SPECIAL ARTICLES

Caring for the Underserved: Exemplars in Teaching

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The objective was to identify exemplars in teaching pharmacy students awareness, knowledge, and the skills needed to provide care and services to the underserved. A call for exemplars was sent out in spring 2007. A subcommittee of the AACP Task Force on Caring for the Underserved reviewed all applications received. The 3 best exemplars for teaching pharmacy students the awareness, attitudes, knowledge, and skills needed to care for the underserved were selected and are described in this manuscript. Included are 1 didactic, 1 experiential, and 1 international experience. These exemplars in educating students on working with the underserved provide schools with models which could be adapted to fit individual programmatic curricular needs.

Keywords: curriculum development, underserved

INTRODUCTION

Underserved patients are “those who face barriers to timely access to health care services which provide the best possible health outcomes.”¹ In the United States, underserved populations include ethnic minorities, women, children, the elderly, low-income groups, rural residents, and those with special health care needs. These groups are vulnerable to experiencing health *disparities* or differences in the quality of care resulting in poorer health outcomes.

The Institute of Medicine (IOM) cited development of interdisciplinary health professions curricula to address social, cultural, and other factors that impact patient care and health care outcomes as a strategy for elimination of health disparities in the United States.² In acknowledgement of the pharmacist’s role in eliminating health disparities, the most recent accreditation standards and guidelines for pharmacy education reflect the imperative for introducing students to working with and effectively caring for underserved patients by mandating inclusion of content related to cultural competence in the curriculum.³ Such content should be woven longitudinally throughout the curriculum in both didactic and experiential learning

environments in order to allow students to develop and apply the awareness, attitudes, knowledge, and skills needed to meet the needs of all patients.⁴

Despite these recent mandates for pharmacy education, resources to assist schools in developing, implementing, and assessing content related to working with the underserved remain scarce. In order to fill this need, the American Association of Colleges of Pharmacy (AACP) convened a task force to develop a resource to assist schools. The task force consisted of faculty members at different colleges and schools of pharmacy in the United States who have experience in providing care for underserved patients. Together its members developed a curriculum framework that describes evidence-based practice, clinical prevention and health promotion, health systems and policy, and community aspects of practice in caring for underserved populations.⁵ The task force also published a paper to aid schools and colleges of pharmacy in developing programs to train pharmacy students in the care of the underserved.⁶ This paper represents the task force’s endeavor in identifying and disseminating exemplars of pharmacy student teaching in both classroom and experiential settings in the care of the underserved.

RECRUITMENT AND SELECTION

In 2007, a call went out to faculty at schools and colleges of pharmacy who might be interested in submitting an example of their work with students in providing

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care to the underserved. Thirteen faculty members from 10 colleges of pharmacy submitted 1 or more applications (Table 1). The submissions included student experiences in 3 settings: didactic, experiential, and international. A subcommittee of the AACP Task Force on Caring for the Underserved developed selection criteria, reviewed the applications, reached consensus on their independent rankings and selected exemplars for inclusion in this manuscript. Faculty members of the selected exemplars were invited to submit a description of their course, including learning objectives, content, and student assessment, and to describe and discuss successes and challenges faced to date. The following section describes each of the 3 selected exemplars.

TEACHING PHARMACY STUDENTS TO CARE FOR THE UNDERSERVED

Didactic Learning: An Elective Course in the Professional Curriculum

Course description. Diminishing Health Disparities Through Cultural Competence was a third-year elective course offered at the University of Minnesota College of Pharmacy on both the Twin Cities and Duluth campuses via interactive television. This 2-credit, seminar-based course examined various dynamics of health disparities and cultural competencies utilizing a sociological framework. The racial and ethnic disparities among underserved and underrepresented groups in the United States (Asian, African, Hispanic, American Indian) compared to Caucasians were explored. The effects of history, health beliefs, and practices on minority health were also addressed. Emphasis was placed on conceptual frameworks and strategies that foster cultural competence and sensitivity (focusing on attitude, knowledge, and skill acquisition) as a basis to alleviate health disparities.

