INSTRUCTIONAL DESIGN AND ASSESSMENT

Introductory and Advanced Pharmacy Practice Experiences Within Campus-based Influenza Clinics

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Objective. To describe the development, implementation, and assessment of an introductory and an advanced pharmacy practice experience (IPPE and APPE) integrated within campus-based influenza clinics.

Design. The influenza clinics were designed to incorporate the learning objectives for the IPPE and APPE, and included preparatory sessions, online learning, and direct patient interactions tailored to the appropriate education level of the learner.

Assessment. The clinics provided influenza vaccinations to 2,292 and 2,877 individuals in 2010 and 2011, respectively. The clinics allowed for experiential education of 39 students earning a total of 467 IPPE and APPE hours in 2010 and 58 students earning a total of 656 IPPE and APPE hours in 2011. Third-year students were assessed before and after completing the IPPE, and improvement was seen in knowledge and self-ratings of perceptions and attitudes toward administering immunizations.

Conclusions. Integrating pharmacy practice experiences within campus-based influenza clinics was an effective way to provide students with direct patient care experience and preventive health services knowledge.

Keywords: introductory pharmacy practice experience, advanced pharmacy practice experience, immunizations, influenza clinic, community outreach

INTRODUCTION

The role of pharmacists as vaccinators has been advancing, and since 2009, pharmacists in all 50 states are allowed to administer vaccinations.¹ Inaccessibility and inconvenience are common factors cited for poor vaccination rates in adults.²⁻⁴ Pharmacists are uniquely positioned to impact vaccination rates because of their knowledge of medications, their integrated role in the healthcare system, and accessibility by the general public. Remarkably, an estimated 250 million people walk into a pharmacy each week.⁵ Additionally, pharmacies often have expanded hours, favorable geographic locations, and generally do not require appointments (in contrast to physicians' offices). A Center for Disease Control and Prevention (CDC) report showed that stores (eg, supermarkets or drug stores) were the second most common place for receipt of the 2011-2012 influenza vaccination among adults in the United States.⁶ The CDC and Department of Health and Human Services

acknowledged pharmacists for their tremendous efforts to raise immunization rates and requested continued efforts by pharmacists to promote and provide immunizations in their communities.⁷

This advancement in practice must be met by advancement in pharmacy education to prepare students to provide immunization advocacy and services upon graduation. Pharmacy curriculums typically include classroom education on vaccine-preventable diseases and laboratory training of vaccination administration techniques. When this training is provided early in the curriculum of a doctor of pharmacy (PharmD) program, students can practice skills and gain confidence in provision of immunization services on introductory pharmacy practice experiences (IPPEs). Colleges and schools that can develop and/or participate in immunization service initiatives can provide practice settings to help fulfill the current requirement that students obtain a minimum of 300 IPPE hours.⁸ Such an activity addresses the Accreditation Council for Pharmacy Education Standard's performance competency for health and wellness and the Center for the Advancement of Pharmaceutical Education (CAPE) outcome for promotion of disease prevention in cooperation with patients, communities, at-risk populations, and other members of the interprofessional team.^{8,9} We describe the

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development, implementation, and assessment of pharmacy practice experiences (PPE) integrated within campus-based influenza clinics. Additionally, we address challenges encountered and modifications after implementation.

DESIGN

The University of Oklahoma College of Pharmacy is part of a comprehensive health sciences center encompassing 7 colleges (pharmacy, medicine, dentistry, nursing, allied health, public health, and graduate), 2 hospitals, and numerous clinics. A traditional 4-year doctor of pharmacy program is delivered synchronously on 2 campuses. The college annually admits up to 80 students on the Oklahoma City campus and 40 students on the Tulsa campus. In addition to the classroom-based curriculum, the program requires 100 hours of IPPE per year for the first 3 years and 1,440 hours of advanced pharmacy practice experiences (APPEs) in the fourth year. Year 1 and 2 (P1 and P2) students accumulate IPPE hours during 4-hour block assignments. Year 3 (P3) students complete an 80-hour practicum in the summer and a 20-hour assignment in the fall or spring. Year 4 (P4) students complete 9 practicums of 160 hours each. The distribution of IPPE assignments includes 55% in community practice, 30% in institutional practice, and 15% in specialty areas including voluntary service-learning activities. The classroom curriculum in the P2 year includes 4 hours of lectures and 4 hours of laboratory practicum on immunizations. This prepares students for practicing vaccination skills within IPPEs in the P3 year and APPEs in the P4 year. This is allowable under the Oklahoma Pharmacy Practice Act as students may administer vaccines under the direct supervision of an Oklahoma licensed pharmacist with an Oklahoma immunization permit.

