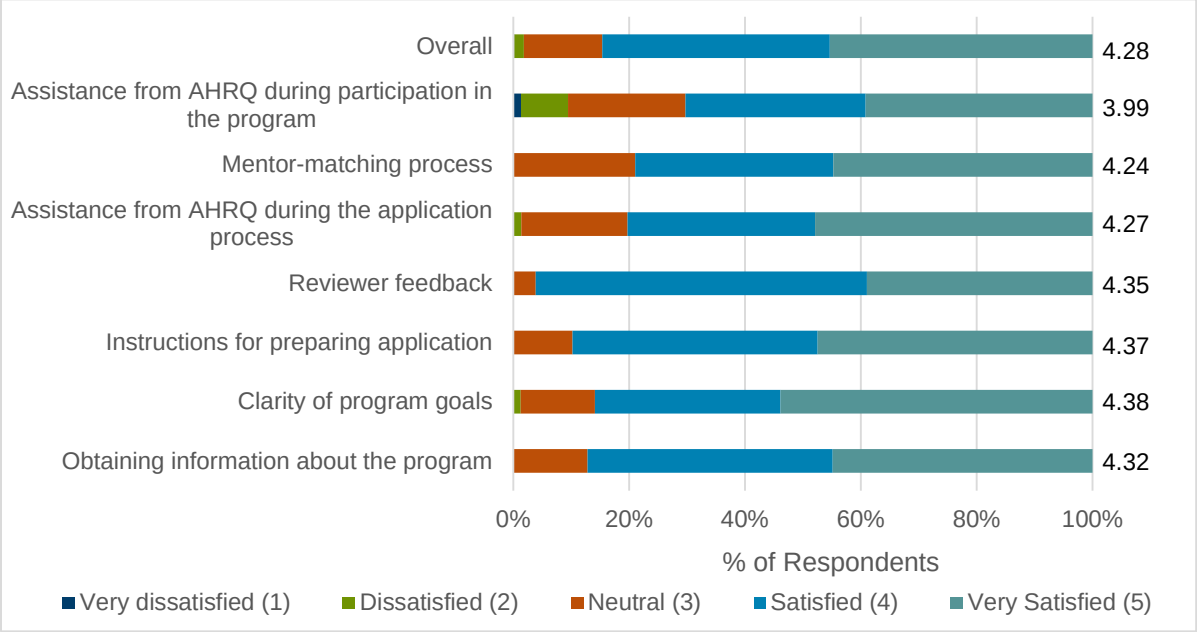
> *"My follow up funding opportunities are very limited and it's become a frustrating area of concern."*

3.6 Satisfaction with the K Award Program

Survey respondents expressed high levels of satisfaction with all aspects of the program, which was measured on a 5-point scale (1=very unsatisfied; 2=unsatisfied; 3=neutral; 4=satisfied; 5=very satisfied). Clarity of program goals received the highest score of 4.38 out of 5.00, followed closely by instructions for preparing the application (4.37) and reviewer feedback (4.35) (Figure 8). The level of assistance from AHRQ during participation was given the lowest score of 3.99.

Figure 8. Level of program satisfaction conveyed in the survey of awardees (N=79)

Q: How satisfied were you with the following aspects of the application process?



Data source: AHRQ K Program Grantee Survey

Additional information about program satisfaction, as well as unmet needs of AHRQ K Program Awardees, can be gleaned from the comments provided in the survey. A few example comments are included below:

> *"The protective time to dedicate to research, to have access to great mentors and the freedom to pursue my own research interests has been fantastic."*

> *"My K-award had a tremendously positive impact on my career. Beyond keeping me in the field of research, it gave me a substantial opportunity to improve my professional and personal skills that have been translated into other values benefiting a number of individuals and organizations beyond me."*

Some survey respondents expressed dissatisfaction with the program and grant management process. The challenges experienced included lengthy and complicated application (N=8), lack of communication during the grant management process (N=6), and difficulty maintaining commitment from mentors (N=10). Additionally, some respondents noted difficulties of maintaining a research career on the limited salary provided by the AHRQ K Program (N=7). One respondent wrote:

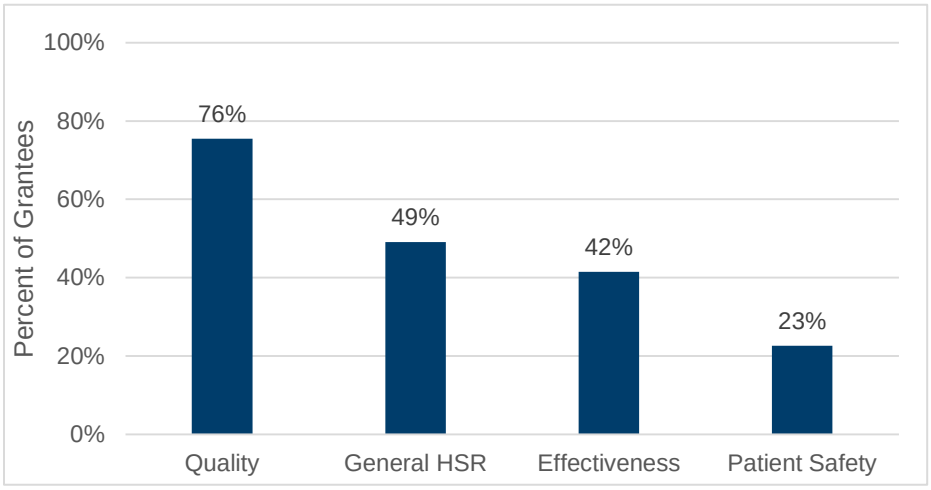
"The K01, through mentorship and protected time, enabled me to keep my job, grow an invaluable professional network, allowed for work/family life balance, and brought recognition to me within my institution for a tenure system position. I am so grateful to AHRQ for the opportunity."

"The program has limited funding and does not adequately cover 75 percent of a salary. It would be good to have yearly staggered increases in funding and salary, based on progress and merit."

3.7 Alignment of AHRQ K Award Funded Research with AHRQ Core Priorities

One of the evaluation objectives was to determine whether and to what extent the funded projects address AHRQ's strategic goal core priority areas; we analyzed the distribution priority codes. Figure 9 shows that nearly all funded proposals addressed quality of care; general health services research and health care effectiveness were addressed in 49 percent and 42 percent of proposals, respectively. Approximately a quarter of proposals included studies on patient safety.

Figure 9. Alignment of AHRQ K Award funded research With AHRQ priority areas (N=106)



Data source: AHRQ K Program Database
HSR: health services research. This category combined equity, affordability, and access.

4. Summary and Conclusions

We used a mixed-method design to characterize return on investment for the AHRQ K Award Program. We found strong evidence of the program positively impacting participants' careers and professional goals. First, 55 to 85 percent of Awardees reported that the funding enabled them to acquire or improve research, leadership, and management skills, which are considered necessary for a successful research career.

Second, 83 percent of survey respondents planned to continue in the research career over the next 5 years. Assuming that all the survey non-respondents left research (the worst case scenario which is unlikely to be true), this represents a retention rate of 62 percent. Career challenges reported by respondents and the pattern of changes in these challenges over time were consistent with their maturation from junior to more senior researchers.

