Barriers Affecting the Delivery of Interdisciplinary Didactic Instruction. Stephanie F. Gardner, Gary D. Chamberlin, Diane E. Heestand and Cindy D. Stowe, University of Arkansas for Medical Sciences. Objectives: The purpose of this study was to identify the barriers to interdisciplinary education as perceived by deans of medicine, pharmacy, and nursing. Methods: A researcher-developed survey was content validated and mailed to 85 deans of medicine, 67 deans of nursing, and 32 deans of pharmacy (n=184) at 103 academic health centers in the United States. Using a 7-point Likert scale, respondents were asked to indicate the extent to which they agreed or disagreed with 10 potential barriers to interdisciplinary education. Results: Information was received from 93 respondents (50.5% return rate). The majority of respondents from all disciplines agreed that a lack of financial resources, administrative support, and perceived value, as well as problems with schedule or calendar served as barriers on their campuses (mean > 4). Student acceptance was perceived as a stronger barrier to interdisciplinary education by medicine (4.30) than by nursing (3.32) and pharmacy (3.43) (P = 0.0019). Implications: More discussions among administrators of various disciplines may allow barriers to be overcome and allow development of interdisciplinary didactic courses that could test the hypothesis that these courses are more cost effective and likely to foster interdisciplinary teamwork in the clinical setting.

Assessing Pharmacy Graduate Outcomes through an Alumni Survey. Patricia A. Howard and Jack E. Fincham, University of Kansas. Objectives: In 2001, an alumni survey was conducted as part of an ACPE self-study and a follow-up to a 1995 survey. Methods: Surveys were mailed to 506 graduates from 1995 to 2000. The survey assessed practice sites, clinical activities, postgraduate education and service involvement. Graduates assessed the contribution of their pharmacy education toward developing skills for problem solving, communication, self-learning and adaptation to change. Results: A total of 306 surveys (60%) were returned. The 2001 findings represent a midpoint in our transition to the all PharmD degree and a new curriculum. Half of the respondents had obtained the PharmD compared to 5% in the previous survey. Graduate demographics were essentially unchanged. More males than females reported working fulltime (95 vs. 79%, P<0.001) which differed from the 1995 survey which found no gender difference. The number of graduates who had completed residencies increased from 2 to 12%. In both surveys, the primary practice site was chain pharmacies, however the number of 2001 respondents working in the pharmaceutical industry had increased (7.3 vs. 2.9%). Although membership in pharmacy organizations increased slightly in the 2001 survey, active participation declined. More 2001
respondents rated the contribution of their education toward developing professional and professional skills as excellent. **Implications:** Periodic alumni surveys provide a useful tool for assessing trends in graduate outcomes and the potential impact of curricular changes over time.

**Assessment of Two-Way, Real-Time Internet-Based Streaming Audio Providers.** Kristin K. Janke and Priya Mehta, University of Minnesota. **Objectives:** To identify a feature-rich, educationally-oriented, affordable, two-way streaming audio service for use as a supplement to text based chat in online group discussions of patient cases and clinical journal articles. **Methods:** Service providers were located by survey of the web, technology enhanced learning literature and educational technology groups. Providers were eliminated if they: 1. only allowed one way audio, 2. only allowed one way audio with the use of a phone line, 3. provided more comprehensive services beyond the audio (e.g. course management) or 4. used a cost structure requiring a University level license. The remaining providers were evaluated based on privacy, ease of setup, ease of use, cost, archiving ability and features. In particular, features such as, video availability, polling, slide display, web page display, application sharing, text based discussion, and desktop sharing, were investigated. **Results:** Initially, 44 providers were identified. Following the initial elimination, seven providers remained. After evaluation based on the criteria, it was determined that Office Hours Live was the most affordable provider and provided many educationally oriented features. **Implications:** With two-way audio via the Internet, learners in web-based courses can more easily work together on patient cases, group projects and the evaluation of journal articles. Collegiate level alternatives are limited, requiring thorough knowledge of this frequently changing provider pool.

**Electronic Resources for Pharmacy Practice Faculty at Colleges and Schools of Pharmacy.** Michelle M. Kalis, Massachusetts College of Pharmacy, Harold L. Kirschnerbaum, Long Island University. **Objectives:** To determine the immunization, other health-related policies and other types of employment requirements at colleges and schools of pharmacy for pharmacy practice faculty members. **Methods:** A questionnaire was mailed to the director of the department/division of pharmacy practice at colleges/schools of pharmacy. **Results:** Fifty questionnaires were returned for an overall response rate of 62 percent. Only 25 percent of respondents indicated that any physical test and/or immunization is required or recommended by the college/school. The most common items required were a PPD, and measles/mumps/rubella vaccinations or titers. For full-time pharmacy practice faculty, 79 percent practice off-campus with the most common sites being hospitals, outpatient clinics, and community pharmacies. For institutions offering tenure, a smaller percentage of pharmacy practice faculty (55 percent) were on the tenure track compared with other faculty members (74 percent). Twenty-seven of 47 respondents indicated that only a PharmD degree is required for employment. Licensure in the state in which the college/school is located and completion of a pharmacy practice residency are the only qualifications required or preferred by at least 70 percent of respondents. **Implications:** Colleges and schools do not have programs in place to require that off-campus formulary requirements for health care workers. Colleges and schools should encourage residency training, board certification, and membership in professional associations.

**Current Use of Electronic Technology to Support Professional Experience Programs.** Kim Leadon, University of North Carolina at Chapel Hill. **Objectives:** The purpose of this study is to describe current use of electronic technology to support professional experience programs at U.S. schools and colleges of pharmacy. **Methods:** Members of the Professional Experience Task Force of the UNC School of Pharmacy constructed an 18-item survey which was piloted to evaluate content, clarity, format, and length of time to complete. Revisions were made and the survey was mailed to 92 U.S. colleges and schools of pharmacy. After follow-up efforts, data was collected from 52 schools for a 57% response rate. Twenty-seven of 47 respondents indicated that only a PharmD degree is required for employment. Licensure in the state in which the college/school is located and completion of a pharmacy practice residency are the only qualifications required or preferred by at least 70 percent of respondents. **Implications:** Colleges and schools do not have programs in place to require that off-campus formulary requirements for health care workers. Colleges and schools should encourage residency training, board certification, and membership in professional associations.

**Development of an Assessment Tool for Pharmacy Student Services.** Jennifer K. Johnson, West Virginia University, David P. Nau, University of Michigan, W. Clarke Ridgway, West Virginia University. **Objective:** A survey instrument was developed to gain structured feedback from students on the status of student services. **Methods:** The questionnaire was developed with the input of faculty, alumni, students and student services personnel to address the following domains of student services: orientation, student organizations, activities, advising, placement services, inter- and intra-class relations, responsiveness of administration and faculty to student needs, curricular load and balance, electives, financial aid, exam scheduling, tutoring. The questionnaire and cover letter were mailed to 4th year students and were administered to 3rd year students during a required course. To assess whether the written questionnaires were adequately identifying the key concerns of the students, ten focus groups were conducted. This allowed verbal feedback to be obtained which was consistent with the written responses. Survey responses were received from 59% of 4th year students and 98% of 3rd year students. All 3rd year students were able to complete the written survey within 20 minutes. A comparison of responses from the focus groups to the written responses confirmed that the written questionnaire had identified the key concerns of students and in some cases offered greater openness of response. The students also appreciated the opportunity to give feedback. **Implications:** The written survey instrument was useful for eliciting student feedback for the purposes of improving pharmacy student services.

**Clinical Background Checks as a Requirement for Advanced Practice Experiences.** William Criner, Creighton University, Tonya Alsharif, Drake University. **Objectives:** To determine the current status of obtaining criminal background checks (CrBC) on pharmacy students prior to entering APE. **Methods:** A review of human resources literature pertinent to CrBC was conducted. Current state legal code relevant to obtaining criminal background checks (CrBC) was obtained from the most current website of the state boards of pharmacy, the American Pharmacists Association (APhA) website, and the current University policies and procedures. A survey of the status of such a requirement by AACP member Colleges and Schools of Pharmacy was conducted. **Results:** Legal code relevant to the conduct of CrBC vary significantly from state to state. NABP lacks specific data relevant to CrBC requirements but stated that majority of State Boards of Pharmacy only ask questions relevant to criminal background. California, however, obtains CrBC on both pharmacists and technicians. Actual CrBC are completed at the time of admission by 37/40 college survey respondents. Actual CrBC are completed prior to APE by 37/40 college survey respondents. Fourteen of forty respondents indicated that healthcare facilities providing APE completed CrBC on students assigned to their facility. Facilities requiring CrBC included the following: the State and Federal Bureau of Prisons, Psychiatric facilities, Pharmaceutical Companies, and private community hospitals. Anecdotal experience with positive CrBC was reported. **Implications:** Evolving risk management procedures on the part of healthcare facilities will increase the requirement for CrBC on pharmacy students prior to APE in the future. Colleges of Pharmacy will benefit by proactively addressing this issue.

**Work In Progress**

**Development of a Virtual Mentor Program.** Amy H Schwartz, and Naser Z Alisharif, Creighton University. A virtual mentor program was incorporated (Fall 2001) with the integration of the web-based Traditional Pharmacy pathway. The rationale for developing a virtual mentor program was to facilitate...
the comprehension of on-line didactic material, active learning, professional socialization, and concurrently ease faculty workload. Informal feedback to program and assessment tool development was retrieved through literature review. Faculty input was sought for the creation of the recruitment timeline and program handbook. Instructors of record (IOR) are convened several months before the semester to determine mentor needs, responsibilities and recruitment methods. Recruitment guidelines were derived from those in place for faculty. Advertising strategies include peer recommendations, personal mailings and email (professional listservs). Program and course orientation, including materials, is provided within the weeks surrounding the start of the semester. Program assessment tools were created for IOR, students and mentors. A mentor evaluation was developed for IOR; course evaluations capture student opinions in sections of the summative personal examination (6-point Likert scale) and open-end response. Additional items under development include mentor web site, database and (educational) development programs. Recruitment for the first two didactic semesters has been completed. Feedback from mentors has been collated, pending analysis. Collection of student and IOR opinions is in progress. This information should provide insight regarding program rationale validity and quality improvement requirements.

Personal Digital Assistants (PDAs) and Computer Use: The Status at U. S. Schools and Colleges of Pharmacy. Kelly M. Smith, Frank Romanelli, Jeff Cain, Aandra Stinchcomb, Thomas S. Foster and Heidi Anderson-Harper, University of Kentucky. Objective: To determine the level of use of PDA and computers within US pharmacy schools. Methods: A survey instrument was developed and electronically distributed to appropriate administrators at all U.S. Colleges and Schools of Pharmacy. The instrument was completed on-line by respondents and data collected included: formal policies regarding PDA use; current requirements regarding PDA purchase and types of applications being used with computers and PDAs. Implications: Colleges of Pharmacy across the U.S. have responded differently to the rapid influx of classroom technology. Little information is available in the literature to assist schools with these types of decisions. These results will provide baseline information, which can be used by Colleges of Pharmacy as a framework for addressing technology needs and practices.

Modification of CQI Tools in Developing a Model of Seamless Programmatic Assessment. Andrew A. Webster, Mary R. Monk-Tutor, Timothy R. Covington, Condit F. Stiel, Pamela J. Sims, Robert H. Schrimsher and Edwina Chan, University of California-San Francisco. Objective: [Supported by a Fast-Tex Grant]."To develop a comprehensive programmatic assessment tool of Hoshin Planning with Spider Diagrams produced marginally quantifiable data. Methods: The MSOP Assessment Committee (AC) has developed a template and rubric to standardize assessment inventory results, especially in terms of relevance to the ACPAC accreditation standards. The 2005-2006 initiative. Implications: Quantifiable data will act as an internal benchmark for future assessments at MSOP. Additionally, these results will form the foundation for recommendations with respect to annual standing committee charges. Results: MSOP aggregate data will be presented along with specific examples from the assessment inventory.

Theoretical Models
Pharmacy Faculty as Expert Witnesses: Is There a Need? What is the Process? What are the Rewards? Joanne Whitney, University of California-San Francisco. Objectives: Pharmacy faculty are seriously underrepresented as expert witnesses in criminal and civil litigation. Causes may include fear of compromising personal ethics, apprehension about capability and ignorance of processes involved in being an expert witness. This poster will explore the need for pharmacy faculty to act as expert witnesses, difficulties which they may encounter and principles and approaches to be followed by pharmacy faculty who serve as expert witnesses. Methods: Case histories (altered to protect confidentiality) will be used to: 1. Delineate the types of cases (patent disputes, wrongful death, gross incompetence) in which pharmacy faculty would be ideal expert witnesses; 2. Explain how expert witnesses are located (referrals from colleagues) and evaluated (CV, interviews) by lawyers; 3. Describe how evidence is received, evaluated (CV, interviews) by lawyers; 3. Describe how evidence is received, evaluated (CV, interviews) by lawyers; 4. Illustrate the steps and organizational format involved in producing a written expert opinion ; 5. Depict what occurs during a deposition; 6 Illustrate how to expect the expert witness in a courtroom trial, what demeanor is required, and how to respond to difficult questions; and, 7. Discuss what compensation, educational, monetary and professional, is to be anticipated. Implications: Although difficult, being an expert witness in litigation is a civic duty, an academic responsibility, is rewarding, and expands the professional leadership of pharmacy faculty.

Computer Demonstrations
Creating Discipline-Specific Software from Scratch: The Pharmaceutical Biotechnology Virtual Lab. Kathleen Boje and Christine Sauciunac, School of Pharmacy and Instructional Technology Services, University at Buffalo. Objectives: We wished to develop a virtual, interactive laboratory environment that enhanced decision-making cognitive skills in the area of biotechnology drug R&D. This software would consist of seven modules illustrating principles of pharmaceutical biotechnology. Each module would present biotechnology problems that would be solved by the scientific method decision-making process. The final product, an interactive, web-based computer simulation, would be of interest to pharmaceutical science, biomedical science, biology and chemistry students. Methods: Prior to this project we had little or no experience in developing discipline specific software. We recognized early on that the project's success was critically dependent on the collaboration of faculty content experts, professional computer programming staff, instructional technology specialists, instructional designers, graphic artists, multi-media programmers and student end users. We had to submit a proposal for funding, identify collaborators, and finalize contractual arrangements with a vendor. The project-planning phase involved an initial "on-site" meeting with all, followed by communications via telephone conferencing and e-mail. The prototype development phase involved solicitation of tool generation, mock-up of interface, educational content creation, storyboard development with animation and programming. Successive modules were developed and refined with student usability testing. Results and Implications: This presentation will step through the process to share our insights (and hopefully inspire other faculty) and demonstrate the completed software.