Table 1. Exemplar Submissions (N=12)

Educator	Institution
Judy Chen	Purdue University
Sharon Conner ^a	University of Pittsburgh
John Conry	St. John's University
Patti Darbishire ^a	Purdue University
Laura Hall	Ohio State University
Seema Patel	University of Illinois, Chicago
Brooke Patterson	University of Missouri-Kansas City
Kim Plake	Purdue University
Ann Ryan-Haddad ^a	Creighton University
Doneka Scott	University of Minnesota
Hazel Seaba	University of Iowa
Laura Shane-McWhorter	University of Utah
Jennifer Tillman ^a	Creighton University

^aSubmitted more than 1 exemplar application

The class met once weekly for 1 hour, 50 minutes. A course director on each campus was present for each class session. At least once per semester, the directors traveled to the other campus to facilitate lectures. Class size was capped at 10 students per campus.

Course objectives. The overarching goals of the course were (1) to provide an opportunity for intellectual dialogue and analytical engagement on major health disparities among cultural, ethnic, and socially disadvantaged groups in the United States; and (2) to develop strategies to foster cultural competence when interacting with diverse groups. These goals were supported with a set of learning objectives (Table 2) vis-à-vis the course content. Since communication was paramount to providing optimal patient care and played a pivotal role in intercultural interactions, the course provided students with opportunities to enhance their written and oral abilities. The course was also structured to further develop skills outlined in the College's general ability-based educational outcomes, which included competencies in thinking, formulating values, ethical decision making, social and contextual awareness, social interaction, and self-learning abilities.

Course content. The course was divided into 2 sections: Introduction to Health Disparities and Introduction to Cultural Competence. The case to eliminate health disparities underscores the importance of becoming culturally competent. The course explored the following issues: conceptualizing race, culture, and ethnicity in

Table 2. Seminar Course Objectives

Define culture, race and ethnicity
Describe the nature and extent of health disparities that exist in US between Caucasian Americans and Non-Caucasian Americans and immigrants
Discuss and reflect on one's individual worldview (including personal stereotyped thinking, common prejudices, and ethnocentrism) and own cultural attitudes/beliefs regarding cross-cultural interactions
Describe the social-historic antecedents of distrust of health care in some groups
Identify the levels of care (individual, social, cultural, and environmental) that contribute to competent appropriate health care
Summarize the National Standards for Culturally and Linguistically Appropriate Services (CLAS) in Health Care and Title VI of the Civil Rights Act of 1964
Describe the need for cultural competence in pharmacy practice
Recognize how cultural health beliefs can be a resource for health and healing and their effects on conventional western treatments and pharmaceutical care

health; historical foundations in race, ethnicity, and health; epidemiology of health disparities; etiology of health status; health care practitioners' and health systems' impact on health disparities; assessing one's own worldview; communication techniques and approaches to culturally appropriate behavioral changes; cultural and linguistic competence, including health literacy; international health and medicine; and disability, ethnogeriatric, and religious competence. (A table illustrating the links between course content with the AACP Curriculum Framework educational outcomes is available upon request from the corresponding author.)

Required course materials consisted of a textbook⁷ and a course pack containing relevant articles from pharmacy, medicine, nursing, and public health literature. Active-learning strategies employed in the classroom included case-based discussions, role play, in-class free writing exercises, scenarios, presentations, and small-group assignments. Multimedia such as film and online education were used to accommodate diverse learning styles. Guest facilitators, such as interpreters, other health care practitioners, and community leaders led discussions. The course concluded with a cultural potluck dinner in which students brought a dish representing their own culture or one studied during the semester. At the dinner, students filled out a postcard documenting ways they planned to provide culturally competent care. These postcards were mailed to students during their fourth-year experiential training to remind them of their commitment.

Assignments. Student assignments included reflections, a cultural activity, debates, and a final presentation. Reflection was a critical component of professional and personal growth. Students wrote a review of the assigned readings twice during the semester (after each respective section) to facilitate synthesis of and reflection on the conceptual models provided in the readings. The review included (1) critical analysis of the most important themes, logic, and evidence in the readings from each respective section, (2) a discussion of a theme that resonated with them as the reader, (3) a discussion addressing how they would incorporate this newly acquired knowledge into their practice, and (4) a discussion of material they would like to further investigate.