"A first step. The first step is necessary to begin a journey. I am so thankful to AHRQ for the opportunity they provided to me."

Third, success rates for follow-up R01s and publication productivity were significantly higher for funded AHRQ Awardees than for unfunded applicants, and were slightly higher for AHRQ than for NIH K Awardees. While we do not have the data to attribute these positive outcomes to the AHRQ funding conclusively, 91 percent of respondents reported that the Award had a significant and meaningful impact.

Survey respondents reported contribution to research, policy, practice, and system capacity resulting from the AHRQ K Award funding. These included informing guidelines and standards (65 percent), systematic reviews (44 percent), reports (42 percent), educational materials (39 percent), legal documents (37 percent), and expert testimony (19 percent). The Awardees also indicated having made a significant contribution to changing clinical practice, including adoption of new or improved service delivery methods (53 percent) and reduction in certain health care costs (38 percent). Finally, most survey respondents indicated that the training impact extended beyond their immediate discipline.

4.1 Program Challenges

Despite the overwhelming positive feedback from survey respondents, some weaknesses were also noted. Several grantees conveyed challenges encountered during the application and project period, calling for a more streamlined application approach and improved communication with AHRQ. Others noted the need to clarify eligibility criteria for each Award. Additionally, respondents noted a need for increased oversight of mentors, dissemination of best practices in mentoring, and assistance with finding a new mentor when necessary. Finally, respondents noted that the funding available to researchers does not adequately cover 75 percent of an investigator's salary.

The need for an enhanced sense of community among AHRQ K Program Awardees was reported as an area of opportunity for AHRQ, to connect researchers on an informal level for resource and idea sharing as well as for peer support. Several respondents requested that AHRQ provide additional funds for continuing education classes as well as opportunities to convene Awardees for career development trainings and/or annual in-person meetings.

4.2 Study Limitations

The study had several limitations. First, the populations of Awardees and unfunded applicants are relatively small, which limited our ability to stratify the data and diminished statistical power (in particular, there were only three (3) Awardees under the K01 program). Second, abstraction of publication data was limited by several factors, including under-reporting due to name changes and false positive hits resulting from common names. Third, the comparisons to the NIH K program was limited by differences in data collection, granularity of available data, period of analysis, and cohort size. Fourth, weaker performance of AHRQ unfunded applicants compared to grantees observed in the study might have been due to their characteristics as researchers rather than non-participation. Fifth, AHRQ K Awardee survey data were self-reported and might have been positively biased. Finally, we were unable to achieve a 100 percent response rate to the survey, and it is possible that outcomes of non-respondents are different than those of respondents.

4.3 Conclusion

Despite these limitations, we concluded that the AHRQ K Award Program is an important contributor to advancing the careers of independent health services researchers and is reasonably well aligned with AHRQ's core priority areas. Two Awardees eloquently conveyed the actionable impact as well as the need to continue this important program:

> *"Tremendously valuable to an early investigator. Research skills transferred readily into operational work driving quality and patient safety improvements."*

> *"Fantastic program. There is a tremendous need for more researchers with expertise in patient safety and health services research. Without rigorous grounding in research methods, as well as training in quality improvement and comparative effectiveness, it is difficult for young faculty to effectively study and improve the systems of care in which they work. AHRQ is perfectly positioned to support development of such a cohort of physician-researchers, who are very much needed. The K Award Program should be vigorously supported if the U.S. is serious about improving the quality of care and the health of our people, and reducing the cost of care."*

Appendix A. List of Data Fields Included In The AHRQ Database

Table A1. Fields Included in the AHRQ Database

AHRQ Database	Identified Additional Variable	Unfunded AHRQ Applicants	NIH Comparison Data (Aggregate Form)
ID Number			
Name		X	
Gender			X
Age in 2014			X (age)
Current Email Address			
Funding Status	X	X	
AHRQ Grant Number		X	
Grant Mechanism		X (year applied)	
Year Funded		X	
Total Number of Years Funded			
Grant Status	X	X	
K Award Project Title		X	
Retired			
Deceased			
Unable to Find			
Budget Source	X		
Involvement of AHRQ Priority Populations (PP)	X		
Funded Re-Submissions Within Evaluation Timeframe	X		
Funded Re-Submission but End Date Beyond Evaluation Timeframe	X		
Discipline1			
Discipline2			
Highest Degree 1			X
Highest Degree 2			
Year of Highest Degree 1			
Year of Highest Degree 2			
Other Degree 1			X
Other Degree 2			
Year of Latest Other Degree			
Grantee's Position Title at Time of Award			
Name of Grantee's Institution at Time of K Award			

AHRQ Database	Identified Additional Variable	Unfunded AHRQ Applicants	NIH Comparison Data (Aggregate Form)
Grantee's City at Time of K Award			
Grantee's State at Time of K Award			
Employment sector at the time of Award	X		
Institution Type at Time of Award	X		
Current Employment Position Title 1			
Current Employment Position Title 2			
Current Employment Type 1	X		
Current Employment Type 2	X		
Current Employment Institution 2			
Current Employment Institution 2			
Current Employment Sector	X		
Current Employment Sector Description	X		
Grantee's Current City			
Grantee's Current State			
Distinguished Position	X		
Number of First Author Pubs at Time of K Program Application		X	
Number of Last Author Publications at Time of K Program Application	X	X	
Number of Publications at Time of K Program Application		X	
Number of First Author Publications After Receipt of K Award		X	
Number of Last Author Publications After Receipt of K Award	X	X	
Number of Publications After Receipt of K Award		X	X
Average Number of Publications per Year After Receipt of Award	X	X	X
Total Number of First Author Publications	X	X	
Total Number of Last Author Publications	X	X	
Total Number of Publications	X	X	X
Proportion of First/Last Author Publications	X		
Number of Grants Received before K Award	X		

AHRQ Database	Identified Additional Variable	Unfunded AHRQ Applicants	NIH Comparison Data (Aggregate Form)
Number of Grants Received since K Award		X (since application)	X
Total Number of Grants Received	X	X	X
Type of Grants Received	X	X	X
Amount of Grant Dollars Awarded			
News Impact of Research			
Present Status			
Present Research Interests			
URL			
Alignment with AHRQ's Strategic Goal Areas	X		
AHRQ Priority Populations			
Unfunded Re-Submissions Within Evaluation Timeframe	X		
Unfunded First Submissions with No Re-Submission At Any Time	X		

Appendix B. AHRQ K Program Grantee Questionnaire

Your responses will be kept confidential to the extent permitted by law, including AHRQ's confidentiality statute, 42 USC 299c-3(c).

