AACP REPORT

Report of the 2018-2019 Research and Graduate Affairs Committee

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EXECUTIVE SUMMARY. The 2018-2019 Research and Graduate Affairs Committee (RGAC) was charged with critically evaluating the leadership development support necessary for pharmacy researchers, including postdoctoral trainees, to develop the skills needed to build and sustain successful research programs and analyzing how well those needs are being met by existing programs both within AACP and at other organizations.

The RGAC identified a set of skills that could reasonably be expected to provide the necessary foundation to successfully lead a research team and mapped these skills to the six domains of graduate education in the pharmaceutical sciences established by the 2016-2017 RGAC (Table 1). In addition, the RGAC identified competency in team science and the bench-to-bedside-to-beyond translational spectrum as being critical elements of research leadership. The universality of these skills and their value prompted the RGAC to make two related recommendations to AACP:

Recommendation 1: AACP should promote the development and use of strategies to ensure intentional and ongoing professional development, such as Individual Development Plans.

Recommendation 2: AACP should explore collaborative research leadership development opportunities between faculty at research-intensive institutions and faculty at non-research-intensive institutions.

The RGAC also examined programs available at AACP and other national organizations that could help pharmacy faculty develop foundational skills for research leadership (Table 2). The RGAC administered two surveys, one to administrators responsible for research at colleges and schools of pharmacy and one to faculty members at pharmacy schools, to gather information about training needs, programming and support available for research leadership development. Administrators and faculty agreed that research is important for career advancement for faculty, and almost all administrators reported their schools provide funds, release time and mentoring for participation in research career development. However, a lack of faculty awareness regarding programs and available support may be a barrier to participation. The RGAC therefore makes two recommendations and one suggestion related to AACP programming:

Recommendation 3: AACP should expand research leadership development opportunities building from existing programs such as ALFP and AACP Catalyst, with consideration placed on developing programs that promote collaborative research.

Recommendation 4: AACP should collaborate with other professional organizations to expand research leadership development opportunities across the academy.

Suggestion 1: Colleges and schools of pharmacy should take a proactive role in promoting and facilitating research leadership development for faculty.

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The RGAC separately examined the research leadership development needs of postdoctoral trainees, recognizing the distinct needs of trainees along the PhD or PhD/PharmD, PharmD/fellowship, and PharmD/residency paths. A review of organizational resources and opportunities for post-doctoral trainees available from national organizations, including AACP, was undertaken (Table 5). The RGAC sees an opportunity for AACP to foster research development of those trainees whose career track will likely be in clinical practice and makes one recommendation and one suggestion related to postdoctoral trainees:

Recommendation 5: AACP should support and/or develop programs and activities for pharmacy residents seeking to transition into faculty positions to acquire the skills necessary to develop and lead research programs.

Suggestion 2: Colleges and schools of pharmacy should include postdoctoral trainees with academic interests in research leadership development opportunities available to junior faculty.

In addition, the RGAC proposed one policy statement that was adopted July 2019 by the AACP House of Delegates:

Policy Statement: AACP recognizes the positive role that research leadership development can play in the success of early and mid-career faculty.

KEY TERMS: Research Leadership, knowledge, Early-Career Faculty, Mid-Career Faculty, Postdoctoral Trainee, Competencies, Professional Development

INTRODUCTION AND COMMITTEE CHARGES

According to the bylaws of the American Association of Colleges of Pharmacy (AACP), the Research and Graduate Affairs Committee (RGAC) assists in the development of the research, graduate education and scholarship agenda of the Association.¹ In this role, the 2018-2019 RGAC was charged by President David D. Allen with the following:

1. Critically evaluate the leadership development support necessary for post-graduate researchers in academic pharmacy to develop the skills necessary to build and sustain successful, innovative, and high impact research programs.
2. Analyze how well leadership development needs are being met by existing programs at AACP or other member organizations serving academic pharmacy and/or the extent to which those programs are utilized.
3. Evaluate the leadership development needs unique to postdoctoral trainees and the extent to which those needs are met by existing programs at AACP or other member organizations.

The RGAC met in person on October 9 and 10, 2018 in Washington, DC to develop a strategy for addressing each of the charges. Additional work by the RGAC was conducted via conference calls and asynchronous communication through Basecamp, an online project management tool.

BACKGROUND

In the scope of higher education leadership development, researcher development has not received significant attention.² Scholarship in research leadership development is scarce, as institutions focus instead on building research

capacity and quantifying outputs.^{3,4} Evans proposes that researcher development has three areas of focus: behavioral, attitudinal, and intellectual development. Shaping leadership principles within these foci, in the context of research leadership, can be accomplished actively, passively, or even unconsciously.⁴ Investments in developing faculty members as researchers during their early careers, through mentoring, structured development, and professional interactions, increase the chances of a successful trajectory for those individuals.³ Additional research suggests that visionary approaches toward research leadership, that do not focus on a 'carrot-and-stick' principle, are essential for inspiring academic researchers to persist.⁵ These authors point to the crucial role that research leaders play in not only staff management, but also in maintaining ethical practices.⁵

Despite the limited attention given to this issue, the development of research leaders is essential in filling the gap created by the ongoing retirement of senior faculty members.³ Research-intensive and research-emerging universities value productivity in this area, and often devote administrative positions to the institutional management of research. In this context, the 2018-2019 RGAC explored available opportunities for intentional (active) development of research leadership in pharmacy faculty and examined the alignment of those opportunities with the needs of this population.