Computer-Based Drug Metabolism Tutorial. Patrick J. Davis and Justin Briggle, University of Texas at Austin. Objectives: Student understanding of drug metabolism requires an integration of functional group recognition, knowledge of phase-1 and phase-2 modifications, the enzymes that catalyze specific reactions, and reaction mechanisms. This project was undertaken to develop a computer-based tutorial for reinforcing and integrating these basic concepts, and for development of the ability to predict routes of drug metabolism based on functional groups present. Methods: Our current approach requires that students generate rational "metabolic trees" for drug molecules based on functional groups present, but there is additional need for review and reinforcement. We have therefore developed an html-based tutorial system in which the student constructs an online metabolic tree for a particular drug by addressing queries at the level of: 1. recognizing the functional group; 2. identifying the name of the metabolic pathway; 3. identifying the requisite enzyme(s); and 4. predicting the final produces). Results: An html-based (platform independent) tutorial was constructed to address the need described. The tutorial also uses Flash animation to simplify viewing as a complex metabolic scheme emerges. Each step in the construction of the metabolic tree requires a correct answer to a query based on the functional knowledge described in the objectives. Implications: The tutorial allows students to test their ability, generates graphs, reviews and integrates the knowledge areas required for understanding drug metabolism. Simple to very complex drug molecules can be analyzed, resulting in the generation of very simple to very complex metabolic schemes. [Supported by a Fast-Tex Grant]

Development and Evaluation of a Metacognitive or Learning Skills Training Program. Judy Garrett and James N. Pasley, University of Arkansas Medical Sciences. Statement of the Problem: A common concern among faculty of entry-level courses (or any course requiring a synthesis of information from prior courses) is the extent to which students lack essential prerequisite information and skills or and appropriate metacognitive or learning skills. Reasons for this lack of preparedness are that students either don't know or have forgotten major science concepts and they are not prepared for the types of learning tasks in professional courses (rote memory vs. application). Objectives: 1. to develop a web-based 'metacognitive skills' training program that includes fundamental information-recalling and applying prerequisite information and skills, understanding types of learning tasks, developing study materials specific to different types of learning tasks, and continuously monitoring understanding; 2. To assess the contribution of different types of metacognitive skills in relation to learning. Methods: Materials were made available to a small group of students and preliminary indicators of metacognitive skills training. The following types of data were used to assess the relative contributions of metacognitive skills to learning: prior achievement, number and comprehensiveness of assignments completed, course exam scores, and student evaluations. Implications: The design and evaluation of these materials address two important issues — effective methods of providing training and effective and reliable methods of assessing metacognitive skills.
A web-based drug information question database designed to teach the systematic approach to drug information using: primary, secondary, tertiary and expert resources; refine their ability to obtain background information, identify and categorize the correct ultimate question, design and implement the most effective search strategy; identify the most applicable resources given a specific drug information inquiry; and (vi) gain an appreciation for the application of literature evaluation. Methods: Educating pharmacy students about the principles of drug information and the systematic approach represented the primary goal of this project. A web-interfaced database of drug information questions was created for use as a tool to facilitate the efficient study of a random sample of 150 completed drug information questions, tutorial, glossary, hyperlinks to drug information resources and other useful web sites, and a user's assessment questionnaire. Formulated questions have been classified according to: complexity, search strategy, nature of the request, disease state, and pharmacologic classification. This classification system is used to randomly generate a different set of questions each time the user accesses the database. Implications: Use of the database facilitates the acquisition of skills regarding the systematic approach to drug information—aka "Evidence-Based Practice." Students are able to practice and refine their skills, and demonstrate their competence.

Development of a Web-Based Pharmacoeconomics Abstract Review Application. Huigang Liang, Kern Krueger, Kimberly Braxton Lloyd and Mahesh Fulcoere, Auburn University. Objective: To develop and assess a web-based pharmacoeconomic abstract review application. Methods: The application was developed using a three-tier structure: the user interface, the back-end database, and the middle tier handling communication between the two. ASP, HTML, JavaScript, and SQL were utilized for implementation. Useable abstracts were identified, keyed by experts, then loaded into the database. An online survey was included in the web site to assess students' acceptance. Results: The application is accessed from a protected web site, and an abstract is randomly selected. The window splits, displaying the abstract on one side and the questions on the other. The question sequence uses a conditional branching algorithm based on the principles of pharmacoeconomics. Answers to each question are buffered, graded, and saved to the database. Students see their grades instantly after they finish reviewing an abstract, and feedback for each abstract is available. Of the 23 students that completed the survey, 70% preferred the online review to a paper-based review. Problems connecting to the site were reported by 39%, and 13% said the transfer speed greatly affected their performance. The feedback at the end of the review increased understanding for 62%, and 57% thought it improved their performance in future reviews. Implications: The interactive nature of the application provides instant feedback and can increase students' understanding of pharmacoeconomics. The automatic grading saves instructor time.

Effective Searching of PubMed's MEDLINE: What's New and Noteworthy? Heidi C. Marleau, University of Wisconsin-Madison. Objectives: 1. provide participants with a refresher on PubMed's MEDLINE and recent database developments. 2. emphasize concepts during hands-on exercises. Methods: Participants will complete brief, pre-class and post-class questionnaires to assess the increase in their knowledge of and comfort level with PubMed's MEDLINE. One instructor will alternate between demonstration and hands-on exercises, and an instructor will act as second instructor if participants are necessary. Topics addressed will include MeSH vocabulary versus keyword searching, Clinical Queries, saving searches via Cubby, Journal Browser, full-text options, and finding online help. Drug information and therapeutics as well as topics of interest to the audience will be highlighted. Results: Participants will sharpen their searching skills by receiving: 1. a refresher on effective searching of PubMed's MEDLINE, 2. an update on latest enhancements, 3. hands-on practice time, and 4. encouragement to ask questions about their own research concerns. Implications: Even though many faculty and students are familiar with PubMed's MEDLINE, they still must stay on top of developments to keep their search skills sharpened. Given the expertise libraries possess in presearch database searching is their duty to share knowledge of this and other databases with their clientele. This demonstration will help to determine if this model of instruction will be continued and expanded at future AACP meetings.

Use of Technology in Experiential Education: Facilitate Education and Communication. Beverly Talluto, David LaScalusa and Amy Lullo, Midwest University-Chicago. Objectives: Enhance the education process through student and preceptor access to course content, course instruction, frequently asked questions, and library services. Provide electronic delivery of all course related material and rotation manuals and forms. Facilitate the management of the Introductory and Practicum Experience course through rotation schedules: The rotation assignments, terminology cases, evaluations of student, preceptor and site, and grade posting. -Provide a tool for electronic rotation selection and communication forum between students, preceptors and the Office of Experiential Education. Utilize the technology to facilitate course evaluations for preceptor satisfaction.

CONTINUING PHARMACEUTICAL EDUCATION

Impact of an Internet-Based Smoking Cessation Educational Module on Pharmacists' Knowledge and Practice: A 1-Year Follow-up. Michael C. Brown and Kristin K. Janke, University of Minnesota College of Pharmacy. Objectives: The objective of this follow-up study was to determine participants' knowledge retention and reported practice change after an Internet-based smoking cessation educational module given one-year prior. Methods: Pharmacists completing the module were eligible to participate in the follow-up study. A 1-year post module posttest was administered. Results: Thirteen of the original 38 participants (34.2%) participated in the follow-up. Knowledge of tobacco use increased 21% (T = 2.19, P = 0.05). In the 10 pharmacists reporting patient contact, six (60%) reported an increase in number of patients who successfully quit smoking. Of the 23 participants who answered the post program surveys (65% response rate), Wilcoxon Signed Ranks analyses indicated statistically significant improvements in 10 of the 12 knowledge areas between pre and post survey administration. 7th-tests comparisons indicated no differences were observed in the average amount of time spent with practice functions. An insignificant decrease in the percentage of time spent providing clinical services was observed. Implications: These findings suggest pharmacists realize long-term cognitive benefits from curricular-based interactive pharmacy continuing education. However, the benefits derived did not significantly affect practice behaviors, including the provision of clinical services. Other mitigating factors may be involved, that if identified, may help guide future program development.

Evaluation of a Pharmacy Continuing Education Program: Long-Term Learning Outcomes and Changes in Practice Behavior. Nancy Fjortoft, Midwestern University, Amy Schwartz, Creighton University. Objectives: To assess the long-term outcomes from a three-month, curriculum-based pharmacy continuing education program, as it relates to changes in practice behaviors. Methods: A pre and post program survey, utilizing a Likert scale, was developed to assess participant knowledge related to twelve cognitive and psychomotor concepts derived from program objectives. Participants were asked questions regarding their practice change after completion. These participants also reported an increase in the number of cessations, averaging 1 additional cessation per month. Implications: Internet-based continuing education is widely available, but the effect of this type of education is in the early stages of assessment. This Internet-based educational module had modest knowledge retention at 1 year. More importantly, it increased pharmacists' reported involvement with tobacco-using patients and increased the number of patients who successfully quit smoking.

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and attain common understandings with others. Mezirow’s transformation theory of adult learning has been adapted for CPE program development in order to meet this need. Methods: A program designed to foster communicative learning should have as its goal the establishment of a community of learners. A priority within this learning community is the formation of optimal conditions for rational discourse. Transformation theory elucidates seven ideal conditions for the development of rational discourse among participants. Results: Educational discourse is secured when: (a) participants have shared expectations about the nature of the setting and of rational discourse that will be used; (b) the environment is low risk for the student in the group conducted the interview using a checklist form to record data collection forms to record the following communication skills: rapport - 87.7%; transition statements - 89.0%; facilitative nonverbal behavior - 98.6%. Implications: A low-risk environment with adult volunteer patients provides pharmacy students an opportunity to master the skills necessary for effective communication history interviews.

Using CD-ROM Technology and Standardized Patients in an Early Pharmaceutical Care Experience Program. Charles C. Barr, Creighton University. Objectives: To develop a non-threatening patient care experience and develop drug therapy problem solving skills in second year pharmacy students. Methods: Standardized patients were video taped as a pharmacist’s faculty person interviewed them. The VHS tape was edited and burned to a CD-ROM for viewing by second year students. Individual patient care problems were addressed on the Internet predetermined by facility linked to the CD. Students were divided into teams of five students each and each student was assigned a role with each patient problem. Each team presented the patient care problem in a written and reflective format. Course evaluations were used to assess the process. Results: CD-Rom based standardised patient interviews offered the student an insight into patient based drug therapy problems and the opportunity to discuss priority of patient care problems and care plan strategy in a reflective and interacting format. Student comments were positive and supportive. Implications: Two findings stand out: (1) patients provide a unique non-threatening learning experience on patient and drug therapy management issues to prepare pharmacy students for three-dimensional patient encounters.

Increasing Awareness of Nontraditional Women’s Health Issues Through an Interactive, Innovative Women’s Health Elective. Kimberly Braxton Lloyd, Shauna Buring*, Janele Krueger, Kirsten Fanning, Pamela Stamm, Miranda Andrus, Charles Taylor, Auburn University. University of Cincinnati. Objectives: To stimulate thought, discussion, and interest in women's health issues by using innovative, interdisciplinary teaching methods. To prepare students to provide pharmaceutical care for female patients. Methods: Students were assigned readings and were tested on these topics each week before lecture to increase classroom participation. Instructors guided student learning for traditional (PMS, pregnancy, contraception, depression, migraines, menopause, osteoporosis, and female cancers) and non-traditional (women in clinical trials, eating disorders, infertility social issues surrounding women's health, and domestic violence) women's health issues. Teaching methods included viewing and discussing popular media, classroom demonstrations, guided questioning, reflective journal writing, and traditional lectures. Course instructors included pharmacy faculty, a physician, a psychologist, and a sociologist. To enhance student understanding of the pathophysiology, clinical presentation, and psychological consequences of specific disease states, live patient interviews were conducted during class. Results: Based on course evaluations, students have increased knowledge and understanding of a broad scope of women's health issues. Classroom discussions and journaling allowed students to think critically about their own perceptions, experiences, and attitudes associated with women's health topics. Implications: This project demonstrated that an elective course in women's health expanded students' understanding of women's healthcare needs and increased student preparation for interfacing with female patients in various pharmacy practice settings.

Comparison of Students’ Perception of Learning Objectives versus Faculty Developed Learning Objectives for an "Internet as a Medical Resource" Lecture Series. Lorraine A. Cicero, Long Island University. Objective: The objective of this study was to determine whether students could identify learning objectives for a 3-hour lecture series on using the Internet as a source of biomedical information. The lecture series is part of a required Information Systems course for P3 entry-level students. Methods: After the three 1-hour lectures were completed, students were asked to write down what they believed they should have learned. Students were permitted to review their lecture notes if necessary. After this information was collected, students were given a copy of the already prepared learning objectives for this topic. Results: One hundred forty students identified an average of 3.4 learning objectives (range 1-7) versus 11 prepared by the instructor. Approximately 50% of the students were able to identify at least three learning objectives written by the instructor. The most frequently identified learning objectives were "describe the criteria for evaluating biomedical web resources" and "describe the historical development of the Internet", and "list ways
So You Only Have One Credit In Your Curriculum Devoted to Social-Behavioral Pharmacy Issues? Strategies for a High-Impact Course.

Dana P. Hammer, University of Washington School of Pharmacy. Objectives: Designed high-impact, one-credit required course that would enjoy while learning and experiencing first-hand some of the unique issues in social-behavioral pharmacy. Methods: Second-year pharmacy students met for two hours once weekly for the last eight weeks of spring semester. Prerequisite courses included Health Care Ethics, Service Learning, Health Care Economics, U. S. Health Care System, and Professional Skills Development. The required eight weeks were focused on in-depth discussions with experts and patients on the topics of: foundational theories of psycho/social/behavioral aspects of health care; lifestyle and behavioral modifications; mind/body medicine; cultural and spiritual issues; complementary and alternative medicine; death, dying and grief; mental illness; and, substance abuse. One-minute papers were used for students to reflect individually on the week’s topic, and attendance. Learning contract described assignments and other criteria students would need to complete to achieve desired grades. Assignments included written papers based on students' attendance at various support group meetings, books read from a pre-approved list, and attendance at various pre-approved seminars or performances related to course content. Results: Students' one-minute papers and course evaluations reflected a positive learning experience, valuable insight gained into social-behavioral pharmacy issues, and appropriate amount of work for a one-credit course. Implications: For curricula with a limited amount of time devoted to social-behavioral pharmacy content, these strategies could prove helpful in designing a valuable, high-impact course.

Concept Mapping in a Pharmacy Communications Course. Lilian H. Hill, Virginia Commonwealth University. Objective: The primary objective of using a concept mapping assignment in a pharmacy communications course was to assist students identify key concepts and principles discussed during the semester and to organize knowledge for learning. Previously, the instructor theorized that students perceived the course as disjointed, and the rest of the curriculum. Method: Concept mapping is a knowledge representation tool that illustrates key ideas and the relationships between them. Detailed instructions were developed for. Students worked in groups of 3-5 and turned in drafts of their maps and accompanying narrative twice during the semester prior to turning in their final assignment. This assignment comprised 25% of their final grade. Formative feedback was collected twice during the semester. Results: Students must spend time discussing course material with their team members and they may also gain insight into how courses in the curriculum are related. Some of the students' maps were excellent and it was immediately obvious which groups had put significant time and effort into their maps. A few left the instructor amazed that so much material had been addressed in a single semester course. Implications: This assignment was helpful to students in a course that requires them to grapple with both conceptual material and factual information, and assists them in moving beyond rote memorization to meaningful learning.

Giving New Pharmacy Faculty a Jump Start. Eric H. Hobson, Albany College of Pharmacy. Objectives: Recognizing that most new pharmacy faculty have little substantive teaching experience, the Albany College of Pharmacy’s Center for Teaching and Learning established the annual “Jump Start” program for new faculty. Method: The Jump Start Seminar includes 2.5 day sessions held within the first eight course sessions were interactive discussions with experts and patients on the topics of: foundational theories of psycho/social/behavioral aspects of health care; lifestyle and behavioral modifications; mind/body medicine; cultural and spiritual issues; complementary and alternative medicine; death, dying and grief; mental illness; and, substance abuse. One-minute papers were used for students to reflect individually on the week’s topic, and attendance. Learning contract described assignments and other criteria students would need to complete to achieve desired grades. Assignments included written papers based on students' attendance at various support group meetings, books read from a pre-approved list, and attendance at various pre-approved seminars or performances related to course content. Results: Students' one-minute papers and course evaluations reflected a positive learning experience, valuable insight gained into social-behavioral pharmacy issues, and appropriate amount of work for a one-credit course. Implications: For curricula with a limited amount of time devoted to social-behavioral pharmacy content, these strategies could prove helpful in designing a valuable, high-impact course.

