

## EXPERIENTIAL EDUCATION

# Integration of an Introductory Pharmacy Practice Experience With an Advanced Pharmacy Practice Experience in Adult Internal Medicine

Winter J. Smith, PharmD,<sup>a</sup> Matthew L. Bird, PharmD,<sup>a</sup> Kimi S. Vesta, PharmD,<sup>b</sup> Donald L. Harrison, PhD,<sup>a</sup> and Vincent C. Dennis, PharmD<sup>a</sup>

<sup>a</sup>University of Oklahoma College of Pharmacy, Oklahoma City, OK

<sup>b</sup>Sanofi US Medical Affairs, Bridgewater, NJ

Submitted October 24, 2011; accepted January 3, 2012; published April 10, 2012.

**Objective.** To describe the development, implementation, and assessment of an internal medicine introductory pharmacy practice experience (IPPE) that was integrated with an existing advanced pharmacy practice experience (APPE) in internal medicine.

**Design.** A structured IPPE was designed for first-, second-, and third-year pharmacy (P1, P2, and P3) students. Activities for the IPPE were based on the established APPE and the individual learner's educational level.

**Assessment.** Students reported a greater understanding of clinical pharmacists' roles, increased confidence in their clinical skills, and better preparation for APPEs. Peers viewed the approach as innovative and transferable to other practice settings. Participating faculty members provided a greater number of contact hours compared to traditional one-time site visits.

**Conclusions.** Integrating an IPPE with an existing APPE is an effective and efficient way to provide patient care experiences for students in the P1-P3 years in accordance with accreditation standards.

**Keywords:** pharmacy education, experiential education, introductory pharmacy practice experience, advanced pharmacy practice experience, internal medicine

## INTRODUCTION

Traditional introductory pharmacy practice experiences (IPPEs) offered by faculty members practicing in the internal medicine service at the University of Oklahoma College of Pharmacy (OUCOP) consisted of the student making a single visit to the practice site where they primarily observed patient care activities. While faculty members felt that even this minimal exposure to internal medicine pharmacy practice was valuable, the limited time spent at the practice site did not allow opportunities for students to be involved in patient care. Additionally, the experience was not progressive in nature and seemed unlikely to prepare students for advanced pharmacy practice experiences (APPEs). According to the Accreditation Council for Pharmacy Education (ACPE), IPPEs should involve actual practice experiences and permit students to assume direct patient care responsibilities.<sup>1</sup> The Center for the Advancement of Pharmaceutical Education (CAPE) Educational Outcomes place an emphasis

on student provision of patient-centered care in collaboration with patients, prescribers, and other healthcare professionals.<sup>2</sup> Furthermore, in 2007 ACPE standards increased the required number of IPPE contact hours to at least 300.<sup>1</sup>

Colleges and schools of pharmacy have taken different approaches to address the required increase in IPPE hours.<sup>3-5</sup> One such approach was a longitudinal experience that spanned the first 3 years of a PharmD program and focused on caring for patients in residential settings.<sup>3</sup> Students' level of involvement in patient care progressively increased from the P1 to the P3 year. Students established relationships with actual patients, assessed medication therapy, developed care plans, and mentored students in earlier classes. Ninety-seven percent of students received grades of "satisfactory" or "excels" based on their performance in patient care. Overall, students provided positive feedback regarding the course.

A second approach to increasing IPPE hours involved offering a 4-week IPPE course that took place at the end of the P3 year, just prior to the beginning of APPEs in the fourth (P4) year.<sup>4</sup> The experience focused on application of previously learned information to patient care, potentially providing a seamless transition to APPEs.

---

**Corresponding Author:** Winter J. Smith, PharmD,  
University of Oklahoma College of Pharmacy, PO Box 26901,  
Oklahoma City, OK 73126. Tel: 405-271-6878 Ext 47323.  
Fax: 405-271-6750. E-mail: winter-smith@ouhsc.edu

There were activities in both community and hospital settings that included medication counseling, developing patient care plans, presenting a journal club, and responding to drug information questions. Faculty members assessed students' performance of clinical skills during the first week of APPEs. Students who completed the IPPE demonstrated better performance of clinical skills than the class prior to implementation. Authors noted that while this approach required significant time and resources, students were able to transition more quickly into APPEs and potentially perform at a higher level.

In a third approach, first- and second-year IPPEs focusing on direct patient care were integrated in order to use academic and preceptor resources most efficiently.<sup>5</sup> The integrated IPPE included a combined recitation session where students completed activities such as reviewing medical records and presenting patient cases. Following the recitation session, students were assigned to clinical sites where they interviewed patients and presented patients cases to preceptors. Working in small groups at the sites, P2 students mentored P1 students. Preceptors and students evaluated the IPPE positively and preliminary data suggested a benefit to APPE performance.