To gain insight into and experience with the traditions of a culture different from their own, students attended and actively participated in a non-Western cultural/ethnic public event at the University, Twin Cities, Duluth, or surrounding areas. Prior to attending, the student had to research the history of the event to gain conversational knowledge of it. They also interviewed another participant (from the cultural group) to gain additional insights regarding the event and its relevance to the culture as well

as the interviewee. Upon completion of the experience, the students wrote a letter addressed to their "aunt" (a retired English composition professor), who was not familiar with this event or culture. In the letter, an event summary was provided, including a brief history, a description of their participation, and reactions/reflections before, during, and after the event. Their experience was then shared during a class session.

Students also engaged in formal classroom debates to advance their critical thinking, literature searching, oral and written communication skills, and their ability to civilly yet assertively discuss different perspectives on controversial issues. Topics included drug importation, pharmacists' conscience clause, interpreter services, and patient-practitioner concordance. After completion of their debates, students wrote a mock article for the University student newspaper highlighting the affirmative and negative arguments proffered during the debate.

As a mock platform presentation given at a national association meeting, the students presented a defined community and a major health disparity issue in that community. Barriers and challenges to optimal health status and care were delineated. Available programs addressing the health disparity were also highlighted. Each presentation was peer-reviewed and feedback was provided to the student.

Assessment. All assignments were uploaded to the course site on WebVista. Both instructors had access to uploaded material, simplifying the distribution and grading process between campuses. Students' knowledge acquisition was assessed in several ways. Students took a multiple-choice and short answer test prior to beginning the course and a multiple-choice and short answer test upon completion of the course. The test consisted of questions on cultural norms and disparities in health for non-majority groups, health literacy, and historical aspects of health care. Class discussion, writing assignments and oral presentations also served to assess knowledge. Since the success of this course and the learning process depended on the presence and meaningful contributions from all class participants, including instructors, participation comprised 25% of the grade.

Students completed anonymous weekly online evaluations using SurveyMonkey (SurveyMonkey.com, Portland, OR), which dynamically shaped the course throughout the semester. A final course evaluation was completed at the end of the course which included an overall assessment of the course, the instructors, and the guest facilitators.

Successes. The class was offered twice, with 12 students completing the course. This class provided an opportunity for all participants to co-construct an

environment that allowed freedom in discussions, regardless of differences in experiences, values, or perspectives, and minimized the effect that interactive television could potentially have on group discussions. This was accomplished by setting ground rules at the onset that were developed and agreed upon by the entire class. A safe haven was created to support thoughtful and nonjudgmental dialogue. Students consistently came to class prepared for thoughtful discussion of the assigned weekly readings. Their critical thinking skills and depth of reflections continuously improved throughout the semester. One student asserted that, “[his] attendance at the [cultural event] gave [him] an appreciation of how other cultures feel when they are subjected to the majority’s behaviors or preferences. . .[he is] better equipped to go out into the community and learn even more about other cultures.” He further stated that “before being introduced to [issues discussed in class], [he] would have approached situations without gathering the appropriate information needed to understand an individual’s needs.”

Examples of student course evaluation comments included that the course would “have a strong impact on them as future pharmacists,” “should be a requirement for all pharmacy students,” and was “the best class that I have ever taken.” Finally, the instructors were able to engage community partners in the course, which may positively impact institutional-community relations.

Remaining challenges. Since many students had not previously experienced a discussion-based seminar, one challenge was orienting students to this course format. Compared to other pharmacy courses, the seminar was reading-and-writing intensive and there were no graded examinations. To be successful and maximize learning, it was imperative that students read all of the weekly course material and focus not on factual memorization, but on synthesizing and reflecting on the material. Another challenge was helping students understand that reflection was a critical component of professional and personal growth and not just “busy work.” Two curricular challenges existed. First, the class was offered at a time that conflicted with one of 2 sections in a required pharmaceutical laboratory course for Duluth students, which precluded some interested students from registering for the course. In those instances, enrolling in the alternate section was not a viable option. Also, there remained a need to shift from an elective to a required course or incorporate the course content throughout the curriculum. In many colleges and schools of pharmacy, the core curriculum is already rigorous and at capacity. This issue was scheduled to be addressed in a future curriculum revision.