Educating Pharmacy Students About Health Disparities Using Peer Teaching. Carolyn Ford, Hampton University. Objective: To educate pharmacy students about the significance of health disparities and strategies for their elimination. Methods: Seven P-3 students enrolled in the health disparities/service learning elective course were required to develop posters. These posters featured the six leading diseases identified by Healthy People 2010 that are associated with major health disparities in racial and ethnic minorities. The posters were visible by the entire student body as they were displayed for 2 weeks in the main hallway of the school. Many students were observed reading and discussing the displays. A "Health Disparity IQ Test" was administered at the conclusion of the poster session and a $25 cash prize was awarded to the three highest-scoring students. Results: A total of 89 (96%) students attended the Biochemistry tutorial in fall 2001. Although the tutorial was available from the beginning of the semester, it was after the first exam that students started availing the tutorial. The tutors recorded student attendance for each tutorial session. The mean post tutorial grade was significantly higher (P<0.00) for the students. Moreover, student grades were positively correlated to tutorial attendance. Students who attended tutorials more frequently reported higher grades. The overall pass rate for biochemistry was also higher for this year as compared to previous years. Implications: This strategy improved student performance. Facilitator feedback was collected twice. Students independently developed a method for forcing first-contact was implemented. For each lecture, some students assigned readings and others were assigned to complete before class, some did not read. To ensure that students come to class and follow-up conversations with participants during the 2001-2002 academic year support the utility and timeliness of the seminar's content and instructional approach. Implications: The Jump Start Seminar will be held August 4-6, 2002 and approximately 50 participants from 12 colleges of pharmacy are expected to participate.

Ensuring First Contact With Lecture Material BEFORE Class Using Creative Assignments and the Online Discussion Board. Akima R. Howard and Arcelia Johnson-Fannin, Hampton University. Objective: To devise a teaching strategy that requires students to interact with class material before the start of lecture. Methods: The instructors used ASHE’s Embalming, Anatomical Skills Program. These techniques were applied to specific disease states including dyslipidemia, anticoagulation, asthma and diabetes. Self-study was enhanced by active-learning exercises including measuring vital signs, reviewing realistic patient cases to practice assessment skills and writing case plans. Individually, students presented their cases, instructors using a standard case presentation format. Instructors provided immediate feedback and suggestions for improvement. Students learned to obtain fingerstick blood samples which they in turn tested using point-of-care monitoring devices such as the Cholestech and Coagu-Check. Results: Course outcomes were assessed using written student evaluations. The consistency of the written format from module to module allowed students to quickly learn and become confident assessing problems and developing care plans. Likewise, consistent use of a case presentation format and instructor feedback dramatically improved students' verbal communication skills. Some students struggled with the large reading assignments but many felt that felt better prepared for externships. Implications: Integrating self-study and active-learning techniques in a consistent format enhances the teaching of pharmaceutical care skills.

Effect of a Biochemistry Tutorial in Improving Pharmacy Student Grades. Arjun Dutta, Jeannette Andrews, Leslie Washington, and Celia Williams, Howard University. Objective: To document the impact of a biochemistry tutorial on pharmacy student grades. Methods: Free tutorials were offered to all PharmD students in their first year. Tutorials were offered for all requested courses. Biochemistry was the most requested and attended tutorial. Previously most students have had difficulty in passing the biochemistry course. Pre and post tutorial grades were recorded for all students attending the tutorial. A paired t-test was conducted to compare the pre/post tutorial grades. The relationship between frequency of tutorial attendance and grades was also assessed. Results: A total of 89 (96%) students attended the biochemistry tutorial in spring 2001. Although the tutorial was available from the beginning of the semester, it was after the first exam that students started availing the tutorial. The tutors recorded student attendance for each tutorial session. The mean post tutorial grade was significantly higher (P<0.00) for the students. Moreover, student grades were positively correlated to tutorial attendance. Students who attended tutorials more frequently reported higher grades. The overall pass rate for biochemistry was also higher for this year as compared to previous years. Implications: This strategy improved student performance. Facilitator feedback was collected twice. Students independently developed a method for forcing first-contact was implemented. For each lecture, some students assigned readings and others were assigned to complete before class, some did not read. To ensure that students come to class and follow-up conversations with participants during the 2001-2002 academic year support the utility and timeliness of the seminar's content and instructional approach. Implications: The Jump Start Seminar will be held August 4-6, 2002 and approximately 50 participants from 12 colleges of pharmacy are expected to participate.

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information centers. Students used the AACP Web listing of US Schools and Colleges of Pharmacy as a starting point. Students were required to post the centers’ URLs and to list the services provided by each center. They were to post the URL BEFORE class. Each student received feedback from the instructor via e-mail. A questionnaire regarding the usefulness of discussion board assignments was distributed. Results: Of the 46 students, 98% indicated that the assignments were useful. Implications: Students eagerly participate in classroom discussions when prepared. The online discussion board enables individual and immediate feedback, which may not be feasible during class. Class time is used to reinforce important material rather than introduce it for the first time.

Implementation of an Online Orientation Option for a High Enrollment Self Study Course. Kristin K. Janke and Heather D. Lindeman, University of Kentucky. Objective: To develop an online, interactive, self-paced high enrollment medical terminology course that provides a more convenient and efficient means to prepare students. Methods: A thirty minute live orientation program was replicated on the course website, including a downloadable syllabus, slide presentation with audio narration, opportunity to indicate interest in study groups, and ability to complete the course entrance survey electronically. Student computing labs were contacted to ensure that appropriate technology was available across campus and detailed instructions for off-campus participation were provided. In addition, a tech support process, including 24/7 paper support, was utilized. Results: During the fall, 215 students (61%) chose to complete the orientation online, while 344 students (76%) chose the online option in the spring. Students reported that the online program was convenient, helping to avoid extra trips to campus or taking time off work. The online format has saved staff time by reducing the number of additional in person orientations and providing more efficient entrance survey analysis. While the online alternative took six hours to produce initially, it took only two hours to update the second term and has saved an estimated 20 hours/term. Only two requests for tech support were received. Implications: Offering an online orientation has addressed scheduling and workload concerns for a high enrollment self study course and has been enthusiastically received by students.

Interfacing with a Basic Sciences Program to Provide Placebo Parenteral Supplies for a Pharmaceutical Care Teaching Laboratory. Susan M. Jay, Marvin Nickolaus and Thomas E. Boothe, University of Kentucky. Objective: To interface with a basic science course in the preparation of placebo, parenteral drug supplies as a means of containing cost in a required professional course for student skill development in aseptic compounding techniques. Methods: Placebo preparation was investigated as part of a graduate course in pharmacy manufacturing. In working with members of the Pharmaceutical Sciences division, it was determined that 3 placebo products would be made in vials for use in a professional course for parenteral product preparation: a lyophilized cake of mannitol to simulate various antibiotics requiring reconstitution; a lyophilized cake of fluorescein dye to use for validation of chemotherapy preparation; and water to simulate parenteral solutions or to use as diluent. Since products are for teaching purposes only, sterilization is optional. A lyophilizer and a capping device (automated or manual) were identified as necessary equipment that is found in many pharmaceutical science programs. Results: Placebo preparations were prepared for use in 4 teaching laboratory exercises with an overall cost savings of 90% in the instructional supply budget. Implications: The resources of a pharmaceutical manufacturing course or a pharmaceuticals graduate research program could be used to provide pharmaceuticals for the pharmaceutical laboratory. Using placebo products eliminates concerns related to cost, national product shortages and drug allergies; thus, instructors have greater flexibility in drug selection.

Implementing Online Case Presentation Evaluations. Jennifer B. Kasjar, Sara L. Schroeder, Brian J. Seitz, St. Louis College of Pharmacy. Objective: Feedback on case presentations is considered essential to improve student performance on course specific abilities. In our therapeutics sequence, students meet in weekly small group discussions for case presentations. In past years, feedback was provided on one group assessment form, and was not received until the next discussion meeting. This did not allow students to immediately utilize feedback. In order to improve and expedite feedback, as well as improve confidentiality, an online system was developed to enhance delivery of feedback to students. Methods: Discussion leaders evaluated students using an online assessment form. An automated notification was emailed to students when feedback was complete. Students could subsequently access a site with a word-processed feedback form. Discussion leaders who had used both the traditional paper and online evaluation forms completed a questionnaire to assess the timeliness, the quality of feedback given, and the issues of confidentiality with the online system compared to the traditional system. Results: Discussion leaders thought the on-line system took longer to complete, but they rated the timeliness, quality and confidentiality of the feedback as no different. Overall, discussion leaders rated the online system as a better means of administering feedback. Implications: An on-line assessment can be employed to provide better feedback in a timelier manner, and at the same time, can increase the confidence of individual students.

High-Stakes/No-Stakes End of Year Examination for Curricular Assessment. Harold L. Kirschenbaum, Martin E. Brown, Judy W.M. Cheng, Vincent E. Reid and David R. Taft, Long Island University. Objective: High-stakes examinations are used by some colleges/schools to determine whether students possess the competencies to progress to the next academic year. The purpose of this study was to survey the same 20 parameters of the curriculum rather than assess individual students. Method: Fifth year entry-level PharmD students were randomly assigned to one of six groups; five of which included an examination: collaborative skills, compounds (sterile and non-sterile dosage forms), drug information skills, patient counseling, and pharmaceutical care plan preparation. The sixth group participated in the traditional examination. Prior to the examination, students did not know the type of examination they were to take so they were unable to prepare. Results: For collaborative skills, based on a Likert-type scale of 1 to 5 (5 being the highest score) no mean score for any of the 20 parameters evaluated was below 3. For care plan preparation, the mean score was 73%. Results from the other examinations were not as encouraging and identified areas in need of improvement. Implications: Identifying student deficiencies prior to advanced practice experiences provides an opportunity to correct these weaknesses. This sort of examination will be repeated annually and may be expanded to include other academic years as it is an excellent way to assess curricular outcomes.

Integration of Pharmacogenomics into the Pharmacotherapy Laboratory. Jill Kolesar, Michael Pitterle, Sandra Hoel and Sarah Sobotkiewicz, University of Wisconsin-Madison. Objective: Based on NCHPEG guidelines, pharmacogenomics was integrated by developing a new required course, an elective course, and an elective research rotation. Additionally, pharmacogenomics was integrated into existing required pharmacy laboratory periods. Student learning and opinion of pharmacogenomic material within pharmacotherapy laboratories was evaluated. Methods: Two clinical pharmacogenomics cases were designed, requiring students to run electrophoresis gels and evaluate sequence results to select therapy and assess cancer risk. Student knowledge was assessed by electronic quiz and opinion surveys by an 8 question tool (I = strongly disagree, 5 = strongly agree). Results: All 109 students took the quiz and 104 participated in the survey. On a four point scale, the mean score on clinical quiz questions was 2.42±1.15SD and the mean score on the pharmacogenomics quiz question was 3.28±0.65SD (P<0.001). Interestingly, students felt that pharmacogenomics was applicable to both current (3.48±0.99SD) and future practice (4.01±0.88SD) and they had adequate background to apply concepts in this course (3.38±1.05SD). Despite not feeling well able to integrate pharmacogenomics into practice (2.54±0.85SD), students didn’t want more time devoted to pharmacogenomics in oncology pharmacotherapy (2.53±0.85SD), in the curriculum as a whole (2.87±1.00SD), to take an elective course (2.51±1.26SD) or have a sequencing lab (1.86±0.94SD). Conclusion: Integration of pharmacogenomics into required pharmacy practice labs was successful in teaching applied pharmacogenomics concepts and third year pharmacy students appreciated immediate application of pharmacogenomics to pharmacy practice.

Using a Web-based Assignment to Reinforce Pharmacoeconomic Concepts. Kem Krueger, Kimberly Braxton Lloyd, Huigang Liang, Mahesh Fuldeore and Mohammad Waleed, Auburn University. Objective: To implement and assess a web-based pharmacoeconomic abstract review program in a pharmacoeconomics course. Methods: Literature review was conducted on 84 abstracts. They were screened and keyed by two trained students and by the course instructors. The database of keyed abstracts was inserted into the online abstract review program. Students could complete an unlimited number of reviews. The top three scores were used to determine the assignment grade. Online abstract review scores were compared to paper-based article review scores from the previous year. The final exam also contained a paper-based article review section, which was identical to the one use the previous year. The scores on this portion of the final exam were compared across the years. Results: Seventy-two students completed the assignment with an average score of 89% (SD=10.3) compared to 92% (SD=5) on the paper-based article review the year before. On average, students completed 11 on-line reviews (SD=6). The scores from the on-line and paper-based reviews did not differ between the two years. Implications: The online abstract review was available 24-hours a day. It reinforced class topics by providing instant feedback with answer explanations. Reviewing abstracts does not provide the same experience as reviewing articles. Because the questions were multiple-choice, students did not evaluate the abstracts in their own words. However, the electronic grading was convenient for instructors.

Use of an Electronic Classroom Response System to Facilitate Case-based Learning. Jeffrey J. Kuper, Joseph A. Barone and Julie A. Saleh, Rutgers School of Pharmacy. Objectives: Goals of this project were to: (i) increase student understanding and retention of the material; (ii) increase efficiency of teaching by providing a supplemental means of assessing student comprehension; and (iii) increase active learning by incorporating more case-based teaching. Methods: The Personal Response System® (PRS) consists of several
receivers connected to a central display and wireless transmitters held by each student in the classroom. Students use the transmitters to respond anonymously to problems posed by lecturers. At the end of the answer period, responses are summarized and displayed as a histogram. The instructor uses this information to assess student understanding and guide subsequent discussion. Results: All five lecturers used PRS in Cardiopulmonary Therapeutics. Student exam performance apparently improved compared to previous years. However, other changes in the course curriculum may have contributed to the apparent improvement in exam performance. The survey consisted of 105 student surveys, 89 were returned. Five out of 5 faculty surveys were returned. The use of computers did not clearly enhance the educational value of the lecture. Students identified the primum movens as the value of the instructor to properly relate course materials (m = 6.25 on a 7-point scale) over personal support from the use of PRS alone. Subjective evaluations completed by both faculty and students showed strong support for PRS. Both groups believed that student understanding was improved by use of PRS. The faculty also felt that PRS helped them to better assess student comprehension, allowed them to redirect content to, and foster communication and professionalism. This fact in combination with the potential benefits of PRS for improving faculty assessment and student comprehension, and the technology will be expanded to other courses.

Design and Implementation of a Teaching Certificate Program for Pharmacy Residents. Kimberly A. Lintner and Beth A. Martin, University of Wisconsin. Objective: To describe the development and implementation of a teaching certificate program aimed at addressing the current lack of structured training for future pharmacy educators. Methods: Nineteen residents participated in sessions and workshops during the 2001-2002 academic year. Residents were each assigned sessions to coordinate and facilitate to gain experience in planning, implementing, and evaluating learning activities. Through readings, activities, and discussions with invited faculty, residents were exposed to many aspects of pharmacy education. The program also included didactic sessions, videotaped presentations, and formal feedback on their teaching skills. Residents were required to develop teaching activities, evaluations, and self-reflections in a teaching portfolio. Results: Residents completed formal evaluations after each session; these results will be shared during the poster session. This experience enhances teaching and communication skills, creates a heightened awareness of the pharmacy educator’s role and teaching as scholarship, and promotes the development of teaching strategies and professional leadership. Implications: Through exposure to and application of techniques and principles learned, residents will be better prepared for teaching opportunities in both academic and practice settings. The certificate program may become incorporated into the required pharmacy resident experience and may be integrated into the preceptor training program. Using this framework, a similar program can be adopted by other sites, thus expanding the pool of pharmacy faculty.

Use of Summative Feedback to Tailor a Graduate Pharmaceutics Course. Wilson S. Meng and Shane P. Deselle, Duquesne University. Objectives: This paper describes the design, presentation, and evaluation of a graduate pharmaceutics course in therapeutic gene delivery incorporating the use of periodic formative feedback to guide the delivery of subsequent class presentations. Methods: Ten students representing diverse backgrounds were enrolled in a class designed to help them incorporate aspects of gene therapy into their research. The course was described as a direct teaching strategy. Following the completion of the first four sections, students responded to anonymous open-ended questionnaires eliciting what aspects of that section they found most interesting and what they found most confusing. This feedback was utilized to enhance discussion during subsequent class meetings and to inform the final special topics section. The instructor consulted with the School’s Director of Assessment to design a summative questionnaire employing behaviorally anchored rating scales to elicit feedback at the end of the course. Results: The majority (75%) of students indicated that the formative classroom assessments were beneficial to them and the instructor. Students were confident in the ability of the instructor to properly relate course materials (m = 6.25 on a 7-point scale) and confident in their own ability to incorporate concepts from the class into their own research endeavors. Implications: The use of formative feedback techniques can be utilized to enhance graduate courses and result in better use of class time and foster students’ communication skills.