SECTION 1: SATISFACTION WITH THE APPLICATION AND GRANT MANAGEMENT PROCESS

1. How satisfied were you with the following aspects of the application process? Select one answer per row.

	Not Applicable	***Very Dissatisfied ⇨ (Go to 1A)***	***Dissatisfied ⇨ (Go to 1A)***	***Neutral***	***Satisfied***	***Very Satisfied***
Obtaining information about the program	☐	☐	☐	☐	☐	☐
Clarity of program goals	☐	☐	☐	☐	☐	☐
Instructions for preparing application	☐	☐	☐	☐	☐	☐
Reviewer feedback	☐	☐	☐	☐	☐	☐
Assistance from AHRQ during the application process	☐	☐	☐	☐	☐	☐
Mentor-matching process	☐	☐	☐	☐	☐	☐
Assistance from AHRQ during participation	☐	☐	☐	☐	☐	☐

1A. If you were dissatisfied with one or more of the above, please indicate the item(s) and explain why:

SECTION 2: PARTICIPANT EXPERIENCE AND CAREER PLANS

2. Which of the following knowledge and skills have you acquired or improved while you were funded by the AHRQ K Award? Select all that apply.[13]

	Acquired Knowledge/Skills	Improved Knowledge/Skills
Scientific Knowledge		
Gaining knowledge about my area of study	☐	☐
Using analytical approaches to define scientific questions	☐	☐
Designing appropriate studies to test scientific hypotheses	☐	☐
Interpreting and analyzing data	☐	☐
Other: Click here to enter text.	☐	☐
Research Skills		
Implementing experimental design/protocols	☐	☐
Carrying out data analysis and interpretation	☐	☐
Applying effective literature search strategies and critical evaluation of the scientific literature	☐	☐
Understanding principles of peer review process	☐	☐
Other: Click here to enter text.	☐	☐
Communications Skills		
Developing publications	☐	☐

[13] Core competencies of a successful scientist. Developed by the National Postdoctoral Association. http://www.fhcrc.org/en/education-training/oscd/core-competencies.html

	Acquired Knowledge/Skills	Improved Knowledge/Skills
Developing grant proposals	☐	☐
Developing career-related documents (e.g., CVs, biosketches, research plans)	☐	☐
Presenting research	☐	☐
Interviewing for jobs	☐	☐
Teaching	☐	☐
Networking	☐	☐
Interacting with patients and other human objects	☐	☐
Other: Click here to enter text.	☐	☐
Leadership and Management Skills		
Creating a vision and setting goals	☐	☐
Running meetings	☐	☐
Delegating responsibilities	☐	☐
Motivating and inspiring others	☐	☐
Mentoring and serving as a role model	☐	☐
Working with individuals of diverse gender, ethnic, cultural, and religious backgrounds	☐	☐
Managing and resolving conflicts	☐	☐
Other: Click here to enter text.	☐	☐

3. What were your short-term goals when you applied to this program? Select all that apply.[14]
   - ☐ Gain scientific knowledge
   - ☐ Develop or improve research skills
   - ☐ Develop or improve communication skills
   - ☐ Develop or improve leadership and management skills
   - ☐ Gain guidance and mentoring
   - ☐ Author publications and presentations
   - ☐ Other, please explain: Click here to enter text.

4. What were your long-term goals when you applied to this program? Select all that apply.[15]
   - ☐ Advance my field of study
   - ☐ Maintain position within academia
   - ☐ Obtain independent research position
   - ☐ Obtain follow-up funding support
   - ☐ Improve the quality of patient care
   - ☐ Other, please explain: Click here to enter text.

5. To what extent were you able to achieve the short-term and long-term goals that you set? Select one.[1]

	Short-Term Goals	Long-Term Goals
Not at all	☐	☐
Somewhat	☐	☐
Mostly	☐	☐
Completely	☐	☐
Exceeded all goals	☐	☐

6. What is your level of satisfaction with the mentoring that you received during your K Award? Select one.
   - ☐ Very dissatisfied ⇨ (Go to 6A)
   - ☐ Dissatisfied ⇨ (Go to 6A)
   - ☐ Neutral
   - ☐ Satisfied
   - ☐ Very satisfied
   - ☐ NA

[14] This question was asked in the survey of the NIH Diversity Supplement Program participants.
[15] This question was asked in the survey of the NIH Diversity Supplement Program participants.

6A. If you were dissatisfied with your mentor(s), please explain why you were dissatisfied and how your mentor(s) could have been more helpful to you.

7. In which of the following aspects of your training experience did you receive adequate help and mentoring? Select all that apply.

☐ Generating project ideas

☐ Designing an approach

☐ Implementing the approach

☐ Analyzing the data

☐ Developing publications

☐ Developing presentation skills

☐ Assistance with job searches

☐ Connecting you with other researchers

☐ Educating you in areas beyond your immediate projects

☐ Other: Click here to enter text.

8. How likely are you to continue in a research career in the next five years? Select one.[3]

☐ I am no longer in a research career ⇨ (Go to 8A)

☐ Very unlikely ⇨ (Go to 8B)

☐ Somewhat unlikely ⇨ (Go to 8B)

☐ Unsure ⇨ (Go to 8B)

☐ Somewhat likely

☐ Very likely

8A. Why did you leave your research career?

8B. You indicated that you are Click here to enter text. [option selected] to continue in a research career. Why?

9. How likely are you to apply for another research grant or contract? Select one.

☐ Very unlikely ⇨ (Go to 9A)

☐ Somewhat unlikely ⇨ (Go to 9A)

☐ Unsure ⇨ (Go to 9A)

☐ Somewhat likely (Go to 10 and 11)

☐ Very likely (Go to 10 and 11)

9A. You indicated that you are Click here to enter text. [option selected] to apply for additional funding. Why?

10. For which of the following research grants or contract are you likely to apply?

☐ Independent Research grant (e.g., R01, R03, etc.)

☐ Research Programs Projects and Center Grants (e.g., P)

☐ Training grant (e.g., K, T)

☐ Cooperative agreement (e.g., U)

☐ Contract

☐ Other: Click here to enter text.

11. What type of funding source administers the grant or contract opportunity you intend to pursue?

☐ Federal Government

☐ State or Local Government

☐ University

☐ Foundation

☐ Industry

☐ Other: Click here to enter text.

12. Which of the following challenges have you experienced since receiving the AHRQ K Award in establishing or maintaining your research career? Select all that apply.[16]

	Previously Experienced	Currently Experiencing
Obtaining continued funding to support your research	☐	☐
Finding a suitable position that matches your interests and facilitates continued professional growth	☐	☐
Establishing collaborative relationships with other researchers in your field	☐	☐
Finding/connecting with good mentors	☐	☐
Recruiting talented students/postdocs to your research group	☐	☐
Balancing research and clinical duties	☐	☐
Balancing research and teaching responsibilities	☐	☐
Balancing research and administrative duties	☐	☐
Balancing work and family responsibilities	☐	☐
Accommodating your spouse's or partner's career	☐	☐
Inadequate pay	☐	☐
Self-doubts about your ability to succeed in a research career	☐	☐
Loss of interest in or motivation for a research career	☐	☐
None	☐	☐
Other: Click here to enter text.	☐	☐

[16] This question was adapted from a survey of participants in the NIH Loan Repayment Program

SECTION 3: THE IMPACT OF THE AHRQ K AWARD ON YOUR CAREER

13. What has been the most important contribution of the AHRQ K Award to your career? Please describe.

14. How valuable has the AHRQ K Award been in your career success? Select one.

☐ Too early to tell

☐ Not at all valuable

☐ Somewhat valuable ⇨ (Go to 15A)

☐ Very valuable ⇨ (Go to 15A)

14A. Do you attribute achieving any of the following career landmarks to your receipt of the AHRQ K Award? Select all that apply.