Policy statement: AACP recognizes the positive role that research leadership development can play in the success of early and mid-career faculty. [Adopted July 2019 by the AACP House of Delegates]

Identification of necessary skills for research leadership development

When evaluating the needs of researchers across academic pharmacy and devising a strategy to support

Table 1. Research Leadership Skills

Skill	Description or Example	RGAC Domain
Research design and methods	Basic to complex skills across the entire research process (from problem identification and hypothesis generation to conducting studies with integrity and disseminating findings).	Domain 2: Research
Grant writing	Identifying appropriate funding opportunities (both intramural and extramural) with the accompanying skillset to develop and submit a proposal.	Domain 3: Scientific Communication
Mentorship	Selection of appropriate mentors (both internal and external to the individual's institution) to foster various needs. Includes both formal and informal mentoring.	Domain 4: Education
Team science	Understanding of both how to structure a team as a leader, and how to work within the existing structure of a team to achieve identified goals.	Domain 5: Leadership and Management
Critical self-evaluation	Ability to self-identify career needs and self-advocate for resources to meet those needs.	Domain 6: Personal and Professional Development
Understanding the translational spectrum	Connecting science with clinical practice from the framework of bench-to-bedside and beyond.	No existing domain

their development as research leaders, environmental factors must be considered. First, needs are framed by the organizational culture of colleges and schools of pharmacy with respect to faculty research. The intrinsic value placed on faculty conducting research and the relative focus and expectations of all faculty members to conduct research varies across institutions.⁶ Therefore, the relative weights given to research, teaching, clinical responsibilities, and service in promotion and tenure decisions will differ by institution.⁷ Time devoted to teaching and clinical responsibilities is a barrier to effective research.⁸ There also exists significant variation in organizational commitment to research infrastructure and resources to support a range of faculty development needs.⁷

Second, the needs of individuals within a given college of pharmacy are shaped by the cultural divide between clinical and basic science faculty. Many modern research opportunities in pharmacy lie at translational boundaries. Success in pursuing those opportunities depends upon recognition from both clinical and basic science communities. However, these communities possess significant differences in orientation, responsibilities, and culture. Lack of understanding of translational work, from bench-to-bedside and beyond, hinders both the formation of researchers (and research teams) ready to respond to various scientific needs and their ability to connect existing researchers and teams.

Successful research leadership development necessitates a recognition that there is not a “one size fits all” approach. Faculty researchers come from different training backgrounds (eg, primary training in clinical practice via a Doctor of Pharmacy program and subsequent post-doctoral training such as residencies; primary training in education; primary training in research via a PhD program; or mixed training such as a PharmD/PhD dual-degree).⁹ Therefore, the design of structural support for career development in research must account for such heterogeneity. Looking across the National Institutes of Health (NIH) career development (K) awards provides the perspective of a national funding agency regarding the different trajectories available to faculty of varied training backgrounds, including post-doctoral and early career research scientists, teacher-investigators, and clinician-scientists.¹⁰ There are clear differences in supported programs and in program announcements for each group of researchers.

Considering the contextual factors described above, we have identified what comprises a reasonable foundational set of skills needed to achieve success in leading a research program. Many of these skills overlap with the six domains of graduate education in the pharmaceutical sciences outlined by the 2016-2017 RGAC,¹¹ highlighting the importance of this framework in seeding the development of future research leaders while students are still engaged in training. The foundational skills for research leadership

Table 2. Leadership and Research Development Programs Commonly Utilized by Academic Pharmacy

Organization	Program	Format	Target Audience	Limitations
AACP	ALFP	Year-long intensive program with four in-person sessions	Mid-career faculty	Offering not specifically focused on research leadership, cost, time commitment
AACP	Catalyst	Year-long intensive program with three in-person sessions and additional virtual training	Mid-career faculty	Small and selective, cost, time commitment, not offered every year
ACCP	MeRIT	Two-year program including in-person and virtual training with mentoring interactions	Early career faculty	Small and selective, cost, time commitment
ACCP	FIT	One-week in-person training with mentoring interactions	Mid-career faculty	Small and selective, cost
ACCP	Research Scholarship Academy	One-year modular program	Early career faculty	Cost, time commitment
ACCP	Futures Grant Program	Mentored research grant	Trainees and early career faculty	Small and selective
ASHP	Pharmacy Leadership Institute	One-week in-person training	Executive level	Offering not specifically focused on research leadership
NACDS	Faculty Scholars Program	Eighteen-month program combining virtual and in-person training with mentoring interactions	Early career faculty	Small and selective, not offered every year

described in this report have been mapped, where possible, to the RGAC graduate education competency framework (Table 1). Continuing the intentional sharpening of these skills beyond training and into faculty development has a potential to address many of the needs related to successful implementation and growth of a research program within a college of pharmacy.¹²

Research design and methods. While faculty members will vary in their research training backgrounds, a basic understanding of the research process is key for developing a sustained and successful research program. Foundationally, this includes literature review, hypothesis generation, experimental design, reproducibility, scientific rigor, and responsible conduct of research. Programming aimed at enhancing understanding of the research process is more important for faculty who either lack, or have received minimal formal research training, a situation common for solely PharmD-trained individuals.¹³ A 2009 survey of pharmacy practice faculty indicated that identification of a research question and development of a strategy for addressing that question were barriers to their success as researchers.¹⁴ However, such training can be useful for faculty with basic formal training who are looking to enhance their skills to facilitate the next phase of their career development.

