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Conflicts of Interest: None

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Abstract

Objective—To describe common facilitators, challenges, and lessons learned of five schools and colleges of pharmacy in establishing community pharmacy research fellowships.

Setting—Five schools and colleges of pharmacy in the United States.

Practice Description—Schools and colleges of pharmacy with existing community partnerships identified a need and ability to develop opportunities for pharmacists to engage in advanced research training.

Practice Innovation—Community pharmacy fellowships, each structured as two years in length and in combination with graduate coursework, have been established at the University of Pittsburgh, Purdue University, East Tennessee State University, University of North Carolina at Chapel Hill and The Ohio State University.

Evaluation—Program directors from each of the five community pharmacy research fellowships identified common themes pertaining to program structure, outcomes, and lessons learned to assist others planning similar programs.

Results—Common characteristics across the programs include length of training, pre-requisites, graduate coursework, mentoring structure, and immersion into a pharmacist patient care practice. Common facilitators have been the existence of strong community pharmacy partnerships, creating a fellowship advisory team, and networking. A common challenge has been recruitment, with many programs experiencing at least one year without filling the fellowship position. All program graduates (n=4) have been successful in securing pharmacy faculty positions.

Conclusion—Five schools and colleges of pharmacy share similar experiences in implementing community pharmacy research fellowships. Early outcomes show promise for this training pathway in growing future pharmacist-scientists focused on community pharmacy practice.

Keywords

Community pharmacy services; research; pharmacy education; fellowships and scholarships

INTRODUCTION

Poor patient outcomes, in spite of significant spending on healthcare, remain a pervasive challenge for the United States.¹ Recent efforts have focused on the development and evaluation of new community care delivery models to improve outcomes and significant federal funding has been allocated for this work.² Moreover, legislative efforts are underway to address the 2010 report to the US Surgeon General's, "Improving Patient and Health System Outcomes Through Advanced Pharmacy Practice," call for pharmacists' recognition as health care providers in the Social Security Act.³ Much attention has been paid recently to

the role pharmacists play in primary care, prevention, public health, and care coordination. Engaging pharmacist-scientists in these efforts may help to achieve these goals. This is especially important for pharmacists practicing in the community where there is great need to implement and evaluate new patient care models and their impact on patient outcomes. This is furthered evidenced by the Medicare Prescription Drug Improvement and Modernization Act, which created Medicare Part D and required that prescription drug plans provide coverage for medication therapy management (MTM) services in 2006, yet wide-scale implementation in community pharmacies has not yet been achieved.⁴

The demand for pharmacist-scientists capable of contributing meaningfully to scholarship and teaching has increased, in part due to the numerous new schools and colleges of pharmacy that have opened in recent years.⁵ Therefore, producing pharmacist faculty trained in research is critical for filling an ever-widening gap that exists both in science and pharmacy education. Although the National Institutes of Health (NIH) supports the notion of pharmacists serving in this role, much work is needed to position more pharmacists as leaders in research.⁶ A 2010 evaluation of junior pharmacy practice faculty found that fewer than half of the respondents felt comfortable with initiating a research project. Respondents' top two areas of interest for further training were in managing funding issues and statistical analysis.⁷ Community pharmacy residency graduates also feel unprepared for faculty roles, particularly in regard to the research component of these positions.⁸ While residency projects have been reported to add value, relatively few are ultimately published.⁹⁻¹¹ As the majority of pharmacy graduates are entering positions in community practice, there is a need for strong academic leaders focused on the growth and success of community pharmacy practice.¹²

One solution for furthering pharmacist research skills is the completion of postgraduate fellowship programs. The American College of Clinical Pharmacy (ACCP) supports fellowship training as one option.¹³ ACCP also has guidelines for fellowship training and a process by which fellowship programs can undergo peer review in order to be recognized as a fellowship that meets ACCP guidelines.

Fellowship programs focusing uniquely on research surrounding community pharmacist-delivered care and the development of community pharmacy faculty may serve as a pivotal strategy for meeting the needs of science and the profession.