Student and Faculty Assessment of the Use of Computer Laptops in the Classroom. Melissa A. Monague, Julia Thier, and Melida M. Jones, Creighton University. Objectives: Computer technology is ubiquitous in pharmacy practice. This fact in combination with the potential benefits of incorporating the Internet into the educational process lead us to consider the use of laptop computers in the classroom. In 2000, we instituted a mandatory student practice policy and the mandatory use of a computerized monitoring system performed a formative assessment of their use. The purpose of this report is to share these data. Methods: A cross-sectional survey design was used to assess the educational use of laptops in the classroom by both students and faculty. The survey was constructed to explore the following issues: enhancement of the educational process; technical support; and continued use. The survey consisted of a variable number of questions soliciting qualitative and quantitative responses. Results: Of 101 student surveys, 89 were returned. Five out of 5 faculty
Implementing a Four-Week Online Self Study Module as Preparation for an Immunization Lab. Todd D. Sorensen, and Kristin K. Janke, University of Minnesota. Objectives: To create an interactive, web-based self-study module that would increase active learning and allow students to demonstrate basic competency prior to engaging in a live immunization delivery laboratory session. Methods: Students were required to complete a 16 hour online module over 4 weeks, covering topics such as vaccine preventable diseases, vaccine pharmacotherapy, target group identification, screening, documentation, liability and reimbursement. The module utilized audio narration coupled with PowerPoint presentations, readings, self-tests, and streaming video. Before attending lab, students were required to achieve 70% on a comprehensive online exam. Following completion, students were asked to submit an online survey assessing comfort with the material, satisfaction with the instructional design and technology, and the module’s workload. Results: One hundred-one students completed the module and 95 (94%) of students passed the comprehensive exam. Twenty-six students (26%) completed the module evaluation. For each of the module’s content areas, at least 90% of respondents reported feeling extremely well, well or adequately prepared. Seventy-three percent indicated that the flexibility of online learning was “highly beneficial.” Of the instructional methods, interactive self-tests were most favored, with 96% indicating their value appears to be based on the availability of additional learning resources.

Implications: Community health workers facilitate students’ ability to provide culturally appropriate care and represent an instructional method that facilitates cultural competency.

Work in Progress Using a Guided Self-Teaching Technique To Help Students Learn To Efficiently Navigate Drug Information Databases. Miriam A. Ansong, Akima R. Howard, and Carolyn Ford, Hampton University. Objectives: To help students teach themselves to use drug information databases using a structured, self-teaching form. Methods: Fourth professional year pharmacy students on Drug Information clerkship are required to effectively use drug information databases to respond to questions. Although students receive training on selected databases during their first and second professional years, often times they do not remember how to use the databases efficiently and require additional training on clerkship. A data collection form was created to guide students to explore the drug information databases and identify areas of learning. All students should have web sites. Implications: While students evaluated both sites favorably, their value appears to be based on the availability of additional learning resources.

Adoption of Integrated, Problem-Based Modules into the Pharmacy Practice Curriculum. Jennifer W. Beall, Mary R. Monk-Tutor, Roger D. Lander, and Edwina S. Chan. Sanford University. Objectives: To implement Phase III of a progressive model for integrating learning concepts across pharmacy practice courses, which was developed by faculty at McWhorter School of Pharmacy in 2000-2001. Methods: Based on the previous model, over 20 faculty helped design three separate week-long, integrated, problem-based learning (PBL) modules in the third year of the curriculum during academic year 2004-2005. The core of each practice course was used to develop two integrated cases; during spring semester content from seven pharmacy practice courses and one pharmaceutical science elective were used to develop one integrated case. Each week was designed around one patient case and related practice activities in order to simulate the real-life experience of a pharmacist. Students and faculty evaluated the effectiveness of the delivery model after each week and improvements were made throughout the process. Results: Three integrated PBL modules were incorporated into the third year curriculum. During each week students interviewed mock patients, performed hands-on clinical assessments, developed written care plans, and addressed multiple problems related to drug education and information, staff management, health care reimbursement and ethics. Lessons learned during the model adoption process will be reported. Implications: An integrated delivery model reinforces holistic patient care as well as the interrelatedness of course content in the curriculum.

Development and Implementation of Software to Facilitate Document Review, Redaction, and Re-entry in a Service Learning Experience. Michael C. Brown, Patricia R. Lind, and Todd D. Sorensen, University of Minnesota. Objectives: The Early Pharmacy Education with Community Teachers (EPHECT) service learning experience required a documentation system to: (i) facilitate student reflection and faculty feedback; (ii) allow the administration to allow viewing of documentation from any computer; (iii) provide secure access; (iv) require minimal training; and (v) track student performance. Methods: A software program was developed using Macromedia® Authorware® to manage all student documentation and faculty feedback. Through passwords, the program controls a user’s access to view and enter documentation from any computer. A newly entered documentation/feedback is immediately posted to the Internet and available from any computer (password permitting). Results: Coordinators developed the system in 80 hours and spent a total of 20 hours

Implications:

Service learning is an effective learning strategy. Frequent feedback with reflection are important features, however, their management in a large service learning experience can be challenging. The software is projected to improve reflection, feedback, and efficiency, thereby improving the long-term viability of a large service learning experience.

Advanced Patient Counseling Focusing on Complex Pharmacist-Patient Scenarios.

Shauna Buring, Raymond Jang, and Jennie Zimmerman, and Jane Pruemmer, University of Cincinnati College of Pharmacy. Objectives: To provide students the opportunity to counsel standardized patients about their medication while dealing with practical issues encountered in community pharmacy practice. To assess the communication skills of students in counseling patients with complex pharmacotherapy and psychosocial issues. Methods: Six pharmacist-patient scenarios each containing three key points were developed. Complex pharmacotherapy issues incorporated into the scenarios included use of natural supplements, identification of drug-induced, and injection of interferon-α-2B. Psychosocial issues included foreign language comprehension, noncompliance in a transplant patient, embarrassment due to injection of interferon-α-2B. Results: Drug-induced side effects were difficult to manage, counseling, followed by peer assessment. The instructor summarized and gave additional feedback. Results: The course is currently ongoing and final results will be presented. Preliminary results show that students were equipped to handle the complicated pharmacotherapy issues but struggled with the psychosocial situations. Implications: Students gained an appreciation for the realities of multifaceted pharmacist-patient interactions in community pharmacy practice.

Discovery-Based Methods Laboratory for Undergraduate Majors in Pharmaceutical Sciences.

Greg Clodfelter, Ron Torry, Rick Morrow, Bob Soltis, Brian Sanders, Don Stratton, and Jim Reynolds, Drake University. Objective: Our Bachelor's of Science degree in Pharmaceutical Sciences is a four year program that requires a significant research component. Traditional methods courses require students to rotate through several laboratories learning different techniques that may or may not be related to a specific research question. While this hands-on approach is beneficial to learning and understanding the techniques, the lack of continuity does not allow for integration of the techniques learned or the application of experimental design to a specific research question. The intent of this newly designed course is to demonstrate to students that research can be integrated into the laboratory and taught as a laboratory methods in a semester long research project. Methods: This laboratory course is designed as a semester long research project examining the behavioral, cardiovascular, biochemical, and molecular changes associated with ovariectomy of spontaneously hypertensive rats. Students gain experience in small animal surgery, behavioral paradigms, isolated tissue techniques, RNA isolation, RT-PCR and western blotting techniques. In addition, the students are trained and certified in the proper care and handling of research animals and participate in discussions on the ethical treatment of animals. Implications: A methods course that focuses on a single research project can be beneficial to undergraduate students because it provides a discovery-based context for learning, understanding and integrating laboratory techniques and experimental design.

Scale for the Assessment of Student Performance in a Small Group Learning Environment.

Brian L. Crabtree and Gary D. Theilman, University of Mississippi. Objectives: Development of a rating scale to measure student performance in a vertically integrated small group problem-based learning format. A statistical correction is to be applied to the results to minimize inter-rater variations. Methods: Students are assigned to groups of eight or fewer. Faculty facilitators use the instrument to assess breadth and depth of knowledge acquisition, reasoning, self-directed learning, problem solving, and interpersonal and group skills. Additional peer assessments, the quality of which is assessed in the rating scale. Performance assessments are conducted three times in each course. The first two assessments are formative and the final assessment is summative. Some of the items on the instrument are unavoidably subjective. To minimize inter-rater variability amongst faculty, a statistical correction is applied to students' scores. This adjustment takes into account differences in mean scores and variance between groups. Implications: The rating scale offers a practical method for assessment of student performance in small groups and has been well accepted by faculty and students. The scale complements other components of the student performance management system and is noted among some raters. This sometimes leads to changes in grades following the statistical correction. Additional training and research are needed to reduce intergroup variation in faculty assessments to establish validity and reliability.

Student Perceptions of Physical Assessment Skills.

Erin C. Dunn and Carrie J. DeKorte, Midwestern University-Glendale. Objectives: Assess and compare student perceptions of physical assessment skills following didactic instruction, and after completion of five experiential rotations. Methods: Pharmacy students entering their final 5 months of didactic instruction completed a survey prior to the beginning of the required 2.5 credit hour course, "Clinical Interview and Assessment." Students indicated their comfort level with performing individual patient interview and physical assessment techniques based upon a scale of 1 to 7 (1 = very comfortable to 7 = very uncomfortable). In the second portion of the survey, participants rated the level of importance of pharmacists utilizing patient interview and physical assessment skills in their professional practice (1 = very important to 7 = very unimportant). The students repeated the survey upon the conclusion of the course and again after 6 months of experiential clerkship rotations. The responses will be compared and reported. Implications: This assessment compares the comfort levels and perceptions of pharmacy students related to patient interview and physical assessment skills following didactic instruction and experiential clerkship rotations and will provide insight into future course structure.

Innovations in Teaching Drug Information Involving Online Consumer Queries.

Brian L. Crabtree and Gary D. Theilman, University of California San Francisco, San Francisco. Objectives: Expand drug information activities within a clinical clerkship to facilitate development of consumer oriented drug information skills. Student and resident activities include individual assignment of consumer queries, self-evaluation, collaborative learning, and peer-evaluation of written responses. Methods: Third and fourth year students and residents are assigned consumer drug information queries received from an online "Ask Your Pharmacist" (AYP) Service. Students and residents independently identify drug information questions within consumer queries, evaluate available patient background information, and research questions using drug information resources and literature. Students and residents self-assess their work. Responses are reviewed for content, organization, spelling, grammar, and readability (e.g., appropriate use of lay language). Select responses are discussed and/or peer-reviewed among students or residents for teaching purposes. Faculty discuss revisions with students and residents to formulate a final response, in addition, residents develop experience in serving as preceptors by reviewing and editing student work. Implications: Third and fourth year students and residents obtain consumer oriented, written drug information skills within a drug information rotation. This experience familiarizes students and residents with questions commonly asked by consumers, reinforces drug information retrieval and evaluation skills, and enhances written communication.

Teaching Drug Information Across the Pharmacy Curriculum.

Brenda L. Gleason, Shelly J. Enders, Brian J. Seiz, and Sheldon G. Holstad, St. Louis College of Pharmacy. Intent: Traditionally, the Drug Information course has been taught to students at the St. Louis College of Pharmacy in their last semester of didactics, just prior to starting clerkships. With this, we have observed that students often possess suboptimal level of drug information abilities during the professional curriculum. Additionally, anecdotal information gathered from students supports the need for abilities learned in Drug Information be learned earlier in the curriculum. Thus, we have redesigned the curriculum to expand Drug Information from one course to modules integrated throughout the curriculum to promote enhanced literature retrieval and evaluation abilities among our students as they progress through the curriculum and enter clerkships. Process: Students practice introductory drug information abilities in the second year of the pre-professional curriculum. As they proceed to the professional curriculum, we will build upon this foundation by devising practice opportunities for students to develop basic literature evaluation skills and strategies for providing drug information in various settings. Literature evaluation skills will be reinforced through Divisional didactic courses such as Pathophysiology, Therapeutics, and Evidence-Based Medicine. Implications: We perceive that introducing Drug Information to students early in their curriculum and building upon that foundation throughout their curriculum will better prepare students to apply and internalize the principles of drug information.

Use of WebCT to Facilitate Service Learning and Reflection for First Professional Year Students.

Jennifer A James, University of Connecticut. Objectives: To develop, implement and evaluate the service learning (SL) component of the first professional year introductory practice experience (IPE) with the aid of internet based Web Course Tools (WebCT) program. Methods: Course objectives were developed to include a longitudinal volunteer SL experience introducing the concepts of caring, social support and community service


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needs. Students set up and coordinated their own SL experience with a non-profit organization serving basic human needs from a patient-centered perspective. Faculty and the university's Office of Community Service and Learning (OCSL) worked with the local organization to develop and identify the project, students were assigned to the project, and the project was evaluated. The project was a successful model for students' learning while being exposed to the responsibilities of a pharmacist on a community pharmacy. The University of Wisconsin-Madison School of Pharmacy has developed a tool for evaluating student skill in communicating with patients. The tool was developed to familiarize faculty with outcome definitions, improve the quality of case studies, and enhance student understanding of the expectations of the case problem-setting process. Performance-based case studies were constructed and instructions for case writers were prepared, and a written guide to help students write case studies was created. The impact of these steps will be evaluated by the task force at the end of the next semester using the same process. Implications: This process has already enhanced faculty awareness and understanding of competence abilities and criteria; created ownership of the assessment process; and fostered increased communication among faculty. Continual application of this interactive process will be used to effect continuous improvement in teaching and learning.

**Development and Testing of a Tool For Evaluating Nonprescription Product Consultations.** Nathan L. Kanous II, Denise J. Walibrand-Pigarelli and Michael E. Pitterle, University of Wisconsin-Madison. Objectives: To demonstrate how a tool for evaluating non-prescription product consultations was created and tested for reliability. Methods: The University of Wisconsin-Madison School of Pharmacy has developed a tool for evaluating student skill in providing prescription consultations. In 2000, a group of researchers from the UK published a set of criteria for assessing the appropriateness of patient counseling in community pharmacies. The University of Wisconsin authors took the existing prescription consultation tool and modified it to reflect those published criteria for community pharmacy consultations. This poster will outline the process for developing a non-prescription tool and present reliability testing conducted on approximately 120 evaluated consultations. Implications: ACPE accreditation guidelines recommend outcome assessments be conducted as a part of accreditation. Developing effective assessment tools to meet this need is an important part of curricular and student evaluation.

**Enhancing Student Reflection through Service-Learning and Communication Courses.** Janelle Krueger, Bruce Berger and Bill Felkey, Auburn University. Auburn students participate in a longitudinal introductory practice experience program placing them with community-based patients during the first three years of the curriculum. This program is based on a service-learning framework and both provision of care and reflection are integral components of the experience. Objectives: Since student reflections have often lacked appropriate depth, a method to improve students abilities to critically reflect upon and learn from their experiences was needed. Additional goals were to provide further guidance to faculty who provide feedback on weekly reflections. Methods: To measure the impact of proposed changes, a 2-part plan was implemented in which: (i) a new model for reflection was introduced in the service-learning based course series and (ii) reinforcement of this model was completed through a project in the required Pharmacy Communication course. Intervention impact is being assessed through a faculty and student evaluation. Results: Faculty feedback indicates that the added Communication course requirement improved student performance.