Career Indicator	K Award Contribution
Attainment of a faculty position	☐
Receipt of tenure	☐
Increased salary	☐
Receipt of additional research funding	☐
Publication of peer-reviewed articles and/or books	☐
Establishment of an independent health services research program	☐
Employment of additional researchers and support staff	☐
Receipt of professional honors or distinctions	☐
Service on editorial boards, peer review panels, advisory councils	☐
Appointment as department/division chair, dean, provost, president, or other leadership position	☐
Appointment as mentor to other researchers	☐

15. Which of the following best describes current your work? Select all that apply.

☐ I am still participating in the K program

☐ Research

☐ Clinical

☐ Teaching

☐ Administration

☐ Other: Click here to enter text.

16. How would you describe your primary workplace environment? Select all that apply.

☐ Academia

☐ Clinical Practice

☐ Private Industry

☐ Professional Society

☐ Federal Government

☐ State or Local Government

☐ Other: Click here to enter text.

17. How would you describe your secondary workplace environment? Select all that apply.

☐ Academia

☐ Clinical Practice

☐ Private Industry

☐ Professional Society

☐ Federal Government

☐ State or Local Government

☐ Other: Click here to enter text.

☐ NA

18. To what extent has your K grant experience enabled you to apply your health services research expertise within an inter- or multi-disciplinary environment?

☐ Not at all

☐ To some extent

☐ To a considerable extent

19. With what other disciplines have you collaborated during your post K Award career? Please list up to three (3) disciplines.

20. Do you think the AHRQ K Award has enabled you to achieve or contribute to any of the following? Select all that apply.[17]

Area	
Advancement of your field	☐
Influence on another field	☐
Contributions to a systematic review	☐
Contributions to clinical, educational, or other guidelines or standards	☐
Contributions to laws or policies	☐
Contributions to government reports	☐
Development of factsheets, newsletters or other educational materials	☐
Provision of expert testimony	☐
Development and testing of new or improved tools, devices, tests, measures, services, or screening approaches to identify, confirm, treat, or manage disease or disability	☐
Adoption of new or improved delivery methods for care or services	☐
Reduction in the cost of care or services	☐

21. What would you consider your most important contribution to health services research, health care-related policy, practice, or system capacity to date? Please describe.

[17] This question was adapted from a survey to evaluate the research program at the Department of Education

For items 22 through 25, please refer to the following scale:

0%	50%	100%
Not At All Valuable	Neutral	Extremely Valuable

Please indicate what percentage you would assign to reflect the value of the AHRQ K Grant Award Program to your:

22. Research Skills Development: Click here to enter text.%
23. Career Progression: Click here to enter text.%
24. Professional Growth: Click here to enter text.%

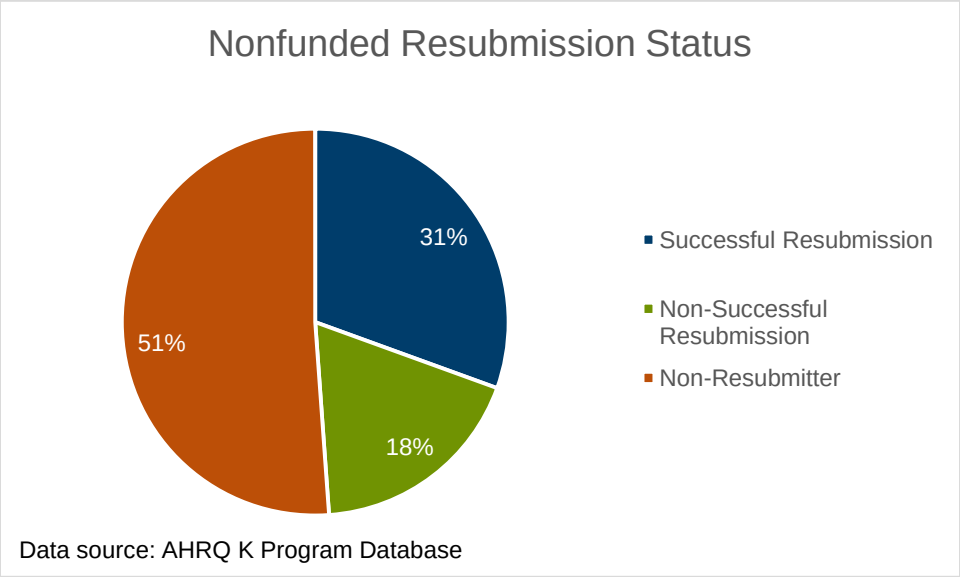
25. Overall, what percentage would you assign to the value of having received the AHRQ K Grant Award? Click here to enter text.%

SECTION 4: CONCLUDING QUESTIONS

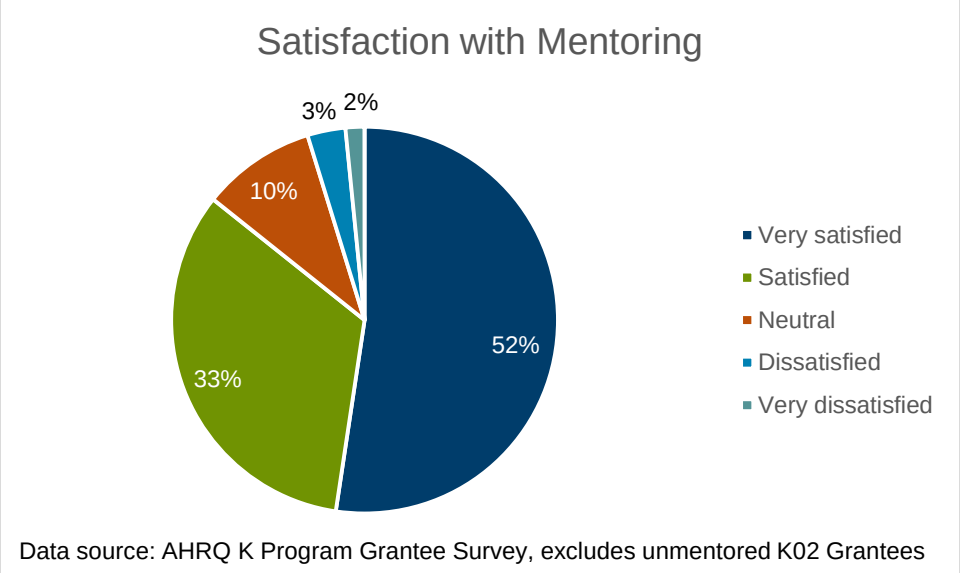
26. Is there anything else you would like to convey to AHRQ about your K program participation or its effects on your career?