OBJECTIVE

The purpose of this paper is to describe common facilitators, challenges, and lessons learned of five schools and colleges of pharmacy in establishing community pharmacy research fellowships, which may assist others working to establish community pharmacy research fellowships at their institutions.

SETTING

This paper shares the experiences of the University of Pittsburgh School of Pharmacy, Purdue University College of Pharmacy, East Tennessee State University College of Pharmacy, University of North Carolina Eshelman School of Pharmacy, and The Ohio State

University College of Pharmacy. Each of these Schools/Colleges has established a postgraduate fellowship program for pharmacists interested in advancing community pharmacist practice through research. To our knowledge, these programs represent all active community pharmacy fellowship programs in the United States.

PRACTICE INNOVATION

This paper describes an innovation in practice-based research training for pharmacists through creation of the community pharmacy research fellowship model. The purpose of community pharmacy research fellowship training is to grow future leaders in community pharmacy research. As described in the ACCP Guidelines for Clinical Research Fellowship Programs, whereas residency training is focused on developing expertise in practice with some experience with research and teaching, fellowship training is focused on developing expertise in research with some experience in teaching and practice. Fellowships are generally highly individualized training programs approximately two years in length and combined with graduate coursework. Therefore, specific goals and features of programs vary by institution. The programs include a practice component for the fellows as a mechanism by which fellows can maintain competency as a clinician, identify relevant research questions, and foster collaborations and educational opportunities with practitioners as well as students/residents.

To our knowledge, the genesis of community pharmacy research fellowship training in the United States was at the University of Pittsburgh. In 2007, the School established the fellowship as an opportunity to more formally grow community pharmacy-based research and meet national needs for such research and appropriately trained individuals. The fellowship complemented existing community-based programs at the School, including the PGY-1 community pharmacy residency, which launched in 2006. Early experiences with the fellowship were briefly described previously.¹⁴

The University of Pittsburgh's first fellow completed the program in 2009 and joined the faculty at Purdue University. As part of this faculty position, a residency program was planned and funding committed. After discussion with the Department Head and Dean, approval was received to modify the residency to become a two-year fellowship program modeled after the program at the University of Pittsburgh. In the subsequent years, similar programs have emerged at East Tennessee State University, the University of North Carolina, and The Ohio State University. The requirements and key features of these five community pharmacy research fellowship programs are described in greater detail in Tables 1 and 2.

EVALUATION/RESULTS

Below, we share early program outcomes as well as common experiences pertaining to the challenges we have experienced, facilitators to successful implementation, and lessons learned.

Outcomes for Programs with Graduates

Thus far, the five programs described have produced four graduates (two graduates from the University of Pittsburgh and two graduates from Purdue University). Upon graduation, fellows were offered positions including research scientist positions, tenure-track faculty positions, and practice faculty positions. Positions accepted included tenure-track positions (n=2) and practice faculty positions with significant research effort (n=2). Across the four graduates, a total of 39 abstracts were accepted during fellowship and 25 peer-reviewed publications resulted from work completed during fellowship. Since graduation, the four graduates have accumulated a total of six research grants or contracts as Principal Investigator, totaling \$734,589.

Experiences and Lessons Learned

Building off Existing Programs and Partnerships—Each of these five fellowship programs build off of other College community-based partnerships and/or existing residency and graduate programs. The maturity of these existing programs creates a strong environment for launching the fellowship. Common elements have included current PGY-1 community pharmacy residency programs, practice-based research networks (PBRNs), community pharmacy-focused research initiatives, and existing MS or MPH programs. Capitalizing on these existing partnerships has been invaluable in identifying prospective candidates, practice and research opportunities for the fellows, and appropriate preceptors and mentors. These partnerships have also created natural teaching opportunities for the fellows. Across our programs, the fellows work or will work closely, with PGY-1 community pharmacy residents and faculty members. Fellows are able to develop teaching skills through providing mentorship on residency research projects as well as clinical teaching opportunities through precepting residents.