At OUCOP, faculty members practicing in internal medicine redesigned the existing internal medicine IPPE into a structured, innovative experience designed to meet ACPE and CAPE requirements, increase the number of contact hours, and maximize faculty resources. In fall 2008, the redesigned adult internal medicine IPPE was implemented. The overarching goals of the redesigned IPPE were to provide direct patient care opportunities to IPPE students and provide more IPPE contact hours than previously offered. Additional goals were to design multiple layers of activities based on educational level, develop learning objectives for each activity, and incorporate feedback in order to facilitate skills development. Faculty members desired to offer meaningful patient care experiences earlier in the curriculum than had previously been offered to increase student engagement and interest in the learning experience, while helping to solidify the connection between classroom lecture material and practice-based application. The format of progressively more advanced learning activities from the P1 to P3 years, active involvement in real patient care situations, and focus on skills development are all consistent with ACPE standards.

We describe the development, implementation, and assessment of the redesigned IPPE, focusing on the impact on faculty workload and efficiency. Additionally, we address challenges encountered, modifications after implementation, and limitations to this approach.

## DESIGN

### The Adult Internal Medicine Practice Experience

The OUCOP is located within the comprehensive University of Oklahoma Health Sciences Center (OUHSC) and delivers the first-professional-degree doctor of pharmacy (PharmD) program on 2 campuses, Oklahoma City and Tulsa. The professional curriculum is delivered as a traditional 4-year program with an average class size of 120 students. The IPPE program at the OUCOP consists of 100 contact hours each year, for a total of 300 contact hours by the end of the P3 year. Students accumulate IPPE hours during fall and spring semester assignments with the exception of an 80-hour assignment during the summer prior to the P3 year. Aside from ensuring that the required hours in community and institutional practice are acquired according to ACPE standards, there is not a specific hour requirement that applies to individual IPPEs areas (overall or by year). The distribution of experiences, on average, is as follows: community practice, 55%; institutional practice, 30%; and specialty areas including voluntary service learning activities, 15%.

The process of assigning students to specific IPPEs involves submission of IPPE preferences by the students, followed by random assignment with manual adjustments to balance schedules as needed. The redesigned internal medicine IPPE was in the specialty areas category and could be completed as often as once per academic year. While some students were assigned to the IPPE for multiple academic years, this was not required. The IPPE was offered by Oklahoma City campus faculty members to students in the P1, P2, and P3 years.

All preceptors for the redesigned IPPE completed specialized residency training in internal medicine. Preceptors were OUCOP faculty members with responsibilities including clinical practice and experiential teaching, lecturing, service, and research and scholarship. During the months that faculty members provided clinical service, approximately 25 hours per week were spent at the practice site. The learning environment was an inpatient adult internal medicine service within a large academic medical center. Clinical pharmacy services had been provided to the internal medicine teams by college of pharmacy faculty members for approximately 25 years. Faculty members participated in daily interdisciplinary patient care rounds, providing recommendations for optimal drug use, facilitating communication about medication therapy at transitions of care, assisting with medication acquisition at discharge, and serving as a drug information resource. This environment allowed students to assume patient care responsibilities in collaboration with other healthcare professionals. Additionally, IPPE students were

able to actively participate in patient care in a progressive fashion in the years leading up to their acute care APPE.

### **IPPE Redesign**

The faculty members reviewed the current APPE and determined which activities could be incorporated into the IPPE. Activities that correlated to concepts and skills already taught in classroom coursework or those to be taught during the current academic year were selected for P1, P2, and P3 students. The activities selected were based on established APPE activities and progressed by educational level (Appendix 1). Exposure to real patients allowed students to apply concepts learned in the classroom which facilitated knowledge retention and is most consistent with an andragogy-based model of learning.<sup>6</sup>