Proposal writing and grantsmanship. Successfully competing for research funding is key to a sustainable research program. Thus, proposal writing and grantsmanship

skills are foundational. This domain includes: (a) identifying an appropriate funding source; (b) crafting a proposal that is responsive to the targeted funding stream; (c) building a strong proposal utilizing rigorous methods; (d) constructing a research team with appropriate expertise in both content and methodology; (e) obtaining preliminary data (if applicable for the announcement); and (f) demonstrating understanding of the study's potential innovation, significance, and place within the wider evidence base. While there are numerous nationally-available resources to enhance grantsmanship skills, few are targeted specifically to pharmacy faculty members.^{15–18} This training would be of utility to all faculty who are expected to demonstrate accomplishments in research and scholarly activity.

Mentorship. Mentorship is a key component for ongoing career success for research faculty, including in research leadership skills training. It is a central focus of existing AACP programs including the Academic Leadership Fellows Program (ALFP) and AACP Catalyst (formerly the Academic Research Fellows Program).^{19,20} As noted in the Research Mentor Role Description for the Catalyst program, a senior research leader would act in this capacity “as a role model and coach to an individual Catalyst in a formal relationship at the home institution. A Research Mentor should create an environment that dissolves the limitations of history, expectation and assumption.”²¹ Although this definition focuses on an internal mentor and a formal mentoring relationship, it is

also important for researchers to identify mentors external to their institution, in both formal and informal capacities, and to meet a range of content, methodological, and general career development needs.^{22,23} This training is of wide utility.

Critical self-evaluation. Faculty must be prepared to reflect on their professional development to-date and self-identify areas of strength and weakness. Key questions to stimulate this reflection include: Where am I in my career development? What are my long-term career goals? What do I have to do to achieve those goals? Answering these questions in the context of creating an Individual Development Plan (IDP) or career development plan that is tailored to the specific needs of each faculty researcher can facilitate a roadmap for success. Establishment of a peer-mentoring committee, as used in many colleges, can serve a similar purpose. Working with appropriate mentors as described above will help a faculty member maximize his or her career development. Tools are available to guide individuals, from new graduates and postdoctoral fellows to mid-career scientists, through this process.^{24,25}

Team science. Research is often and increasingly being performed in interdisciplinary and/or interprofessional teams.²⁶ Many faculty members must be prepared to be either a contributing member of a team or to lead a team themselves. Individuals who lead a team must be equipped with an understanding of how to structure a team, recruit individuals with complementary content expertise and methodological skill sets, and manage these individuals within the context of either a specific research project or wider research program/unit. This will set the stage for building a research network of multiple teams (internal and external to the institution) which will allow a project to transit the translational continuum. Key to both leading and being an active participant on a team is an understanding of different disciplinary backgrounds and research traditions. A basic example to highlight these differences is the issue of authorship and order of authors (e.g., is the lead author listed first or last?). This type of training will be useful to many now and will have increasing importance in future years.

Understanding the translational spectrum. This includes an understanding of the entire translation spectrum (bench-to-bedside-to-beyond). Translational research is defined as “the process of turning observations in the laboratory, clinic and community into interventions that improve the health of individuals and the public – from diagnostics and therapeutics to medical procedures and behavioral changes.”²⁷ Being able to place a research project in the continuum of translational research is key to providing context and to inform design, aligning with the

team science skills described above. This cross-understanding across the translational spectrum may be particularly important for faculty who lack formal practice training but is also important for students to understand during their professional development in order to facilitate the early formation of the next-generation of pharmacy researchers/research leaders.

Because of the universality of these skills, regardless of the college or school of pharmacy, there exist opportunities for AACP to provide overarching support to the development of the pharmacy research workforce. At an association level, this support expands access to research leadership development with minimal resource allocation from individual colleges or schools. Additionally, AACP could leverage its connection to colleges and schools of pharmacy to establish new relationships between schools in support of developing a broad research leadership pipeline.

Recommendation 1: AACP should promote the development and use of strategies to ensure intentional and ongoing professional development such as IDPs.