Importance of Creating a Fellowship Team—In all of these programs, fellows receive mentorship from a group of formal and informal preceptors rather than only an individual fellowship director. This approach has been successful in allowing the fellow to benefit from multiple strengths, talents, and experiences. At minimum, this has included both a fellowship director(s)/research mentors along with a practice preceptor to oversee the patient care component of the fellowship. Some programs have formed a fellowship council or committee as well. Involving multiple preceptors enables the fellows to learn from others with expertise in specific areas of focus for the program, including research, teaching, and patient care, and introduces the fellow to new content areas and additional opportunities for professional growth.

Flexibility in Graduate Program Requirement—While all of our programs include the completion of graduate coursework as part of the fellowship, this requirement is tailored in unique ways to meet the local needs of each fellowship (Table 3). For example, at the University of Pittsburgh, the fellow completes an MPH degree, which is also an option at East Tennessee State University. ETSU also offers a graduate certificate in biostatistics, epidemiology, and health care management if the MPH degree is not desired. At the University of North Carolina, the fellow enrolls in courses through the Translational and Clinical Research Curriculum, created through an NIH Clinical and Translational Science

Award. Alternatively, at Purdue University, the fellows enroll in the College's graduate program and complete an MS degree. The graduate programs range from 18–45 credits and include both thesis and non-thesis options. Regardless of the specific degree completed, we have found that this portion of the fellowship is critical in developing specific research skills (e.g., research methods, statistics) while gaining “hands on” research experience through their fellowship projects.

Shared Learning and Networking Opportunities—Each of our programs have benefited from shared learning and networking with each other and colleagues external to the programs. Informal means of communication across existing programs have been utilized, as current programs have developed from existing personal relationships. Emails, impromptu gatherings at professional meetings and conference calls have been used to network and share ideas. The growing network of community pharmacy residency programs and directors has been another beneficial source of ideas. As the need for community pharmacy fellowship-trained individuals increases in the future, we suspect that the number of available positions will also increase, leading to a need for more formal and structured communications.

Placement of Fellowship Graduates—Although collectively we have only graduated four fellows to date, we have found that the positions fellows were offered and ultimately pursued, aligned well with the goals of the programs and meet identified needs. Each of the four graduates accepted faculty positions and has either secured, or is actively pursuing, extramural funding for their research programs. This gives us confidence in the ongoing success of these programs and their ability to fill a gap in the development of community-focused researchers.

Recruitment—Recruiting appropriate candidates has been the greatest challenge that we have observed. Two of our programs have experienced years in which appropriate candidates were not identified and positions were left unfilled. However, from our experiences we have also identified recruitment approaches that work well and that others seeking to establish similar programs may wish to consider. First, we have seen that recruitment needs to involve several avenues that incorporate both active information dissemination and candidate searches. Our programs include information about the fellowship on our institutions' websites, and have found it is important to keep such information up to date for program recognition. Furthermore, most programs have attended the American Society of Health-System Pharmacists (ASHP) Midyear Clinical Meeting and utilized the Personal Placement Service (PPS) for completing initial interviews with interested candidates. While PPS has been a valuable tool, it may be necessary for program directors to be proactive in identifying candidates for interviews. As current PGY-1 residents may be unaware that fellowship training is an option, some of our programs have found it valuable to contact those residents expressing interest in faculty positions, particularly in community or ambulatory care (via their PPS profile) in order to describe the fellowship and ways in which the training could better position the candidate for the faculty position desired.

In addition to our websites and PPS, our programs have recruited candidates at the American Pharmacists Association (APhA) Professional Opportunities Connection, and American

College of Clinical Pharmacy (ACCP) Residency and Fellowship Forum at their annual meetings, and included information about the programs in the ACCP Directory of Residencies, Fellowships, and Graduate Programs. Reaching out to PGY-1 community pharmacy residency program directors and sending personal emails to current community pharmacy residents or other colleagues has also been utilized.

Finally, we have found that it is important to be confident in the admissions requirements but with a degree of flexibility. For example, many PharmD students have expressed interest in entering the fellowships immediately after graduation. However, four of our programs require completion of a PGY-1 community pharmacy residency or equivalent practice experience, because of the program goals of creating pharmacist-scientists with patient care experience and their role in overseeing practice activities of PGY-1 community residents.