Future innovative changes planned for the course included offering the course to other health profession stu-

dents; adding a service learning component in which the students could apply their newly acquired skills to improve health in the local community; and utilizing simulated patients to assess clinical skill performance.

Experiential Learning: An Advanced Pharmacy Practice Experience

Course description. The Advanced Pharmacy Practice Experience (APPE) at Tippecanoe Community Health Clinic (TCHC) was an 8-week required ambulatory care experience offered to pharmacy students in their fourth professional year. At the time of writing, TCHC was the only Federally Qualified Health Center (FQHC) located in the rural Greater Lafayette, Indiana area. Annually, this nonprofit clinic served as a safety net for more than 9,000 medically underserved patients, special populations, and the uninsured. Patient ethnic demographics included Caucasians (over 50%), Hispanics (25%), African Americans (9%), and Asians (6%). Approximately 70% of the patients served had incomes below 100% of the federal poverty level, more than 50% received Medicaid or other government assistance, and 40% were uninsured. Coordinated primary healthcare services were provided to all age groups through 4 subclinics: adult medicine, women’s health, pediatrics, and dental. Specialized services included pharmacotherapy referral, nutrition counseling, smoking cessation, telephone triage, medication assistance, health referral, and homeless outreach.

Student assignment to the APPE depended on professional interests and geographic location. The experience emphasized providing quality patient-centered care to the underserved population in a primary care setting. The student-to-preceptor ratio was generally 2:1. Activities developed at TCHC were designed to enhance students’ understanding of pharmacotherapy for a variety of disease states relating to caring and management of underserved patients.

Course objectives. The goals of this clinical APPE included: (1) strengthening verbal and written communication skills; (2) developing skills in the provision of pharmaceutical care; (3) applying didactic knowledge to patient care; (4) managing and monitoring drug therapy; (5) refining problem-solving skills; (6) developing critical thinking skills; and (7) developing competency in pharmacy practice with the underserved. Specific clinical experience objectives are listed in Table 3.

Course content. The Pharmacotherapy Referral Program at TCHC was established by a faculty preceptor to assist patients with medication-related issues and provide chronic disease management. Primary care physicians, nurses, and allied health care providers requested consults

Table 3. APPE Objectives at Tippecanoe Community Health Clinic

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1. Describe the philosophy of clinical pharmacy practice, emphasizing its application to caring for the underserved patients in a multidisciplinary ambulatory care environment.
 2. Obtain, organize, and assess patients' medication profiles for potential medication-related problems:
 - Untreated indication, drug use without indication
 - Inappropriately prescribed drugs, dosages, frequency of administration
 - Drug-drug, drug-disease, drug-food, and drug-lab interactions
 - Contraindications for drug therapy
 - Adverse drug reactions
 - Compliance, accessibility and affordability
 - Need for alternative or additional therapies to optimize care
 3. Integrate information to design, recommend, implement, monitor and evaluate patient specific pharmacotherapeutic regimens to prevent or resolve medication-related problems in underserved populations.
 4. Assess patient medication adherence and develop strategies for improving adherence in underserved patients.
 5. Develop a level of comfort in interacting with other healthcare providers and an appreciation of the roles of the various members of the healthcare team.
 6. Advise physicians and other healthcare professionals on appropriate drug therapy based on clinical efficacy, safety, availability, ease of administration and cost-effective prescribing.
 7. Demonstrate effective communication skills with underserved patients in interviews and educational sessions.
 8. Demonstrate effective communication skills with healthcare professionals in written and verbal format.
 9. Respond to information requests from patients and healthcare professionals through appropriate drug literature retrieval, evaluation, interpretation, and clinical application.
 10. Demonstrate medication history taking skills, medication reconciliation skills, and physical assessment skills.
 11. List 3 challenges and rewards of caring for the underserved population.
 12. Identify the role of pharmacists in addressing health disparities.
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and referred patients to the program. Under the supervision of a faculty preceptor, all students undertook the responsibilities of a primary care pharmacist, providing comprehensive clinical services, and were accountable for their patients' medication therapies and outcomes. Services provided included but were not limited to patient education, physical assessment, initiation, modification, monitoring, and evaluation of drug therapies, and contributions to medication-related policies and programs. Multiple direct patient interactions provided abundant opportunities for students to develop patient care skills, cultivate patient trust, refine counseling techniques, promote continuity of care, and foster positive relationships with the clinic staff members. In addition, students worked side-by side and collaborated with a primary care provider and nursing staff to recommend appropriate patient-specific drug therapy 2 half days per week. This allowed students to establish themselves as the primary pharmacy resource for the team. All students contributed to educational (eg, in-service presentation and pharmacy newsletter) and clinical services. (A table linking APPE activities to the AACP Curriculum Framework educational outcomes is available upon request from the corresponding author.)