The IPPE redesign required approximately 1 month for initial development. This month consisted of faculty collaboration to select APPE activities for IPPE student participation, develop learning objectives and assessments for each activity, and determine how the IPPE would fit logistically into the existing APPE structure. Educational materials for certain daily APPE activities (eg, patient medical record review, drug information scenarios, clinical drug monitoring, and SOAP note documentation) were developed for IPPE students during this period in order to more clearly define assignments. Simultaneous with the development phase, faculty members worked with the office of experiential education to modify the existing method of assigning IPPE students to faculty members in order to accommodate the month-long experience. Delivery of the IPPE required 2.5 additional faculty hours per month above requirements for APPE delivery (prior to the IPPE redesign). This additional time was distributed as follows: orientation (1 hour), drug information scenarios discussion (30 minutes), clinical drug monitoring discussion (30 minutes), and SOAP note presentation (30 minutes). Formative assessments occurred immediately following IPPE activities and required minimal additional time. An online education portal was used to provide instructions and facilitate completion of assignments. An administrative assistant scheduled APPE and IPPE activities prior to the beginning of each month, taking into consideration faculty members' and students' multiple class schedules and clinical responsibilities. This process required approximately 5 hours per month. Activities involving students in all classes were typically scheduled during the noon hour, when classes were not in session. Scheduling conflicts were addressed on a case-by-case basis and resolved without compromising the learning experience.

During each month in which 2 APPE students were assigned to each faculty member, 3 IPPE students were

also assigned to the faculty member (generally one P1, one P2, and one P3 student). Students were eligible to participate in the IPPE once per academic year, during either spring or fall semester, and no prerequisites were required. Activity scheduling was done with consideration of clinical service responsibilities at the practice site, the APPE schedule, and IPPE student class and examination schedules. A detailed calendar of IPPE and APPE activities for the month was provided to each student during orientation on the first day of the IPPE. Preceptors individually supervised patient care activities, which were staggered (ie, only 1 IPPE student participated at a time). In accordance with state law, each preceptor supervised no more than 2 students (IPPE and/or APPE) engaging in patient care at any one time. Group activities, such as orientation and journal club, included both IPPE and APPE students and were led by 1 faculty member.

At the conclusion of the IPPE experience, P1 students were eligible to receive credit for up to 5 contact hours, P2 students received up to 12 contact hours, and P3 students received up to 20 contact hours (Appendix 1). All hours were tracked and documented using an IPPE hours log. Hours were signed off by the precepting faculty member and reconciled by the college's office of experiential education. Students were allowed up to 1 month to complete the IPPE. Because P1 students received a maximum of 5 contact hours, they were allowed to participate in other IPPEs during the month in order to meet curricular requirements. Students in the P2 and P3 classes generally completed only this IPPE during their assigned month.

### **Methods of Teaching and Evaluation**

Teaching methodologies included active learning and lectures (teaching tools available from the corresponding author upon request). For example, orientation and the patient medical record review/quiz used lecture-based teaching methods. On the other hand, patient discharge counseling and literature evaluation required active preparation and involvement. Peer teaching was involved as well. During the clinical drug monitoring exercise, APPE students modeled patient care activities for P3 students to help them understand the pharmacy student's role on the internal medicine team. One assignment completed by P3 students was a SOAP (subjective, objective, assessment, and plan) note writing exercise and oral patient presentation for one acute problem (Appendix 1 and Appendix 2). Faculty members ensured that each disease state presented had been covered previously in classroom coursework. These students had also received instruction regarding SOAP note writing in previous courses. This activity required application of previous knowledge to

real patients and allowed students to complete the entire picture for an inpatient pharmacotherapy problem. Students were provided with online resources through the Desire2Learn learning portal (Desire2Learn, Inc., Kitchener, ON, Canada; Blackboard, Inc., Washington, DC was used when the redesign was initially instituted). These online resources included assignment details, patient care materials, helpful readings, literature evaluation tools, and links to clinical practice guidelines. Verbal formative feedback was provided by the faculty member after each IPPE activity. Summative feedback was provided at the conclusion of the IPPE through faculty assessment of students' professional interaction and communication, preparedness, and completion of assignments. Approval from the OUHSC Institutional Review Board was granted for this study.

### EVALUATION AND ASSESSMENT

A detailed description of student perceptions of this IPPE approach has been previously reported.<sup>7</sup> Seventy-one students (17 P1s, 16 P2s, and 38 P3s) completed the redesigned IPPE between fall 2008 and spring 2011. This corresponded to 5% to 15% of the class size depending on the year. Pre- and post-IPPE surveys instruments were designed to evaluate student attitudes and perceptions in relation to their clinical skills and understanding of clinical pharmacy (survey instruments available upon request). Students were asked to complete the same self-evaluation at the beginning and end of the IPPE month on a voluntary basis and provided informed consent prior to completion. The response rate for completed pre- and post-IPPE survey instruments was 96% (68 of 71 students). Pre- and post-IPPE survey responses were compared via paired *t* tests, with an *a priori* alpha of 0.05. Survey instrument reliability was also evaluated via Cronbach's alpha for internal consistency of each of the various subscales contained in the survey

instrument. All data management and analyses were performed in Stata, version 10.1 (StataCorp LP, College Station, TX).

