RESEARCH

Sustainability of a Practice-based Interprofessional Introductory Pharmacy Practice Experience Course

Wesley Nuffer, PharmD,^a Eric Gilliam, PharmD,^a Michael McDermott, MD,^b Christopher J. Turner, PhD^a

^a University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, Aurora, Colorado

^b University of Colorado School of Medicine, Aurora, Colorado

Submitted July 24, 2014; accepted December 07, 2014; published June 25, 2015.

Objective. To describe a successfully sustained interprofessional introductory pharmacy practice experience (IPPE) in which third-year pharmacy students were paired with nonpharmacist practitioners.

Methods. Course data were retrospectively reviewed and analyzed to reveal details about the program. Provider participant numbers and student perception data were reviewed and reported on.

Results. The number of students and providers participating increased during the 13 years of the program. On average, preceptors participated for 3 years and hosted 4 pharmacy students. Students consistently agreed the course helped increase student communication competencies and integration into interdisciplinary practice (mean agreement of 88.4% and 91.6%, respectively).

Conclusion. A required interprofessional IPPE course designed to develop students' self-confidence working and communicating with nonpharmacist practitioners has been successfully sustained for more than a decade. Students report improvements in self-confidence and achievement of the course's primary outcomes.

Keywords: pharmacy student, introductory pharmacy practice experience, interprofessional education, experiential training

INTRODUCTION

Interprofessional team-based care has become the global standard to address the growing complexity of health care posed by a growing and aging population and the increasing prevalence of chronic disease.¹⁻⁴ Traditional models of health care are inefficient and ill-equipped to provide the appropriate quality and volume of service in modern society and, in response, new patient-centric models of care are appearing.⁵⁻⁷ Examples include the Patient-Centered Medical Home and Accountable Care Organizations, the focus of which is on establishing interprofessional health care teams who work collaboratively with each other and with patients to optimize patient health outcomes.⁸⁻¹⁰

In response to these evolving models of care, interprofessional education has become more prominent in the training of healthcare professionals.^{9,11} To date, most literature describing interprofessional education has focused on campus-based activities; but, it is important

that campus-based initiatives are carried forward into practice-based interprofessional experiential learning. Within the pharmacy profession, practice-based interprofessional education has largely been limited to health-system pharmacy practice even though the majority of pharmacists practice in community settings.

The Skaggs School of Pharmacy and Pharmaceutical Sciences (SSPPS) implemented a community practice-based interprofessional course in 2002.¹² An introductory pharmacy practice experience (IPPE), third-year PharmD students were paired with community-based providers for a semester-long series of half-day visits. The learning objectives were to enhance students' abilities to communicate and work closely with nonpharmacist health care professionals and to gain an appreciation for the workplace pressures faced by those practitioners. Providers were given these global course objectives to guide them in designating student activities. Students' direct responsibilities varied depending on the site to which they were matched.

Recruitment for these placements occurred primarily through telephone interactions between the experiential programs director and provider office personnel; this evolved to include e-mail and face-to-face recruitment, as well as referrals from providers already engaged in the course. The initial recruitment focus was on primary care

Corresponding Author: Wesley Nuffer, PharmD, University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, 12850 E Montview Blvd., C238-V20-1116J, Aurora, CO 80045. Tel: 303-724-2654. Fax: 303-724-2658. E-mail: Wesley.Nuffer@ucdenver.edu

physicians and nurse practitioners. With expanded class sizes and changes to the health care system, recruitment grew to include internists, specialty physicians, physician assistants, nurse practitioners, and, in some cases, dentists. Participation in the program was voluntary; no monetary reimbursement was provided. Providers were incorporated as part of the large preceptor pool partnering with the University of Colorado and were privy to the same preceptor benefits such as campus library access, adjunct faculty appointments at the school, continuing education opportunities, and invitations to various preceptor recognition events. Many provider preceptors were recognized and honored across the 12-year span of the program for their outstanding commitment to pharmacy students.