Research leadership includes supporting graduate students, postdoctoral research associates, early career scientists, and mid-career scientists in their career development. For those activities, many institutions now use an IDP that provides a framework for trainee and trainer to develop a common set of goals, and the 2017-2018 RGAC previously considered strategies to encourage broad adoption of IDPs by the Association and training programs at colleges and schools of pharmacy.²⁸ The creation of IDPs includes the following elements: (1) assessment of skills and interests; (2) career exploration, including career events and networking; (3) goal setting strategies to advance research projects and research career; and (4) execution of the designed plans, supported by internal and external mentors/advisors. The same construct would be useful for faculty and provide a similar touchstone for all stakeholders to commit to a development plan and evaluate its implementation. Research programs, centers, departments, and teams can use the identified key research leadership skills to build and optimize IDPs for their own faculty. When IDPs are used, they must be supported by ongoing discussions with an administrator and/or a mentoring team so that progress toward the IDP goals can be evaluated and facilitated.

It is acknowledged that colleges of pharmacy utilize various strategies for career development. For example, mentoring committees are frequently established for junior faculty members to provide career advice and guidance. Annual reviews of performance, often mandated at the university level, frequently include goal-setting and evaluation of progress toward these goals as well as progress toward promotion. Some colleges have an

associate dean who is charged to enhance faculty career development. All of these strategies are useful and can fulfill the overall goal of professional development.

Recommendation 2: AACP should explore collaborative research leadership development opportunities between faculty at research-intensive institutions and faculty at non-research-intensive institutions.

AACP could seed the creation of collaborative research between research-intensive and non-intensive schools. Opportunities include the creation of research exchange programs (eg, a visiting scholar/visiting faculty framework), grant-writing workshops, and research mentoring programs to enable the building of teams across the translational research continuum. Other options might be found in both short- and long-term student training. Further exploration into the optimal mechanisms for stimulating this type of interaction and collaboration is needed, particularly in light of potential barriers such as time commitment and perceived research competition between institutions.

Evaluation of met and unmet research leadership development needs of faculty

Having established a set of foundational skills needed by research leaders, the RGAC next sought to determine if and how those skills are supported by existing programs from AACP and other national organizations, including the American College of Clinical Pharmacy (ACCP), American Society of Health-System Pharmacists (ASHP), and National Association of Chain Drug Stores (NACDS). To this end, the RGAC took a two-pronged approach. First, the RGAC identified programs offered by AACP and other organizations that provide training in some form of leadership (either broadly defined or specifically related to research leadership) or research development. Although the RGAC recognizes that universities frequently provide their own programs in research leadership development, it elected to focus on those programs that are widely available to all colleges and schools of pharmacy. These programs, which utilize a variety of formats, are outlined in Table 2.

While there are a variety of programs currently available for pharmacy faculty to further develop their research and leadership skills, they are not without limitations. For example, programs like the Pharmacy Leadership Institute from ASHP,²⁹ offerings from the Academy for Advancing Leadership (AAL), and AACP's ALFP¹⁹ offer extensive leadership training, but these programs may not provide sufficient consideration of the unique needs of research leaders. Other programs, including those offered by ACCP and AACP Catalyst, may align more closely with research leadership development, but the number of participants in those programs is small relative to the Academy at-large; this limits the extent of potential

benefit from such formalized training in research leadership. Most of these programs also come at a cost, both in terms of price and time commitment, that may deter broad participation.

Recommendation 3: AACP should expand research leadership development opportunities building from existing programs such as ALFP and AACP Catalyst, with consideration placed on developing programs that promote collaborative research.

The need for this type of education is broad, making it important to build a mechanism that is widely accessible and affordable. Not every faculty member and institution will be able to commit time and resources necessary for a year-long intensive experience characterized by programs such as ALFP and Catalyst, nor will this type of training be appropriate for each individual faculty member. One strategy to incorporate training of this type into current programs offered by AACP would be to use a "pre-meeting" format attached to one of the national meetings (e.g., AACP Annual Meeting) to meet this need. This pre-meeting could be coupled with online content developed specifically for the key subject areas that participants can utilize before the face-to-face meeting. Depending on the specific content of the pre-meeting, this approach could be attractive to faculty who require less intensive training, or this approach could alternatively be used to enhance the ALFP and Catalyst programs by providing basic training in preparation for participation in those programs. Alternatively, AACP could provide opportunities within its Association meetings in the form of seminars, sessions, or workshops related to research career development. This type of short-format training is already offered by many other professional societies, including the American Society for Pharmacology and Experimental Therapeutics (ASPET).

Recommendation 4: AACP should collaborate with other professional organizations to expand research leadership development opportunities across the academy.

Collaboration with related organizations would avoid duplicative efforts while ensuring a broader reach to faculty and trainees at colleges and schools of pharmacy who may not already engage with AACP. These efforts would enable AACP and partner organizations to expand upon previously established programs to address unmet research leadership needs. Moreover, these collaborative efforts between associations/societies could facilitate the formation of interdisciplinary collaborations between researchers in colleges and schools of pharmacy.

Surveys of Research Leadership Training Needs

Although programs to support research career development exist in AACP and other national organizations, it

is less clear to what extent those programs are known and utilized by pharmacy faculty. Similarly, there may be additional research career development needs of pharmacy faculty that are not met by these programs. To address these issues, the RGAC developed two online surveys to collect information regarding current training needs for research leadership at pharmacy schools, programs that are being utilized now to meet those needs, and the support available to faculty to participate in such programs. This report presents an overview of some of the survey results to identify potential opportunities and challenges associated with research leadership development. Both surveys were open from November 2018 to January 2019. Responses were not counted if no questions were answered or if the duration of participation was less than five seconds, indicating immediate closure of the survey after accessing the online link.