After completion of the IPPE, there was a significant improvement in students' self-reported ability to do the following: describe the role of a clinical pharmacist on an acute care team, explain how a clinical pharmacist interacts with patients, locate information in a patient's chart, locate answers to drug information questions, evaluate drug literature, and counsel patients on a medication ( $P < 0.05$ , Table 1). No significant difference was detected in students' self-reported ability to document relevant information in SOAP format ( $P = 0.074$ ). However, only P3s completed this activity ( $n = 34$ ); therefore, this comparison was underpowered. An additional 10 observations would have been required to significantly detect the difference identified.

Eight APPE students who had completed the redesigned IPPE during their P3 year were asked to reflect on the experience. Questions related to the role of the IPPE in preparation for APPEs and the overall value of the experience were asked. Each student responded that the real life experiences and application of knowledge and skills incorporated into the IPPE were extremely positive. Many mentioned that the level of student involvement and accountability was greater for this IPPE than others they completed. Students appreciated how patient counseling, literature evaluation, and patient case presentations provided an introduction to activities in which they would regularly participate during APPEs. Students also commented that mentorship from P4 students during the IPPE helped them know what to expect in APPEs.

### Stakeholder Perceptions

In fall 2009, 8 clinical pharmacy faculty members received a detailed description of the IPPE along with an invitation to provide feedback. These included 5 OUCOP

Table 1. Students' Self-Assessments Before and After Completing the Redesigned Introductory Pharmacy Practice Experience

Ability or Clinical Skill	Mean Score Before IPPE (n = 68) <sup>a</sup>	Mean Score After IPPE (n = 68) <sup>a</sup>
Describe pharmacist's role on medicine team <sup>b</sup>	3.2	4.0
Describe pharmacist's role with patients <sup>b</sup>	3.2	4.0
Locate information in medical chart <sup>b</sup>	3.4	4.0
Locate drug information <sup>b</sup>	3.7	4.1
Evaluate literature <sup>b</sup>	2.8	3.4
Counsel patients <sup>b</sup>	3.2	3.8
Document SOAP notes <sup>c</sup>	3.4	3.7

Abbreviations: SOAP = subjective, objective, assessment, and plan.

<sup>a</sup> Survey responses based on a rating scale on which 1 = not at all confident and 5 = very confident.

<sup>b</sup>  $P < 0.05$ .

<sup>c</sup>  $P = 0.074$ , activity completed by P3s only ( $n = 34$ ).

faculty members: 2 associate professors who practice in ambulatory care, 1 associate professor in acute care pediatrics, 1 assistant professor in acute care oncology, and 1 assistant professor in inpatient adult internal medicine (who was not involved in this IPPE). Three external faculty members who practice in inpatient adult internal medicine (2 professors and 1 assistant professor) were invited as well. Focused questions were related to the compliance of this approach with requirements of the 2007 ACPE standards, transferability to other practice settings, and overall assessments of the IPPE (questions available from the corresponding author upon request). Seven of the 8 invited faculty members participated: 5 internal and 2 external. Peer evaluators felt that this approach complied with ACPE standards for pharmacy practice experiences. They also felt that the approach would be easily transferable to other practice settings. According to these evaluators, noteworthy components included early introduction of the student to the pharmacist's role in a real clinical practice setting, increasing complexity of activities as students progressed through the curriculum, student accountability for assignments, faculty feedback provided to students, and the layered design of faculty mentoring students in their P1, P2, P3, and P4 years simultaneously.

The chair of the Department of Pharmacy: Clinical and Administrative Sciences and the director of experiential education were also asked to evaluate this IPPE. The department chair felt that this approach provided a rigorous experience in adult medicine at the learner's level of practice skills and maximized faculty efficiency. The director of experiential education commented that the IPPE increased the depth of experience at all levels; incorporated self-directed preparation, online learning, and reflection; and involved APPE students as mentors.

### Contact Hours Provided

The number of faculty preceptors for the IPPE ranged from 3 to 4 each academic year (Table 2). Contact hours provided by these faculty members were compared to the amount provided by other acute care faculty members and all other clinical faculty members at OUCOP (Table 2). The data were analyzed using 3 separate 2-way analyses of variance (ANOVAs) with post-hoc analyses by pre-planned contrast to detect differences between specific groups. The dependent variables for the 3 ANOVAs were IPPE contact hours provided, number of IPPE students precepted, and number of APPE students precepted. The *a priori* alpha was 0.05 and data management and analyses were performed using Stata, version 10.1 (StataCorp LP, College Station, TX).