Elements of the course evolved over time based on preceptor and student feedback and the program's ability to meet course objectives. Reflective papers were implemented so students could self-critique performance and identify learning as it occurred. Small group discussions were implemented as a way for students to learn from each other's experiences and to reflect on their own performance. Students were organized into small groups of 7-8 and paired with a practicing faculty member or preceptor, who helped facilitate discussions. Each student took turns describing a significant encounter at their practice site, which entailed an outline of the learning that occurred as a result of the encounter and interaction with their provider, and a reflection on how they handled the situation. Other students in the group provided feedback and input on each experience. This manuscript describes the sustainability of the IPPE course from its inception in 2002 to 2014.

METHODS

The study employed a descriptive research methodology based on a retrospective review of course data. Data were collected as part of quality assurance for the courses. This project was designated as exempt by the Institutional Review Board. Records from 2002 to 2014 were reviewed to establish the number of students and providers who participated. Specifically, records were analyzed to establish the number of students per provider, the number of years each provider participated in the course, and the professional discipline and specialty of each provider. In addition, one of the longest standing physician preceptors in the course was invited to provide a preceptor's perspective, similar to the professional endorsements made by preceptors when referring the program to providers who may potentially join the program (Appendix A).

Student perception data, collected annually as part of routine procedures to meet Accreditation Council for Pharmacy Education (ACPE) PharmD standards, were collated

and analyzed using Microsoft Excel. In addition, course syllabi were reviewed to identify changes in the course, such as the number and duration of the required practice site visits and procedures for assessment of student performance.

RESULTS

The number of students and providers participating in the program increased progressively since the course's first offering in 2002 (Figure 1). Class size ranged from 68 students in 2002 to 157 students in 2012. The 2014-2015 year had 154 enrolled students at time of writing, which represented 226% of the initial numbers in the program. Similarly, the number of participating providers increased from 67 in 2002 to 194 in 2014. The need to recruit new providers into the program steadily decreased over time. Initially, the number of providers participating in the course mirrored the number of students in a 1 to 1 ratio. Since the third year of the program, returning preceptors provided a majority of student placements, while the number of newly recruited providers fluctuated (Figure 1). Beginning in 2009, the eighth year of the program, several providers began taking on multiple students, which reduced new provider recruitment despite an increase in student placements.

In addition to yearly changes in capacity, programmatic changes in course structure were implemented. Students enrolled in the early years of the course attended 10 site visits, each lasting 2 hours. During years 8 and 9 of the program, the number and duration of visits were increased to twelve 3-hour visits. This was reduced to the 2014 iteration requiring students to attend eight 3-hour visits throughout the semester. Additionally, beginning in 2010, students began attending small group reflective sessions on campus twice each semester. Table 1 describes the types of medical providers who mentored students throughout the course's history. Provider professions are represented primarily by medicine but span a broad range of human health care. Initially, the program focused on the recruitment of primary care physicians but was later expanded to include practitioners across multiple health care professions and specialties in response to increasing class sizes. Individual providers remained engaged in the course for various lengths of time. On average, preceptors participated for 3 (3, SD=3) years and have hosted an average of 4 (4, SD=3) pharmacy students.

Student reflective practice demonstrated a number of lessons learned while working in these practice sites. Examples include learning that workplace pressures inherent in health care, such as those imposed by third-party payers (eg, multiple formularies), were not restricted to pharmacists. In addition, students saw the prescription refill process from the providers' perspective, which surprised many students because they saw the impressive

Figure 1. Change in Preceptor Recruitment and Retention.

daily volume of refill requests waiting for responses. Students witnessed providers' challenging workloads, with patients occupying multiple examination rooms and reception areas full of patients waiting to be seen. They experienced the challenge of being tasked to take a medical and/or medication history from one patient, while the provider was in the next room taking care of a different patient. They witnessed providers caring for patients with complex, multiple disease states, often requiring 30 minutes to obtain an accurate medication profile, when the patient's scheduled visit was only meant to last 15 minutes. Student perception data was assessed each year upon completion of the course. Student response rates ranged from 93.5% to 100%, with an average response rate of 97.2% across the 13 years. Students consistently agreed the course met its primary objectives of improving students' communication abilities with nonpharmacist team members and of improving students' understanding of nonpharmacy clinical work environments, with an average agreement rate of 88.4% and 91.6%, respectively (Figure 2). Students increasingly reported their agreement that nonpharmacist providers were invested in the educational experience of the pharmacy student (Figure 2). Furthermore, students increasingly reported an ability to contribute to patient care while at the provider's practice site, an experience students valued. Course feedback reflected pharmacy student integration into these practices and active student participation in helping deliver care. It showed that the preceptors and practice staff were almost uniformly supportive, friendly, and helpful, and that the students were given tasks that took them out of their comfort zones, challenging them to apply skills and knowledge at the setting.