The first survey was intended to collect responses from administrators responsible for faculty research (Appendix 1). The survey link was sent to CEO deans of pharmacy schools, and 57 responses were collected. Table 3 provides an overview of the Carnegie designations noted by administrators at colleges and schools of pharmacy. However, because Carnegie designations describe an entire university and do not consider differences in research activity between colleges within a university, administrators were also asked to categorize their college or school of pharmacy with regards to research and teaching responsibilities. While approximately half of responses came from R1 or R2 institutions, or those doctoral universities with high research activity, roughly one-quarter of pharmacy schools were described as research-intensive. Instead, most pharmacy schools were described as teaching-intensive or research/teaching-balanced. This would suggest that while some pharmacy schools at high research activity universities may have access to university-wide resources, additional environmental

factors that are unique to the structures of pharmacy schools should be considered when designing or implementing research support programs and services.

A second survey was designed to collect information from faculty about their backgrounds, needs and limitations with respect to research leadership development (Appendix 2). Faculty survey recipients were identified through the AACCP roster of pharmacy faculty. The total of 540 responses were collected. To understand faculty demographics, the RGAC faculty survey asked respondents both to describe their research and teaching workload as well as to indicate their training background. Faculty responses regarding teaching and research workload were roughly similar to those responses collected through the administrator survey, with approximately one-quarter of faculty indicating their workload is research-intensive and nearly three-quarters of responses reporting a teaching-intensive or research/teaching-balanced environment. Additionally, roughly one-third of faculty respondents self-identified their backgrounds as PhD-trained research scientists and one-third as residency-trained pharmacists (Figure 1). Faculty could identify themselves with multiple backgrounds if appropriate, yielding several variations of pharmacist-scientists within the responses.

Faculty-conducted research was considered important by both administrator and faculty respondents. Greater than three-quarters of faculty survey responses indicated that research is required for promotion, despite that nearly the same proportion of responses indicated more focus at the school on teaching or a balance between teaching and research responsibilities. Similarly, administrator survey responses noted that research was required for the majority of tenure-track faculty when not separated by discipline. Discipline-specific research requirements varied, with basic science faculty and social and administrative science faculty more frequently required to conduct research than their practice counterparts.

Table 3. Carnegie Classifications of Institutions Represented in the Administrator Survey

Institution Type	Number of Responses
R1: doctoral universities – highest research activity	17
R2: doctoral universities – higher research activity	6
R3: doctoral universities – moderate research activity	13
M1 – M3 master's colleges & universities	6
Baccalaureate colleges & universities	5
Special focus four-year	4
Others	5
No response	1

Figure 1. Training Background of Faculty Survey Respondents

However, more than half of pharmacy schools indicated a requirement for practice faculty to conduct research, stressing a need for a broad portfolio of research career development programs, tools, or services to suit the varying needs of all disciplines.

To advance faculty research, the administrator survey found that schools were supportive of faculty participating in research leadership development programs, and that at least some faculty take advantage of such programs. According to the administrator survey, faculty members currently participate in the following programs in career development related to research: AACCP (33 responses), other professional organizations (45 responses), university (43 responses), college/school of pharmacy (44 responses), and department (25 responses). Whether faculty preferentially engage in research career development programs offered by other professional organizations than by AACCP due to the current AACCP offerings not meeting their needs or a lack of awareness in how AACCP supports research career development is unknown. However, these results suggest that any new programs developed by AACCP should be mindful to address needs that are not widely supported by other organizations. For example, as a home to all disciplines of research found at colleges and schools of pharmacy, AACCP is uniquely positioned to bring together researchers from these disciplines to learn from one another.

When considering why a respondent may not participate in available research leadership development program, the most commonly-selected limiting factors for faculty members were fees and funding, indicated by one-third of respondents. However, nearly all responses from administrators indicated that schools support registration and/or travel costs associated with attending leadership development programs. The time commitment for travel was cited by faculty nearly as often as a limiting factor, and many respondents also noted a lack of time to complete pre- or post-work for programs. Approximately

two-thirds of administrator responses noted that release time was provided for faculty attending leadership development programs, while three-quarters of schools provide some form of mentorship or encouragement to participate in leadership development programs. Collectively, the mismatch between faculty limitations and administrator support may reflect variations across institutions, a possible lack of awareness of what support is available to faculty, and/or that the support provided is insufficient to the costs and time demands of existing programs.

Suggestion 1: Colleges and schools of pharmacy should take a proactive role in promoting and facilitating research leadership development for faculty.

A striking aspect of survey responses was that faculty awareness was low for many external programs, such as those offered by scientific and professional societies and associations. This lack of awareness, coupled with a lack of interest and a perception of limited value gained from these programs, suggested by free text responses to “Other limiting factors,” may constitute another significant barrier to participation in training. This perception appears to be mismatched with administrator perception of the value of these programs, given that schools provide financial support and release time, as indicated by survey results. Greater awareness of both the existence of programs to support continued research career development and their value could be achieved through additional communication between faculty and administrators.