The University of Oklahoma College of Pharmacy recognized the opportunity to provide influenza vaccinations to health sciences center faculty and staff members when this service was discontinued by employee health in 2010 because of budget cuts. For the first year, the influenza clinics sponsored by the college of pharmacy were offered at the Oklahoma City campus only. Based on its success, the program was expanded to include the Tulsa campus in 2011. Two pharmacy faculty members with experience in immunizations led the initiative to coordinate the campus-wide influenza clinics. The primary resources for the influenza clinics were the 2 lead faculty members, a Tulsa coordinator (for 2011), additional pharmacy preceptors, pharmacy residents, and pharmacy students. All participating faculty members and preceptors had Oklahoma State Board of Pharmacy-issued immunization permits which required that they had completed an approved training program (eg, American Pharmacists

Association immunization training) and active cardiopulmonary resuscitation training. Additionally, the 2 lead faculty members had over 10 years of experience in provision of annual immunization education, training, and services. The 3 primary objectives for the initiative were to: (1) provide influenza vaccinations to faculty members, staff members, and their families; (2) advocate and educate about pharmacists' roles as vaccinators; and (3) provide experiential education to pharmacy students. Experiential education opportunities were provided for students in the P2 through P4 years at graduated levels of involvement based on the timing of exposure to immunization education in the curriculum and within the practice experience assignment schedule and structure of the experiential education program. In the fall of the P2 year, students received lectures on immunizations and vaccine-preventable diseases within a preventative health module course. After completion, the P2 students were scheduled for Immunization Advocacy IPPEs in 4-hour blocks during which they observed the full influenza clinic operation and hands-on experience with patient screening and registration. In the spring of the P2 year, students received vaccine administration training within the pharmacy practice laboratory, which enabled them to participate in administering vaccines during their P3 IPPEs and P4 APPEs and provide the manpower for the influenza clinics. P3 students were scheduled for a 20-hour Immunization Advocacy IPPE in the fall which included attendance at a preparatory session (1 hour), participation in 4 influenza clinics (12 hours total), attendance at a wrap-up session (1 hour), viewing of 2 "Stop the Flu" presentations (2 hours), and a written reflective essay (2 hours). P4 students, who worked in the clinic in 4-hour shifts, were either scheduled by their APPE preceptor or volunteered for shifts if they were not scheduled for a practicum in October. Pharmacy residents coordinated with their residency directors and preceptors to volunteer for 4-hour clinic shifts as their schedules allowed. Postgraduate year 1 (PGY1) residents administered vaccinations, and postgraduate year 2 (PGY2) residents with preceptor licenses assisted with supervising P3 and P4 students. In addition to the lead/coordinating faculty members and PGY2 residents, faculty volunteers were scheduled for each clinic to provide adequate student supervision. In accordance with state law, each preceptor supervised no more than 2 students (IPPE and/or APPE) administering vaccinations at any one time. All students were provided formative feedback during this experiential assignment. Approval from the University of Oklahoma Health Sciences Center Institution Review Board was granted prior to initiation of the Immunization Advocacy IPPE and influenza clinics.

All components of the influenza clinics were designed to incorporate the experiential education objective. The physician-approved protocol listed vaccinator qualifications as being a pharmacist with an immunization permit or a pharmacy student who had successfully completed immunization training and was working under the direct supervision of a licensed pharmacist with an immunization permit. Large conference rooms were scheduled for the influenza clinics to allow adequate space for clinic personnel (10 to 15 individuals comprising pharmacy students, residents, and faculty and staff members) as well as the employees coming to be vaccinated. The immunization consent form allowed the employee to choose to have their vaccine administered by a pharmacist or a pharmacy student under the supervision of a pharmacist. Because less than 5% of employees selected the option to have only a pharmacist administer their immunization, this option was later removed from the consent form.

Training materials were developed to supplement the immunization education provided in the core curriculum and prepare students for participation in the influenza clinics. These online resources included assignment details, patient care materials, helpful readings, and links to clinical practice guidelines. All materials were available online through the Desire2Learn portal (Desire2Learn, Inc., Kitchener, ON, Canada) with access provided to all college of pharmacy faculty members and students. In September 2010, two lunch-and-learn presentations were delivered by the 2 lead faculty members to the college of pharmacy faculty and staff members and students to kick off the initiative. The first presentation "Stop the Flu-It Starts With You!" provided information on influenza transmission, the influenza vaccine, healthcare provider rates of influenza infection and influenza vaccination, and an overview of the campus-wide program. The second presentation "Stop the Flu-What You Can Do!" highlighted pharmacy laws regarding immunizations, protocol examples, practice setting examples, and immunization advocacy. Videos for these sessions were provided on Desire2Learn for the 2011 season. In September, a pre-clinic hands-on session was required for the P3 IPPE cohort as well as other interested individuals to provide a review of the IPPE requirements and a refresher on vaccination administration. This session highlighted management of potential complications (ie, anaphylaxis reactions, allergic reactions, hitting bone or difficulty penetrating skin, excessive bleeding), special populations (eg, pediatrics, pregnancy), and alternate vaccine formulations (ie, intranasal, high-dose). In November following the influenza clinics, the students in the P3 cohort were required to attend a wrap-up session that included a debriefing about