27. Based on your experiences with the K Award, do you have any suggestions, comments, or criticisms to offer about both the strengths and weaknesses of the K Award program? (Your advice will be greatly valued.)

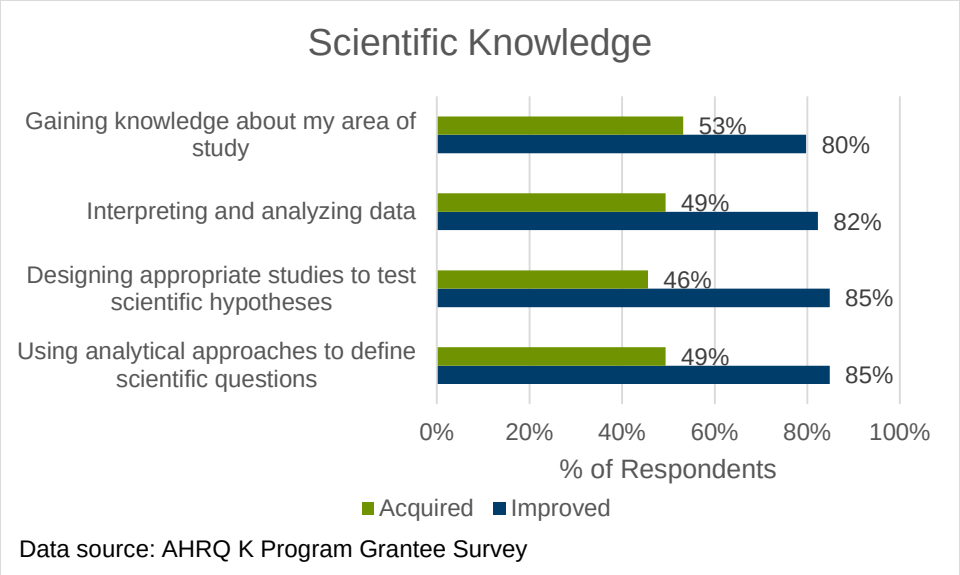
Appendix C. Additional Data Referenced in Report



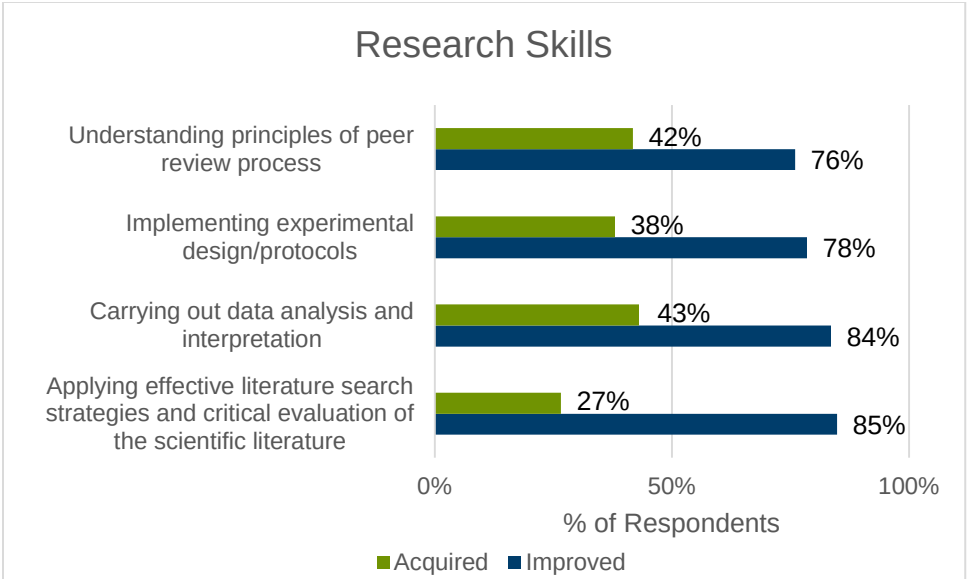
Data source: AHRQ K Program Database



Data source: AHRQ K Program Grantee Survey, excludes unmentored K02 Grantees



Data source: AHRQ K Program Grantee Survey



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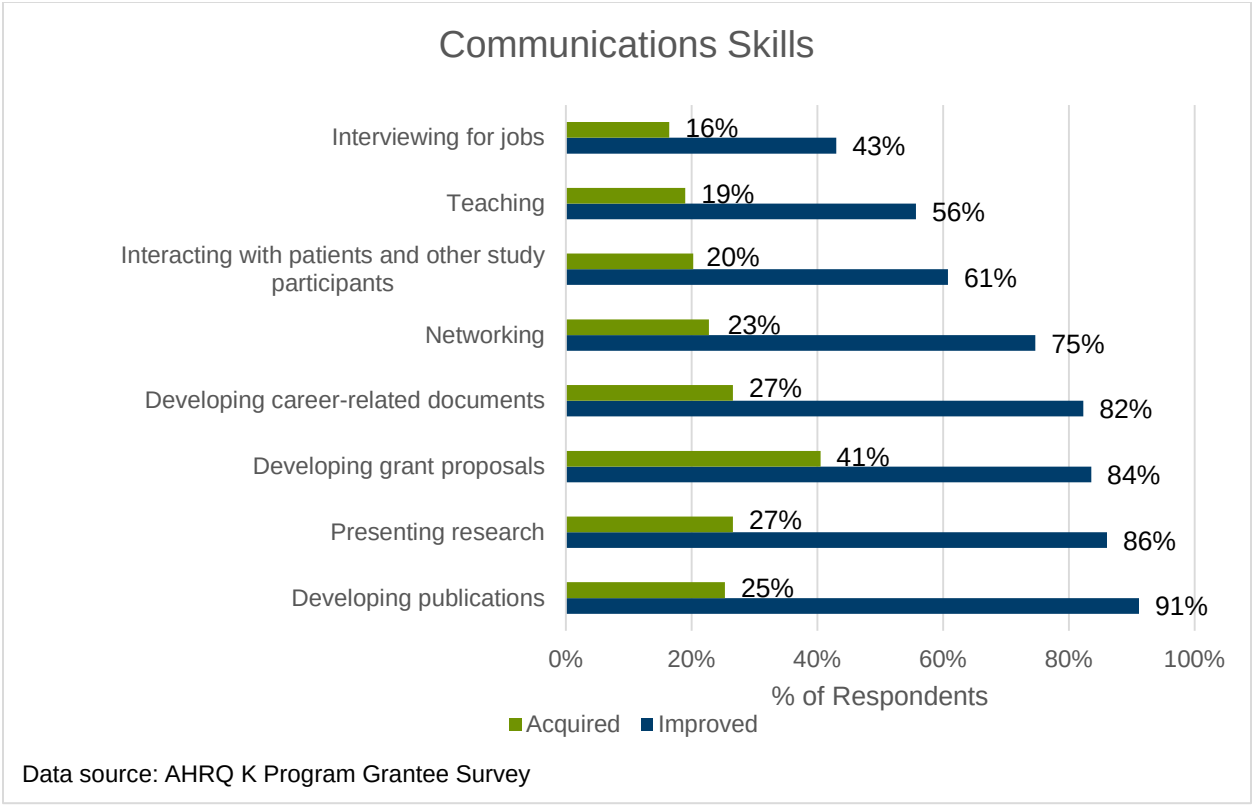