Because time and costs were often listed as limiting factors for individuals potentially interested in pursuing research leadership development, one potential time- and cost-effective avenue of support by AACCP for these faculty would be the development of webinars and other virtual content. Along these lines, both surveys included a list of potential webinar topics, and respondents were asked to rank the topics in order of most to least useful.

Table 4. Faculty and Administrator Ranking of Webinar Topics

Webinar Topic	Faculty Overall Rank	Administrator Overall Rank
How to lead a project by collaborating with other researchers	1	1
How to change directions or develop new directions in my research	2	4
How to formulate an appropriate research question for my trainees	3	2
How to select an appropriate funding agency for my research ideas	4	3
How to develop and implement a budget	5	5
How to work with technicians, students, and post-doc trainees	6	6
How to establish and monitor a culture of research integrity	7	7

Topics and rankings by both faculty and administrators are shown in Table 4. Faculty and administrators both ranked research leadership topics (formulating research questions for trainees, how to lead a project by collaborating, selecting appropriate funding agencies, how to change or develop new research directions) more highly than research management topics (developing a research budget, working with technicians/trainees, establishing a culture of research integrity). Importantly, both faculty and administrator responses ranked leading a project by collaborating with others as the most useful topic. This is consistent with the increasing need for researchers to be skilled in team science mentioned previously. The topics of next greatest interest to faculty and administrators resonate with the research skills and competencies outlined in Table 1 – critical self-evaluation and professional development to support changes in research direction; mentorship and education in support of student research; and grant writing and scientific communication to seek funding sources for existing and new research directions. Collectively, these responses provide insight into initial directions AACP should pursue in the creation of content to support research leadership development.

Examination of met and unmet research leadership development needs of postdoctoral trainees

Research leadership development ideally begins before the first faculty position is gained and is included as an integral element of pre- and postdoctoral research training. Previous work by the RGAC has focused on establishing a solid foundation of research skills in predoctoral trainees.^{11,28} However, additional efforts to support postdoctoral trainees in research leadership development is necessary when preparing these individuals

for faculty roles. Before designing or implementing additional support for the postdoctoral community, it is important to recognize differences among groups of individuals collectively termed postdoctoral trainees. The first group would include those pursuing additional research training following completion of a PhD or PharmD/PhD dual-degree program (**Post-PhD or Post-PharmD/PhD trainees**). The second group would include those who have completed a PharmD program and are pursuing research training through a fellowship (**Post-PharmD fellows**). The third group would be those who are pursuing residency training (**Post-PharmD residents**).

Those in the first group, by the nature of PhD training (e.g., in pharmaceutical sciences), likely have acquired knowledge in research design and methodology, data analysis, publication, and grantsmanship positioning them to assume leadership of a research team. Those in the second group likely would be more diverse and, on average, have fewer opportunities to have developed skills for establishing and leading a research program than their post-PhD or post-PharmD/PhD trainee counterparts. Those in the third group, mostly likely the largest cohort, might gain some research training in their PGY1 or PGY2 years, though it would not be the primary focus of their programs. Given the clinical and professional focus of PharmD programs and residency training, it is likely that individual initiative would drive some in such programs to seek research training through use of electives, special programs, dual degrees, and development of more extensive residency research projects. Regardless of the path to postdoctoral training, individuals will benefit from development of the “power skills” outlined in previous reports from this committee.¹¹

Table 5. Organizational resources and opportunities for postdoctoral training

Organization	Program(s) or Resource(s)
AACR	Funding for postdoctoral and clinical research fellows Minority scholar award provides travel support to attend conferences
AAPS	Offers a career center at annual meetings to facilitate interactions between job seekers and employers Maintains webpage with career resources for trainees
Academy Health	Maintains a scholarship and fellowship directory
ACCP	Mentored funding awards for trainees to conduct research Provides guidelines for fellowship training requirements and accomplishments
ACS	Postdoctoral fellowships for cancer-related research
AFAR	Postdoctoral transition awards to aid in moving from advanced postdoctoral level to faculty
ASHP	Funding for residents to conduct research
ASPET	Maintains list of postdoctoral training opportunities for pharmacology Maintains webpage with career resources for trainees Established two committees to support career development and leadership development of trainees Offers a graduate student/postdoctoral colloquium and career center at annual meetings to facilitate interactions between job seekers and employers Provides travel awards to postdoctoral fellows and other trainees for the annual meeting
Industry sources	Various individual partnership between schools and pharmaceutical companies to support postdoctoral training
ISPOR	Awards Graduate education SIG, including tips for obtaining a postdoctoral position Maintains a fellowship and internship directory
PhRMA Foundation	Funding for postdoctoral fellows in several pharmacy-related fields

The RGAC undertook a review of organizations related to different aspects of pharmacy and pharmaceutical sciences in regard to programs designed to provide opportunities to gain additional research training or experience, with the assumption that leadership training could be a component. These included ACCP, ASHP, ASPET, American Association for Cancer Research (AACR), International Society for Pharmacoeconomics and Outcomes Research (ISPOR), PhRMA Foundation, Academy Health, American Cancer Society (ACS), American Federation of Aging Research (AFAR), American Association of Pharmaceutical Scientists (AAPS), and industry sources. Specific programs or resources provided by each of these organizations are listed in Table 5.

