

## INSTRUCTIONAL DESIGN AND ASSESSMENT

### An Elective Pharmaceutical Care Course to Prepare Students for an Advanced Pharmacy Practice Experience in Kenya

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Submitted August 31, 2012; accepted October 29, 2012; published April 12, 2013.

**Objective.** To develop a prerequisite elective course to prepare students for an advanced pharmacy practice experience (APPE) in Kenya.

**Design.** The course addressed Kenyan culture, travel preparation, patient care, and disease-state management. Instructional formats used were small-group discussions and lectures, including some Web-based presentations by Kenyan pharmacists on disease states commonly treated in Kenya. Cultural activities include instruction in conversational and medical Kiswahili and reading of a novel related to global health programs.

**Assessment.** Student performance was assessed using written care plans, quizzes, reflection papers, a formulary management exercise, and pre- and post-course assessments. Student feedback on course evaluations indicated that the course was well received and students felt prepared for the APPE.

**Conclusion.** This course offered a unique opportunity for students to learn about pharmacy practice in global health and to apply previously acquired skills in a resource-constrained international setting. It prepares students to actively participate in clinical care activities during an international APPE.

**Keywords:** international pharmacy, clinical pharmacy, advanced pharmacy practice experience, experiential learning, pharmaceutical care

## INTRODUCTION

Pharmacists are encouraged to take a more active role in global health care.<sup>1-3</sup> To prepare student pharmacists for this expanding role, colleges and schools of pharmacy are incorporating components of cultural awareness, competency, and experience into their curricula. Experiential training, such as advanced pharmacy practice experiences (APPEs), has been identified as a time during which these elements can be offered and incorporated into a curriculum. One way in which programs do this is by offering opportunities to participate in international experiences, which allow students to be exposed to cultural diversity and to practice cultural competency, both of which are addressed by Accreditation Council on Pharmaceutical Education (ACPE) standards.<sup>4,5</sup> Immersion into a culture is an effective method of internalizing the concept of diversity, and studying abroad allows students to continue pursuing their educational goals while experiencing a different cultural environment. International APPEs provide clinical

training in an international setting, which prepares students for the diverse experiences and populations found in all practice settings while maintaining the rigor and curricular structure of a professional program.

As with many universities, the strategic plans of Purdue University and its college of pharmacy focus on improving the international impact of the university.<sup>6</sup> One way in which this area of interest has been addressed is through the establishment of the Purdue Kenya Program, which established a practice site in Eldoret, Kenya, in collaboration with the Academic Model Providing Access to Healthcare (AMPATH). In 2001, AMPATH was established as a partnership between the government of Kenya's Ministry of Health, the Moi Teaching and Referral Hospital, Moi University School of Medicine, and a consortium of North American universities, with the primary goal of addressing the HIV/AIDS epidemic. It now provides prevention and treatment service for HIV/AIDS and many other chronic diseases throughout western Kenya.<sup>7</sup> AMPATH's activities extend to a care network that includes over 60 satellite clinics and a population of more than 2 million people in its catchment area.<sup>8,9</sup> Developed in 2003 to provide pharmacy services for AMPATH, the Purdue Kenya Program merges clinical care

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with teaching and research to provide a comprehensive program for both patients and students. The mission of the program is to provide and expand sustainable access to high quality care to all patients within its catchment area of western Kenya.

In Kenya, where there are approximately 8 pharmacists for every 100,000 people compared with 100 pharmacists for every 100,000 people in the United States, Purdue University recognized an opportunity to impact patient care internationally with sustained student involvement.<sup>10</sup> Therefore, an 8-week global health APPE entitled Purdue Kenya Program APPE was established.<sup>11</sup> To prepare students for their involvement in the program, a 2-credit elective course was developed. With a goal of preparing student pharmacists for active contribution in an international APPE, the course focused on cultural awareness, travel preparation, and targeted disease state management.

## DESIGN

The 15-week, 2 credit-hour elective course was introduced in 2004. The elective was offered during the third-year spring semester of the PharmD program before students began their APPEs in the fourth year. Although the course was designated as a professional elective, all students enrolled in the APPE were required to participate. The elective and APPE can support up to 36 students annually and has had 171 participants since 2004.