Finally, students reported improvements in their self-assessed level of confidence as a result of working

with a nonpharmacist health care practitioner (Figure 3). Student perception data did not appear to change based on logistical changes to the course, including the introduction of on-campus, faculty-facilitated small group discussion classes and changes to the number and length of student visits to the practice.

Provider feedback regarding the program was collected informally through focus groups and discussions across multiple years. Verbal and written feedback was predominantly positive. Further evidence of the value placed on these matches by providers was evidenced by

Table 1. Provider Preceptor Demographics in the Interprofessional Introductory Pharmacy Practice Experience (IPPE)

Provider Type	n	%
Physicians	388	91.5
Family Medicine	181	42.7
Pediatrics	50	11.8
Internal Medicine	44	10.4
Endocrinology	13	3.1
Geriatrics	12	2.8
Dermatology	11	2.6
Allergy/Asthma	10	2.4
Cardiology	9	2.1
Women's Health/OB-GYN	9	2.1
Nephrology	7	1.7
Psychiatry/Neurology	6	1.7
Urgent Care	5	1.2
Other Specialties	31	7.3
Nurse Practitioners	23	5.4
Physician Assistants	9	2.1
Dentist	2	0.45
Optometrist	2	0.45

Figure 2. Student Perception of Achievement of Programmatic Goals.

multiple requests from providers to host students full time for 6 weeks (240 hours) through the school's fourth-year advanced pharmacy practice experience program.

DISCUSSION

This study demonstrates that an interprofessional course pairing third-year pharmacy students with non-pharmacist health care providers for a semester-long series of half-day visits to the providers' practice sites is sustainable despite a doubling in class size, from around 80 students to around 160 students. Acquiring and maintaining support from a large number of providers, representing multiple health care professions and specialties within the metropolitan Denver area, suggests these providers see sufficient value in the experience to continue volunteering their time and resources to it. This value is inferred further by a majority of providers electing to participate for multiple years, accepting students on an yearly basis, hosting multiple pharmacy students each

year, and endorsing the program by recruiting new provider preceptors on behalf of the school. Provider requests to take on pharmacy students for longer periods of time during fourth-year APPEs further emphasize value. As an example of this value added, one physician's perspective about this program, including benefits to both the students and to the practice, is included in the appendix.

While many preceptors participated on a regular basis, health care providers received requests to host students from multiple colleges and schools representing all health care professions. Accordingly, it was unreasonable to expect every nonpharmacist preceptor and practice site to host a pharmacy student every year. In addition, workplace environments varied year to year and, as an example, practice sites found it difficult to host students during disruptions caused by implementation of electronic medical record systems. Accordingly, many preceptors participated on a frequent but not continuous basis, resulting in the need for a pool of preceptors larger

Figure 3. Student Perception of Self-confidence.

than the class size, which paralleled the recruitment needs for additional pharmacist preceptors. We used an arbitrary designation that an active preceptor was one who hosted at least one student in the past 3 years and, by that designation, the 2014 preceptor pool was approximately 120% of the class size.

The study provides evidence that achievement of course objectives has been sustainable for the life of the course (2002–present). Students were assessed by providers at the end of the semester and by reflective writing assignments in which students described their experiences. (The description and evaluation of the SSPPS IPPE reflective writing program was previously published.)¹³ Students' reflective writings provided direct evidence that the primary course objectives were consistently achieved, a fact corroborated by student perception data presented in this paper. The perception scores regarding the 2 primary course objectives were consistently high for every year the course was offered.

