

## AACP REPORT

### **Breaking Down Barriers to Pharmacy Graduate Education: The Report of the 2017-2018 Research and Graduate Affairs Committee**

Samuel M. Poloyac,<sup>a\*</sup> Jane E. Cavanaugh,<sup>b</sup> Nicholas E. Hagemeyer,<sup>c</sup> Krishna Kumar,<sup>d</sup> Russell B. Melchert,<sup>e</sup> James M. O'Donnell,<sup>f</sup> Ronny Priefer,<sup>g</sup> Daniel R. Touchette,<sup>h</sup> Dorothy F. Farrell,<sup>i</sup> Kirsten F. Block<sup>i</sup>

<sup>a</sup> University of Pittsburgh School of Pharmacy, Pittsburgh, Pennsylvania

<sup>b</sup> Duquesne University School of Pharmacy, Pittsburgh, Pennsylvania

<sup>c</sup> East Tennessee State University Gatton College of Pharmacy, Johnson City, Tennessee

<sup>d</sup> Howard University College of Pharmacy, Washington, DC

<sup>e</sup> University of Missouri-Kansas City School of Pharmacy, Kansas City, Missouri

<sup>f</sup> University at Buffalo, The State University of New York School of Pharmacy and Pharmaceutical Sciences, Buffalo, New York

<sup>g</sup> Western New England University College of Pharmacy, Springfield, Massachusetts

<sup>h</sup> University of Illinois at Chicago College of Pharmacy, Chicago, Illinois

<sup>i</sup> American Association of Colleges of Pharmacy, Arlington, Virginia

#### **EXECUTIVE SUMMARY**

The 2017-2018 Research and Graduate Affairs Committee (RGAC) was given three charges aimed at helping academic pharmacy address barriers that must be overcome by both students and schools to attract, retain, and support the development of a diverse, well-rounded, and successful graduate student population. These charges were (1) identifying teaching methodologies, tools and opportunities that graduate programs can introduce into curriculum to overcome barriers to success of today's and tomorrow's learners; (2) developing a strategy for achieving member support of the 2016-2017 recommended graduate competencies by identifying gaps in and existing examples of courses or opportunities that achieve competency-based pharmacy graduate education; and (3) identifying potential strategies to address identified barriers to pursuing graduate education, especially among under-represented student populations. This report describes attitudes toward and opportunities related to competency-based education in graduation education in colleges and schools of pharmacy, identifies types of tools schools could use to enhance training towards the competency framework developed by the 2016-2017 RGAC, particularly with regards to the so-called power skills, and outlines a role for AACP in facilitating this training. This report also considers a number of barriers, both perceived and real, that potential students encounter when considering graduate training and suggests strategies to understand the impact of and mitigate these barriers. To strengthen competency-based graduate education, the RGAC puts forth two recommendations that AACP develop a toolkit supporting the training of power skills and that AACP should develop or curate programs or tools to support the use of individual development plans (IDPs). The RGAC also puts forth a suggestion to schools that IDPs be implemented for all students. In considering the barriers to pursuing graduate education, the Committee proposes one policy statement that AACP supports the training and development of an increasingly diverse population of researchers at pharmacy schools through active efforts to promote M.S. and Ph.D. education along with Pharm.D. education. Additionally, the Committee provides recommendations that AACP should expand its efforts in career tracking of graduate students to include collection and/or analysis of data that could inform the Academy's understanding of barriers to pursuing graduate education in pharmacy schools, the AACP Office of Institutional Research and Effectiveness should expand upon graduate program data described in the annual Profile of Pharmacy Students report, and finally that AACP should include graduate programs in efforts to increase diversity of students at pharmacy schools.

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\*Chair

**KEY TERMS:** Pharmacy, Pharmaceutical Sciences, Graduate Education, Power Skills, Social Cognitive Career Theory, Under-Represented Student Populations, Diversity

## **INTRODUCTION AND COMMITTEE CHARGES**

The Bylaws of the American Association of Colleges of Pharmacy (AACP) state that the role of the Research and Graduate Affairs Committee (RGAC) is to assist with the Association's research, graduate education and scholarship agenda.<sup>1</sup> Accordingly, President Steven A. Scott charged the 2017-2018 RGAC with the following:

1. Identify teaching methodologies, tools and opportunities that graduate programs can introduce into curriculum to overcome barriers to success of today's and tomorrow's learners.
2. Develop a strategy for achieving member support of the 2016-2017 recommended graduate competencies by identifying gaps in and existing examples of courses or opportunities that achieve competency-based pharmacy graduate education.
3. Identify potential strategies to address identified barriers to pursuing graduate education, especially among under-represented student populations.

The 2017-2018 RGAC general committee operations were very similar to those previously described for the 2016-2017 RGAC.<sup>2</sup> The RGAC met in person in Alexandria, Virginia on October 16 and 17, 2017 to map out its strategies to address the charges and identify opportunities to engage stakeholders regarding the adoption and barriers to adoption of core competency domains in the pharmaceutical sciences.