Two pharmacy practice faculty members coordinated the course. Both were integral members of the program who had been to Kenya multiple times and were present for all class periods to lead discussions, work with guest lecturers, and coordinate course assignments. There was no required textbook for this course; however, a course manual had been designed that included key information related to the Kenyan culture, including Kiswahili vocabulary sheets, travel preparation, and disease state management. It also included the APPE syllabus and a practice experience handbook so that students could become familiar with these topics as they were discussed throughout the course. Kenyan-based faculty, clinical pharmacists, and residents provided the disease state lectures, ensuring that the content was relevant to the clinical practice setting. Instruction emphasized treatment and patient care in Kenya and contrasted that with practices in resource-rich settings, such as the United States. Each lecture by the Kenyan practitioners was videotaped in advance and aired during the scheduled class session. Course coordinators were then present to answer questions and lead discussions focused on the lecture content. Past student participants were also asked to return to attend discussions related to Kenyan culture, travel preparation, as well as to provide

information about day-to-day living during the practice experience.

Course objectives were initially developed based on course coordinators' visits to Kenya, input from onsite faculty, and activities suggested for all study-abroad students. All course objectives were matched with the Purdue University College of Pharmacy Professional and General Outcome Abilities as well as the ACPE and Center for Advancement of Pharmacy Education standards.<sup>12</sup> The course objectives, developed using Bloom's taxonomy and created to promote higher order learning, were categorized into 3 categories: disease state management, culture, and travel preparation.<sup>13</sup>

A variety of instructional methods and learning activities were used to achieve the course objectives (Appendix 1). Classroom lectures on disease state management were partnered with care plan assignments and discussions. To ensure authenticity, patient cases were developed from patient-practitioner encounters in Kenya. Each patient case was accompanied by an in-class discussion, which allowed students to compare and contrast practice in Kenya and the United States. In order to highlight the cultural differences students would experience, several cultural vignettes were discussed throughout the course. Additionally, students were expected to learn some basic Kiswahili. The suggested terms were included in the course packet in the form of a language study guide, which was reviewed with the students the week before each quiz. Discussions were led by course coordinators and past participants. To ensure adequate preparation for travel, the last 6 hours of the course were dedicated to this topic and used to answer student questions. During these sessions, important program (both University and onsite programmatic) policies and procedures were reviewed.

Course assignments were designed to augment the information provided in the lecture and discussion sessions (Appendix 1). The first assignment, a reflective-thoughts paper, required students to write short reflective responses addressing their reason for participation in the APPE, what they expected to gain, and challenges and differences they anticipated encountering when practicing in Kenya. The second assignment was focused on drug information, with the goal of familiarizing students with different units of measurement, medication brand names, and clinical scenarios in resource-constrained settings. This assignment required students to use unit conversions while examining therapeutic substitutions in the case of an unavailable formulary agent. The third assignment was a reflective assignment based on reading *Walking Together, Walking Far* by Fran Quigley, a book about AMPATH. Students answered questions about the book and participated in a class discussion. The fourth assignment required

students to “live with” HIV/AIDS for 1 month, during which time they were assigned to follow an antiretroviral drug regimen using candy medications and to complete a written reflection and participate in a discussion. This assignment helped students gain insight into the complex medication regimens used by AMPATH patients and simulated the stigma that can be associated with HIV/AIDS in Kenya. Another assignment was a grant-writing exercise for which students developed service-learning projects, which may later have been implemented during the APPE. Along with the grant application, students completed a detailed plan that explored the project’s feasibility and sustainability as well as its implementation. Finally, students were assigned 2 of the class readings on disease states that were not discussed during a lecture but were pertinent to the practice environment (eg, typhoid and rheumatic heart disease).

As the course evolved, a few assignments were discontinued or changed (Appendix 1), including the journal club, travel preparation assignment, reading assignment, and topic presentation. The journal club evaluation, which focused on patient population differences, was removed after the first year and replaced with the medication-compliance exercise described above. For the travel preparation assignment, students prepared a “Dear Doctor” letter and patient education handout about vaccinations and travel preparation for various parts of the world. This assignment, the purpose of which was to guide students in using resources for travel preparation and practice written communication skills, was removed to allow for additional time to address travel preparation specific to the APPE. The final assignment removed was the topic presentation. Each student was paired with a classmate who was assigned to the same APPE block in Kenya to present on a topic relevant to Kenyan clinical practice (eg, tuberculosis medications, antiretrovirals, antimalarials) to a specific audience (ie, patients, nurses, or physicians). This assignment was removed because of time limitations as the class size grew. Although removed from the course, both the journal club and the topic presentations were included as activities completed during the APPE. The reading assignment previously included *Things Fall*

*Apart* by Chinua Achebe and *Mountains Beyond Mountains, The Quest of Dr. Paul Farmer: A Man Who Would Cure the World* by Tracy Kidder. While these books generated good reflection and discussion about African culture and public health, the current required reading was specific to the APPE practice site.