In comparison to other acute care faculty members and all other clinical faculty members, IPPE faculty

members for the redesigned model provided a significantly greater number of IPPE hours from 2008 to 2011 (Table 2,  $P < 0.05$  for both comparisons). Interestingly, faculty members in the redesigned IPPE precepted significantly fewer students compared with other acute care faculty members ( $P < 0.05$ ). However, there was no significant difference in the number of IPPE students precepted in the redesigned IPPE compared to all other clinical faculty members ( $P > 0.05$ ). Similarly, no differences were found in the number of APPE students precepted by the redesigned model faculty members compared to other acute care faculty members and to all other clinical faculty members ( $P > 0.05$ ).

### DISCUSSION

The goals of the IPPE redesign were met with the delivery of a more meaningful IPPE experience and an increased number of IPPE hours provided. With appropriate planning and administrative support, minimal effects were seen on faculty workload. Also, faculty collaboration was fostered through the design and implementation of the experience. Student attitudes toward this IPPE approach were overwhelmingly positive. Peers and stakeholders provided positive feedback as well. In addition, other OUCOP faculty members expressed interest in adapting their APPEs to this design.

The results of this experience are noteworthy for several reasons. First, under the redesigned model, 3 or 4 faculty members (3 full-time equivalent [FTE] faculty positions) provided approximately 100 IPPE contact hours each academic year. For other faculty groups providing a different IPPE experience, fewer IPPE hours were provided by 11 to 21 FTE faculty members. Also, under the redesigned IPPE, faculty members precepted significantly fewer or a similar number of IPPE students compared to other faculty members. These results were not unexpected. Because of its structure and the greater number of contact hours provided by faculty members, the redesigned IPPE can only be offered to a limited number of students per faculty member per month. Finally, the redesigned IPPE did not impact faculty members' ability to accommodate APPE students, as evidenced by similar numbers of APPE students precepted. In summary, the redesigned IPPE provided a greater number of contact hours to fewer or a similar number of students compared to other acute care and clinical IPPEs.

There were no elements of this IPPE approach that were unsuccessful, but there were challenges, and based on experience from this implementation, certain components of the IPPE were modified. While this model is adaptable to other clinical settings, the initial development required time, which might be a barrier to implementation.

Table 2. Overview of Faculty Precepting Load After Implementation of a Redesigned Introductory Pharmacy Practice Experience in Adult Internal Medicine

	Redesigned IPPE Faculty	Acute Care Faculty	All Other Clinical Faculty
IPPE Hours Provided Per Academic Year <sup>a</sup>			
2008-2009			
Hours, mean (range)	105 (42-168)	43 (3-67)	35 (0-104)
FTE	3	11	21
2009-2010			
Hours, mean (range)	107 (61-157)	73 (0-167)	43 (0-137)
FTE	2.8	12	19
2010-2011			
Hours, mean (range)	103 (97-112)	63 (0-122)	36 (0-146)
FTE	3	12	17
IPPE Students Precepted Per Faculty Member Per Academic Year <sup>b</sup>			
2008-2009			
Students, mean (range)	9 (6-12)	13 (1-22)	11 (0-36)
FTE	3	11	21
2009-2010			
Students, mean (range)	7 (4-9)	15 (0-31)	8 (0-24)
FTE	2.8	12	19
2010-2011			
Students, mean (range)	7 (6-8)	13 (0-30)	8 (0-25)
FTE	3	12	17
APPE Students Precepted Per Faculty Member Per Academic Year <sup>c</sup>			
2008-2009			
Students, mean (range)	12 (12)	11 (0-16)	9 (0-21)
FTE	3	11	21
2009-2010			
Students, mean (range)	10 (8-12)	7 (0-14)	7 (0-24)
FTE	2.9	12	22
2010-2011			
Students, mean (range)	9 (6-12)	7 (0-14)	7 (0-22)
FTE	3	12	25

Abbreviations: IPPE = introductory pharmacy practice experience; FTE = full time equivalent; Redesigned IPPE faculty = internal medicine faculty members involved in the IPPE redesign; acute care faculty = other faculty members precepting in acute care settings (internal medicine, medicine subspecialties, pediatrics, and pediatric subspecialties); all other clinical faculty = faculty members precepting in ambulatory care settings and geriatric consulting.