The most common examples of communicating and working with providers, evidenced through the students' writing, were discussions about pharmacotherapy options in the treatment of specific patients. These discussions challenged students to apply their skills and knowledge to actual patient scenarios, and students recognized that whatever options were presented could be implemented by the provider and could directly impact the patient's life. This level of responsibility placed on students emphasizes the important role these experiential encounters had in students' training and education. It is therefore not surprising that they consistently reported improvement in their self-confidence. Students were asked for their opinions regarding pharmacotherapy and, equally important, were often encouraged to question providers' thought processes and decision-making. Moreover, interactions with pharmacy students prompted providers to reflect on their patient-care activities and may be one of the principal reasons providers continued their involvement in the program.

Improved student understanding of the working environment of providers is evidenced by students' written reflections or small group discussion activities. As noted, students gained a wider perspective about the health care system and various practice pressures faced by providers. We anticipated that this greater understanding should lead to better interprofessional collaborations in practice as pharmacy students hold better insight into challenges faced in these settings.

Implementing faculty-facilitated small group discussions further enhanced student learning, as each student was required to choose a case to reflect on and describe to the group, which led to a group discussion about the case and its nuances. The diverse nature of the cases and

unique challenges they presented often led to rich discussions and new insights in the group. With the large diversity of provider sites available to students, these sessions helped participants appreciate challenges faced across many different practice settings.

As noted, students reported being challenged and tasked with applying their skills while at these settings. In effect, and crucial to the learning process, students were treated as members of practice site communities rather than as visitors or observers. This is an essential, value-creating element at the practice site into which the student is to be integrated. Students, if they are to become competent independent practitioners, must be socialized to the health care community. They must see themselves accepted as colleagues by experienced health care professionals and trusted to make valuable workplace contributions. The collective data presented here, along with the written reflection data,¹³ provides evidence that the course has value in the socialization process by putting students in professional situations in which they are accepted, integrated members of the health care practitioner community.

Current accreditation standards for the practice of pharmacy in the United States specify that the majority of pharmacy practice experiences in the PharmD curriculum must be supervised by qualified pharmacist preceptors, and new 2016 standards contain similar language. Consistent with these standards, SSPPS pharmacy students achieve all required practice-based outcomes during concurrent IPPE coursework in various pharmacy practice settings. In contrast, this IPPE experience constitutes only 8% of the students' total IPPE hours and provides unique opportunities to implement practice skills in an interprofessional setting. While this course predates current IPPE hour requirements for pharmacy curricula, the addition of required IPPE programs has not interfered with the ability to maintain the nonpharmacist provider IPPE. Based on feedback from providers and students, this experience adds value and should continue to be supported as an essential part of pharmacy students' training.

CONCLUSION

A required third professional year, interprofessional IPPE, designed to develop students' self-confidence in working and communicating with health care practitioners outside of pharmacy and to provide insight into the working environments of those practitioners, has been successfully sustained for more than a decade. Sufficient numbers of providers have been recruited from the metropolitan Denver area to accommodate a class size of around 160 students, and these providers have a sustained interest in pharmacy student education. Student reflection data shows that the practice sites are willing to incorporate

pharmacy students in direct and indirect patient care activities. The study provides indirect evidence through the long-term sustainability of the course that third-year pharmacy students have the competency to integrate themselves into medical and nursing practice sites and to contribute to patient care. It also provides evidence that the course is useful in socializing pharmacy students in the context of interprofessional health care teams.