### **Identify teaching methodologies, tools and opportunities**

When considering what new tools or teaching methodologies could enhance the success of trainees in graduate programs across colleges and schools of pharmacy, the RGAC relied heavily on the framework of graduate education competencies outlined in the report of the 2016-17 RGAC.<sup>2</sup> This framework was designed to enhance the career competitiveness of highly sought-after, well-rounded graduates from pharmaceutical science graduate programs.<sup>2</sup> Of the RGAC competency framework, the first three domains – Foundational Knowledge (Domain 1), Research (Domain 2), and Scientific Communications (Domain 3) – comprise traditional graduate training, while the latter three domains – Education (Domain 4), Leadership and Management (Domain 5), and Personal and Professional Development (Domain 6) – can be viewed as power skills that complement research training and are vital for graduates seeking employment upon completion of their terminal degrees.

Given the great variability in training and assessment in Domains 4-6 across and within pharmacy schools and the developing recognition of the important role the contained competencies play in trainee success, the RGAC has chosen to focus on these Domains as potential areas in which further support from AACP may reduce barriers to learner success. The RGAC views all domains within the competency framework as necessary, but the universality of power skills across all disciplines make them especially attractive for AACP to focus its effort in support of graduate programs. Moreover, AACP's role as a national organization provides a unique opportunity to centralize resources and reduce variability of power skill training across graduate programs.

### **RECOMMENDATION 1**

AACP should develop a toolkit supporting training of power skills, which could include resources and tools developed by other organizations, by colleges and schools of pharmacy, or de novo educational programs and resources developed by AACP.

This toolkit may be in form of a collection of existing resources, self-paced webinars, and workshops at annual/regional meetings. It may also include content developed in partnership with other organizations (eg, American Chemical Society, American Association of Pharmaceutical Scientists, American Society for Clinical Pharmacology and Therapeutics, Society of Toxicology, Clinical and Translational Science Institutes, etc.) or pharmacy schools. Initial suggested topics include the development of leadership skills, team building, work/life balance, resource and time management skills, career development, interpersonal skills, writing skills, collaborative research, and Individual Development Plans (IDPs). Importantly, the toolkit should not be a static collection of resources limited to the skills outlined above; rather, a successful toolkit would be a resource that adapts to the needs of schools and trainees as additional or alternative skills become necessary for tomorrow's graduates.

An AACP repository for power skills resources would support lifelong learning for all AACP members and constituents, including Pharm.D., M.S., and Ph.D. students as well as faculty and administration at pharmacy schools. An AACP repository could also leverage and add value to AACP programming in Domain 4 and 5 competencies and skills such as "Teaching and Learning," team building, management, and leadership which is already offered at AACP meetings and learning institutes. AACP

could also seek to incorporate programs from other organizations, such as the American Chemical Society's "Leading without Authority," into its Interim and Annual Meetings, and the repository could include links to these external programs.

While some power skills lend themselves to stand-alone workshops or webinars, others require a significant self-evaluation conducted at multiple points in one's academic career. The National Institutes of Health (NIH) requires that institutions describe each year how IDPs are used to manage the training and career development of students supported by NIH training grants. Some institutions now include IDPs in their curricula for graduate programs, and the RGAC believes IDPs would benefit all graduate students. IDPs provide a formal structure to the mentor-driven training of traditional graduate education and are an opportunity for the mentor and mentee to establish objectives that support the needs and goals of the program and the graduate student. Additionally, having IDPs in place for all students enables graduate programs to reduce variability in training and ensure that power skills are being addressed.

The process of creating an IDP should be dynamic, allowing for the plan to be discussed periodically and improved. A number of organizations and universities have developed references to guide the process of creating an IDP. However, to facilitate broader usage of IDPs in pharmacy schools and maximize the benefit of their use, both at an individual and an institutional level, AACP should play a role in curating resources and developing structured workshops for both graduate students and advisors.

## **RECOMMENDATION 2**

AACP should develop or curate programs or tools to support the use of IDPs.

## **SUGGESTION 1**

Graduate programs are encouraged to implement IDPs for all trainees, utilizing existing resources such as [myidp.sciencecareers.org](http://myidp.sciencecareers.org).

## **Achieving member support of the 2016-2017 recommended graduate competencies**

Although the domains identified by the 2016-2017 RGAC are generally accepted as covering important skills and essential characteristics of successful graduates, the comprehensive adoption and assessment of competency of these skills is challenging for graduate education programs in pharmacy schools. Graduate faculty may benefit from additional resources and examples of competency-based education (CBE) implementation and effective approaches for assessment within graduate level courses. CBE refers to systems of instruction,

assessment, grading, and academic reporting in which students must demonstrate proficiency in the concepts and skills being taught.<sup>3</sup> With direct assessment CBE, students' progress at their own pace and are not restricted by typical semester timeframes, and skills may be gained by experiential rather than course-based components of graduate education. Other forms of CBE include course-based and hybrid programs, which retain the credit hour structure and assessment using grades.<sup>4</sup> Because of the mentorship/mentee relationship between graduate students and faculty and low student to faculty ratios, graduate programs may be particularly well suited to applying CBE methods.