the clinics' successes, lessons learned, feedback from immunization surveys, and submission of reflective essays.

EVALUATION AND ASSESSMENT

The college of pharmacy-run clinics provided influenza vaccinations to 2,292 faculty and staff members and their families in Oklahoma City in 2010 and 2,877 in Oklahoma City and Tulsa in 2011 (Table 1). Influenza clinic offerings included 57 to 65 hours per year to provide this volume of vaccinations at multiple locations for accessibility and convenience. The clinics provided the setting for significant experiential education opportunities for the PharmD program, with 39 students earning a total of 467 PPE hours in 2010 and 58 students earning a total of 656 PPE hours in 2011 (Table 2). The required supervision for IPPE and APPE students and the influenza clinics operation accounted for 186 faculty hours in 2010 (from 16 faculty members and preceptors) and 218 faculty hours in 2011 (from 22 faculty members and preceptors). Student training and supervision was largely supported by the clinical pharmacy department of which 39 of 50 faculty members (78%) had received their immunization training and permit.

All P2 and P3 students were asked to complete IPPE evaluations. There was a high response rate (100% in 2010 and 85% in 2011) for completion of the IPPE evaluations. Students rated the IPPE favorably and a summary of the evaluations are provided in Table 3. Students were also encouraged to provide narrative comments on the IPPE evaluation form. The major themes from this feedback were that the experience provided hands-on immunization practice, maximum direct patient care, a fun and enjoyable experience, and contributed to a positive impact on the health sciences center community.

The P3 cohort contributed a significant proportion of the manpower needed for vaccine administration, with

Table 1. Influenza Clinics Operated and Staffed by Pharmacy Students and Faculty Members

	Oklahoma City Campus	Tulsa Campus	Total
Clinics held, No.			
2010	13	0	13
2011	12	5	17
Total clinic hours, No.			
2010	57	0	57
2011	45	20	65
Vaccinations administered, No.			
2010	2292	0	2292
2011	2533	344	2877

Table 2. Experiential Education Offerings in the Influenza Clinic Within a College of Pharmacy

	Trainees, No	Training Hours, No
P2 students		
2010	6	24
2011	9	35
P3 students		
2010	18	360
2011	25	500
P4 students		
2010	15	83
2011	24	121
Residents		
2010	4	19
2011	6	25
Total		
2010	43	486
2011	64	681

Abbreviations: P1 = first-year pharmacy; P2 = second-year pharmacy; P3 = third-year pharmacy.

each student vaccinating 75 to 100 individuals over their 12-hour influenza clinic assignment. In their reflective essays, P3 students shared that the experience helped them to quickly reduce their nervousness about immunizing patients, refine their skills, develop confidence in their ability to immunize, and gain experience in management of challenging situations. Many students noted that this was a valuable service that they would like to see continued and hoped to participate in as pharmacists if their future schedules allowed.

Pre- and post-IPPE assessments of the P3 students were designed to measure student knowledge, attitudes, and perceptions. Students were asked to complete the same knowledge test and self-evaluation survey at the beginning and end of the IPPE on a voluntary basis and

provided informed consent prior to completion. The response rate was 90.7% (39 of 43 P3 students). Pre- and post-IPPE responses were compared via paired *t* tests, with an *a priori* alpha of 0.05. All data management and analysis was performed in Stata, version 10.1 (StatCorp LP, College Station, TX). After completion of the IPPE, there was significant improvement in students' knowledge of influenza and immunizations, self-evaluation of knowledge of immunizations, and self-rating of vaccination skills (Table 4). In addition, all students reported a high likelihood of providing vaccination services as a practicing pharmacist with either a 6 or 7 rating (on a 7-point Likert scale).