**Early Pharmacy Education with Community Teachers (EPhECT): A Longitudinal Service Learning Experience.** Patricia R. Lind, Michael C. Brown and Todd D. Sorensen, University of Minnesota. Objectives: Students in EPhECT should: (i) Develop a relationship with a community teacher (CT), (ii) Learn from their CT’s health and life experiences, (iii) Identify and meet their CT’s needs, and (iv) Gain a sense of the pharmacological role. Methods: EPhECT teams are comprised of a CT, a first (PDI), second (PDI), and two third (PDIII) year students, and a faculty member. The PDI and PDII students visit their CT in the CT’s home twice per semester. Visits focus on meeting the first three objectives. Following each visit, students complete written reflection and a reflective interview. PDIII use these materials to develop the fourth objective by working with their CT in the on-campus Pharmaceutical Care Clinic. With a preceptor, students complete an assessment, care plan and physician letter. Results: Student reflections contain evidence of a valuable, individualized experience, with 84% describing better understanding of the patients’ perspective, PDI and PDII students reported companionship (52%), provision of general health information (35%), and encouragement to use health care resources (17%) as services provided. All of the CT Clinic participants reported a positive experience and 92% of CT’s reported to be more likely to utilize pharmacists since joining EPhECT. Further assessments continue. Implications: Through EPhECT, students work in a rich, patient-centered, nontraditional learning environment that may motivate them to practice as patient-centered pharmacists in the future.

**Simulated Pharmacy and Therapeutics Committee Meeting in an Infectious Diseases Module of a Pharmacotherapeutics Sequence.** Jennifer M. Malinowski and Bill Wisler, University. Objectives: An educational strategy was developed for students to engage in the process of making drug therapy recommendations by applying drug information skills using written and oral communication to recently reviewed information on antibiotic pharmacotherapy. Methods: Sixty-four second professional year Doctor of Pharmacy students enrolled in an Infectious Diseases Module of a required 4-semester Pharmacotherapeutics sequence were divided into six groups. Using an instructor-defined topic assignment, each group developed a written submission suitable for inclusion into a simulated Pharmacy and Therapeutics Committee meeting agenda. Written information was assembled and distributed to the class and members of the committee (which included two faculty members and four 4th professional year Doctor of pharmacy candidates) one week before the meeting. During the meeting, student representatives provided a brief oral presentation on the assignment and responded to questions from the committee. Following the presentation, students observed the committee interact and vote on each of the assignments. Students evaluated the presenters and their peers for their performance within the groups. Student evaluations of the assignment will be reviewed. Implications: Students will be successfully engaged in active learning while being exposed to the responsibilities of a pharmacist on a Pharmacy and Therapeutics Committee and the role of a Pharmacy and Therapeutics Committee as it relates to infectious diseases.

**Utilization of a Comprehensive Evaluation Exercise in Nonprescription Medicines Course.** Bella H. Mehta and Kristin A. Casper, Ohio State University. Objective: To enable a first year pharmacy student to: (i) assimilate information gathered during a nonprescription medicines course; (ii) effectively conduct an interview; (iii) formulate an appropriate product recommendation; and (iv) effectively counsel a patient. Method: Each student was assigned a patient with a chronic disease during Week 2 of the quarter. Students wrote a care plan for their patient with product recommendations for the following complaints: cough/cold, pain/fever and GI upset (diarrhea, constipation, acid/peptic disorders). Each recommendation included the brand and generic product name, the dosing information, duration of therapy, and pertinent patient information. On Week 9 of the quarter, students used the written care plan as a resource for the videotaping exercise. The “patient” described symptoms for one of the three complaints from the written care plan assignment. The student ‘pharmacist’ then used their written care plan to recommend the most appropriate product and counsel the patient. Results: While students indicated that the exercise improved their communication skills and was equivalent to a real-life experience, they wanted more practice with "mock interviews" prior to completing the videotaping. With slight modifications, including development of "real patients," the exercise will be reintegrated into the curriculum as a nonprescription medicines course. Implications: This assignment assesses students’ ability to apply didactic lecture information and communication techniques to specific patient scenarios.

**Theatrical Teaching.** Peggy C de Voest and Tracey L Mersfelder, Ferris State University, Otsego. The Ferris State University Doctor of Pharmacy program ensures student participation in their own education thus developing a more independent learning model. Hands-on instruction and
active student involvement will be utilized to enhance learning. **Methods:** A therapeutic topic at the University of Kentucky was selected from an available database. The course was designed to reflect the current professional-year 3 Therapeutics course that reflects the participating faculty members' interests. The lecture was developed and written by the faculty members. This material includes a PowerPoint presentation to ensure baseline knowledge, hands on experiments with the medications, and a play, which casts the students as characters. All materials and props will be designed and made by the faculty members in order to ensure the smooth flow of teaching. A background knowledge probe and a memory matrix will be administered to the student prior to and after the lecture. A short post lecture evaluation will be administered to determine the student's perception of the style.

Lastly, multiple-choice questions will be administered roughly one week after the lecture.

**Implications:** This teaching method provides an interactive and one of a kind means of engaging students in their own learning. It will also provide a format on which this style may be introduced into other classes to make them more learner centered. Ultimately, it will increase the understanding of the lecture/discussion content and promote critical and independent thinking for students.

**Development and Implementation of Women's Health Structured Clinical Instructional Models.** Melody Ryan and Eleanor Bird, University of Kentucky. **Objective:** To develop and implement structured clinical instructional models (SCIMs) for women's health topics for third professional year students. Process: A Women's Health Education Team was convened with representation from the Colleges of Allied Health, Dentistry, Medicine, Nursing, and Pharmacy. Five women's health topics (Human Immunodeficiency Virus, Diabetes, Osteoporosis, Cardiology, and Domestic Violence) were selected and core, standardized objectives were determined. Each college further developed the cases for its discipline. The College of Pharmacology formed a committee of faculty, a pharmacist, a nursing student, and a professional student, developed specific, pharmacy-related objectives, case scenarios, and grading criteria for each topic. The cases included objectives, student instructions, standardized patient scripts, checklist grading sheets, case support materials, and follow-up student work. Standardized patients were trained to portray the cases. The SCIMs were piloted with 10 students. Feedback was solicited immediately from both students and standardized patients and provided to the task force. The SCIMs were further modified and a materials checklist was developed. The final versions of the SCIMs were used in the third professional year curriculum over two semesters. Logistical modifications provide parallel learning experiences for 88 students were necessary. Student feedback was solicited following SCIM participation and will be summarized. **Implications:** Lessons learned in case development and implementation will be shared with recommendations for maximizing the benefits while efficiently using resources.

**Effect of an Internet-Based Practice Exam on Students' Actual Exam Performance.** Jennifer A. Santee, University of Missouri - Kansas City. **Objective:** To determine whether a voluntary, internet-based practice exam improves pharmacy student performance on a written multiple choice exam.

**Methods:** Students at the University of Missouri - Kansas City were informed of an internet-based, voluntary, internet-based practice exam. WebCT was used to develop an internet-based, 50 question multiple choice practice exam students can take on their own. After a student electronically submits the completed practice exam, he/she is immediately provided with feedback on the type of question, correct or incorrect, further information about the medication in question, and/or alternative ways to mentally process the information being tested on. The investigator will determine the percentage of students who use the practice exam. Analysis of coverage will be used to determine if students who take this practice exam obtain a higher percentage correct on the actual exam and require less attempts to pass the actual exam than students who do not use the practice exam. Grade point average will be used as a potential confounding variable. **Implications:** In the past students have required multiple attempts in order to pass the actual exam. This requires increased resources to administer the exam. The practice exam and feedback will hopefully improve student performance and therefore decrease the number of times the exam must be administered.

**Asynchronous Education: Experience with Video Streaming.** Amy H Schwartz, Creighton University Objective: To evaluate student acceptance with and overall feasibility of video streaming as a method for delivering course material. The course was designed to accomodate an asynchronous learning pathway. **Methods:** Professional Development Seminars involves a series of presentations related to profession socialization, practice and career opportunities. The course employs interactive lectures and roundtable discussions. Video streaming was selected based on a review of instructional materials and distance education resources. Weekly seminars are recorded and streamed; resultant links are available on the course web site along with handouts, slides and reading materials. Compact discs back-ups are being developed for students who experience technical difficulties. Student feedback regarding course content, video quality and accessibility is sought during the midpoint and end of the course. **Results:** The course was piloted from autumn 2001 to spring 2002 in two sections, with 25 students in one and 40 in the other. The course was not intended as a "shadowing" program). Suggestions given to the prescribers were told that they were not able to complete the video streaming. Prescribers who declined participation did so primarily for logistical reasons and time to receipt of links has varied. Student comments regarding the use of video streaming have been positive. Problems encountered with secondary to internet service connection, appear to be the primary limiting factor. **Implications:** Seminar series offer a unique challenge for distance education. The information collected should provide insight regarding the usefulness of video streaming.

**Online Intensive Journaling to Evaluate Service-Learning Experiences.** Jeri J. Sias, UTEP/UT-Austin Cooperative Pharmacy Program, John Scentsers-Zapico, University of Texas at El Paso. **Objective:** To use interactive on-line journals to: (i) document students' perceptions of the role of the pharmacy profession along the US-Mexico border as part of their lecture series and community service experiences; and (ii) encourage problem solving and critical thinking. **Methods:** A cross-disciplinary initiative between the pharmacy program and English department occurred. Students were taught to use the "TheJournalPlace.com" and placed in small on-line clusters where they periodically reflected on border health issues in one of three journal sections. "Stasis" provided a forum to state their current understanding of health care or the pharmacy profession. "Dialogue" allowed students to interact and respond within their clusters. "Abrupt" documented change and growth in students' understandings of their health care role. The instructor commented to each student making the experience timely and personal. **Results:** Nine students have participated and been evaluated through their journal reflections and formal course evaluation. Student use was mixed—some students participated fully while others often resisted interaction with their cluster mates. Three semesters remain to document experiences and to improve participation. **Implications:** This forum has provided a manner to document short and long-term perspectives while encouraging on-line dialogues among students and teachers. After completing the service experiences, the program will evaluate the growth and perceptions of pharmacy students in this border community through interactive on-line media.

**Interprofessional Introductory Experiential Course.** Christopher Turner, Brian Dvernill, Ralph Altierre and Larry Clark, University of Colorado. **Objective:** To improve a colleague from another academic institution's ability to improve students' self-confidence working with prescribers and to provide insight into the working environments of these practitioners. **Methods:** With help from the School of Medicine's Foundations of Doctoring Program, physicians and nurse practitioners in metropolitan Denver were approached by fax and/or telephone and asked to precept a third year entry-level Doctor of Pharmacy student for two hours per week for 10 weeks. Course objectives were described and the prescribers were asked to consider how they might utilize a student for 20 hours to assist in patient care (i.e., the prescribers were told that the course was not intended as a "shadowing" program). Suggestions given to the prescribers were told that they were not able to complete the practice exam. Prescribers who declined participation did so primarily for logistical reasons and asked to be contacted next year. **Implications:** Physicians and nurse practitioners in metropolitan Denver are interested in interprofessional education and are willing to precept pharmacy students in an introductory pharmacy practice experiential course.

**Theoretical Model**

**Designing a Pharmacy Practice Skills Laboratory to Synchronize Skill Development with Didactic Learning in Cardiovascular Pharmacotherapeutics.** Shanna M. Buring, Beth Brown, Mike Doherty, Andrea Wall, William Fant and Mike Bottorff, University of Cincinnati. **Objective:** To design a course for pharmacy students that integrated the clinical pharmacy practice with didactic learning. **Methods:** A drug therapy lab was designed for students to gain hands-on experience with cardiovascular medications. The course covered therapeutic classes such as anticoagulants, anti-hypertensives, lipid-lowering, calcium channel blockers, beta-blockers, and ACE inhibitors. Students were evaluated on their knowledge of the medications through written exams and quizzes. The course also included a simulation of a patient care service experience, where students were paired with preceptors from various healthcare settings, including hospitals, long-term care facilities, and clinics. **Implications:** The new curriculum was well-received by students, who reported increased confidence in their ability to manage cardiovascular patients. The course also provided opportunities for students to network with healthcare professionals and to develop skills in patient education and counseling.
interaction evaluation, and global cardiovascular risk assessment including blood pressure, mean arterial pressure, cholesterol, and triglycerides. The pharmacotherapeutics determined which skills to teach and how to construct active learning modules. Results: Students performed well in most modules and related knowledge learned in the didactic course with skill development. This was particularly true for dispensing and counseling and physical assessment. Implications: The collaborative effort of faculty from both courses served to reinforce cardiovascular-related knowledge and skills between traditional didactic pharmacotherapeutics courses and pharmacy practice skills labs. This laboratory served as a model for synchronization of teaching that could be replicated in future pharmacy practice skills labs.

Spiral Curricular Models: Assessing Ability Development In Case Analysis Sessions. Nicole Jones, Darren Grabe, Mario Zeolla and Nancy Waite, Albany College of Pharmacy. Objectives: Case analysis is a small group based learning activity embedded within a Pharmacotherapy course sequence. This activity (4 X 3 hour sessions spanning two semesters) was originally created as a single session and was not developed for multiple sessions; therefore, the format was repeated rather than developed for ability advancement. Students have expressed dissatisfaction with the activity's repetition. To increase the activity sequence's effectiveness, we have revised case analysis using a spiraling curricular model. Methods: The original session emphasized lower-order questioning about specific disease states and patients. Spiral curricular models limit assessment of communication and problem solving abilities. Steps taken to revise case analysis included: identify pertinent ability outcomes; sequence sessions to teach, practice and assess those outcomes at stepped difficulty levels. The revised case model uses a spiral educational process spanning 4-sessions. Results: Each session assesses information gathering, verbal and written communication, problem solving, and therapeutic knowledge application abilities. Increased ability and skill level is plotted across the sequence. The spiral design required time adjustments for the last two sessions and changing the fourth session to focus on multiple disease states. Additional emphasis is placed on faculty training, assessment consistency, and student preparation. Implications: Spiral curricular models enhance student learning at higher critical orders. Students should demonstrate stronger knowledge bases and abilities development while finding the case analysis sequence relevant, yet challenging.

LIBRARIES/EDUCATIONAL RESOURCES

Work In progress - How Librarians Can Help Faculty Remain Current with New Drug Information Databases. Elizabeth C. Jackson and Amy E. Ellison, Mercer University. Many studies report best practices for teaching students about drug information databases. However, virtually none describe faculty training. During its 2002 ACPE self-study Mercer faculty members told the steering committee that they needed to learn about new drug information resources added by the Swilley Library. In January 2002, sixteen faculty members confirmed this in a survey. Would a single annual laboratory/lecture, conducted by a librarian, serve this need? February 21,2002 a librarian from the Swilley Library will present a lecture/laboratory on new medical databases. Faculty members who attend will complete a survey to determine whether they expect to use the databases in the coming month, and 2. if they plan to add links to the databases for on-line syllabi during the next six months. In April 2002 a librarian will interview those who attended the lecture, asking if these teachers were able to meet their goals for using the databases and planning for syllabi links to the databases. The authors will then share the results with the pharmacy faculty and Swilley library faculty members. Together librarians and faculty will devise a faculty-training plan for 2002/2003. Spring 2003 the authors will report results of the two teaching strategies and make recommendations.

Planning and Implementation of a Pharmaceutical Information Services Program. Susan M. McGuinness, Mary Linn Bergstrom and Anne Prussing, University of California, San Diego. Objectives: Establish and provide information resources and library services for the newly established University of California, San Diego (UCSD) School of Pharmacy and Pharmaceutical Sciences (SPPS). Methods: The SPPS allocated funds to the UCSD Biomedical Library (BML) for collection development and the UCSD Libraries funded a professional librarian position with liaison responsibilities for the SPSS. BML hired a pharmacy librarian to assess and develop the pharmacy and pharmacology collection, to ensure awareness of library services among faculty and students, and to participate in pharmacy informatics curriculum development. Collection development well as need for an elective course in this area. The assessment utilized a five-point Likert scale, their opinion of the relative importance of various skills and abilities in a pharmaceutical care practice. They were also asked to assess the level of competency of students they have recently precepted (in the last five years) in various skills and abilities, also using a 5-point Likert scale. 134 surveys were sent to preceptors involved in the Externship program of the St. Louis College of Pharmacy. Implications: Librarianship is essential in designing a Pharmaceutical Care Laboratory. Practitioners have the "real-world" experience needed to help us plan a laboratory with relevant activities and exercises. The results of this survey will be very valuable to us in doing so. In addition, an assessment of our recent students' strengths and weaknesses in various skills and abilities will enable us to design a laboratory which will help prepare graduates who are competent and confident in providing pharmaceutical care.