Data source: AHRQ K Program Grantee Survey

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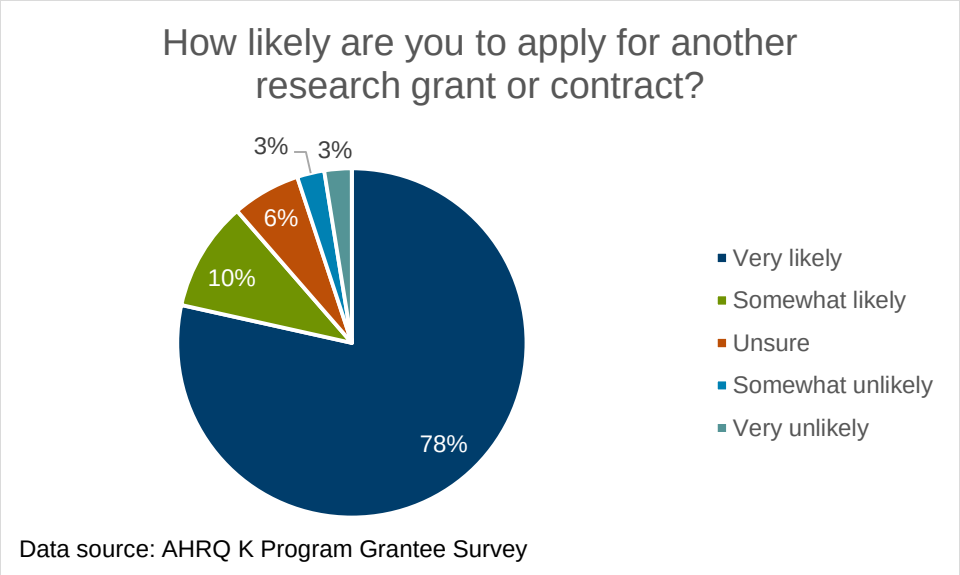
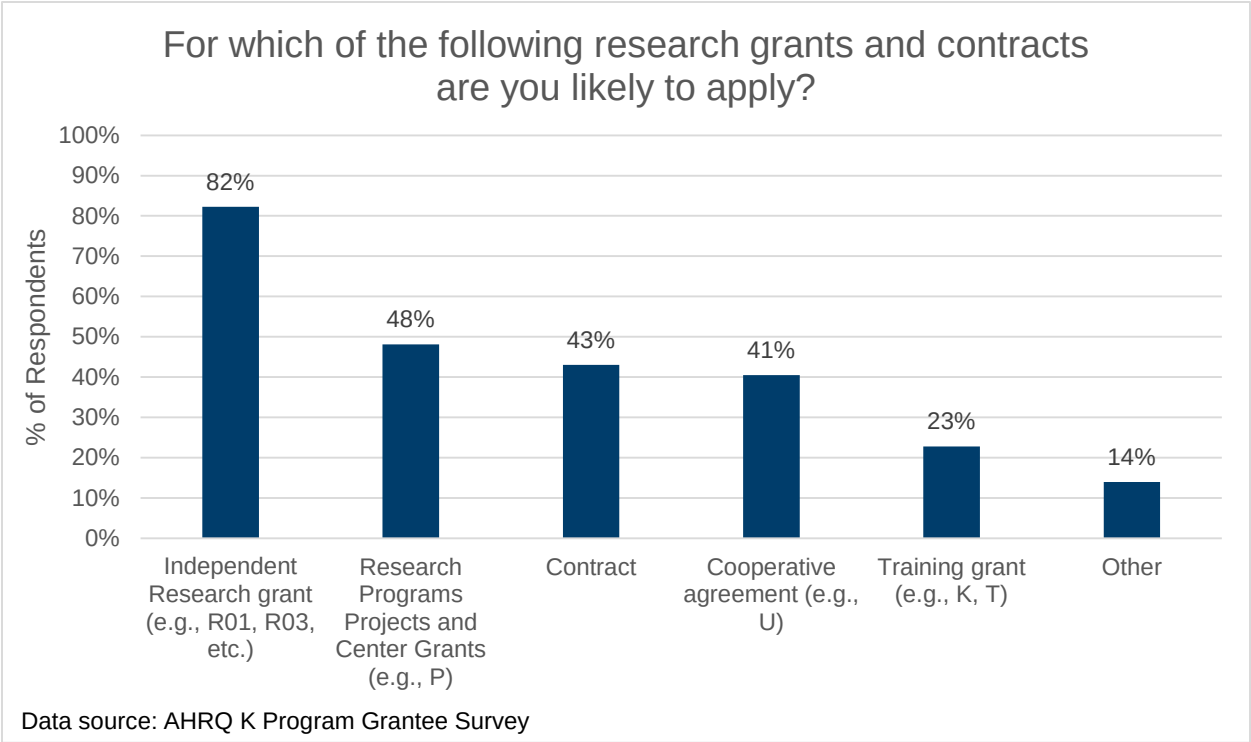
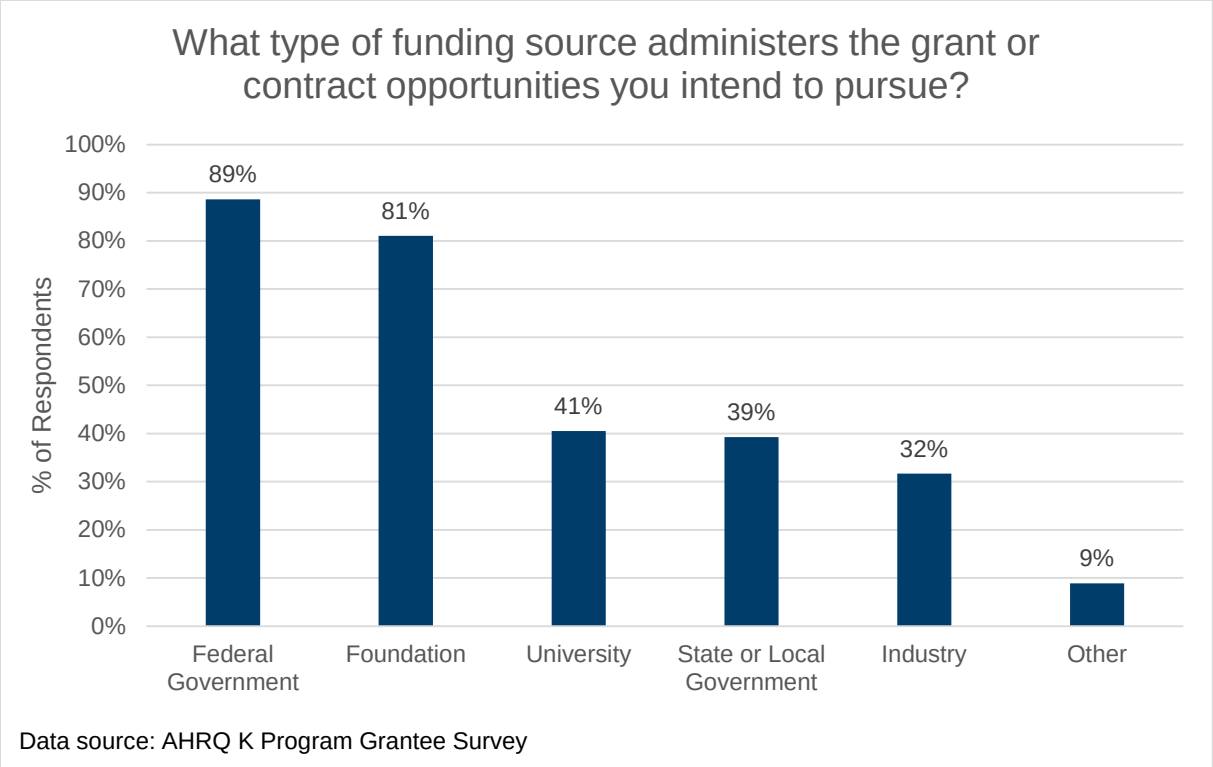