## EVALUATION AND ASSESSMENT

To ensure proper evaluation, multiple assessments were used in the course in addition to required assignments. Course grades were determined based on points from required assignments, assessment activities, and participation in discussions (Appendix 1). Three in-class quizzes were used to assess knowledge of basic and medical Kiswahili, Kenyan medical abbreviations, and information from disease state lectures.

Student learning was assessed through the use of pre- and post-course assessments, which included a total of 34 items: 11 related to course content in the key areas of culture, 19 about disease state management, and 4 regarding travel preparation. The pre-course assessment assessed baseline knowledge of the topics discussed in the course and assisted faculty in identifying areas to focus discussion.

Based on pre-course assessment results (Table 1), students entered the elective course without knowledge regarding common disease states and cultural differences that faculty members have identified as necessary for active participation in the APPE. The post-course assessment was applied to the course grade, and a passing grade of 80% was required to participate in the APPE. A remediation plan was offered to students who did not pass. Table 1 highlights students’ overall performance on the assessments.

The assessment data demonstrated that students had limited knowledge related to Kenyan culture, travel, and common disease states treated in Kenya before beginning the course. No students received a passing grade (80%) on the pre-course assessment (2011, 54.9%; 2012, 52.8%). The post-course assessment demonstrated improvement across all categories. The average improvement was 34% from pre- to post-course assessment (2011, 31.5%; 2012,

Table 1. Overall Evaluation of Pre- and Post-Course Assessments in an Elective Pharmaceutical Care Course To Prepare Students for an APPE in Kenya

	Average Pre-Course Assessment Score, %	Average Post-Course Assessment Score, %	Average Improvement, %	Requiring Remediation, <sup>a</sup> %	Passed to APPE %
2011 (n=26)	54.9	86.4	31.5	15	100
2012 (n=24)	52.8	89.3	36.5	7	100

Abbreviation: APPE=advanced pharmacy practice experience.

<sup>a</sup> Those who scored under 80% on the post-course assessment.

36.4%). Four students (15%) in 2011 and 2 students (7%) in 2012 required remediation. The remediation process included contacting a course coordinator to discuss performance on the post-course assessment and meeting to review course material, followed by a retake of the assessment. All students, including those requiring remediation, were able to successfully pass to the APPE.

To further analyze the course assessment data, items from the 2012 pre- and post-course assessments were categorized into travel preparation, culture, and disease-state management (Table 2). The average score within each category was improved, and students passed each individual section with an average >80%. The greatest improvement in assessment scores was seen in the disease-state management category (45.3%), compared with 17.3% and 34% in travel and culture, respectively. The category with the least amount of improvement was travel preparation (17.3%).

Course lectures and content were evaluated using standardized items taken from a standard set of evaluation statements available through the University (PICES: Purdue Instructor Course Evaluation Service).<sup>14</sup> The course evaluations were posted on Blackboard (Blackboard, Inc., Washington, DC), a Web-based educational tool. To ensure completion of course evaluations, students received a bonus point for completing each evaluation. Table 3 contains course evaluation summaries.

## DISCUSSION

The described course met its stated objective of preparing students for active participation in an international pharmacy setting, as demonstrated by the 34% improvement in scores from the pre-course to the post-course assessment. To achieve this improvement, the course content was built around the specific objectives related to ensuring disease-state management, travel preparation, and Kenyan culture competencies were obtained. The course developers identified that the course content should include not only travel and culture preparation but also disease-state management of commonly treated diseases at the international practice site. Disease-state management was incorporated so students would be able to properly care for patients in the Kenyan practice

setting. Based on course assessments, students were more prepared to assist with caring for patients in their new environment because they had received training on the common disease states, medications, and resource limitations encountered.

The need for disease-state management education is evident in the poor performance for this category of items on the pre-course assessment (44.6%). This finding was expected, as the students had learned little about these specific disease states and treatment regimens prior to this course and, therefore, had more knowledge to gain by taking the course. Other programs focus solely on culture and travel preparation with the belief that students who know how to manage patients in the United States or where their pharmacy training takes place are ready to practice globally. However, resource-constrained settings frequently do not use the same medications or approach to caring for their patients as in a typical US-based practice. Without proper training in disease-state management in resource-constrained settings, students face challenges and often struggle during their APPE, which impacts their credibility as part of the healthcare team. Without this training, students are prone to recommend medications not available in this setting and to not fully understand the impact of cost on treatment decisions.