CBE has been employed to various degrees in the training of health professionals and accreditation of health profession schools. The Accreditation Council for Medical Education introduced CBE to the accreditation of schools of medicine by creating six core competency domains in 1999<sup>5</sup> and launching these CBE-based domains in the education of physicians in 2001.<sup>6</sup> Nursing education has traditionally required students to demonstrate competencies in passing the National Council of Licensing Exam for Registered Nurses. More recently, several programs have adopted self-directed direct assessment CBE for nurses who already have an associate degree in nursing.<sup>7</sup> In 2015, pharmacy accreditation standards were introduced that included standards linking competencies to desired outcomes.<sup>8</sup>

Less common are the incorporation of CBE principles in research-intensive graduate programs, such as those found in pharmacy schools. The accreditation criteria for the Schools of Public Health and Public Health Programs, released by the Council on Education for Public Health, included a list of foundational competencies for the M.P.H. and Dr.P.H. programs.<sup>9</sup> At the University of Pittsburgh School of Pharmacy, core competencies were developed for training students enrolled in a clinical pharmaceutical scientist Ph.D. training program.<sup>10</sup> Similarly, a competency-based assessment, similar to that required for accreditation of Pharm.D. programs, was developed for a Master's of Science in Pharmaceutical Sciences (M.S.P.S.) at Campbell University College of Pharmacy and Health Sciences.<sup>11</sup>

Little is known about the opinions of graduate program faculty in pharmacy schools regarding adoption of CBE and development of assessments that align with CBE principles and priorities. The RGAC therefore decided to conduct a qualitative assessment to better understand the beliefs and norms of faculty in graduate programs towards the use of core competencies in the education of graduate students. Specifically, we explored familiarity with, culture of, and attitudes towards CBE,

goal setting, and goal assessment. We then explored the control of, potential issues with, benefits of, and need and desire for support of CBE in graduate programs.

Focus groups were formed using a convenience sample of faculty involved in teaching and/or administering graduate programs and attending the 2018 AACP Interim meeting. A total of 10 participants (7 female and 3 male) were interviewed in the two focus groups. All participants were involved in their school's graduate programs: 5 were Directors of Graduate studies, 7 were graduate faculty, and 8 had other administrative graduate program roles. Nearly all (9 of 10) participants had over 15 years of academic experience.

A facilitator guide was developed using the theory of planned behavior as a framework (Appendix 1).<sup>12-16</sup> Specifically, questions focused on identifying normative beliefs and subjective norms of using core competencies to guide graduate program development and assessment, the presence of factors facilitating or hindering the adoption of CBE in guiding graduate programs, and individual or program readiness to adopt CBE for graduate programs.

Several key themes emerged from the focus groups regarding the use of CBE, goal setting, and goal assessment for graduate programs. One important theme was the concern that competencies were a step towards national graduate program accreditation and oversight and that the AACP competency domains would be developed and used to drive accreditation processes, with related assessment and reporting requirements. However, the intention of the 2016-2017 RGAC was solely to use its competency framework to enable shared content across graduate programs, and not for accreditation purposes. Once the intentions were discussed, progress was made in a focused discussion of implementation and advantages of generally agreed upon competency domains.

Discussions centered on the ability of graduate programs to adequately address certain competency domains. There was general consensus that Domains 1-3 (Foundational Knowledge; Research; and Scientific Communication) were adequately addressed in nearly all training programs through the processes associated with proposing and defending a research thesis proposal. Many programs also offered didactic coursework addressing topics within these domains. Some programs also offered coursework covering some topics and opportunities in Domains 4 and 6 (Education; and Personal and Professional Development), but to a lesser extent. One participant suggested that many Pharm.D. programs have developed coursework that addresses Domain 6 and could possibly be used as a template for graduate programs. It was suggested that schools with newly established or less developed programs, in particular, would have difficulty

incorporating Domains 4 and 5 (Education; and Leadership and Management) into their graduate programs. Others agreed that student and faculty workload might increase beyond acceptable limits if too much emphasis is placed on domains that are not currently part of graduate program training. Finally, the assessment of competencies was viewed as another potential barrier to implementation of the AACP competencies. There were questions and limited discussion regarding when to begin assessing and how to assess competencies developed using the AACP domain framework.

Despite these concerns, there was considerable interest and support for further development of the domains into competencies. Specific participant statements included the potential benefits of the competencies in guiding development of newer graduate programs and in curricular reevaluation. Competency-based graduate education and the AACP competency domains were viewed as being beneficial for promoting skills needed in the workforce, echoing the original discussions by the 2016-2017 RGAC in developing the competency domains. One participant thought that certain domains within the AACP aligned with efforts from the National Science Foundation Research Traineeship and the National Institute of General Medical Sciences (NIGMS) to promote skills that help graduate students enter the workforce in less time.

Several ways to assist programs with incorporating the competencies into their existing educational frameworks were suggested in the focus groups. One suggestion was for AACP to develop or promote existing programming addressing the competencies, given the need for this content in specific areas of domain training. This would also potentially alleviate concern by one participant who noted that there was high variability in the degree of exposure and training in Domain 5, Leadership and Management. One participant noted that some schools have access to what we term power skills course content through National Centers for Advancing Translational Sciences (NCATS) Clinical and Translational Science Awards (CTSAs). AACP could facilitate shared access to such content. These suggestions informed RGAC Recommendation 1 above. By sharing resources through an AACP repository, AACP could also help to identify successful practices. Eventually, assessment of competencies could become part of the repository and training programs as more experience was gained.