REFERENCES

1. Greenfield D, Nugus P, Travaglia J, Braithwaite J. Factors that shape the development of interprofessional improvement initiatives in health organisations. *BMJ Qual Saf.* 2011;20(4):332-337.
2. Greenfield DR, Nugus P, Travaglia JF, Braithwaite J. Interprofessional learning and practice can make a difference. *Med. J Aust.* 2011;194(7):364-365.
3. Goldman J, Meuser J, Rogers J, Lawrie L, Reeves S. Interprofessional collaboration in family health teams: An Ontario-based study. *Can Fam Physician.* 2010;56(10):e368-374.
4. Zwarenstein M, Goldman J, Reeves S. Interprofessional collaboration: effects of practice-based interventions on professional practice and healthcare outcomes. *Cochrane Database Syst Rev.* 2009 (3): doi: 10.1002/14651858.CD000072.pub2.
5. Kodner DL, Spreeuwenberg C. Integrated care: meaning, logic, applications, and implications—a discussion paper. *Int J Integr Care.* 2002;2:e12.
6. Demiris G, Afrin LB, Speedie S, et al. Patient-centered applications: use of information technology to promote disease management and wellness. A white paper by the AMIA knowledge in motion working group. *J Am Med Inform Assoc.* 2008;15 (1):8-13.
7. Arnrich B, Mayora O, Bardram J, Tröster G. Pervasive healthcare: paving the way for a pervasive, user-centered and preventive healthcare model. *Methods Inf Med.* 2010;49(1):67-73.
8. Adams AJ, Clark DR, DeLander GE, et al. Report of the AACP task force on patient-centered medical homes and accountable care organizations. *Am J Pharm Educ.* 2013;77(7): Article 142.
9. Interprofessional Education Collaborative. Core Competencies for Interprofessional Collaborative Practice. 2011; <https://ipecollaborative.org/uploads/IPEC-Core-Competencies.pdf> Accessed June 8th, 2015.
10. Stange KC, Nutting PA, Miller WL, et al. Defining and measuring the patient-centered medical home. *J Gen Intern Med.* 2010;25(6):601-612.
11. Reeves S, Zwarenstein M, Goldman J, et al. The effectiveness of interprofessional education: key findings from a new systematic review. *J Interprof Care.* 2010;24(3):230-241.
12. Turner CJ, Altieri R, Clark L, Dwinnell B, Barton AJ. An interdisciplinary introductory pharmacy practice experience course. *Am. J. Pharm. Educ.* 2004;68(1):Article 10.
13. Nuffer W, Vaughn J, Kerr K, et al. A three-year reflective writing program as part of introductory pharmacy practice experiences. *Am J Pharm Educ.* 2013;77(5):Article 100.

Appendix A

PHYSICIAN-BASED PERSPECTIVE

I have been a strong supporter of the SSPPS provider program since 2004, taking students for more than 10 years. I personally collaborate with 3 PharmD practitioners in the endocrinology clinic and routinely see the value that a pharmacist and pharmacy students bring to patient care in our clinic. The pharmacy students who work in our practice participate in several ways. They are present in the examination room during patient visits along with our endocrinology fellows, internal medicine, and family practice residents, and medical students. After hearing a patient's history, pharmacy students are invited to ask the patient questions. They then participate in focused parts of the physical examination, such as the diabetic foot evaluation. They are then asked about their recommendations regarding the optimal management of the patient. More recently, we initiated a volunteer program for pharmacy students to enter medication lists for new patients and to reconcile medication lists for existing patients into the electronic health record. Accepting and training pharmacy students in the clinical environment is an extension of training a student from any discipline; there are benefits to both student and provider as a result of the pairing. I value this program and look forward to training pharmacy students in my practice for years to come.

Students benefited by witnessing real-life situations where the pharmacological science and medications they learned were applied directly to help improve the health and quality of patient lives. They had the opportunity to learn why specific medications were chosen in various situations and how individualization of management plans take shape through shared decision making with each patient. By experiencing shared decision making in action, students can understand that a shared, decision-based management plan is different than algorithm-based decisions, but they are often more efficient and satisfactory for the individual patient. By being asked for their opinions regarding medication choices directly in the presence of patients, students began to have confidence displaying their extensive knowledge of disease states and evidence-based management options.

Providers also consistently benefited from this experience by having readily accessible information on medication pharmacology, effectiveness, potential risk and adverse drug-drug interactions. They were also able to easily appreciate the valuable contributions that other specialized members of the health care team can offer in terms of patient acceptance of and confidence in management plans, adherence to medication instructions, and ultimate clinical outcomes. Integrating the teaching of students into a clinical practice environment helps to challenge the provider to outline their thinking processes, explain the way they manage patients, and to consider different perspectives, which can be even more pronounced when coming from a student trained in a different health care discipline.