PHARMACY PRACTICE

Completed Research

Elective Course in Landmark Trials: Assessment of Faculty Attitudes and Curricular Need. Jill S. Burklewicz and Julie A. Weberski, Midwestern University. Objective: To determine faculty attitudes regarding: (i) appropriate role of incorporating landmark trials in the curriculum; (ii) current student preparedness to support therapeutic recommendations with clinical trial data; and (iii) curricular need for an elective course in landmark trials. Methods: An internet survey was developed and sent to 36 pharmacy practice faculty, with one follow-up survey for non-responders. Faculty were asked to respond to statements on the appropriateness of incorporating landmark trials in course curriculum, and the need for an elective course in this area. The assessment utilized a five-point Likert scale (5- strongly agree, 3-no opinion, 1- strongly disagree). Results: The response rate was 78%. Overall, 86% of faculty agreed that it is appropriate to require pharmacy students to read landmark trials as part of clinical elective courses. Only 32% of faculty agreed that the current curriculum adequately prepares pharmacy students to support therapeutic recommendations in clinical practice with evidence from clinical trials. Most faculty (89%) agreed that there is a need in the current curriculum for an
 elective course in landmark studies (43% strongly agree; 46% agree). Faculty reported that students tended towards, and not receiving (N=24) at a 40. Implications: An elective course in landmark trials will be offered in summer 2002. The course will be 2 credit hours and focus on evaluating clinical trial data that support therapeutic recommendations in primary care.

**Development of CAPE Outcome Based Goals and Objectives for Community Pharmacy Advanced Practice Experiences.** Jennifer Cerulli and Margaret Malone.

Methods: To develop an approach to providing and evaluating CPAPE, a focus group of preceptors met and identified three major needs: a list of suggested activities, an assessment tool, goals, and evaluation tools to fit their practice setting. To develop a new clerkship template, the number and type of experiential activities from faculty based CPAPE were documented to determine a reasonable workload for students and preceptors. Samples of standardized objectives from other colleges of pharmacy were reviewed for format and content. The key CAPE outcomes to be achieved and assessed during the CPAPE were identified and linked with specific student activities. Assessment tools were adapted or developed. The template was piloted by 2 faculty with 8 students and revised prior to the July 2001 implementation.

Results: The resulting template combines CAPE-based objectives with specific clerkship activities and assessment tools in feedback from preceptors and students. Students felt there was a large amount of documentation required.

Implications: The standardized goals and objectives clarify expectations for CPAPE preceptors and students. Future use of a computer database for documentation may reduce the paperwork.


Methods: To develop, implement and evaluate an ambulatory care clerkship in a community health center (CHC). A faculty member instrumental in developing an internal and clinical pharmacy CHC services precepted the clerkship initially. Clerkship activities include patient and provider drug information, medication histories, patient counseling and education, polypharmacy reviews and recommendations, warfarin monitoring and dosage adjustment, insurance presentations, newsletter or vocation literature, and interprofessional team introduction, and case presentations. Students evaluate the clerkship activities at the conclusion of the experience. The instructor evaluates the student's clerkship performance. Results: Since May 1999, 16 students have completed the 8-week required clerkship experience and have completed 4-week elective. Student performance has been above average in the site with 13 students receiving A's (81%) in the required clerkship; the rest have received B's. Student evaluation of the activities has been favorable with 88% rating them either satisfactory or of great value. Students rated the balance of clerkship activities as satisfactory 84% of the time. Implications: CHC's provide a rich environment for ambulatory care clerkships. Patient and disease state variability are excellent education needs of providers and patients are great. There are many opportunities for pharmacy students to provide service as they gain experience in patient care.

**Student Self-Assessment of Drug Knowledge and Skills Before and After Clerkship Experiences.** Lilian H. Hill, Cynthia K. Kirkwood, Gretchen M. Brophy, Beth S. Gray and Michael A. Crouch, Creighton University.

Methods: A survey consisting of 28 items of drug knowledge and 17 skills was developed and approved by the coordinators of the four-semester sequence of service state management courses. VCU's Institutional Review Board approved the study. A preliminary survey was administered to the class of 2000 (N=38) before graduation. The second administration was the class of 2001 (N=72) before their clerkship year. The survey will be repeated each in the same course in the subsequent student clerkship courses. The survey also included administrative staff and preceptors. The Mann-Whitney rank sum test is being used to compare student assessment of drug knowledge and clinical skills before and after clerkships and compare student and preceptor evaluations. Results: The results of the preliminary survey reflect some disparity in the types of knowledge and skills taught. For example, the preceptors assessed more basic knowledge of pharmacology and drug interactions than did students. Results of the student and preceptor studies will be presented. Implications: The surveys will be used by instructors of the pharmacotherapy course to determine how effective instruction has been and what curricular changes will be needed.

**Cost-Effectiveness of Nesiritide in Acute Decompensated Heart Failure.** Daniel E. Hillman, Mark A. Malesker and Christopher J. Holewinski, Creighton University.

Methods: This was a case-control health care resource utilization analysis of patients receiving N (cases) and not receiving N (controls) at a 40-bed University teaching hospital. 40 pts with acute decompensated HF (DRG127) admitted to the coronary care unit (CCU) comprised this study group. 20 pts serving as controls did not receive N were matched with 20 pts serving as controls receiving N within 36 hrs of hospital admission. Cases had to receive a minimum of 24 hrs of N. Results: Costs of health care resources were based on College of Charleston N cost. N was received for an average length of stay (LOS) in both the CCU (9.25 hrs) and for total hospital LOS (20.0 hrs). Pts receiving N had fewer diuretic (-2.5) and potassium doses (-2.7) and less blood draws for electrolytes/renal function (-2.3). Pts receiving N also received less dobutamine, dopamine, IV nitroglycerin, and milrinone. Utilization of other resources was not significant. A significant difference was noted in cases and controls. The difference in health care resource costs which included the cost of N ($625 for cases, was $500 less for cases than controls. Implications: When N is added to therapy within the first 36 hrs of hospital admission to pts with acute decompensated HF, health care resources are reduced and a cost saving is realized.


Objective: To characterize nonprescription nicotine replacement therapy (NRT) users and to gauge their interest in pharmacist-facilitated tobacco cessation resources. Methods: Semi-structured, in-depth telephone interviews were conducted with 103 NRT users. Recruitment strategies included point-of-sale advertisement, health care endorsements, email notifications to public users, announcements in print media, and Web promotion. Results: On average, participants had been smoking for 21.7 years, had made 6-2 serious quit attempts, and were smoking 20.4 cigarettes per day prior to quitting. Although pharmacists currently are not being utilized as community resources for quitting, the concept is appealing to many patients—48% believed it to be very or extremely useful for patients in general to utilize pharmacists to provide services. Implications: Because NRT products are available almost exclusively at pharmacies, pharmacists are in a logical candidate for providing assistance to smokers using NRT as an aid for cessation. Results of this study support an expanded role for the pharmacist in assisting patients with smoking cessation.

**Consumer Attitudes Toward Pharmacists, Pharmacy Practice, and Pharmaceutical Care.** Mark Malesker, Erin Haney, Denise Roach, and Michael Monaghan, Creighton University.

Objective: Schools and colleges of pharmacy are encouraged to develop programs around the philosophy of pharmacist care, but does the consumer know what pharmaceutical care is? The purpose of this project was to assess the public's knowledge and attitude toward pharmacists, educators, and curriculum. Methods: A Cross-sectional survey design was used to assess the knowledge and attitudes of consumers in both the independent/chain setting. Results were tabulated and descriptive statistics performed. Results: One hundred and four surveys were completed. Sixty percent of respondents had education training beyond high school and 40% of greater than four years. Consumers had highly variable responses regarding attitudes toward pharmacy and practice. Only 47% believed that graduates received the Pharm.D. degree. Sixty-one percent were not sure if pharmacists can become specialized in different areas. On the other hand, 66% believed that insurance companies should reimburse pharmacists for services. Another 46% were willing to pay more if extra reimbursement went to the pharmacist. Forty-two percent of respondents were willing to pay $1.00 extra per prescription for these services. Implications: Overall, consumers demonstrated little knowledge of pharmacists and pharmacy practice yet believe in reimbursing for pharmaceutical care services. More consumer-directed education may enhance the perceived monetary value of pharmacist care services. Schools and colleges of pharmacy must take an active role in this education.

**Student Achievement Versus Reactions to Incorporating Performance-based Assessments in a Therapeutics Course.** Michael S. Monaghan, Gary N. Elsasser, Creighton University.

Objectives: Programs are encouraged to adopt skills-based curricula and greater-hands on learning. A new survey based assessment of both the student and preceptor studies will be presented. Implications: Results of the surveys will be used by instructors of the pharmacotherapy sequence to determine how effective instruction has been and what curricular changes will be needed.
in either domain with this change in testing. Methods: Student achievement was evaluated by computing mean scores and two-year differences in overall and semester scores from the last year of MCQ (1999) versus the first year of PBA (2000) using the Mann-Whitney U test. Student reactions were evaluated by comparing instructor and course evaluations. Results: Overall, student performance did not change. Instructor/course evaluations were much more derogatory and negative for the PBA year compared to the MCQ year. Implications: As schools match their assessments to an ABC, care should be given in evaluating instructor and course effectiveness based on student comments.

Using "Wit" to Introduce Humanistic Issues to First Year Pharmacy Students. Robert L. Page, David C Thompson, Susan M Paulson, University of Colorado at Denver. Objectives: To evaluate the impact of a baseline understanding of humanistic issues associated with pharmaceutical care due to limited patient exposure until their advanced practice clerkships. A module was developed to facilitate first year students' understanding of health care delivery (HCD) from a patient's perspective and the inpatient clinical pharmacist's (ICP) role in improving patient care. Methods: Prior to the module, students were surveyed on understanding of ICP roles. Students watched Wit, a movie about inpatient experiences of an ovarian cancer patient. Students were asked to critique professional behaviors between providers and patient, and comment upon the ICP's role in improving HCD. An oncology ICP then led a discussion regarding the humanistic and therapeutic challenges of managing oncology patients. Students completed exit surveys. Results: Survey analyses showed that students (n=95) had a poor understanding of ICP roles. In summary, students considered that: the module changed student perception about ICP roles in patient care (61%); patients and physicians have equal involvement in making therapeutic decisions (72%); providers should treat patients as individuals (92%); the module changed the students' understanding of the therapeutic role of medication therapy management (97%). Implications: The use of the Wit movie with student discussion can be used successfully to introduce humanistic issues and highlight the ICP's roles to first year pharmacy students. This may serve as a model for other institutions.

Effect of a Pain Management Elective Course on Students' Attitudes and Knowledge Regarding Pain. Raylene M. Rospond, Drake University. Objectives: To evaluate the effect of a pain management course on the knowledge and attitudes of pharmacy students regarding pain. Methods: The impact of a 2 credit pain management course on knowledge and attitudes was evaluated utilizing a 53 question survey instrument developed from pre- and post-course assessment. Students enrolled in fall 2001 completed pre and post-course assessment on-line utilizing SurveySuite. Percent correct on each item pre and post course was evaluated for improvement. Student course evaluations scores on understanding of concepts and principles and value of course were also examined. Results: Twenty-one students (6DP1, 12DP2, 3DP3) completed both pre and post course assessments. Total % answered correctly increased from a mean of 63.2 to 86.7 (average % correct increase/question of 23.5). Average increase in % correct of 28.8% was demonstrated on 44/53 survey questions. 100% correct occurred on 4/53 questions on the pre and post-course assessment. Surprisingly, the % of total correct increased in percent correct of 4.7. Student evaluations indicated improved knowledge of concepts and principles: mean score 4.62/5.0 on likert scale. All 21 students indicated via evaluations improved knowledge and/or awareness of chronic pain after completing the course. Implications: Pain is the number one primary symptom reported by patients although it often is not well-recognized in pharmacy curricula. Results indicate that the knowledge and attitudes of pharmacy students can be improved via a single pain management course.

Pre-Clerkship Intensive On-Hands Workshop on In-Patient Pharmacy Practice. Alfred T. Reiman, Patricia M. Grace, Gayle A. Brazeau, Gene D. Morse, University at Buffalo. Objective: To implement and evaluate an intensive on-hands pre-clerkshop workshop on in-patient pharmacy practice. Methods: Two weeks before starting their rotations, fourth year students participated in five distinct modules of in-patient pharmacy practice in a real-time on hands environment. Students assumed the roles of a staff pharmacist. The modules were: 1. medication order entry, 2. IV preparation, 3. controlled substance inventory, 4. cart fill, and 5. drug information. Student evaluation was competency based with 75% considered a passing performance. Students could not start rotations until they successfully completed this program. Approximately 45 students participated in two workshops in the fall 2001 semester. The workshops goals were evaluated by a student focus group and surveys and were well received. Faculty commented that the workshop was beneficial in providing direct on hands experiences, however the number of specific activities for the various modules was too many and distracted from learning. Preceptors reported that students were better prepared for their sites. Faculty thought this program was useful, but needed slight modifications before the next round to achieve the goals. The pre-clerkship intensive on-hands workshop on in-patient pharmacy practice is useful to prepare students for their rotations. This allows students to participate in a standardized mentoried approach to learn important skills for institutional practice.

Teaching Patient Counseling in Spanish. Jeri J. Slas and Susana James, University of Texas at Brownsville. Objectives: 1) to facilitate a class for pharmacists to counsel patients regarding medication use in Spanish relevant to the US-Mexico border community, (ii) to develop course materials in Spanish specific to pharmacy education needs. Methods: A Spanish language instructor from Mexico assisted in developing culturally appropriate patient counseling materials for an upperclass senior pharmacy practice, and as an adjunct, primarily in Spanish for beginning and intermediate level Spanish speakers by a pharmacy faculty-language instructor team. Students were taught to address patients in correct formal Spanish and communicate professionally with patients using simple dialogues. The class incorporated counseling techniques for various medication formulations and included the Indian Health Service model for confirming patient understanding. Results: Student evaluations were positive regarding the practical applications of the class. Pharmacy education materials for vocabulary and medication counseling dialogues in Spanish were prepared that were relevant and specific to this border community. Implications: By taking the course pharmacy students were exposed to culturally appropriate vocabulary and patient consultation skills in Spanish. With the increasing number of Spanish speakers in the United States, these materials may be applicable in other educational settings and areas of the country.

Standardized Patient Examination Scores Are Useful in Identifying Students Most in Need of Remediation. Cindy D. Stowe, Stephanie F. Gardner and Keith J. Christensen, University of Arkansas for Medical Sciences. Objective: The purpose of this study was to utilize standardized patient examinations to identify students who would most benefit from remediation. Methods: A standardized patient examination was conducted in the Spring Therapeutics I (2nd professional year) and in the Fall Therapeutics II (3rd professional year). Data from these classes was used to create a model for identifying students most in need of remediation. No student who had an overall A average had a failing average on the standardized patient examination. Implications: The use of the standardized patient examination scores from the first two semesters of Therapeutics will allow the development of a remediation pathway for at risk students that will run concurrently with Therapeutics III and prior to entering clerkship rotations.