#### **Identifying barriers to pursuing graduate education**

In addition to its charges related to supporting the development of skills in trainees already enrolled in graduate programs, the 2017-2018 RGAC was charged to



identify potential strategies to address identified barriers to pursuing graduate education, especially among under-represented student populations. A majority of the published work describing barriers to pursuing graduate education and potential interventions in pharmacy schools is found in previous AACP RGAC Reports.<sup>17-20</sup> In general, barriers have been anecdotally reported as opposed to identified through empirical research. The 2014-16 RGAC, in particular, collected qualitative and quantitative data that will certainly inform the Academy regarding both strategies and barriers for future data driven decision making for recruitment efforts.<sup>18</sup>

In addressing this charge, the 2017-2018 RGAC considered the following questions: Are there empirically identified barriers to pursuing graduate education in colleges and schools of pharmacy? If so, to what extent are the identified barriers keeping students that would otherwise pursue graduate school from doing so? How do barriers differ across potential graduate student populations (e.g., those with a Pharm.D. degree, members of under-represented minority groups, those with large student loan debt incurred)? To what extent are identified barriers modifiable? Is there a “shortage” of US-trained pharmacists and/or non-pharmacists with graduate training in pharmaceutical sciences?

The 2017-2018 RGAC perceives there to be no definitive answers to these questions, in part because studying the pharmacy graduate student cohort, and those who are considering graduate education at colleges and schools of pharmacy, is difficult. Several objectives within Strategic Priority 4 of the AACP 2016-2019 strategic plan aim to remedy this lack of information about the graduate student population in pharmacy schools. However, these objectives do not specifically address the population of would-be graduate students that do not end up pursuing a graduate degree in a pharmacy school. With that in mind, the RGAC believes these data will be invaluable in addressing barriers to pursuing graduate education.

### **RECOMMENDATION 3**

In activities related to the 2016-2019 Strategic Plan, AACP should expand its efforts in career tracking of graduate students to include collection and/or analysis of data specific to graduate education that could inform the Academy’s understanding of barriers to pursuing graduate education in pharmacy schools.

The 2017-2018 RGAC elected to focus in part on identifying potential strategies for US-pharmacy trained individuals. Fall 2016 analyses indicated 293 of 3026 enrollees in pharmacy Ph.D. programs had earned a pharmacy degree from a US institution, or about 2 students per accredited college or school of pharmacy.<sup>21</sup>

The RGAC perceives Pharm.D. graduates who pursue additional graduate education in the pharmaceutical sciences as an untapped resource to better understand barriers to pursuance. However, to better understand the barriers and needs of this population, more data on this population is needed.

### **RECOMMENDATION 4**

The AACP Office of Institutional Research and Effectiveness should publish a Graduate Student Population Special Report annually that expands upon graduate program data described in the annual Profile of Pharmacy Students report.

### **Facilitating Pursuance of Pharmacy Graduate Education**

For purposes of this report, pursuance of graduate education in pharmacy schools – regardless of the preceding path – within cognitive theory is considered a task choice. Social Cognitive Career Theory (SCCT) – an extension of Bandura’s validated Social Cognitive Theory (SCT) – is a useful framework through which career decision making, including barriers and task choices, can be viewed.<sup>22,23</sup> Moreover, the SCCT provides a framework to help identify points of intervention when recognizing and mitigating barriers to pursuance of graduate education in pharmacy schools. While a thorough description of the SCCT is beyond the scope of this report, along the SCCT continuum from early formation of interests to selection of a career, barriers to pursuance of graduate education in pharmacy schools could potentially include: limited career exposure, lack of career self-efficacy, negative career outcome expectations, and negative environmental factors.

To date, research specific to barriers to pursuing graduate education in pharmacy schools is very limited, as is the case in other health profession schools. When considering applying for enrollment in M.D./Ph.D. programs, for example, students indicate the length of training, lack of role models, financial difficulties, and the cultural gap between medicine and graduate education are barriers to pursuance.<sup>24</sup> All of these barriers can be viewed through an SCCT lens. Importantly, however, research regarding intervention effectiveness in M.D./Ph.D. programs is lacking. Given limited research regarding identified barriers and even less research describing effective strategies, this report provides a brief list of strategies that pharmacy schools could consider (and evaluate) to mitigate barriers across the aforementioned continuum.

### **Exposure to Research at Pharmacy Schools**

Strategies to provide both pharmacy and undergraduate students direct experience with research at pharmacy

schools should be evaluated. Pharmacy students should be exposed to and provided an opportunity to participate in research projects early in the curriculum. Examples include paid research assistantships, course credit for research projects (required or elective), co-curricular and extra-curricular mentored research opportunities (e.g., summer internships/fellowships), and research projects with senior peer students. Examples of undergraduate research engagement include summer research experience programs, professional and undergraduate research courses and independent study opportunities, and part-time or work study research projects during the school year. In all cases multi-institutional approaches should be considered.<sup>27</sup> Embracing a broad definition of “research” may also help pharmacy schools be more welcoming to potential students. Appropriately and holistically defining research early in the Pharm.D. curriculum and exposing professional and undergraduate students to the manner in which research is indispensable in the pharmacy profession and the breadth of research activities at pharmacy schools could encourage pursuit of graduate education by students otherwise unlikely to consider it.