<sup>a</sup>  $P < 0.05$  for Redesigned IPPE Faculty vs. Acute Care Faculty and Redesigned IPPE faculty vs. All Other Clinical Faculty.

<sup>b</sup>  $P < 0.05$  for Redesigned IPPE Faculty vs. Acute Care Faculty;  $P > 0.05$  for Redesigned IPPE Faculty vs. All Other Clinical Faculty.

<sup>c</sup>  $P > 0.05$  for Redesigned IPPE Faculty vs. Acute Care Faculty and Redesigned IPPE faculty vs. All Other Clinical Faculty.

However, after initial development, this approach allowed for increased faculty efficiency. A limitation to the IPPE redesign is that students may complete the experience during any of the first 3 years of the PharmD program. While some students have completed the IPPE during successive years, doing so is not required. Completing this IPPE in the P1, P2, and P3 years has the potential to have a greater impact on APPE performance.

Reflections by APPE students suggest that this IPPE helped prepare them for clinical activities during

practice experiences. Also, improvement in students' self-perceived clinical skills and understanding of the clinical pharmacist's role were demonstrated based on pre- and post-experience survey responses. However, the use of student self-evaluation of skills as a measure of learning is a potential limitation because it may not accurately reflect student competency. Nonetheless, self-assessment is a key component of self-directed learning in pharmacy education as well as continued professional development. Overall, the redesigned IPPE faculty

members have been pleased with the level of preparation, participation, and enthusiasm of IPPE students, as well as the quality of their work.

While investigators have observed improved APPE performance by some students who previously completed the IPPE (primarily P3s), to this date evidence is anecdotal. Evaluation of specific acute care skills before and after the IPPE may be helpful in providing a baseline skill performance level that can be built upon throughout the IPPE. This would serve to identify opportunities for repetition and to document the impact of IPPE activities. Similarly, comparison of specific acute care skills between APPE students who did and did not complete this IPPE could provide more insight into the impact of the experience on APPE performance.

Based on student feedback and performance, several modifications were made to the IPPE after the first year of implementation. A worksheet was developed to provide guidance when defining a drug information question and planning the search strategy, which also provided a guide for group discussion facilitation by the faculty preceptor. Faculty evaluation of students in the areas of professional interaction and communication, preparedness, and completion of assignments was added to the IPPE hours log to provide documented summative feedback to students. Based on comments from P3s regarding the time required to complete activities, the total number of contact hours provided was reduced from 25 to 20. Also, flexibility for students who desired to complete additional clinical activities was added. For example, although not required, some students desired an additional day on rounds or an additional patient counseling opportunity.

Additional modifications to the experience will be made. P2 students expressed a desire to complete more contact hours during the IPPE. As these students could potentially participate in portions of the clinical drug monitoring and SOAP note documentation activities, as well as provide medication counseling to additional patients, faculty members are reevaluating IPPE activities to make additional activities available to P2 students. A faculty evaluator noted the potential for peer teaching opportunities in addition to the clinical drug monitoring activity. Faculty members are further defining peer teaching opportunities that exist within the current IPPE activities.

## SUMMARY

This IPPE in an inpatient adult internal medicine practice site involved structured activities for P1, P2, and P3 students that were layered on the established APPE. Direct patient care activities, self-directed preparation of assignments, and online learning were all components of the redesigned IPPE. Students perceived that the redesigned IPPE increased their clinical skills and understanding of clinical pharmacy. Additionally, participating faculty members were able to provide significantly more IPPE hours to students compared to other faculty groups. This required little additional work beyond provision of the established APPE, thereby maximizing faculty efficiency. Because IPPE students completed established APPE activities, this model should be transferable to other clinical settings that provide APPEs.

## ACKNOWLEDGEMENTS

The authors thank Luanne Janke for her administrative assistance in the provision of the IPPE and Diana Randall for her assistance in data collection and analysis.