Another unique feature of this course was the Patient Empathy Modeling exercises. Students were asked to

“live the life” of an underserved patient with multiple chronic diseases while coping with an economic (homeless), cultural (Hispanic), or communication (illiterate or hearing-impaired) barrier for 10 days.⁸ This Patient Empathy Modeling pedagogy was designed to sensitize pharmacy students to the issues faced by the underserved and enhance students' humanistic attitudes in caring for underserved patients.

Assessment. Utilizing a scoring rubric for the mid- and summative rotation assessments, student performances were evaluated on 3 main components: (1) professional work habits and abilities; (2) clinical knowledge, judgment, and management; and (3) drug information and oral-written communication skills. Specific forms were used to evaluate assigned projects and presentations. As students completed required chart reviews before patient visits and provided proactive recommendations, frequent clinical discussions on patient cases served as a mechanism to assess students' ability to retrieve and present relevant information, critically evaluate drug therapies, identify drug-related issues, and formulate evidence-based therapeutic plans.

Successful delivery of patient-centered care required students to learn how to interact with diverse patients effectively. As each student worked alongside the faculty preceptor during patient encounters, their abilities

to integrate clinical knowledge and skills were ultimately assessed through patients' feedback, comprehension, and response to determine evidence of clinical and cultural competence in delivering patient-centered care. Formative assessments were provided to students throughout the APPE. At the end of the rotation, students completed a final written assignment in which they reflected on their overall learning and perceptions of caring for the underserved patients.

Successes. Although students gained therapeutic knowledge, clinical skills, and confidence during the APPE, one of the most valuable aspects of student learning was their ability to tailor healthcare delivery to meet individual patient needs and formulate patient-specific drug therapy recommendations when optimizing care for diverse and unique individual patients. As students developed a sincere understanding of patient's circumstances, they left the APPE with new perspectives and their preconceived notions regarding the underserved dispelled. One student conveyed in the final reflection paper, "I had some struggles at the beginning of the rotation when I walked into a consultation room and the patient had body odor, dirty clothes, and poor hygiene. However, by the end of the rotation it seemed like I did not notice these things anymore. Instead of looking at the outward appearance, I started seeing the patient as somebody who needed my compassion and professional advice." This type of change in attitude was important since genuine concern and sensitivity toward the underserved will be needed in future pharmacists if health disparities are to be alleviated.

Successful student learning required consistent supervision and strong mentoring from preceptors during the clinical APPE. These components were critical in this unique practice environment because many students are not comfortable with caring for the underserved, a population that is often negatively portrayed by the general public. Sufficient patient encounter time was crucial for students to personally interact and build a trusting relationship with their patients that encompassed listening, understanding, and appreciating patients' individual backgrounds. Fostering the pharmacist-patient relationship helped students recognize and acknowledge the uniqueness and humanity of each patient. Through this mutually beneficial relationship, medically underserved patients gained access to quality healthcare and pharmacy students gained valuable insights into patient care while they experienced the endless rewards that caring for the underserved offers.