Pharmacy Practice Theoretical Model Combining a State-Funded Community-Based Geriatric Educational Outreach Program and an Ambulatory Care Clerkship Rotation. Jennifer Cerulli, Jean Schreck, Macary Week and Mario Zeolla, University of Illinois at Chicago. Objectives: Pharmacists are key professionals in health promotion and disease prevention initiatives among older adults, a population at significant risk for morbidity and mortality. Didactic pharmacy education and traditional clerkship teaching strategies, however, may not adequately prepare the pharmacy student for contemporary geriatric pharmacy practice. Our goal was to develop a teaching method, in collaboration with a community health outreach program, which enhanced the development of skills necessary to successfully deliver pharmaceutical care to the growing, diverse geriatric population. Methods: Ambulatory Care clerkship students are required to complete a special project that focuses on pertinent issues that are commonly encountered in that practice setting. This project was structured to require the students to provide medication evaluation and counseling, immunization education and associated risk-level stratification for up to six diverse geriatric populations participating in a collaborative College of Pharmacy and State-agency funded outreach program. Students demonstrated a greater understanding of geriatric health concerns and needs. They exhibited enhanced communication skills and self confidence in caring for diverse, older adult populations. Students improved participants' perceptions about the role of pharmacists. The importance of collaborative initiatives was validated. Relationship with the State agency was enhanced. Learning enhancement and reinforcement of didactic principles. 2. Mutually beneficial for students, faculty, participants and agency. 3. Will be continued in subsequent rotations.

Work in Progress: Evaluation of Drug Information Requests in Community Pharmacy. Jennifer Cerulli, Jean Schreck, Macary Week and Mario Zeolla, Albany College of Pharmacy. Objectives: To document drug information requests received by students during community pharmacy advanced practice experiences

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Emphasizing Caring Behaviors as Integral in the Training of Doctor of Pharmacy Students. Carnita Coleman, Hampton University. Objectives: When pharmaceutical care is discussed, the clinical concepts of pharmacotherapeutics are illuminated; however, patient care is often slighted. A pharmacist that refuses to see the patient as vital can impede development of the essential therapeutic relationship. The purpose of this training is to help future pharmacists recognize and overcome this potential barrier to optimal patient care. Methods: In-class discussions and case presentations were incorporated into a pharmaceutical care course required of all third-year pharmacy students at Hampton University. The class was divided into groups of five and was evaluated using a checklist tool in an OSCE. To determine the feasibility of third-year pharmacy students serving as standardized patient care takers, the OSCE was piloted involving a non-pharmaceutical care professional. Results: Students recognized caring behaviors as an important component of pharmaceutical care and demonstrated patient sensitivity by formulating their own case studies. Students discussed interactions with patients using positive and negative examples of caring behaviors. Suggestions were made on how to exhibit care without sentimentality. To document patient interaction and care, requirements of the practitioner, characteristics of caring behavior, strategies to manage illness, and recognition of patient reaction to illness were discussed. Student groups performed out-of-class research on appropriate caring behaviors and attitudes for formal presentations. Students visited practice sites to evaluate the implementation of pharmaceutical care. Results: Students recognized caring behaviors as an important component of pharmaceutical care and demonstrated patient sensitivity by formulating their own case studies. Students discussed interactions with patients using positive and negative examples of caring behaviors. Suggestions were made on how to exhibit care without sentimentality. To document patient interaction and care, requirements of the practitioner, characteristics of caring behavior, strategies to manage illness, and recognition of patient reaction to illness were discussed. Student groups performed out-of-class research on appropriate caring behaviors and attitudes for formal presentations. Presenting this material early in the curricular can use the database to obtain sample questions and identify resources useful in the community pharmacy setting.

Evaluation of Consulting Skills in a Non-Prescription Products Course. Beverly Talluto, David Loiacono and Amy Lullo, University of Wisconsin-Madison. Objectives: The evaluation of the attainment of proficiency in counseling skill based on practice research project, students work in teams of 4 or 5 to generate ideas and develop a research protocol under faculty mentor guidance. Recent graduates were surveyed for feedback on course changes. Results: Fifty-five percent of the students stated the team approach was more desirable than working independently. Forty-two percent believed the project enhanced their knowledge of research methodology. Eighteen percent of these projects were presented as a poster presentation or submitted for publication. Based on this feedback, additional course changes were implemented: (i) idea generation and protocol development occur early in the P-3 year; (ii) a timeline is established for each project and evaluated and using a checklist tool in an OSCE. To determine the value of the OSCE as a longitudinal predictor of performance in clinical practice. Methods: Fourth-year students participate in an OSCE consisting of five stations dealing with one patient and one prescriber. Third year students are trained to play the role of the patient and to present the case at each station. Students complete a self and peer evaluation at the end of the project. Implications: Through this course evolution, students have developed a better understanding of the scientific method as demonstrated by higher quality projects. It is beneficial to students seeking graduate training and for faculty seeking additional outlets for scholarly activity.
Determine if there is a correlation between: 1. The amount of time students report preceptors spend with them and student satisfaction with the rotation. 2. The amount of time students report preceptors spend with them and the final rotation grade. 3. The students' degree of satisfaction with the rotation and the final rotation grade. Observe similarities and differences between community, clinical and hospital rotations in the relationships of time and satisfaction, time and grade, and satisfaction and grade. Methods: Students reported their degree of satisfaction with the preceptor and the rotation through formal evaluation forms and written comments. Students report the amount of time spent with their preceptor daily and weekly. Students receive a formal grade at the end of each rotation. Time and satisfaction data and the students' final grade will be compiled and graphed. The time versus grade, versus satisfaction, and satisfaction versus grade data will be reviewed to observe for potential trends and to identify any similarities or differences between community, clinical and hospital rotations. Implications: Highlight the relationship trends between time spent with the preceptor, student satisfaction and rotation grade. Extrapolate trend data to restructure rotations. Expand the study to examine amount of time spent versus quality of time spent.

**Implementation of a Pharmaco genomics Elective Course in the Doctor of Pharmacy Curriculum at the UNC-Chapel Hill School of Pharmacy.** John Valgus, Kevin Haynes, Tina Brock, John Pieper, Jim McAllister and Roy Hawke, University of North Carolina-Chapel Hill.

**Objectives:** To develop, implement, and evaluate an introduction to applied pharmacogenomics (PGx) elective course offered in Spring 2002 to Doctor of Pharmacy students. Methods: The course was modeled to include the core competencies in genetics outlined by the National Coalition for Health Professionals' Education in Genetics. The course was discussed addressing genetic concepts and terminology, clinically relevant polymorphisms affecting drug metabolism and disposition, the impact of genetic variation on drug response dynamics, legal/ethical issues raised by PGx, and the impact of PGx on the profession of pharmacy. Faculty was recruited from the Schools of Pharmacy, Medicine, and Public Health, as well as private industry. Students were evaluated on individual presentations, class participation, and final examination. Student attitudes and knowledge towards the applications of PGx for the future of the pharmacy profession will also be formally assessed.

**Implications:** Pharmacy education is focused on the development of skills and competencies required of clinical pharmacy practitioners who can interface with interdisciplinary teams, to ensure optimal patient care. The development of practice of evidence-based medicine will evolve to include the application of pharmacogenomic information in order to optimize drug therapy. Pharmacy education needs to respond to the challenges of developing curricula that will prepare clinicians for the integration of objective genetic measures with the practice of pharmacy.

**SOCIAL AND ADMINISTRATIVE SCIENCES**

**Completed Research**


**Objectives:** To measure perceived knowledge of pharmacists and physicians regarding herbal products and assess differences in these perceptions among groups of pharmacists and physicians. The resulting data may be used by both students and pharmacists to observe for potential trends and to identify any similarities or differences between community, clinical and hospital rotations. Extrapolate trend data to restructure rotations. Expand the study to examine amount of time spent versus quality of time spent.

**Methods:** Methods: The course was modeled to include the core competencies in genetics outlined by the National Coalition for Health Professionals' Education in Genetics. The course was discussed addressing genetic concepts and terminology, clinically relevant polymorphisms affect-

Objective: To assess the relationship between student-life stress and HRQOL among PharmD students at a public university. Methods: The Student-life Stress Inventory and the SF-12 (HRQOL) questionnaire were administered during a one-week period of the Fall 2001 semester to students in the first three professional years. The SF-12 was calculated to assess the relationship between academic stress and HRQOL for the entire sample, by gender and professional year. The Bonferroni corrected level of significance for the analyses was P<0.004. Results: A total of 166 usable responses were obtained which represented 66.3% (n=110) female, 39.2% (n=65) upperclassmen, 33.8% (n=56) second-year, and 27.1% (n=43) first-year students. The respondents' mean age was 26.8 (SD=5.42) years. Student-life stress was significantly negatively correlated to the student SF-12 component score (P=0.001) for the entire sample (r= -0.58), gender (females= -0.56, males= -0.56) and within each professional year (first-year = -0.50, second-year = -0.49, third-year = -0.68). Student-life stress was non-significantly negatively correlated to the physical SF-12 component score. Implications: Higher student-life stress was related to lower mental component HRQOL scores. Strategies should be developed to reduce student-life stress and improve the mental component of HRQOL. Additional research is needed to assess the impact of the relationship of student life-stress and the mental component of HRQOL on academic performance. 

Application of Pharmaceutical Marketing and Advertising Concepts Using a "Marketing Team" Approach. David J. Mihm, Arnold & Marie Schwartz College of Pharmacy and Health Sciences. Objective: Using a student "marketing team" approach in a second-year professional elective, several course learning-objectives were achieved: to have students themselves "create" their own hypothetical "new product" launch. Methods: The team creates or is given a project and works on a hypothetical "new product" launch. The team creates or is given a project and works on a hypothetical "new product" launch. Results/Outcomes: Projects are evaluated by the instructor, a panel of graduate students, and by peer-evaluation of group quantitative and qualitative participation. The team is given a budget for the project and how well the project is marketed. Results: Students, via the group project, do meet several specific course learning-objectives, gained an appreciation of marketing concepts, and gained a better understanding of group dynamics. 

Theoretical Model

Systematic Framework for Selecting Validity Models in Research. Marion K. Slack, University of Arizona. Objective: Research studies, particularly non-randomized designs, are subject to numerous threats to validity. This presentation describes a systematic framework for selecting a model for addressing validity issues. Methods: The framework is based on three definitions of research design: purpose, time frame, and control. Operational definitions were developed to facilitate identification of each dimension and the research design literature searched for associated validity issues. Specific models were constructed by 67 identifying the validity issues associated with each dimension. Results: Use of the operational definitions and the three dimensional framework resulted in 10 specific validity models. In this framework, all exploratory and descriptive models are observational but may be prospective, cross sectional or retrospective. Retrospective and cross sectional analytic designs also are observational, however prospective analytic designs may be either observational or interventional. Validity models are associated with particular models of the match between the purpose, time frame, and control hypotheses. Those associated with control include selection bias, observation bias, misclassification bias, and implementation issues. With respect to time line, loss to follow up is an issue for both retrospective and prospective studies; retrospective studies also have validity issues associated with recording and retrieval of data and missing data. Issues for cross sectional studies include timing of events and recall bias. Implications: The framework enables investigators and consumers of research to systemically identify and address validity issues which should produce higher quality studies and critical consumers. 

Work In Progress

Assessing Patient Counseling Skills Using Different Evaluation Methods: A Triangulation Study. Conrad W. Dhing, John M. Lonie and Donna Dolinsky, Long Island University. Objective: Triangulating the patient counseling skills of fourth-year PharmD students using different evaluation methods. Method: Fourth-year PharmD students enrolled in the Communication Skills course were given different types of assignments with varying complexity involving patient counseling. These assignments included a series of multiple-choice questions, short-answer case studies, videotaped patient counseling, role-playing, and written essay. Each of these assignments tested the students' ability to provide patient counseling on a different cognitive level. The outcomes of this study will show that these evaluation methods can differentiate the varying levels of skills involved in patient counseling. Implications: This model of assessing patient counseling skills using different evaluation methods allows for more accurate representation of the student's ability to counsel a patient. The vast range and complexity of skills involved in patient counseling can only be fully realized by using different evaluation methods. 

Assessing Patient Counseling Skills Using Software to Analyze a Critical Incident Essay. Donna Dolinsky, John M. Lonie and Conrad Dhing, Long Island University. Objective: To evaluate the use of critical incident software in assessing written essays demonstrating empathy, awareness, and active listening. Method: Following communication skills instruction, students were asked to describe a critical incident that occurred in the workplace, school or home, that involved using one or more of the communication skills. Written essays, using a role-playing, patient counseling, empathy, and active listening techniques, were written and submitted by the students. These essays were assessed using software to analyze the essays. Results: Students were instructed to tell what lead up to the incident, what was said by each participant, describe non-verbal behavior, describe and evaluate the outcome, and indicate what they would change to bring about a more effective outcome. The 98 essays were scanned into a Microsoft Word document and scored using a standardized score. The essays were then submitted to critical incident software. The software identified the prominent verbal and non-verbal behaviors that were identified using different software analysis packages. The results will be summarized and displayed in a way to permit evaluation of scales and software, and sent to Pharmacy communications skills faculty for assessment, evaluation, and usefulness in teaching students these communication skills. Implications: These techniques and tools can prove useful in assessing communication skills in large classes as an adjunctive technique to role-play and observation at practice sites.

Objectives: To document the prevalence, scope, and diversity of pharmacy school education in complimentary and alternative therapy topics and to obtain information about the organizational and academic features of these courses. 

Methods: A survey was developed to assess the frequency and nature of alternative medicine instruction in U.S. pharmacy schools. An 11-item survey was developed through iterative processes of the directors and academic pharmacists. The survey was pilot tested for its validity and was mailed to all schools of pharmacy in the U.S. The surveys were addressed to academic or curriculum deans at each of the 85 pharmacy schools. The survey specifically elicited responses about existing or planned instruction in alternative medicine, and the administrative and educational characteristics of courses in alternative medicine. 

Implications: The results of this survey will help delineate the present nature of alternative medicine instruction in pharmacy schools across the country in light of the increasing demand for alternative therapies by consumers.

Community Pharmacists Knowledge Regarding The Human Genome Project. Amit Kulkarni, Gauri Shringarpure, Abid Ghafoor and S. S. Sangsiriy, University of Houston. Objectives: The objective of this study is to evaluate community pharmacists’ current knowledge regarding the advances in the human genome project (HGP) and understand their requirement for education and training on this subject. 

Methods: A cross sectional study was conducted in order to determine the knowledge of the community pharmacist regarding HGP and identify areas in which they would require training to keep up with the advancement in technology. A survey would be administered to around 100 pharmacists working in community pharmacy in the Houston Metropolitan Area. A data collection questions for the previous year’s consultation points strongly agreed strongly disagree scale would be used to measure their knowledge regarding the HGP. In addition, data regarding the attitude of the pharmacists toward advances in the HGP along with demographic variable will be obtained. 

Data will be coded and analyzed using the SAS statistical package at a set priori significance level of 0.05. 

Implications: New advances in sciences bring along with it a lot of apprehension. The HGP is probably one of the biggest and controversial advances yet. This study will help us evaluate what the pharmacist knows about the HGP and if they are prepared to handle the challenges that it would bring about. This review will also help in identifying areas in which the pharmacist and the pharmacy staff would require training to cope with these changes.

Effects of Patients’ Demands, Physician/Other Health Care Providers’ Demands and Pharmacists’ Perceived Professional Image on Expected Job Satisfaction from Pharmacy Students’ Perspective. David J. Mihm, Ankur Mehta, Conrad Djing and Donna Dolinsky, Long Island University. Objectives: To investigate students’ perceptions of the effects of patients’ demands on pharmacists’ job satisfaction, to investigate students’ perceptions of the effects of pharmacists’ perceived professional image on pharmacists’ job satisfaction, and to study students’ perceptions of the effects of pharmacists’ perceived professional image on pharmacists’ job satisfaction. 

Methods: “Myths and Facts” is the title of a survey questionnaire method for measuring perceptions of job satisfaction. A detailed questionnaire that would provide an index for deriving the respondents’ feelings and perceptions towards some factors related to the job such as patients’ demands, pharmacists’ perceived professional image from instruments scaled anonymously to problems posed by lecturers. At the end of the answer period, exam performance apparently improved compared to previous years; however, other changes in the curriculum make it impossible to attribute this improvement to PRS alone. Subjective evaluations completed by both faculty and students showed strong support for PRS. Both groups believed that student understanding was significantly increased, and also found that their students were able to better assess student comprehension, allowed them to redirect class time, and facilitated classroom discussion. 