## REFERENCES

1. Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree, Guideline Version 2.0, Adopted January 23, 2011, Accreditation Council for Pharmacy Education. <http://www.acpe-accredit.org/standards/default.asp>. Accessed February 20, 2012.
2. Center for the Advancement of Pharmaceutical Education (CAPE) Educational Outcomes 2004, American Association of Colleges of Pharmacy. <http://www.aacp.org/resources/education/Pages/CAPEEducationalOutcomes.aspx>. Accessed February 20, 2012.
3. Stevenson TL, Brackett PD. A novel approach to introductory pharmacy practice experiences: an integrated, longitudinal, residence-based program. *Curr Pharm Teach Learn*. 2011;3(1):41-52.
4. Mort JR, Johnson TJ, Hedge DD. Impact of an introductory pharmacy practice experience on students' performance in an advanced practice experience. *Am J Pharm Educ*. 2010;74(1):Article 11.
5. Crill CM, Matlock MA, Pinner NA, Self TH. Integration of first- and second-year introductory pharmacy practice experiences. *Am J Pharm Educ*. 2009;73(3):Article 50.
6. Beck DE, Thomas SG, Janer AL. Introductory practice experiences: a conceptual framework. *Am J Pharm Educ*. 1996;60(2):122-131.
7. Kessler TL, Vesta KS, Smith WJ, Dennis VC, Bird ML, Harrison DL. Students' attitudes and perceptions of a structured longitudinal introductory pharmacy practice experience (IPPE) medicine rotation. *Curr Pharm Teach Learn*. 2011;3(1):2-8.

## Appendix 1. Introductory Pharmacy Practice Experience (IPPE) Activities, Learning Objectives, Student and Faculty Roles, and Assessment Methods

<b>IPPE Activity, (Educational Level), Contact Hours Provided</b>	<b>Learning Objectives</b>	<b>Student Role(s)</b>	<b>Faculty Role(s)</b>	<b>Assessment Method</b>
Orientation to inpatient internal medicine pharmacy services and IPPE, (P1, P2, P3), 1 hour	Describe (in general) the role of clinical faculty in the inpatient internal medicine practice setting and their career paths Define the members of the interdisciplinary internal medicine teaching team Describe expectations for IPPE activities and professionalism Determine the schedule of IPPE activities for the month	Attend and participate in discussion	Describe inpatient internal medicine practice setting and pharmacist roles within this setting Clearly define expectations for IPPE activities and student participation	• None
Patient medical record review and educational quiz, (P1, P2, P3), 1 hour	Locate major sections of a patient's medical record Describe information found in major sections of a patient's medical record Given a patient scenario, retrieve specific information from the patient's medical record	Complete self-directed medical record orientation exercise and educational quiz	Provide instructions for assignment	• Quantitative performance assessment: graded quiz with feedback provided for correct and incorrect answers
Participation in patient care rounds, (P1, P2, P3), 3 hours	Observe interdisciplinary internal medicine team rounds Identify pharmacy-related issues for each of the medicine team's patients List unfamiliar disease states, drugs, and terminology for review with faculty member Explain the clinical pharmacist's patient care role in the inpatient internal medicine practice setting	Attend patient care rounds, including pre- and post-rounding activities Complete rounds participation form while each patient is presented during rounds Actively discuss issues such as unfamiliar terminology, diseases, or medications with faculty member	Facilitate IPPE student engagement in rounding activities Identify clinical teaching opportunities and prompt discussion with IPPE student (during or after rounds)	• Qualitative observation data: students record patient problems, pharmacy interventions, and outstanding questions on rounds participation form

*(Continued)*

## Appendix 1. (Continued)

IPPE Activity, (Educational Level), Contact Hours Provided	Learning Objectives	Student Role(s)	Faculty Role(s)	Assessment Method
Patient discharge counseling, (P2, P3), 1 hour	Construct and execute a plan for counseling an internal medicine inpatient on one medication in preparation for hospital discharge Evaluate patient understanding of medication information provided Evaluate the effectiveness of the patient interaction after discharge counseling is performed	Prepare for counseling activity by researching medication, disease state, and key counseling points Provide medication counseling to faculty member and patient, and evaluate understanding Reflect on effectiveness of counseling provided	Provide 24 hour advance notice of counseling assignment Allow student to practice counseling and provide feedback Observe actual patient counseling provided Provide verbal feedback to IPPE student immediately after counseling activity	<ul style="list-style-type: none"> <li>Qualitative observation data: faculty member provides immediate formative feedback to student regarding “practice run” and actual counseling provided to patient</li> </ul>
Drug information scenarios assignment, (P2, P3), 2 hours	Use the provided Drug Information Worksheet (with guided questions) to organize a response to a drug information question Identify appropriate resources when answering a drug information question Communicate an organized and concise drug information response in a small group setting	Complete self-directed drug information assignment Share response and strategy with group of peers and faculty member for discussion Reflect on your approach to the assignment, learning different approaches to drug information questions from pharmacy student colleagues.	Provide instructions for the exercise Provide immediate feedback to each student, addressing their approach to the drug information scenario and interpretation of the supporting resources (faculty use a standardized, referenced answer key)	<ul style="list-style-type: none"> <li>Qualitative performance assessment: students present their responses to group and receive immediate formative feedback from faculty</li> </ul>
Journal club/ literature evaluation, (P2, P3), 4 hours	Evaluate an assigned article using the Critical Review Form Actively participate in a small group journal club discussion Explain the importance of evaluating literature as a practicing pharmacist	Evaluate assigned article Explain key concepts of article evaluation in relation to the assigned article Reflect upon the usefulness of the article in clinical practice and the importance of literature evaluation skills as a pharmacist	Evaluate assigned article Facilitate discussion of key concepts as each student works through a section of the critical review form	<ul style="list-style-type: none"> <li>Qualitative performance assessment: each student completes the Critical Review Form prior to the activity and presents their responses. (Students are expected to answer similarly for any one article.) Immediate, formative feedback is provided by the faculty</li> </ul>