DISCUSSION

The need for pharmacist-scientists versed in community pharmacy practice has prompted the development of fellowships focused on community pharmacy research at multiple academic institutions. As described, the programs are modeled after the ACCP fellowship guidelines and have similar core characteristics in terms of the approach to mentorship, prerequisites, program length, and overall structure. Moreover, although ACCP does not recommend a specific number of credit hours devoted to biostatistics and/or research methods, the inclusion of graduate coursework on these topics in each of these fellowship programs aligns well with ACCP recommendations.¹⁴ ACCP recommendations also do not specify whether completion of a thesis would be considered more desirable than a non-thesis degree; rather, the recommendations emphasize research and grantsmanship skill obtainment that could be achieved in a number of ways. This flexibility has been embraced by the community fellowships, contributing to the individualized nature and, consequently, natural variability in graduate coursework structure across these programs.

Recruitment has been the primary challenge shared among the fellowship programs possibly due to a lack of awareness of community pharmacy fellowships, uncertainty regarding employment options post-fellowship, and an overall lack of understanding of program goals. Prior research has measured the financial implications for pharmacists choosing to pursue graduate school and determined that financial incentives need to be improved in order to successfully encourage PharmD graduates to consider obtaining a PhD.¹⁶ As community pharmacy fellowships require a minimum of three years post-PharmD to complete and fellowship graduates are likely to pursue similar positions as PhD graduates, it is likely that the same is true for these programs. Changes in the pharmacy workforce and demand for pharmacists are other factors that could influence recruitment. In addition to changes in the workforce, the overall health system shift to outcomes and value-based care will likely lead to demand for pharmacists with the skills needed to conduct practice-based research in community settings.

Recruitment may become less of a challenge in the future, as overall acceptance and awareness of community pharmacy fellowships grows, and as more attention is given to the importance of research in the PharmD curriculum.¹⁷ Pharmacy residencies of every type

faced similar recruitment challenges in their early stages, but as the healthcare landscape has shifted, there are currently far more applicants for residencies than available positions.¹⁸ It is reasonable to predict that as change continues, graduates will increasingly seek new postgraduate opportunities to prepare them for challenges ahead. This has been evidenced by a growing emphasis on discussion regarding innovative training models for community pharmacists during special sessions at the APhA Annual Meeting and Exposition over the past few years. At these meetings, community pharmacy fellowship training as well as emerging PGY-2 community pharmacy residencies have been discussed.^{19–20}

As with the growth of pharmacy residency training, as community pharmacy fellowships multiply, formality in accreditation or other recognition of quality may be developed. Currently, research fellowship program review has been limited to the voluntary ACCP Peer Review of Fellowships, which defines requirements for the training program, preceptor quality, fellowship applicant criteria, and fellowship experiences.¹⁴ As ASHP and APhA currently jointly accredit community pharmacy residencies,²¹ perhaps joint accreditation and peer review of fellowship programs by ACCP and APhA will one day be considered. As programs continue to expand geographically and strengthen, a more formalized process and resource center may assist programs to continue to grow while assuring quality of experience for all fellows.

CONCLUSION

Development and initial success of these five community pharmacy fellowship programs has led to community-focused pharmacist-scientists prepared for academic roles. The continued growth and development of these programs will help address the need for successful pharmacist-scientists who contribute meaningfully to community pharmacy practice research, education, and innovation. We hope sharing these lessons learned and experiences will assist additional institutions in implementing community pharmacy fellowships, and inform community pharmacy organizations of the potential to partner with trainees and their teams on meaningful and pragmatic community pharmacy research.

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KEY POINTS

What is already known

- New models of healthcare in the US are on the rise and community pharmacists play increasingly engaged roles in patient care.
- Due to community pharmacists' rapidly expanding engagement in patient care, there is a need for pharmacist-scientists and pharmacy faculty with expertise in community-focused research to advance, replicate and scale pharmacist-provided care in the community.