Remaining challenges. Although limited manpower and resources, lack of access, and psychosocial barriers will remain challenges for all healthcare professionals in

caring for the underserved, one major barrier arises from the societal stereotype of this underprivileged and underserved population. Based on the faculty members' unpublished findings prior to starting the APPE, many students had limited understanding of the underserved and thus had developed negative misconceptions. These misperceptions may have negatively affected students' desire to work with underserved populations and may have compromised the quality of healthcare delivery. Overcoming these prejudices and cultivating the desire and ability to provide quality care requires a team effort from pharmacy colleges and schools and educators. To maximize the impact of APPEs such as this, colleges and schools would benefit from longitudinally implementing and integrating related content early in the curriculum (eg, didactic and laboratory courses, introductory pharmacy practice experiences) in order to spark students' interests and enhance understanding of the underserved. Early, mentored, direct patient exposure will not only promote student awareness, attitudes, and knowledge about underserved populations, but also provide critical care and services to these patients.

Learning Across Borders: An International Experience

Course description. A University of Iowa Service Learning Institute spawned a collaboration among faculty members in engineering, writing, and pharmacy that led to the creation of International Perspectives: Xicotepec, the University's first international service-learning course. The 2 semester-hour course was designed to introduce multidisciplinary students to the benefits, challenges, and logistics of partnering with nonprofit organizations and community members to provide service in a community in a less developed country. In collaboration with International District 6000 and Xicotepec Rotary members, students developed discipline-specific projects aimed at addressing community identified health, social service, and environmental needs in Xicotepec, Mexico. These needs have been previously identified by the Xicotepec Rotary group.

The course was coordinated by 3 instructors, each representing one of the 3 disciplines, and was given over over 9 consecutive weeks. It included 7 weeks of didactic coursework and project design, 1 week onsite in Xicotepec executing the projects, and 1 week preparing and delivering a final report and public presentation. For spring 2007, the cost of the trip per individual was \$1000. Students were informed of the costs associated with the course upon enrollment. Iowa Rotarians arranged all the travel, housing, and meals for instructors and students. Individual instructor travel-related expenses were

Table 4. International Service-Learning Course Objectives

Describe the process by which Rotary International established the Xicotepec Project: commitment, funding, needs assessment, sustainability.
Collaborate to construct a fact book (portfolio) for Xicotepec and the various projects.
Understand the concept and goals of reflection and systematically apply reflection to this learning and service experience.
Interpret the tenets of professional behavior in the Xicotepec environment and apply them appropriately.
Exhibit best practices for teamwork and team writing.
Collaborate with Rotary International and Xicotepecians to construct a plan to achieve profession-specific goals for a team project.
Work with Rotarians and local people to execute the plan in Xicotepec.
Analyze the delivery, value, and sustainability of the plan.
Recommend future directions for the project.
Deliver a descriptive, evaluative, and reflective presentation following the experience in Mexico.

covered to various extents through the University of Iowa International Programs, individual discretionary faculty funds, and personal funds. While students were not guaranteed funding support, course coordinators set a goal of identifying funding for all but \$200 of a student's expenses. In 2007, the goal was achieved by tapping into the University of Iowa international programs and student government funds, Rotary International funds, and each instructor's faculty discretionary funds.

Through the course and experiences in Xicotepec, students developed an appreciation for the role of international service, enhanced their knowledge and understanding of their primary disciplines, and prepared culturally and professionally for effective teamwork in an international environment. Reflection assignments/exercises enhanced the knowledge and skills students gained and applied during the service project in Xicotepec.

Course objectives. The overall goal was to prepare students to successfully function in a profession-specific manner in a less-developed country. Common course objectives for all students are listed in Table 4.

Course content. During the first 7 weeks, the class met for 2 hours each week. The first hour was spent discussing a variety of scheduled topics that defined expectations, prepared students for the trip, and promoted maintenance of the University of Iowa-Xicotepec Rotary relationship. (A table linking course content and activities to the AACCP Curriculum Framework educational outcomes is available upon request from the corresponding author.)