Employees and family members who were vaccinated were asked to complete a brief, voluntary survey as they exited the influenza clinic. This provided feedback on the skill level of the person who administered the vaccine from the patient's viewpoint. As the influenza clinics were open to health sciences faculty and staff members, approximately a third of those who received the vaccine were healthcare providers (eg, physicians, nurses, pharmacists) who were also skilled vaccinators. The 2010 survey instrument asked participants to rate their vaccinator and yielded a 70% response rate (1,596 of 2,292). The results were overwhelmingly positive with 97% rating their vaccinator's skills as "good" or "excellent." The 2011 survey had a 42% response rate overall and posed a similar question, asking the respondent's overall satisfaction with receiving the influenza vaccination. Over 95% (1,166 of 1,222) provided a rating of 5 out of 5, indicating they were "very satisfied" with receiving the influenza vaccination. Also noteworthy was that 75% of those surveyed in 2011 were return customers who had received their influenza vaccination from the 2010 pharmacy-led influenza clinics.

Table 3. Pharmacy Students' Evaluation of an Introductory Pharmacy Practice Experience Working in the College-based Influenza Vaccination Clinic

	2010 (N = 24)	2011 (N = 29)
Opportunity for active participation was provided ^a	3.6	3.9
The environment promoted learning ^a	3.4	3.8
My expectations for learning were met or exceeded ^a	3.5	3.7

Abbreviations: P2 = second-year pharmacy; P3 = third-year pharmacy.

^a Mean score on a 4-point rating scale (The response options were disagree (1), somewhat agree (2), agree (3), and strongly agree (4).

Table 4. Third-Year Pharmacy Students' Test Scores and Survey Responses Before and After Completing an Introductory Pharmacy Practice Experience in the Influenza Clinic

	Combined 2010-2011 Data		
	Pre-IPPE Score/ Rating	Post-IPPE Score/ Rating	P
Knowledge test, %	81.4	96.0	< 0.001
Self-rating of knowledge ^a	4.9	6.2	< 0.001
Self-rating of skills ^a	4.9	6.7	< 0.001
Likelihood to be future vaccinator ^a	6.3	6.9	< 0.001

^a Score based on a 7-point Likert scale (1 = lowest, 7 = highest).

DISCUSSION

The influenza clinics were largely successful in meeting the stated objectives. In the initial year, the Oklahoma City clinics provided 2,292 influenza vaccinations, which accounted for 47% of the Oklahoma City faculty and staff members. This success allowed for expansion to include the Tulsa campus and to provide 2,877 vaccines to 64% of the faculty and staff members of both campuses. This college-led, campus-based program has provided a new practice setting for meaningful IPPE and APPE learning experiences for PharmD students. This program provided 486 and 681 total hours of training for P2, P3, and P4 students and pharmacy residents, in 2010 and 2011, respectively.

The influenza clinics still operate successfully, but our experience has led to modifications to improve this campus outreach program and experiential education offering. In the first year, a few students came to the influenza clinics unprepared or overly nervous, having only administered a couple of practice saline injections within the P2 laboratory and at the P3 refresher session. This led to adjustments in the preparatory session, including inviting pharmacy faculty and staff members to receive their influenza vaccinations during the practice session and strongly encouraging attendance by all scheduled vaccinators (ie, P4s, residents, and faculty members). Attendance at this live session has always been a requirement for P3 students. The review session was also recorded and placed on the Desire2Learn Web site for repeat viewing by P3s and others in attendance or for those faculty members, residents, and P4s who were unable to attend the live session. All scheduled vaccinators were required to either attend the live session or view the recording to refresh their skills. Likewise, those in attendance at the preparatory session were required to practice administering the vaccination, and we revised the practice from saline injections to actual influenza vaccines for pharmacy faculty and staff members.

The other major modification made was in the influenza clinic hours, specifically in Oklahoma City. In 2010, after the first-week rush, the pace at which faculty and staff members presented to the clinic was slower and resulted in lags between vaccinations. As a result, we decreased the number of influenza clinics held by 21% and thereby increased our efficiency from 40 vaccinations per hour in 2010 to 56 vaccinations per hour in 2011 in Oklahoma City. In the second year, we also refined our staffing model to include an average staffing of 2 administrative personnel or P2s to handle registration, 8 vaccinators (P3s, P4s, or residents), and 4 faculty preceptors for the Oklahoma City campus. Coordinating around class

schedules to ensure student availability and to offer clinics at various times and days of the week for the convenience of employees presented significant scheduling challenges. Because the influenza clinic's needs are best matched with the 20-hour IPPE for P3 students, the schedule was constructed to ensure that the maximum number of P3 vaccinators could participate. To allow faculty and staff members and their families a range of days and times on which to come to the clinic, a limited number of clinic sessions were offered when P3s were not available and this provided the opportunity for P4s and residents to participate in single influenza clinic shifts as a component of their assigned practice experiences. In the future, we will likely follow similar scheduling and staffing models. The Tulsa clinics required less manpower and fewer clinics, but longer clinic hours to accommodate the smaller campus population.