AACP could also increase awareness of graduate education and research opportunities at pharmacy schools by expanding its recruitment efforts like the Pharm4Me campaign. The Pharm4Me campaign is focused on providing information predominantly targeted for high school students interested in pharmacy, STEM, or other health professional careers. Expansion of the Pharm4Me campaign to include information, both print and digital, on pharmacy sciences would be an important step in promoting graduate education to a high school audience. Similar efforts are needed to target current college students pursuing B.S. degrees in chemistry, biology, and other pharmacy related disciplines. To reach this audience, AACP could expand its efforts with regards to Health Professions Week to include research and graduate education. This is a week-long recruitment event targeting both high school and college students in which the 2017 participants consisted of 44.6% college students. Participation in this event is an especially attractive strategy, already employed by AACP for pharmacy student recruitment and adaptable to support graduate student recruitment.

### **Considerations for the Pharm.D./Ph.D. Path**

Two commonly mentioned barriers to pursuance of graduate education are the length of training and financial considerations.<sup>25–27</sup> AACP data indicate student loan indebtedness for Pharm.D. graduates has increased significantly in recent years, with average amounts borrowed

exceeding \$160,000 in 2017.<sup>28</sup> Research indicates stress associated with student loan indebtedness influences students’ decisions to pursue postgraduate training.<sup>29</sup> The 2017-2018 RGAC has identified the following approaches to potentially mitigate time and financial barriers to graduate education for pharmacists:

1. Competency-based training: Movement away from an emphasis on traditional didactic coursework to more flexible CBE models could facilitate decreased time to degree.
2. Program articulation: Applying and evaluating articulation principles to Pharm.D./Ph.D. degrees similar to those employed with Pharm.D./MBA and Pharm.D./M.P.H. joint degrees.
3. Stipends and tuition reimbursement: Using the Medical Scientist Training Program as a model, there is an opportunity for pharmacy schools to explore innovative, sustainable means by which MSTP-like Pharm.D./Ph.D. training programs can be developed. Importantly, the Academy should be able to justify the need – both professionally and societally – for such a program.
4. Student loan repayment: The NIH Loan Repayment Program can help professional degree holders who pursue research careers in designated areas of interest. The extent to which Pharm.D. recipients compete for and obtain such awards are unknown and thus should be further explored.
5. Credit hour requirements/barriers: While most graduate programs at US pharmacy schools must adhere to credit hour requirements set by their respective graduate schools, dialog should be encouraged to assess requirements for didactic, research, dissertation/thesis, and other course credit hours in terms of effectiveness and efficiency.
6. Micro-credentialing: Graduate programs could utilize technology and online education to more efficiently achieve pre-defined competencies.

### **Barriers among under-represented student populations**

Some barriers to the pursuit of graduate education are unique to or disproportionately affect under-represented student populations. It is the contention of the RGAC that diversity drives discovery. Diversity of race, sex, orientation, discipline, and training are the keys to novel perspectives to generate breakthroughs in research. Fusion of thought and expertise across a diverse array of individuals with unique personal and professional experiences will maximize innovative thinking with a direct impact on the advancement of research discovery.

Consistent with this philosophy of the importance of diversity in pharmacy education and practice, the RGAC identified three currently existing policies approved by AACP:

- AACP affirms the value of diversity and inclusivity in all elements of the academic mission and of the institutional policies and practices that achieve such goals. (Source: Argus Commission, 2014)<sup>30</sup>
- AACP recognizes that a diverse student body, faculty, administration, and staff contribute to improvements in health equity and therefore encourages member institutions to develop faculty, staff, pharmacists and scientists whose background, perspectives, and experiences reflect the diverse communities they serve. (Source: 2015-17 Taskforce on Diversifying our Investment in Human Capital)<sup>31</sup>
- AACP supports the development of an increasingly diverse population of pharmacists to serve as part of health care communities and teams that reflect the diversity of the populations served. (Source: Argus Commission, 2014)<sup>30</sup>

As with the importance of diversity in pharmacy practice communities, diversity in graduate education and research at pharmacy schools is equally as important. This is especially true given that graduate education programs will train a significant portion of our future faculty to serve as role models for further expansion. Thus, a specific policy statement as it relates to graduate education in pharmacy schools should be considered.

## **POLICY STATEMENT**

AACP supports the training and development of an increasingly diverse population of researchers at colleges and schools of pharmacy through active efforts to promote graduate and professional education. [Adopted by the 2018 AACP House of Delegates]

To support the emphasis on diversity in training and developing future leaders in pharmacy research, there is a clear need to increase efforts to diversify the graduate student pipeline. As such, the RGAC has considered a number of strategies aimed at recruitment as a central factor in achieving a more diverse graduate student population.

## **RECOMMENDATION 5**

AACP should include graduate programs in efforts to increase diversity of students at colleges and schools of pharmacy.

With regard to specific strategies to act on this recommendation, there are a number of efforts already underway at AACP for recruitment of pharmacy students that

could be adapted or expanded to support graduate student recruitment. For example, AACP maintains a strategic partnership with Kaplan to develop and promote PCAT prep materials. Preparatory materials for the GRE could also be included in diversity outreach initiatives to students potentially interested in graduate education at pharmacy schools.