What the findings add

- Community pharmacy research fellowships have been established successfully at five academic institutions using common strategies while facing similar challenges.
- Fellowship graduates have been successful in publishing peer-reviewed articles, securing grant funding, and securing faculty positions.

Table 1

Program Requirements and Structure

	University of Pittsburgh	Purdue University	East Tennessee State University	University of North Carolina	Ohio State University
Year started	2007	2010	2014	2014	2015
Program length	2 years	2 years	2-3 years	2 years	2 years
Number of positions available	1	2 ^a	2 ^b	1	1
ACCP peer-reviewed	No ^c	Yes	No ^c	No ^c	No ^c
Preceptors/directors/ roles of supervisory staff	2 co-directors oversee main research projects and overall experience; fellowship council comprised of research faculty; 1 clinical patient care preceptor; 1-2 teaching mentors	1 director oversees day-to-day activities and serves as primary research mentor; 2 patient care mentors; additional mentors selected by fellow	1 director oversees research and graduate level training; 2 community preceptors oversee practice portion; additional key personnel from NIH grant and Academic Health Science Center faculty serve as mentors	1 director oversees day-to-day activities and serves as primary research mentor; additional mentors selected by fellow	1 director oversees day-to-day activities and serves as primary research mentor; 1 patient care preceptor; 1 teaching mentor; advisory group for research support
PGY-1 required	Yes	Yes	Preferred	Yes	Yes
Funding	Sustained alumni endowment	Endowed grants from the Hook Drug Foundation and Lilly Endowment, Inc.	75% college supported; 25% grant supported (NIH/NIDA R24 DA036409)	50% college supported; 50% grant supported	College supported through community-focused endowments

^a Positions recruited each year (junior/senior fellow)

^b Positions recruited every two years (progress in same class)

^c Plan to pursue peer review by ACCP

Program Key Features

Table 2

	University of Pittsburgh	Purdue University	East Tennessee State University	University of North Carolina	Ohio State University
Teaching certificate program offered	Yes	Yes	Yes	Yes	Yes
Patient care opportunities	Spends ½ day per week in an outpatient pharmacist patient care practice	Works with PGY-1 community pharmacy resident in community/ambulatory care settings 1 day per week.	Work in a charitable clinic community pharmacy setting alternating between staffing and patient care responsibilities; approximately ½ day per week	Works with student pharmacists through patient care activities in various settings and volunteers at underserved medical clinic; flexible schedule	Spends ½ to 1 day per week in an outpatient pharmacist patient care practice
Partner resources and initiatives	Community pharmacy residency program and related faculty, family medicine residency program and related faculty, Pennsylvania Pharmacists Care Network ²²	Five affiliated community pharmacy residency programs, community pharmacy PBRN, ²³ Center for Medication Safety Advancement, ²⁴ MTM practice network ²⁵	AppNET PBRN, ²⁶ NIH/NIDA Diversity-promoting Institutions Drug Abuse Research Program (DIDARP) Award#: R24 DA036409.	Community pharmacy residency program, and related faculty, Center for Medication Optimization through Practice and Policy	Community pharmacy residency program, MS in Community Care, Partner for Promotion program ²⁷

Graduate Coursework

Table 3

	University of Pittsburgh	Purdue University	East Tennessee State University	University of North Carolina	Ohio State University
Degree structure	MPH; combination of coursework and 200 hour practicum	M.S. in Pharmacy Practice with an Area of Concentration in Medication Safety	Option of public health certificate or MPH in four public health concentrations	2-year non-degree program in translational and clinical research focusing in biostatistics, epidemiology, and career development	MS in Health-System Pharmacy Administration with an Emphasis in Community Care
Credits hours	36-42	Min 30	15-18 (Certificate); 43 (MPH)	18	33.5 plus independent study credit for major project
Minimum credit hours in biostatistics and/or research methods	6	6	9 in MPH core; concentration and certificate dependent	18	24.5
Thesis or non-thesis	Decided by fellow	Decided by fellow	Non-thesis	Non-thesis	Non-thesis