In the second hour of class, students separated into their discipline-specific teams: engineers, pharmacists, writers. Instructors in each discipline presented and led discussions on topics relevant to their student group's project. A medication management project identified by the Xicotepec Rotarians as highly valuable to their community was school-based deworming for preschool and elementary school children. The prevalence of intestinal worms in Xicotepec children was estimated by local

health care professionals to range between 27% to 90%. Deworming in schools was an important public health activity and considered safe and effective by the World Health Organization (WHO).⁹

This project presented specific medication therapy management challenges, including identification of the drug of choice, selecting the most appropriate source, ensuring drug quality, determining the logistics of drug procurement and administration, and documentation of both administration and the intervention experience. Using information available from the WHO, the World Bank, and the literature, the students selected albendazole, 400 mg, single dose, over mebendazole.¹⁰⁻¹¹ Both drugs are highly effective against ascariasis (roundworm). Albendazole is more effective for hookworm (*Necator* and *Ancylostoma*) infections, while trichuriasis (whipworm) may require multiple doses of either medication. Albendazole is also better absorbed than mebendazole. Multiple sources of a generic preparation were identified for use outside the United States. The students decided to purchase albendazole, 400 mg, chewable tablets from Cipla Ltd, a prequalified manufacturer with WHO inspection reports, based on cost and the provision of a certificate of analysis.¹¹

The portion of the course spent onsite also raised spontaneous challenges and learning opportunities for the student teams. The community requested an additional intervention from the pharmacy group, fluoride application for the children's teeth, in conjunction with the deworming. Additionally, the pharmacy students served as the medical information resource for over 40 travelers in the group.

Assessment. Each course instructor developed their own student assessment and discipline-specific grading rubrics. The pharmacy students were assessed in 4 domains: (1) participation (20%), (2) reflection (20%), (3) written final report (40%) and (4) platform presentation (20%). Participation was objectively determined by direct instructor observation of individual student contri-

bution to the group project and interaction in group work. Activities included weekly individual performance reflections and 3 individual critical incident reflections of the Xicotepec experiences. Following the week in Mexico, the student teams composed a group reflection. The final written report described the project, documented its outcome, and provided recommendations for future trips. Each group's platform presentation consisted of a slide presentation documenting the projects, outcomes, and impact on the students' professional and personal lives and was delivered through a program held for District 6000 Rotarians, friends and family of the travelers, university administrative officials from each college, and representatives from the International Programs and Provost's Offices.

The students evaluated the course and its instructors using standard university course evaluation survey instruments. Written reflections and discussions with faculty members and Rotary District 6000 members after the trip provided additional information regarding the impact and efficacy of course logistics and experiences. Additional feedback from the Xicotepec Rotary Club was solicited by District 6000 and relayed directly to course instructors and students.

Successes. International Perspectives: Xicotepec was founded on the philosophy that the course should provide collaborative service, reflect provision of self-identified community needs and be sustainable. In the year following its first offering, the course became a highly visible and unique example of interdisciplinary internationalization of the curriculum at the University. Overall, it has been a resounding success for all partners – students, faculty members, the University, Rotary International, and the Xicotepecians.

Five pharmacy, 6 engineering, and 5 writing students participated in the first course offering. One of the 5 pharmacy students graduated in spring 2007. As further evidence of the personal and professional growth obtained through the course, the remaining 4 students chose to participate in international APPEs. One student, a PharmD-MPH joint degree candidate, will do an MPH practicum in Xicotepec. Individual students were approached and asked to present their Xicotepec experience in several academic and non-academic venues. The impact of the course on students is reflected in these comments from the 2007 pharmacy team:

The experience of the Xicotepec Project has allowed us to be comfortable dealing with patients who come from different cultural and socioeconomic backgrounds as well as communicate using a different language. In response to this language difference, we were able to improve our Spanish skills which will certainly benefit

us in communicating with our future patients. Perhaps the greatest professional advantage of this experience was the opportunity to interact with real patients in a non-scripted, uncontrolled environment. We were forced to adapt our plans, problem solve and make decisions without the luxury of lengthy deliberation. As future pharmacists, these skills will prove invaluable to our clinical judgment and management capabilities.

Through the course experience, the pharmacy students successfully functioned in a profession-specific manner in a less-developed county. During the 2007 trip, approximately 2000 preschool and elementary school children were dewormed. As proof of the perceived beneficial value of the project, the Xicotepec public health officials requested that students provide the deworming service annually.