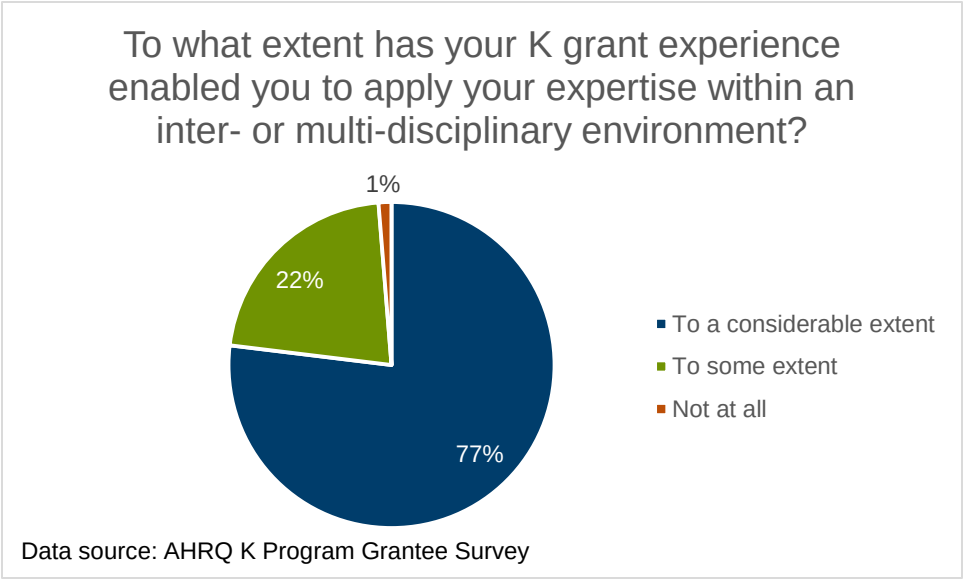
Data source: AHRQ K Program Grantee Survey



Data source: AHRQ K Program Grantee Survey



Data source: AHRQ K Program Grantee Survey



Data source: AHRQ K Program Grantee Survey

Appendix D. List of Peer-Reviewed Journals in Which AHRQ K Awardees Have Published

A

Academic Emergency Medicine
Academic Medicine
Academic Pediatrics
Academic Radiology
Advances in Nursing Science
AIDS and Behavior
AIDS Patient Care and STDS
Alimentary Pharmacology and Therapeutics
Alzheimer's & Dementia
Ambulatory Pediatrics
American Heart Journal
American Journal of Bioethics
American Journal of Cardiology
American Journal of Emergency Medicine
American Journal of Epidemiology
American Journal of Gastroenterology
American Journal of Health Promotion
American Journal of Health-System Pharmacy
American Journal of Hematology
American Journal of Hospice and Palliative Care
American Journal of Hypertension
American Journal of Infection Control
American Journal of Kidney Diseases
American Journal of Law and Medicine
American Journal of Managed Care
American Journal of Medicine
American Journal of Medical Quality
American Journal of the Medical Sciences
American Journal of Obstetrics and Gynecology
American Journal of Orthopedics (Belle Mead, N.J.)
American Journal of Pharmaceutical Education
American Journal of Preventive Medicine
American Journal of Public Health
American Journal of Respiratory and Critical Care Medicine
American Journal of Rhinology
American Journal of Roentgenology
American Journal of Transplantation
American Psychologist
AMIA ... Annual Symposium proceedings
Anesthesia and Analgesia
Annals of Allergy, Asthma, and Immunology
Annals of the American Thoracic Society
Annals of Emergency Medicine
Annals of Family Medicine
Annals of Internal Medicine
Annals of Plastic Surgery
Annals of the Rheumatic Diseases
Annals of Surgery
Annals of Thoracic Surgery
Annual Review of Public Health
Antimicrobial Agents and Chemotherapy
Applied Clinical Informatics
Applied Ergonomics
Applied Health Economics and Health Policy
Archives of Disease in Childhood: Fetal and Neonatal Edition
Archives of Gerontology and Geriatrics
Archives of Internal Medicine
Archives of Neurology
Archives of Otolaryngology - Head and Neck Surgery
Archives of Pathology and Laboratory Medicine
Archives of Pediatrics and Adolescent Medicine
Archives of Physical Medicine and Rehabilitation
Archives of Surgery
Arthritis Care & Research
Arthritis and Rheumatism

B

Best Practice & Research: Clinical Obstetrics & Gynecology
Birth
BJOG: An International Journal of Obstetrics and Gynecology
BMC Family Practice
BMC Geriatrics
BMC Health Services Research
BMC Infectious Diseases
BMC Medicine
BMC Medical Informatics and Decision Making
BMC Medical Research Methodology
BMC Pediatrics
BMC Research Notes
BMJ
BMJ Open
BMJ Quality & Safety
Bone
Breast Journal
Breastfeeding Medicine

C

Canadian Family Physician
Cancer
Cancer Causes and Control
Cancer Detection and Prevention
Cancer Epidemiology, Biomarkers and Prevention
Cancer Treatment Reviews
Cardiorenal Medicine
Cardiovascular Revascularization Medicine
Chest
Circulation
Circulation: Cardiovascular Interventions
Circulation: Cardiovascular Quality and Outcomes
Circulation: Heart Failure
Cleft Palate-Craniofacial Journal
Clinical Cardiology
Clinical Gastroenterology and Hepatology
Clinical Infectious Diseases
Clinical Journal of the American Society of Nephrology
Clinical Orthopedics and Related Research
Clinical Pediatrics
Clinical Pharmacology and Therapeutics
Clinical Respiratory Journal
CMAJ
Comprehensive Therapy
Contraception
Critical Care Medicine
Current Cardiology Reports
Current Diabetes Reviews
Current Opinion in Critical Care
Current Opinion in Rheumatology