While the course has received positive feedback, there were some limitations, 1 of which is the use of taped lectures. Originally, taped lectures were used to incorporate Kenyan practitioners in the course while controlling for the time zone differences and unpredictable reliability of technology and the Internet. While feedback received from the final class evaluations about them was favorable, it would be beneficial if students were able to ask the lecturers questions, which was not possible with the use of taped lectures. In the future, Skype (Microsoft Corporation, Luxembourg City, Luxembourg) technology will be used for the Kenyan-based lecturers to allow for more interactive in-class discussion.

Another limitation was the size of the groups when faculty members facilitated small-group discussions during class. The class was divided into 2 groups of approximately 10-12 students each because there were only 2 faculty members available for this exercise. Unfortunately,

Table 2. 2012 Changes from Pre- to Post-Course Assessment Based on Course Content Areas, N=24<sup>a</sup>

Assessment Item Category	Average Pre-Course Assessment Score, %	Average Post-Course Assessment Score, %	Average Score Improvement, %
Travel preparation (n=4)	81.3	97.9	17.3
Culture (n=11)	53.8	81.8	34.2
Disease state management (n=19)	44.6	81.6	45.3

<sup>a</sup> Number of students assessed in 2011.

Table 3. Evaluation Summary for Elective Pharmaceutical Care Course to Prepare Students for an APPE in Kenya, 2004-2012

<b>Course Evaluation Item</b>	<b>2004 n=12</b>	<b>2005 n=23</b>	<b>2006 n=29</b>	<b>2007 n=25</b>	<b>2008 n= 19</b>	<b>2009 n=13</b>	<b>2010 n=13</b>	<b>2011 n=18</b>	<b>2012 n=15</b>	<b>Mean ± SD</b>
I understand what is expected of me in this course.	4.6	4.7	4.7	4.3	4.2	4.5	4.5	4.0	4.3	4.4
Course requirements are clear.	4.6	4.6	4.7	4.2	4.3	4.4	4.5	4.1	4.3	4.4
Lecture information in highly relevant to course objectives.	4.6	4.7	4.7	4.3	4.2	4.5	4.7	4.0	4.5	4.5
Course projects increase my understanding of concepts and principles.	4.6	4.3	4.5	4.3	4.3	4.5	4.5	4.2	4.4	4.4
The practical application of subject matter is apparent.	4.6	4.6	4.7	4.4	4.4	4.8	4.5	4.3	4.5	4.5
The teaching strategy used in this course is appropriate.	4.6	4.4	4.4	4.3	4.2	4.5	4.5	3.7	4.2	4.3
Class discussion is kept on track and moving forward.	4.8	4.2	4.2	4.1	4.1	4.1	4.1	4.1	4.0	4.2
One real strength of this course is the classroom discussion.	4.9	4.4	4.2	3.8	4.2	4.3	4.8	4.3	4.5	4.4
There is an appropriate mix of lecture and discussions in this class.	4.9	4.4	4.3	4.0	4.3	4.5	4.5	4.3	4.5	4.4
Handouts are valuable supplements to this course.	4.8	4.5	4.6	4.3	4.4	4.5	4.6	4.0	4.0	4.4
Course assignments are interesting and stimulating.	4.8	4.1	4.3	3.9	4.2	4.5	4.3	4.1	4.3	4.3
I receive appropriate and timely feedback on assignments.	4.5	3.9	4.6	4.1	4.1	4.4	4.4	4.1	3.8	4.2
I understand the method of evaluation used to grade my work.	4.6	4.1	4.4	4.1	4.2	4.4	4.5	3.9	4.3	4.3
An atmosphere where ideas can be exchanged freely and easily was created.	4.9	4.7	4.6	4.4	4.4	4.5	4.7	4.5	4.7	4.6
Each student is encouraged to contribute to class learning.	4.5	4.6	4.5	4.2	4.3	4.4	4.2	4.3	4.5	4.4
The workload is appropriate for the goals in this course.	4.3	3.8	4.3	3.5	4.2	4.6	4.5	4.1	3.5	4.1

(Continued)

Table 3. (Continued)

Course Evaluation Item	2004 n=12	2005 n=23	2006 n=29	2007 n=25	2008 n= 19	2009 n=13	2010 n=13	2011 n=18	2012 n=15	Mean ± SD
Interacting with other students in my class helps me learn.	4.6	4.4	4.5	4.1	4.4	4.3	4.6	4.6	4.7	4.5
I learned new ways to think about issues dealt with in this class.	4.6	4.3	4.6	4.2	4.1	4.3	4.3	4.2	4.3	4.3
This course broadened my understanding of people from different cultural and ethnic backgrounds.	4.5	4.4	4.6	4.3	4.4	4.5	4.4	4.4	4.6	4.5

Note: Scores based on response scale on which 1=strongly agree; 2=agree; 3 neutral; 4=disagree; 5=strongly disagree

there were not enough qualified facilitators with knowledge about Kenya to allow for smaller groups. As the program grows and the number of interested students increases, the instructional methods will also need to be revisited because the current arrangement would not be suitable for a larger number of participants.