The AACP Strategic Student Recruitment Guide highlights a number of recruiting events the Association currently attends, including the Tour for Diversity and the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS). AACP would benefit from using these opportunities to support graduate student recruitment as well as considering additional conferences, such as the Annual Biomedical Research Conference for Minority Students (ABRCMS) and the American Indian Science and Engineering Society (AISES). NIGMS, which supports research training at different career stages and across biomedical research disciplines, encourages engagement with these and similar organizations to increase diversity among students in graduate programs.

AACP engagement with these organizations could involve a presence at their annual meetings to provide students with information on the advantages of graduate education at pharmacy schools, including resulting career opportunities. Additionally, AACP could support the efforts of pharmacy schools attending these conferences by providing unified messaging and promotional materials for pharmacy graduate degrees similar to those used in Pharm.D. recruitment efforts. Graduate programs are encouraged to participate in these conferences, as the presence of postdoctoral fellows at these conferences also provides an opportunity to enhance recruitment of pharmacy school faculty from underrepresented minority groups. A more representative faculty would be a crucial step in increasing recruitment and improving retention of a diverse graduate student body.

In addition to ramping up recruitment activities at national conferences, there are other opportunities to establish or strengthen partnerships with national organizations focused on graduate training and/or increasing diversity within graduate education. For example, AACP could partner with the American Foundation for Pharmaceutical Education (AFPE), an organization with which AACP is already closely aligned, to bolster the graduate student pipeline through a funding mechanism. Using the model of the AFPE Gateway to Research Scholarships program that provides stipend support to full-time students enrolled in a Pharm.D. program to increase research exposure, AACP and AFPE could create a similar award and support level aimed at increasing



research opportunities to underrepresented student populations. The applicant pool for this new award could include undergraduates in chemistry, biology, engineering, or other STEM fields with interest in pursuing pharmacy research experiences in addition to Pharm.D. students. To advertise such opportunities to students outside of pharmacy, AACP and AFPE could engage organizations such as SACNAS, AISES, and ABRCMS.

It is important for AACP to identify and implement methods to facilitate the efforts of member schools to ensure the training of a diverse population of graduate students. To the extent possible, this should build on existing groups within AACP, while also engaging national organizations and programs with strong track records for building diversity and inclusiveness within educational and scientific enterprises. The Graduate Education SIG, with over 300 members, supports students and postdoctoral fellows associated with graduate programs in pharmacy schools and includes promotion of diversity among its goals. As such, it is an excellent resource to identify best practices for recruitment and support of graduate students from underrepresented groups as well as students with disabilities. In particular, it can facilitate the sharing of successful approaches by engaging those most directly involved in graduate education. These efforts could also tap into the work of other organizations, such as the 2016 report from the Coalition of Urban Serving Universities, the Association of Public Land-Grant Universities, and the Association of American Medical Colleges.<sup>32</sup> This report details a plan for organizational change, diverse student success, recruitment and admissions, and diverse faculty hiring and advancement practices.

## CONCLUSION AND CALL TO ACTION

Collectively, the charges of the 2017-2018 RGAC can be viewed as an assessment of and strategies to overcome two primary types of barriers in graduate education: those barriers that prevent potential trainees from pursuing graduate training, and additional barriers encountered during training that prevent graduates from achieving sustained success after completion of training. With respect to both types of barriers, it is clear that current methods of recruiting and training the future research workforce are in need of refreshing to meet the demands of trainees and employers. This report emphasizes the need for the Academy to empirically understand the barriers to pursuing graduate training in colleges and schools of pharmacy so that students who have an interest in pursuing this type of training are adequately supported in their endeavors. Likewise, this report begins to assess more formally the barriers associated with a move towards competency based graduate education that includes

training in power skills that previously have not been a focus of graduate training but are needed in today's and tomorrow's research landscape. It is the RGAC's belief that both types of barriers can be overcome, ultimately to the benefit of both the trainees and the graduate programs. Implementing the necessary changes to understand fully and address barriers in graduate education will take time, but collaborative efforts across graduate programs and in partnership with AACP can position pharmacy graduate education at the forefront of next generation research workforce.