D

Diabetes Care
Diabetes Educator
Diabetes Technology & Therapeutics
Diagnostic Microbiology and Infectious Disease
Drugs

E

Emerging Infectious Diseases
Emergency Medicine
Emergency Medicine Journal

Epidemiology
Ergonomics
European Journal of Nuclear Medicine and Molecular Imaging
Evaluation and the Health Professions
Expert Review of Vaccines

F

Family Medicine
Food and Drug Law Journal
Future Microbiology

G

Gastroenterology
Gastroenterology Clinics of North America
Gastrointestinal Endoscopy
General Hospital Psychiatry
Gerontologist
Gut

H

Health Affairs
Health Care Management Review
Health Expectations
Health and Quality of Life Outcomes
Health Services Research
Health and Social Work
Heart
Heart Rhythm
HERD
Hypertension

I

Infection Control and Hospital Epidemiology
Informatics in Primary Care
Inquiry
International Journal of Dermatology
International Journal of Health Geographics
International Journal of Medical Informatics
International Journal of Medical Sciences
International Journal of Nursing Studies
International Journal for Quality in Health Care
International Urogynecology Journal
Intensive Care Medicine
Issues in Comprehensive Pediatric Nursing

J

JAMA
JAMA Internal Medicine
JAMA Otolaryngology-- Head & Neck Surgery
JAMA Pediatrics
JAMA Surgery
Joint Commission Journal on Quality and Patient Safety
Joint Commission Journal on Quality and Safety
Journal of Acquired Immune Deficiency Syndromes
Journal of Adolescent Health
Journal of Advanced Nursing
Journal of Allergy and Clinical Immunology
Journal of Alternative and Complementary Medicine
Journal of Ambulatory Care Management
Journal of the American Academy of Dermatology
Journal of the American Board of Family Medicine
Journal of the American College of Cardiology
Journal of American College of Health
Journal of the American College of Radiology
Journal of the American College of Surgeons
Journal of the American Geriatrics Society
Journal of the American Heart Association
Journal of the American Medical Directors Association
Journal of the American Medical Informatics Association
Journal of the American Pharmacists Association
Journal of Antimicrobial Chemotherapy
Journal of Arthroplasty
Journal of Asthma
Journal of Bioethical Inquiry
Journal of Biomedical Informatics
Journal of Biopharmaceutical Statistics
Journal of Cancer Education
Journal of Cancer Survivorship
Journal of Cardiac Failure
Journal of Cardiac Surgery
Journal of Cardiothoracic and Vascular Anesthesia
Journal of Clinical Epidemiology
Journal of Clinical Ethics
Journal of Clinical Microbiology
Journal of Clinical Oncology
Journal of Clinical Pharmacy and Therapeutics
Journal of Community Health
Journal of Comparative Effectiveness Research
Journal of Developmental and Behavioral Pediatrics
Journal of Diabetes Science and Technology
Journal of Emergency Medicine
Journal of Evaluation in Clinical Practice
Journal of Extra-Corporeal Technology
Journal of General Internal Medicine
Journal of Geriatric Psychiatry and Neurology
Journals of Gerontology. Series A: Biological Sciences and Medical Sciences
Journals of Gerontology. Series B: Psychological Sciences and Social Sciences
Journal of Gerontological Nursing
Journal of Hand Surgery
Journal of Health Care for the Poor and Underserved
Journal of Health Communication
Journal of Health Economics
Journal of Healthcare Quality
Journal of Hospital Medicine
Journal of Intensive Care Medicine
Journal of Interventional Cardiology
Journal of Medical Internet Research
Journal of the National Comprehensive Cancer Network
Journal of the National Medical Association
Journal of Neurology, Neurosurgery and Psychiatry
Journal of Neurosurgery
Journal of Nursing Administration
Journal of Nursing Care Quality
Journal of Nursing Scholarship
Journal of Obstetric, Gynecologic, and Neonatal Nursing
Journal of Orthopedic Trauma
Journal of Palliative Medicine
Journal of Patient Safety
Journal of Pediatric Health Care
Journal of the Pediatric Infectious Diseases Society
Journal of Pediatric Rehabilitation Medicine
Journal of Pediatric Surgery
Journal of Pediatrics
Journal of Public Health Management and Practice
Journal of Rural Health
Journal of Thoracic and Cardiovascular Surgery
Journal of Thrombosis and Haemostasis
Journal of Trauma
Journal of Trauma and Acute Care Surgery
Journal of Ultrasound in Medicine
Journal of Urban Health
Journal of Urology
Journal of Vascular Surgery
Journal of Viral Hepatitis
Journal of Women's Health
JACC: Cardiovascular Imaging

L

Lancet
Lancet Infectious Diseases
Liver Transplantation

M

Maternal and Child Health Journal
Medical Care
Medical Care Research and Review
Medical Clinics of North America
Medical Decision Making
Medical Education
Medical Education Online
Medical Teacher
Medicare & Medicaid Research Review
Milbank Quarterly
Movement Disorders

N

Nature Reviews: Rheumatology
New Zealand Medical Journal
Neurocritical Care
Neurologic Clinics
Neurology
NeuroRx
New England Journal of Medicine
Nursing Research

O

Obesity
Obstetrics and Gynecology
Oncology Nursing Forum
Ophthalmic Plastic and Reconstructive Surgery
Otolaryngology and Head and Neck Surgery

P

Pain Medicine
Parkinsonism & Related Disorders
Patient Education and Counseling
Pediatric Blood & Cancer
Pediatric Cardiology
Pediatric Critical Care Medicine
Pediatric Emergency Care
Pediatrics
Perspectives in Health Information Management
Pharmacoeconomics
Pharmacoepidemiology and Drug Safety
Pharmacotherapy
PLoS Medicine
PLoS One
Policy, Politics & Nursing Practice
Prehospital Emergency Care
Preventing Chronic Disease
Preventive Medicine
Primary Care Diabetes
Primary care Respiratory Journal
Proceedings of the American Thoracic Society
Psychiatric Services
Psychology & Health
Psychological Reports
Psychosomatic Medicine
Public Health Nursing

Q

Qualitative Health Research
Quality of Life Research
Quality Management in Health Care
Quality in Primary Care
Quality & Safety in Health Care

R

Radiology
Rehabilitation Psychology
Research in Gerontological Nursing
Research in Nursing and Health
Research in Social & Administrative Pharmacy
Resuscitation

S

Science
Seminars in Respiratory and Critical Care Medicine
Seminars in Thoracic and Cardiovascular Surgery
Simulation in Healthcare
Southern Medical Journal
Spine
Stereotactic and Functional Neurosurgery
Stroke
Studies in Health Technology and Informatics
Surgical Innovation
Surgery
Systematic Reviews

T

Telemedicine Journal and E-Health
Topics in Stroke Rehabilitation
Transactions of the American Clinical and Climatological Association
Transfusion
Transplantation

U

Urology

V

Vaccine
Value in Health

W

Western Journal of Medicine
Western Journal of Nursing Research
Women and Health
Women's Health Issues
Work
World Journal of Surgery

Y

Yale Journal of Health Policy, Law, and Ethics