This 2-credit elective was time-intensive and demanding. Although increasing the credits offered to 3 has been discussed, it is not an option at this time because Purdue University College of Pharmacy is changing the structure of its curriculum. Finally, if additional international APPE sites were to be added, course revisions would be needed to incorporate learning activities specific to these sites. Although much of the content on disease states would still be applicable because of the prevalence of certain disease states in resource-constrained countries, educational lectures on disease states may require updating to add relevant content not currently presented. Expansion of the elective would be possible if additional faculty members could provide oversight during case discussions so that cases specific to the practice site could be used. Content related to culture and local travel preparation would need to be revised but may be suitable to breakout sessions or small groups, if an adequate number of facilitators were available.

Given that there is a lack of literature discussing courses to prepare students for international APPEs, this course could serve as a model for other colleges and schools of pharmacy interested in offering international experiences for students. While international APPEs are offered within pharmacy college and school curricula, there is only 1 other example of a similar course or elective model in the literature.<sup>15</sup> More literature documentation about international APPEs and accompanying coursework and orientation is needed.

In order to draw broader conclusions about international experiences, a better understanding of the variety

of experiences offered by pharmacy colleges and schools, length of the practice experiences, and amount of faculty supervision would be beneficial. The Purdue University College of Pharmacy course and the APPE can serve as a model for other institutions looking to develop international training and experiential opportunities. The key components of this model that would be essential if it were to be replicated include a detailed preparatory course that would include disease state education appropriate for the practice site and adequate assessment to ensure adequate student preparation for active participation in an international practice setting.

## SUMMARY

Through participation in this unique course, students were prepared for the Purdue Kenya Program APPE in Eldoret, Kenya. This course focused not only on cultural awareness and travel preparation but also on acclimating the student pharmacist to disease state management in a resource-constrained setting. Based on the assessment results, comprehensive training and education are necessary to prepare student pharmacists for a global health APPE.

## ACKNOWLEDGEMENTS

The authors thank Julie Everett, PharmD, James Fuller, PharmD, and Laura J. Holtz, PharmD, for assisting with the course development; Kim Plake, PhD, for assisting with the manuscript; and our Kenyan colleagues for their contributions to the course.

The AMPATH Partnership is supported in part by a grant from the United States Agency for International Development as part of the President's Emergency Plan for AIDS Relief.

Funding was provided through a Learning Outcomes Assessment Grant from the Purdue University Center for Instructional Excellence.

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Appendix 1. Course Activities and Grading in an Elective Pharmaceutical Care Course to Prepare Pharmacy Students for an APPE in Kenya

Topic	Lecture	Discussion	Care Plan	Assignment	Quiz
Disease State					
Formulary management and calculations		X		X	
Introduction to SI units/calculating CrCl	X				
Medication monitoring	X				
Rheumatic heart disease				X	
Malaria	X	X	X		X
Tuberculosis	X	X	X		X
Typhoid <sup>a</sup>		X	X	X	
HIV with minimal resistance	X				
Opportunistic infections	X	X	X		X
Maternal child health	X				
Diabetes care in Kenya	X				
Culture					
<i>Walking Together, Walking Far</i> by Fran Quigley		X		X	
Program video/documentary	X				
Reflective thoughts on Kenya		X		X	
Pharmacy practice in Kenya	X				
Medication compliance <sup>b</sup>		X		X	
Travel					
International programs/study abroad guest speaker	X				
International travel preparation	X				
Local travel education	X				
APPE preparation	X				
General topics					
Financial aid guest speaker	X				
APPE preparation and policy/procedure Review	X				
Service Learning grant application				X	
Deleted activities					
Healthcare considerations in black patients <sup>c</sup>	X				
Helminths and parasites <sup>c</sup>	X				
Journal club				X	
Topic presentations				X	
Global travel advice		X		X	
Malnutrition	X				

Abbreviations: APPE=advanced pharmacy practice experience; SI=standard international; CrCl=creatinine clearance; HIV=human immunodeficiency virus.

<sup>a</sup> Previously associated with lecture and quiz but modified to an out-of-class reading.

<sup>b</sup> Activity coupled with the HIV lectures to reinforce the lecture material.

<sup>c</sup> Topic deleted based on student feedback and need for more discussion time.