## REFERENCES

1. Bylaws for the American Association of Colleges of Pharmacy; Inc, American Association of Colleges of Pharmacy. [https://www.aacp.org/sites/default/files/2017-10/aacp\\_bylaws\\_revised\\_july\\_2017.pdf](https://www.aacp.org/sites/default/files/2017-10/aacp_bylaws_revised_july_2017.pdf). Accessed February 13, 2018.
2. Poloyac SM, Block KF, Cavanaugh JE, et al. Competency, Programming, and Emerging Innovation in Graduate Education within Schools of Pharmacy: The Report of the 2016-2017 Research and Graduate Affairs Committee. *Am J Pharm Educ.* 2017;81(8):S11. doi:10.5688/ajpeS11.
3. Competency-Based Learning, The Glossary of Education Reform. <https://www.edglossary.org/competency-based-learning/>. Accessed January 23, 2018.
4. Cunningham J, Key E, Capron R. An evaluation of competency-based education programs: A study of the development process of competency-Based programs. *J Competency-Based Educ.* 2016;1(3): 130-139. doi:10.1002/cbe2.1025.
5. Nasca TJ, Philibert I, Brigham T, Flynn TC. The next GME accreditation system—rationale and benefits. *N Engl J Med.* 2012;366(11): 1051-1056. doi:10.1056/NEJMSr1200117.
6. Batalden P, Leach D, Swing S, Dreyfus H, Dreyfus S. General competencies and accreditation in graduate medical education. *Health Aff (Millwood).* 2002;21(5):103-111.
7. Gravina EW. Competency-Based Education and Its Effect on Nursing Education: A Literature Review. *Teach Learn Nurs.* 2018;12(2): 117-121. doi:10.1016/j.teln.2016.11.004.
8. Accreditation standards and key elements for the professional program in pharmacy leading to the doctor of pharmacy degree, Accreditation Council for Pharmacy Education. <https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf>. Accessed February 8, 2017.
9. Council on Education for Public Health. <https://ceph.org>. Accessed January 23, 2018.
10. Poloyac SM, Empey KM, Rohan LC, et al. Core Competencies for Research Training in the Clinical Pharmaceutical Sciences. *Am J Pharm Educ.* 2011;75(2):27. doi:10.5688/ajpe75227.
11. Bloom TJ, Hall JM, Liu Q, Stagner WC, Adams ML. Developing an Assessment Process for a Master's of Science Degree in a Pharmaceutical Sciences Program. *Am J Pharm Educ.* 2016;80(7):125. doi:10.5688/ajpe807125.
12. Fishbein M, Ajzen I. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research.* Reading, Mass.: Addison-Wesley; 1980.
13. Fishbein M, Ajzen I. Attitudes and voting behavior: An application of the theory of reasoned action. *Prog Appl Soc Psychol.* 1981;1(1):253-313.
14. Ajzen I, Madden TJ. Prediction of Goal-Directed Behavior: Attitudes, Intentions, and Perceived Behavioral Control. *J Exp Soc Psychol.* 1986;22(5):453-474. doi: 10.1016/0022-1031(86)90045-4.



15. Ajzen I. Behavioral interventions: Design and evaluation guided by the theory of planned behavior. In: Mark MM, Donaldson SI, Campbell B, eds. *Social Psychology and Evaluation*. New York, NY: Guilford Press; 2011:72–101.
16. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991;50(2):179-211. doi: 10.1016/0749-5978(91)90020-T.
17. Blouin R, Brixner D, Cutler S, et al. The Report of the 2012-2013 Research and Graduate Affairs Committee. *Am J Pharm Educ*. 2013;77(8):s9. doi:10.5688/ajpe778S9.
18. Eddington (Chair) ND, Aubé J, Das SK, et al. Report of the 2014-2016 AACP Research and Graduate Affairs Committee. *Am J Pharm Educ*. 2016;80(9):S21. doi:10.5688/ajpe809S21.
19. Brueggemeier RW, Clark AM, Das SK, et al. The path forward: the future of graduate education in the pharmaceutical sciences: the report of the 2010-2011 Research and Graduate Affairs Committee. *Am J Pharm Educ*. 2011;75(10):S13. doi:10.5688/ajpe7510S13.
20. Crismon ML, Albright FS, Canney DJ, et al. The Role of Dual-Degree Programs in Colleges and Schools of Pharmacy: The Report of the 2008–09 Research and Graduate Affairs Committee. *Am J Pharm Educ*. 2009;73(8):S06. doi:10.5688/aj7308S06.
21. Taylor JN, Taylor DA, Nguyen NT. The Pharmacy Student Population: Applications Received 2015-16, Degrees Conferred 2015-16, Fall 2016 Enrollments. *Am J Pharm Educ*. 2017;81(7):S8. doi:10.5688/ajpe817S8.
22. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ, US: Prentice-Hall, Inc; 1986.
23. Lent RW, Brown SD, Hackett G. Toward a Unifying Social Cognitive Theory of Career and Academic Interest, Choice, and Performance. *J Vocat Behav*. 1994;45(1):79-122. doi: 10.1006/jvbe.1994.1027.
24. Holmes SM, Karlin J, Stonington SD, Gottheil DL. The first nationwide survey of MD-PhDs in the social sciences and humanities: training patterns and career choices. *BMC Med Educ*. 2017;17(1):60. doi:10.1186/s12909-017-0896-1.
25. Hammond DA, Oyler DR, Devlin JW, et al. Perceived Motivating Factors and Barriers for the Completion of Postgraduate Training Among American Pharmacy Students Prior to Beginning Advanced Pharmacy Practice Experiences. *Am J Pharm Educ*. 2017;81(5):90. doi:10.5688/ajpe81590.
26. McCollum M, Hansen LB. Characteristics of Doctor of Pharmacy Graduates Entering and Not Entering Residency Training Upon Graduation. *Am J Pharm Educ*. 2005;69(3):42. doi:10.5688/aj690342.
27. Migliore MM, Costantino RC, Campagna NA, Albers DS. Educational and Career Goals of Pharmacy Students Upon Graduation. *Am J Pharm Educ*. 2013;77(9):187. doi:10.5688/ajpe779187.
28. American Association of Colleges of Pharmacy Graduating Student Survey: 2017 National Summary Report, American Association of Colleges of Pharmacy. [https://www.aacp.org/sites/default/files/2017-10/2017\\_GSS\\_National\\_Summary\\_Report.pdf](https://www.aacp.org/sites/default/files/2017-10/2017_GSS_National_Summary_Report.pdf). Accessed March 30, 2018.
29. Hagemeyer NE, Gentry CK, Byrd DC, et al. Student Pharmacists' Personal Finance Perceptions, Projected Indebtedness upon Graduation, and Career Decision-Making. *Am J Pharm Educ*. November 2017:ajpe6722. doi:10.5688/ajpe6722.
30. Yanchick VA, Baldwin JN, Bootman JL, Carter RA, Crabtree BL, Maine LL. Report of the 2013-2014 Argus Commission: Diversity and Inclusion in Pharmacy Education. *Am J Pharm Educ*. 2014;78(10):S21. doi:10.5688/ajpe7810S21.
31. White C, Conway JM, Davis PK, et al. AACP Special Taskforce White Paper on Diversifying Our Investment in Human Capital. *Am J Pharm Educ*. 2017;81(8):S13. doi:10.5688/ajpeS13.
32. Increasing the Diversity in the Biomedical Research Workforce: Actions for Improving Evidence, Coalition of Urban Serving Universities, Association of Public and Land Grant Universities, Association of American Medical Colleges. [http://urbanuniversitiesforhealth.org/media/documents/Increasing\\_Diversity\\_in\\_the\\_Biomedical\\_Research\\_Workforce.pdf](http://urbanuniversitiesforhealth.org/media/documents/Increasing_Diversity_in_the_Biomedical_Research_Workforce.pdf). Published 2016. Accessed April 11, 2018.