Many of the opportunities national organizations provide for postdoctoral trainees include a funding mechanism to support research training. Similarly, NIH-funded training mechanisms should be considered when identifying what opportunities exist for postdoctoral trainees to obtain and enhance research leadership skills. For example, the National Institute for General Medical Sciences (NIGMS) is a major supporter of pre- and postdoctoral T32 training grants. An emphasis in recent years has been ensuring trainees develop professional and leadership skills to aid in development as scientists. A significant feature is

training of mentors, even experienced ones, to ensure the quality and consistency of training. Career development is a core component of training grants and individual fellowships from all institutes, perhaps not yet at the level required by NIGMS.

Research training support by NIH is not limited to NIGMS. Clinical and Translational Science Awards (CTSAs) funded by the National Center for Advancing Translational Sciences (NCATS) provide focused research training at the late postdoctoral-early faculty stage through the KL2 mechanism. They also provide shorter-term research training opportunities. However, with only ~60 CTSAs nationwide, a minority of pharmacy schools are likely engaged.

The extent to which individuals from the three target groups can benefit from the funding, services, and opportunities provided by the organizations listed in Table 5 vary. Some opportunities or resources are designed to serve a particular type of individual. For the most part, organizations focus on funding of postdoctoral positions and provide guidance specific to the nature of the programs and organizations. With the exception of NIH-affiliated programs, including CTSAs, and some committees from organizations such as ASPET, most opportunities do not specifically focus on development of leadership skills necessary for the transition from the postdoctoral years to faculty members'

establishment of research programs. Specific skills, beyond research competence, that appear necessary to make this transition include those previously described in Table 1 as well as effective engagement in scientific and professional organizations and engagement with community partners and stakeholders. Indeed, the framework described in Table 1 should not be limited to support for faculty researchers but would additionally benefit postdoctoral trainees on their way to a faculty position.

Suggestion 2: Colleges and schools of pharmacy should include postdoctoral trainees with academic interests in research leadership development opportunities available to junior faculty.

Another important factor that will influence the extent to which an individual will be provided opportunities for developing leadership skills necessary to lead a scientific program is the environment of the specific pharmacy school. While all colleges and schools of pharmacy must provide opportunities for research and scholarship as a part of meeting accreditation standards,³⁰ there is considerable variation. Many schools have funded research programs and graduate programs, while others do not. Post-PhD and post-PharmD/PhD trainees almost certainly will find themselves in research training settings with opportunities for growth in research leadership. These individuals also are likely to engage with scientific and professional organizations such as AAPS, ASPET, or ACCP. Similarly, post-PharmD fellows likely will be in somewhat structured, relatively resource-rich environments and logically would engage with ACCP. By contrast, those in post-PharmD residency training might not necessarily be in an environment that fosters high-level research training.

Post-PhD trainees are well positioned to become basic science faculty members in schools of pharmacy. Post-PharmD/PharmD-PhD fellows and post-PharmD residents will more likely move into faculty positions in pharmacy practice departments. Those in the former group likely have reasonable opportunities for developing research leadership skills in-house or through professional and scientific organizations. Those in the latter group are at greater risk for this not to be the case. This provides an opportunity for AACP to foster development of research leadership development among those in career tracks that will focus on clinical practice.

Recommendation 5: AACP should support and/or develop programs and activities for pharmacy residents seeking to transition into faculty positions to acquire the skills necessary to develop and lead research programs.

AACP has the opportunity to engage those in residency training and anticipating an academic career to gain skills and experience to increase the likelihood that they

will be successful in establishing and leading research programs. Research leadership at AACP could work with the Leadership Development SIG and Pharmacy Practice Section to develop programs and activities for those in residency programs to acquire skills necessary to develop and lead research programs once they have assumed faculty positions. PharmD fellows/post-PhD postdoctoral fellows should be included in these efforts as peer mentors; such a relationship will be mutually beneficial. AACP should also collaborate with organizations such as NACDS in such programming.

CONCLUSION AND CALL TO ACTION

Building from the competency framework developed by the previous RGAC for graduate education in colleges and schools of pharmacy, this report seeks to continue a lifelong learning model for pharmacy researchers to identify, develop, and refine skills needed to lead high impact research programs and agendas. While there appears to be a core set of skills that define research leadership across all career stages, how those skills are strengthened should be tailored to the career stage to best meet the needs of the researcher. Through the policy statement and recommendations articulated in this report, AACP can and should serve as a bridge to those seeking additional development in essential leadership skills necessary to drive innovation in pharmacy research, from connecting researchers at different institutions to providing additional leadership development opportunities directly. Additionally, the survey results described here indicate that many colleges and schools are already providing some level of support for faculty to build and augment their leadership skills. Suggestions to colleges and schools to take a proactive role in research leadership development, including in the support of postdoctoral trainees as they build these skills, serve to reinforce these survey results and recognizes that long-term success of any AACP initiatives and of the research workforce will require continued engagement of colleges and schools in this area. Indeed, to advance both research and leadership development, collaboration is key to success. Just as research itself is increasingly the domain of multidisciplinary teams addressing complex questions, it is critical for AACP to forge partnerships with members and other associations to achieve a common goal of preparing researchers for leadership roles throughout their careers.