Rotary International District 6000 members believed their partnership with the University of Iowa and the Xicotepec Rotary Club was a scalable model for other Rotary clubs. The Xicotepec collaboration has been highlighted at state, national, and international Rotary meetings.

The overall success of the course itself was also demonstrated by the interest it attracted from other disciplines on campus. The spring 2008 trip included a nursing faculty member and an education faculty member who participated to identify roles for their students for the 2009 course. Spanish language students will also participate in the 2009 course. The experiences of the original instructors allowed them to provide structure and support to new faculty members as they became involved in the course.

Finally, the projects offered expanded opportunities for collaboration with faculty members in other disciplines. The course experiences and projects also offered the potential for future international community-based research and scholarship for faculty members and students.

Remaining challenges. As the first course offering unfolded, instructors identified several content and pedagogy-related issues to be addressed in subsequent courses. Due to perceived time constraints for covering common course content, future offerings were a full semester (16 weeks) and increased to 3 credit hours. The extended length allowed students additional time for group reflections and processing recommendations for future course offerings and trips. Serious logistical challenges encountered during actual travel (ie, supplies confiscated by Mexican customs), offered opportunities for students to problem solve, cooperate, and develop leadership skills.

The 2008 goal for the pharmacy project was to reach 3000 children. Over 3100 were dewormed. Unfortunately the University's 2008 spring break coincided with Holy Week in Mexico. Rotary scheduled the trip for the week

prior to spring break, when first- through third-year pharmacy students were in class. Therefore, only fourth-year students who could take the course as an APPE participated in the trip for 2008. Two fourth-year students enrolled in the 2008 course offering as an APPE. In the future, the trip will be arranged to avoid scheduling conflicts.

The pharmacy students also identified additional challenges encountered during project rollout to be considered in the future. Linking the pharmacy team with teeth fluoridation was deemed an inefficient use of time. The unexpected extent of cavity presence in the children's teeth raised questions about the public health value of fluoride application. Students observed that a significant number of children had trouble chewing the albendazole tablets. The tablets adhered to dental caries and crevices, making it difficult to apply the fluoride. For future course offerings, pharmacy projects will concentrate on deworming and other specific medication-related issues. A future pharmacy team will be charged with the clinical problem of creating an albendazole product suitable for children who cannot chew the tablets.

Finally, the multidisciplinary nature of the course was clearly one of the course's greatest strengths, as educators are increasingly focusing on interprofessional learning environments and opportunities. As the number of disciplines and instructors in the course increases over time, it may be challenging to maintain the cohesiveness and the identity that developed within the initial small group. It may be necessary to either extend course offerings and/or limit the number of disciplines/students involved in each offering over time to maintain a consistent quality of experience from the course itself.

DISCUSSION

The exemplars described illustrate innovative curricular approaches to providing students with the opportunity to learn and gain experience working with underserved populations. They provide a variety of examples of how this material may be imparted and addressed in different learning environments. At a time of continuing faculty shortages and, for many public institutions, contracting financial resources, dissemination of novel curricular approaches allows schools to benefit from the knowledge and experience of other institutions. The exemplars also provide examples of how schools may collaborate with academic and community partners to develop and deliver curricular opportunities for students to gain knowledge, skills, and experiences in serving the underserved.

Limitations include enforcement of standards/guidelines by accrediting bodies that continue to emphasize the need for sound curricular development, implementation, and assessment in this subject area. Continuing scrutiny

and evaluation in these areas would ensure graduates are able to assess and meet the needs of underserved populations. This may positively impact patient care and outcomes and diminish health disparities. Further research in this area is necessary to demonstrate the effect that making curricular changes to address the needs of underserved populations may have on patient care.

CONCLUSION

The 3 exemplars presented provide concrete, detailed examples of how some colleges and schools of pharmacy are providing innovative educational experiences related to underserved populations. In disseminating these models, we hope other schools may utilize and share knowledge to implement and/or refine their own curriculum. Ultimately, it is hoped that pharmacy schools will share their educational innovations and experiences in caring effectively for the underserved.

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