Appendix 1. Facilitator's Guide to the American Association of the Colleges of Pharmacy's Research and Graduate Affairs Committee Core Competency Focus Groups

Welcome and thank you for participating! Before we get started, we would like to introduce ourselves. (*brief introductions for facilitators*)

The American Association of the Colleges of Pharmacy's 2016-17 Research and Graduate Affairs Committee developed and vetted a set of core competency domains specific to graduate education in the pharmaceutical sciences. The core competency domains are provided on the first page of your handout. The purpose of this focus group is to better understand the processes by which graduate programs develop, improve, and assess their programs and to gather information about how best to facilitate adoption of these core competencies. We're also interested in understanding real and perceived barriers to adoption and implementation. We've asked you to participate because you are involved in the administration of your School or College's graduate education program.

Prior to this focus group, you should have received the AACP's Research and Graduate Affairs Committee's report supporting the policy statement on core competencies for review. We will briefly review the policy statement and domains of the core competencies.

First, we'd like to get a better idea about the setting at your institution. We would also like to learn more about your familiarity with and attitudes towards competency-based education, including goal setting and assessment.

- 1.1 Briefly describe your experience with competency-based education in PharmD programs and graduate programs.
- 1.2 Describe the extent to which your school's/college's graduate school assesses graduate students based on core competencies. Describe the extent to which evaluating graduate students across core competencies is an expectation at your institution. Who is championing this effort, if anyone?
- 1.3 To what extent do you think competency-based training is the norm in pharmaceutical sciences graduate programs? Why or why not?
- 1.4 Describe your attitude towards competency-based education.
- 1.5 Describe your colleague's perceptions of and department's and/or school/college's culture as it pertains to the use of competency-based education.

With this next group of questions, we are interested in finding out more about the potential issues anticipated with adopting the AACP Core Competencies for Graduate Programs and ways of improving incorporation of the competencies into Schools or Colleges of Pharmacy graduate education programs.

- 2.1 Has your school/college/program engaged in competency-based graduate education?
  - 2.1.1 If yes, describe some of the barriers you had to overcome to engage this process. How did you overcome them?
  - 2.1.2 What are some positive outcomes your program/college/school has experienced as a result of engaging in competency-based education? What are some negative outcomes?
- 2.2 If competency-based graduate education is not happening, what are some barriers to evaluating graduate students across core competencies? How might these barriers be overcome?
- 2.3 What would be required to adopt the AACP Core Competencies at your institution? Would adoption most likely occur at the college level or the departmental level? Who ultimately would make the decision to adopt the core competencies?
  - 2.3.1 What potential policy barriers exist to adopting the AACP Core Competencies?
  - 2.3.2 What potential attitudinal or cultural barriers exist to adopting the AACP Core Competencies?
- 2.4 What might be the expected outcomes and impacts of pursuing competency-based education for pharmaceutical science graduate programs at your institution?
- 2.5 How might interested faculty advance the concept of competency based education for pharmaceutical science graduate programs at your institution?
- 2.6 Considering the AACP Core Competencies, which of the major domains do you think are well addressed by graduate programs at your institution (i.e. programs in which you are involved and/or programs of which you are aware)?
- 2.7 Continuing to consider possible adoption of the AACP Core Competencies at your institution, what could AACP do to support adoption of the Core Competencies? How would AACP's involvement be perceived by faculty and administrators at your institution?