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Appendix 1. Survey of Administrators at Colleges and Schools of Pharmacy

1. Which of the following Carnegie designations describes the institution where your college/school of pharmacy is located?
R1: Doctoral Universities – Highest research activity
R2: Doctoral Universities – Higher research activity
R3: Doctoral Universities – Moderate research activity
M1 – M3 Master’s Colleges and Universities
Baccalaureate Colleges and Universities
Special Focus Four-Year
Others (please describe with free texts)
2. What type of pharmacy school do you work in?
Research-intensive
Teaching-intensive
Teaching-only (no research requirement)
Research/teaching balanced (equal weight)
Others (please describe with free texts)
3. What is the current status of faculty-conducted research at your institution? [Options: required, recommended, optional, or not applicable]
Tenure-track faculty
Non-tenure-track faculty
Basic science faculty
Practice faculty
Social and administrative science faculty
4. Does your college/school provide any of the following for your faculty members to attend leadership development programs? [Select all that apply.]
Financial support (travel, registration)
Release time
Mentorship/encouragement to attend a program
None
5. Faculty members at your college/school participate in formal programs in career development related to research that are provided by the following [select all that apply]:
AACP
Other professional organizations (ACS, AAPS, ASPET, ACCP, ASHP etc.)
University
College/School of Pharmacy
Department
6. Research career development programs offered by our college/school include [select all that apply]:
Career-related seminars presented by visiting speakers
Workshops on specific skills related to research careers (e.g., grant writing, time management, mentoring, publishing, personnel management)
Faculty mentoring programs that specifically address research and leadership development
Associate/assistant dean who provides support as part of faculty career development
Internal peer review of grant applications/manuscripts and/or peer-editing
Utilization of outside consultants to advise faculty members on their research
Other (please specify)
7. Does your school/college offer a course, available to graduate, postdoctoral, and/or professional students, that meets the NIH requirements for “Responsible Conduct of Research?”
Yes
No
8. Please rank (drag and drop) the topics of webinars provided by AACP in the order of the most useful (top) to the least useful (bottom).
How to work with technicians, students, and post-doc trainees
How to formulate an appropriate research question for my trainees
How to lead a project by collaborating with other researchers
How to develop and implement a budget
How to change directions or develop new directions in my research
How to select an appropriate funding agency for my research ideas

How to establish and monitor a culture of research integrity

9. Are faculty members in your college/school able to switch from tenure-track to non-tenure-track appointments, and vice versa?

Yes

No

Not applicable

Appendix 2. Survey of Faculty at Colleges and Schools of Pharmacy

1. What is your background? [Select all that apply]
 - Research scientist (PhD)
 - Research scientist (non-PhD)
 - Residency-trained pharmacist
 - Fellowship-trained pharmacist
 - Pharmacist (no previous residency/fellowship training)
 - Others (please describe with free texts)
2. How do you categorize your position? [Select all that apply]
 - Science faculty
 - Practice faculty
 - Social and administrative science faculty
 - Tenure-track
 - Non-tenure-track
3. What type of pharmacy school do you work in?
 - Research-intensive
 - Teaching-intensive
 - Teaching-only (no research requirement)
 - Research/teaching-balanced (equal weight)
 - Others (please describe with free texts)
4. What is the current status of faculty-conducted research at your institution?
 - Required for promotion
 - Valuable, but not absolutely required for promotion
 - Optional
 - Not included in my contract
 - Others (please describe with free texts)
5. Please indicate the degree to which you agree or disagree with the following statements. [Options: strongly agree, somewhat agree, somewhat disagree, or strongly disagree]
 - My university provides sufficient training for me to lead a research group.
 - My professional organizations provide sufficient training to lead a research group.
 - I received sufficient training to lead a research group during my graduate and/or postgraduate training.
6. What would be the limiting factor for you to participate in a research leadership program? [Select all that apply.]
 - Fees
 - Time commitment for travel
 - Time to complete pre- or post-work
 - Others (please describe with free texts)
7. Please rank (drag and drop) the topics of webinars provided by AACP in the order of the most useful (top) to the least useful (bottom).
 - How to work with technicians, students, and post-doc trainees
 - How to formulate an appropriate research question for my trainees
 - How to lead a project by collaborating with other researchers
 - How to develop and implement a budget
 - How to change directions or develop new directions in my research
 - How to select an appropriate funding agency for my research ideas
 - How to establish and monitor a culture of research integrity
8. Please select your experience with the following organizations (please indicate the program you had the highest degree of interests with free texts): [Options: not aware, aware, applied, or participated]
 - AACP Academic Leadership Fellows Program
 - AACP Walmart Scholars Program

AACP MeRIT

ACCP FIT

ACCP Academy

ASHP Pharmacy Leadership Institute

NACDS Faculty Scholars Program

AAL Leadership Development Program

ACS Leadership Development Program

Other workshop/programs (please indicate which organization and which program)