(Continued)

## Appendix 1. (Continued)

<b>IPPE Activity, (Educational Level), Contact Hours Provided</b>	<b>Learning Objectives</b>	<b>Student Role(s)</b>	<b>Faculty Role(s)</b>	<b>Assessment Method</b>
Clinical drug monitoring, (P3), 4 hours	Summarize activities involved in clinical drug monitoring with an APPE student using the "Internal Medicine Clinical Pharmacist's To-Do List" Discuss findings with faculty preceptor and P4 APPE students	<u>IPPE students</u> Perform clinical drug monitoring for one patient with the assistance of an APPE student Participate in discussion with preceptor and APPE student <u>APPE students</u> Demonstrate clinical drug monitoring activities in preparation for patient care rounds to the assigned IPPE student Discuss this exercise and other clinical drug monitoring activities with the IPPE student and preceptor	Pair one P3 IPPE and one P4 APPE student together for this activity Assist P4 student with patient selection for P3 student clinical drug monitoring Schedule a 30-minute patient discussion with the IPPE and APPE students	None: this is a mentorship exercise for APPE students and prepares IPPE students for their SOAP note assignment.
SOAP note documentation, (P3), 4 hours	Construct an organized and concise SOAP note for one acute medical problem Present SOAP note to faculty preceptor and P4 APPE students	Construct a typed SOAP note Present SOAP note to preceptor and APPE students	Assign a patient and medical problem to IPPE student Provide student with the necessary (de-identified) subjective and objective information Schedule a 30-minute presentation time Provide feedback to student immediately after presentation	Qualitative observation data: review of completed SOAP note by faculty member and group discussion with IPPE and APPE students

Appendix 2. Example of Completed SOAP Note

---

**Subjective:**

This patient is a 73 year old male presenting with lower back pain. The pain has begun radiating down his left leg into his left foot and was limiting daily activities. He visited a physician out of state who found the pain to be due to a trauma-related fracture. The pain continued to worsen and increasing ibuprofen did not relieve the pain. He came to get a second opinion here and neurosurgery performed an MRI. He did not find a trauma-related fracture, but did see lesions suspected to be metastatic cancer. Patient is admitted currently going through a full diagnostic workup, possible origin of cancer is unknown. Currently, the patient is having pain during movements such as standing up or sitting down. His pain is still in the lower back and radiating down the left leg. He has been receiving the ibuprofen prescribed for PRN use. PMH includes CAD with Hx of CABG in 2001. The patient reports no drug allergies. He quit smoking 40 years ago, and says he drinks occasionally but limits intake.

**Objective:**

T – 37

HR – 87

BP – 155/73

Weight – 170#

Heart – regular with no murmur

Rectal – Guaiac negative, no prostate lesions

Neurologic – lower extremity strength was weak possibly due to pain. Significant pain occurred when the patient tried to raise leg off the bed. Diminished deep tendon reflexes on the left side.

**Assessment:**

The patient's pain management is currently suboptimal. Ibuprofen failed previously – NSAIDs are generally first line for bone pain, but are not sufficient in this patient as sole therapy. The hydrocodone/acetaminophen is requiring frequent dosing to control his pain, and lacks long term relief. The patient is requiring 50 mg of hydrocodone daily. The next best option is to use a long-acting pain regimen with coverage for breakthrough pain.

**Plan:**

Initiate oxycodone ER 20 mg every 12 hours, with 5 mg oxycodone IR every 6 hours as needed for breakthrough pain. Also dose ibuprofen around the clock, 800 mg every 6 hours for the potential bone pain. Monitor patient's pain scale daily after initiation of new regimen. The patient may need a bowel regimen for constipation or diphenhydramine for itching with opioid treatment. Monitor for respiratory depression. It may be necessary to re-evaluate regimen when a definitive diagnosis is made.

---