Student feedback about the IPPE experience was positive and ratings improved from 2010 to 2011. The more favorable ratings in 2011 were likely the result of having busier clinics that led to more vaccinations given per hour, yielding more direct patient care interactions. Also, in 2011 the lead faculty roles were focused solely on clinical activities, while support staff members took over administrative responsibilities. This resulted in the influenza clinics in the second year running smoother than in the first year, which probably led to a better experience for all involved.

While the survey responses from those vaccinated were favorable, there was a drop in survey response rate from 70% in 2010 to 42% in 2011. In 2011, the total hours for clinic offerings were reduced, yielding busier clinics with more vaccinations given per hour. As a result of the busier schedule, faculty members and vaccinators did not encourage participants to complete the survey instruments as much in year 2 of the program. Additionally, participants may have had to wait a little longer to get their vaccination which may have led to them not wanting to take any more time to complete the survey instrument. Also, because we were vaccinating the same population in both years, some may have felt like they had already given feedback the first year.

Implementation of campus-based influenza clinics requires significant faculty and staff resources. The average of 200 faculty hours per year devoted to the influenza clinics is substantial; however, the corresponding offering of 656 IPPE and APPE hours is also significant. After the first year, we were able to adjust scheduling to be more efficient with faculty preceptors' time. Specifically, there were 2.5 hours of IPPE and APPE contact time for every faculty hour in 2010 and 3.0 hours for every faculty hour in 2011. The faculty members' participation in the influenza

clinics not only counted toward their teaching requirements but also as service to the university. We have also reduced the amount of staff time to include 2 individuals at the opening and closing and only 1 person during the operating hours of the influenza clinics. In return for the output of faculty and staff time, the college of pharmacy has had multiple gains including positive outreach for the college of pharmacy within our health sciences community for provision and continuance of this important preventative health service and financial compensation through the reimbursement of the university's insurance for the vaccinations given.

The 2010 influenza clinics did not return on investment because of over ordering of vaccine supply related to difficulty assessing volumes needed for this new endeavor. However, the 2011 influenza clinics brought in \$105,571 in insurance reimbursement that yielded a net income of \$57,869. The net income was derived from only direct expenses, such as the cost of the vaccinations, needles, and other supplies. We did not allocate any compensation costs for faculty or staff members' time. A true cost allocation would have yielded a different number; however, we wanted to highlight new (or additional) dollars that this project provided to the college. The college worked with the university's human resources department to submit claims via the onsite pharmacy directly to its main insurance carrier.

The university's wellness program guaranteed payment for any employee who was not on the plan. The financial operations of this program were managed through the retail pharmacy on campus. The retail pharmacy is a business unit of the college of pharmacy. For accounting and insurance billing purposes, all supplies were purchased through the pharmacy and all revenues were deposited into the pharmacy account. The net income from the second year of operation remained in the pharmacy as part of its operations funds. Income from pharmacy operations helps support the students and faculty members with non-recurring costs such as professional conferences, faculty development, and professional memberships.

This report adds to the literature for IPPE students participating in immunization services. Turner and colleagues reported on an IPPE requirement of 3 hours in a community pharmacy to provide adult immunization services for all P2 and P3 students. Their design differed in that students were provided immunization training prior to the P2 year and community preceptors were enlisted to provide the training sites within local community pharmacies. A survey of 50 preceptors used for this IPPE activity rated the program to be highly valuable to the pharmacy. Their report gives an alternate model for

consideration of offering immunization IPPE using adjunct preceptors and community pharmacies. Similar to our report, this study provided evidence of student achievement in administering adult vaccinations (average of 30 to 70 patients vaccinated per student) and building of confidence in vaccination skills (in a pre-post survey) within an IPPE program.¹⁰

SUMMARY

Campus-based influenza vaccination clinics provided experiential education opportunities for P2, P3, and P4 students, as well as residents, and a convenient venue at which health sciences center faculty and staff members and their families could receive immunizations. The IPPE and APPE assignments included preparatory sessions, online learning, and direct patient care within the influenza clinics. The P3 cohort studied showed improvement in students' knowledge, perceptions, and attitudes toward vaccinations. Faculty members were able to offer significant IPPE hours and enrich APPE assignments within this new practice setting. This new initiative has helped the college to meet accreditation standards for health and wellness and CAPE outcomes for promotion of disease prevention within the health sciences community. This model should be transferable to other colleges and schools of pharmacy desiring to offer campus-based immunization clinics or other preventative health programs.

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