Implications: To our knowledge, this is the first report of an audience response system being used to facilitate case-based teaching in a pharmacy curriculum. PRS was a useful tool for improving faculty assessment and student comprehension, and the technology will be expanded to other courses.

Outcomes-Based Integrated Hybrid PBL CBL. Susan Mansour, Patrick Farmer and Anne Marie Whelan, Dalhousie University. In 1995 the Dalhousie College of Pharmacy identified several goals for curricular change: (i) increase accountability by making the curriculum outcomes-based; (ii) increase the ability of the curriculum to lead practice; (iii) direct the curriculum toward improved patient health care; (iv) increase graduates’ communication skills; and (v) improve the problem solving ability of graduates. This led to the development of an outcomes-based integrated hybrid problem-based learning (PBL) curriculum. The curriculum included integrated PBL and case-based learning, self-directed learning, problem solving, learning and practice by body system and disease states, a four-year skills laboratory, a three-year Critical Appraisal Series, and practice experiences. The integrated PBL process simulates pharmacy practice and encourages students to develop and practice their life-long learning skills. Faculty responsibilities are significantly increased. Turnaround time for the curriculum development is about five years ongoing. Each curricular component incorporates various student assessments; comprehensive assessments such as an annual progress examination and Objective Structured Clinical Examination are used. Curricular evaluation includes evaluations by students, results of the annual progress examination, and faculty course evaluations. The College has achieved complete curricular change with the first class graduation in the spring of 2001. Interim curricular evaluation results indicate students achieve...
levels of knowledge and skills similar to, or better than, those achieved previously.

Course on Chronic Illness: Learning the Patient's Perspective. Kimberly Blake, Drake University. Over the last century, the nature of health and health care has changed. First, unlike the early 1900s, patients are not dying of acute diseases, but chronic ones. A patient no longer can take a "pill" and expect to be "all better" at the end of two weeks. Chronic illnesses require long-term management, meaning that health care professionals will need to develop a rapport and learn of the patient's perspective of health and well-being. As part of this, health care professionals need to envision a patient holistically and be aware of his concerns and the impact his lifestyle may have on treatment decisions. The goal of the Psychosocial Aspects of Chronic Illness was to allow pharmacy students to learn about, investigate, and experience the whys of patient behavior. To attain this goal, a variety of teaching techniques were used to help the student learn about the patient's perspective. Videos, live presentations, simulation exercises, and autobiographies/biographies were incorporated and melded with course content. Reflective paragraphs, class discussion, lecture, and patient scenarios/cases also were used. Students were expected to participate in the process - they tried to change a health behavior, developed a teaching presentation on culture, and wrote papers about their exercises. By using several techniques, it was hoped that the students remained engaged throughout the semester - with each student experiencing his desired learning process at least one time in the semester.

Stayin' Alive: Advancing Medicinal Chemistry by Enhancing Student Responsibility for Learning. Victoria F. Roche and Naser Z. Alsharif, Creighton University. Objectives: The purpose of this project was to increase student interest in medicinal chemistry and in taking responsibility for learning. Methods: Course content was updated, restated, and packaged in conversational packets containing a detailed lesson handout, learning objectives, lesson summary, and case study problems. Students read the handout packet and complete a comprehensive quiz over the material no later than 24 hours prior to class. Quiz questions were provided in the lesson packet to guide learning. The final quiz average counted for 10% of the final grade, and served as the reward for preparedness. Lecturing over handout materials was abandoned in favor of interactive discussion on areas of difficulty, active learning exercises and group presentations designed to stimulate analytical thinking, and sharpen clinical problem solving skills. Student Outcomes: Students have been much better prepared for class discussion than in previous years, and responded positively to the quizzes and interactive classroom. Performance, as measured by exam and final grades, did not suffer. Project Implications: Small changes in content delivery, and the offering of relatively small academic rewards, can stimulate students to preparedness and enliven the classroom by allowing time for activities which foster higher level thinking and reinforce clinical relevance. Interest in subject matter is increased when classroom activities are more meaningful to the learners. Professionalism will be optimized when the entire academic culture fosters student responsibility for learning.

INNOVATIONS IN TEACHING COMPETITION

Award Winners

EPHect - A Longitudinal Service Learning Experience. Michael C. Brown, Patricia R. Lind and Todd D. Sorensen, University of Rhode Island. EPhECT, as the name suggests, is a series of visits to theipes, comprised of a CT, a first (PDI), second (PDII), and two third (PDIII) year students, and a faculty member. EPhECT has 3 main components: Community-teams, comprised of a CT, a first (PDI), second (PDII), and two third (PDIII) year student teams, and a faculty member. Community outreach activities which foster higher level thinking and reinforce clinical relevance. Phase I students set realistic, measurable project goals and undertake behavior modification supervision of Phase II students. Phase I students keep a journal and submit a final written project summary reflecting on personal successes, failures and factors that contributed to the project outcome. Weekly group meetings and journal writing provide accountability. Phase II students conduct weekly meetings and evaluate Phase I student projects. All students complete pre- and post-surveys to determine whether the project produces changes in knowledge, skills and attitudes. Results: Evidence of student learning comes from journal entries, final project summaries and post-surveys in both phases of the project. The majority of students report that behavior modification is a more difficult process than previously thought. Most students also report an attitude change toward patients undertaking behavior modification due to better understanding of the difficulty of change or knowledge of the tools used in behavior modification. Implications: Both Phase I and II students develop empathy, through personal experience, for patients attempting lifestyle change. Students report the ability to apply the knowledge, skills and attitudes to experiences after the project ends.

Student Directed Experiential Learning in a Program of Continuous Competency Assessment. Raylene M. Rospond, Sandy Dirks, Drake University, and Dennis McAllister, Midwestern University-Glenelde. Objectives: The purpose of the project was to design, implement, and evaluate a continuous student assessment process in a competency-based experiential education program. Methods: Experiential education competencies were approved and adopted by faculty for evaluation of student proficiency across all experiential rotations. Students receive a "credit" or "no credit" for the entire experiential education program based on achievement and maintenance of a minimum proficiency level of 4 for each of the 144 activities under 4 competency areas. Preceptor and student orientation to the new process first occurred prior to the 1997/98 experiential year. Student portfolios, initially print and now electronic include documentation of activities, samples of project work, sample patient interventions, preceptor and self-assessment forms. Proficiency scores for each competency are tracked by the college and used to focus rotation activities. Results: Individual student learning is demonstrated through procedural based review of performance. Individualized interventions are instituted during the experiential year to provide formative and summative assessment. Individualized remediation programs are developed and implemented for students not achieving proficiency requirements. Student evaluations of entire experiential program and skills improved demonstrate positive results. NAPLEX scores have improved and post-graduate opportunities have been maintained. Implications: Continuous Competency Assessment Process addresses numerous limitations of standard approaches to experiential education. Innovative approach combined with current technology allows individualized student development programs and enhanced programmatic assessment with acceptable resource allocation.

SCHOOL POSTERS

Student Recruitment and Development. Charles Perry, Kern Krueger and Paul Jungnickel, Auburn University. Objectives: To develop a more diversified and qualified applicant pool through education, outreach, and training. Methods: Recruitment is divided across the fall semester. Phase I students set realistic, measurable project goals and undertake behavior modification supervision of Phase II students. Phase I students keep a journal and submit a final written project summary reflecting on personal successes, failures and factors that contributed to the project outcome. Weekly group meetings and journal writing provide accountability. Phase II students conduct weekly meetings and evaluate Phase I student projects. All students complete pre- and post-surveys to determine whether the project produces changes in knowledge, skills and attitudes. Results: Evidence of student learning comes from journal entries, final project summaries and post-surveys in both phases of the project. The majority of students report that behavior modification is a more difficult process than previously thought. Most students also report an attitude change toward patients undertaking behavior modification due to better understanding of the difficulty of change or knowledge of the tools used in behavior modification. Implications: Both Phase I and II students develop empathy, through personal experience, for patients attempting lifestyle change. Students report the ability to apply the knowledge, skills and attitudes to experiences after the project ends.

Development and Implementation of an Advanced Practice Experience in Pediatrics. Robert P. Henderson, Paula A. Thompson, Michael G. Kendrick, Mary A. Worthington, Mary R. Monk-Tutor and Roger D. Lander, Sanford University. Objectives: Development and implementation of an elective pedagogics rotation for fourth year Pharm.D. students allowing them to learn teaching methodologies in a variety of settings.

Methods: Late
in the Fall 2000 semester, pharmacy faculty expressed interest in an elective pedagogy rotation. The Department of Pharmacy Educational Policy Committee developed specific goals and objectives for such a rotation. It was offered to students beginning in June 2001, and by the end of the 2001-02 academic year eleven students and eight preceptors will have participated. Experiences of the students have varied widely, depending upon the setting and preceptor, and have included classroom lecturing, small-group facilitation, clinical instruction, administrative tasks and assignments. In a survey, students were administered to all students and faculty participating in this rotation and the results discussed in a meeting of all participants. This information will be used to refine the experience for the coming year. **Implications:** Pharmacy educators have a responsibility to provide leadership in the profession by cultivating future leaders. Additionally, academic faculty in the future must be better prepared to teach and have an impact upon a broad range of practitioners, positively influencing the profession of pharmacy.

**University of Southern California School of Pharmacy: Fostering the Development of Academic Pharmacy's Future Leadership.** Kathleen H. Besinque, Mark A. Gill and William C. Gong, *University of Southern California.* The USC School of Pharmacy has demonstrated a tradition of innovation and excellence in pharmacy education. The School's vision statement "Setting the Direction for Pharmaceutical Care, Education and Research" is reflected throughout teaching and research programs that include the development of future academic leaders. USC has developed several initiatives to foster interest in academic pharmacy including student mentorship teaching experiences, clerkship electives and a residency program. The ASHP accredited residency programs at the School emphasize teaching and research. There are twenty-five residents participating in the program in a wide range of clinical specialties. A research project must be publishable and presented at the annual Western States Residency Conference. Teaching experiences include development of a clinical case and teaching guide for the Therapeutics course, seminars, clerkship teaching and the providing lectures in didactic courses. The residency program has trained a significant number of residents that are faculty in pharmacy schools and as clerkship faculty at affiliated sites. Building on a century of excellence, USC continues to provide new directions for the profession of pharmacy.

**Promoting Academic Careers Throughout the Curriculum.** Ruth E. *Nemire and Elizabeth Frenzel Shepherd, *Nova Southeastern University.* Students have the opportunity to learn about academia early in their pharmacy education in an Early Experience course. The course was developed for topic discussion and reflection of early practice experiences. First semester second year students are required to pick a project with a faculty mentor, exposing them early to various aspects of being a faculty member. Projects include poster presentations, video development, new student recruitment, and career week planning. The student then has the opportunity to present their project at the annual Eastern Accreditors Conference. This provides students the opportunity to become familiar with the expectations of doing an academic elective clerkship with the Director of Experiential Education. These students are exposed to all aspects of academic life, including meeting with deans and faculty, teaching in a course, readings and discussion of educational theories. Students are exposed to administrative, service and teaching responsibilities of faculty members. Weekly discussions of educational theories and methods are the core of this rotation. Students build on the discussions by developing a lecture for a class of their choosing. Students are evaluated during this lecture. Students are involved in creating policies, student manuals, and writing. NSU College of Pharmacy residents may also choose to work with the Directors of Experiential Education and Clinical Education to complete an academic elective clerkship. The goals and objectives are similar to the advanced practice rotation, however, the resident is expected to tailor the assignments to their interests and personal goals and function at an advanced level.

**Promoting a Summer Research Experience for Pharmacy Students through an NIH-funded Mechanism.** Bradley C. Cannon and Nancy E. Kawahara, *University of Florida.* Over the past seven years the UF College of Pharmacy has utilized the NIH Short-term Research Training Program (T35 mechanism) to provide motivated pharmacy students a high quality 10-week summer research experience. This program is an excellent mechanism to stimulate an interest in research among pharmacy students and prepare them to consider careers in academic pharmacy, medicine or veterinary medicine. First and second year professional students are introduced to this program through in-class formal presentations, e-mail messages and individual or group office informational sessions. Faculty mentors are drawn from a list of committed faculty throughout each of the three colleges. A six-member committee comprised of basic science and clinical faculty evaluates the fellow student applications. Successful students are selected based on their academic record and letter of intent, faculty mentor commitment and the scientific merit of the research proposal. The program is designed to acquaint the student with the future faculty and junior faculty mentors. Summer research projects are all considered appropriate as long as they are hypothesis-driven endeavors. Students receive both a modest stipend and a small sum to support their research effort. Whenever possible students are encouraged to continue their research program beyond the original 10-week experience. The goal is to guide the students in the construction of research protocols, in state-of-the-art biomedical techniques, and the organization of an oral presentation and presentation of their data at local and/or national scientific meetings.

**Academic Courses and Experiences at Mercer University Southern School of Pharmacy.** Julie A. Hixson-Wallace, Vicky Turler-Vega, J. Grady Strom and Richard A. Jackson, *Mercer University.* An extreme shortage of pharmacists has created the future for the pharmacist as a professional and career option, we offer the following activities: an elective course titled Introduction to the Pharmaceutical Sciences which focuses on teaching skills; an academic/administrative advanced practice experience for senior Doctor of Pharmacy students; and an academic rotation for pharmacy residents from various programs in the Atlanta area. Additionally, our Center for the Advancement of Teaching and Learning is developing an elective course in teaching principles and methodology. This course intends to utilize faculty from the many schools on our campus and be open to students from any of the degree programs. The goals of this program include: 1. identification of academic career opportunities in Introductory Practice Experience I; 2. career exposure to the curricular teaching principles and methodology. The course provides students with opportunities to teach in our PharmD, B.S. and R.N. programs available on our campus including pharmacy, theology, education, and nursing. All of these activities serve to cultivate pharmacy students to become the leadership of the future of academic pharmacy.

**Cultivating Academic Pharmacy's Future Leadership.** Beverly A. Talluto, Robin M. Zavod and Lynn Radonic Patton, *Midwestern University-Chicago.* The faculty of the Chicago College of Pharmacy has created an environment to foster academic careers in pharmacy. Interdepartmental programs have been developed to provide opportunities over all four years of the curriculum for the students to observe, understand, and apply the theories of teaching and learning. These programs include: 1. identification of academic career opportunities in Introductory Practice Experience II; 2. participation in classes and workshops conducted by residents in the CCP Primary Care Residency with a Focus on Pharmacy Education; 3. involvement in an elective course in Introduction to Teaching and Learning Issues offered in the third professional year; 4. completion of elective teaching rotations with the Pharmacy Practice faculty and other clinical pharmacy faculty; 5. presentation of a lecture or series of lectures, learn delivery techniques, and complete a "Teaching Enhancement/Improvement" project; 6. inclusion of external Adjunct Faculty in the delivery of classroom lectures and colloquia so students observe the commitment of pharmacy practitioners to teaching; and 7. development of a variety of educational activities to reinforce the students' awareness of residency opportunities in academia.

**Contemporary Pharmacy Practice: An Academic Experience for Senior Students.** Bradley C. Cannon and Nancy E. Kawahara, *University of Illinois at Chicago.* This poster outlines the use of senior pharmacy students as instructors in a core curriculum course. Since 1995, 111 senior students have provided instruction to students enrolled in Contemporary Pharmacy Practice, a core course designed to introduce students to patient counseling and to enhance their problem solving skills. During each six-week rotation, senior students are responsible for instructional design, implementation, and evaluation in two of the four performance-based laboratories. Goals and objectives for the senior pharmacy students focus on developing teaching, writing, computer, ethical, and didactical skills, small group facilitation, defense of grading decisions, and development of standardized role-playing scenarios. Feedback from enrolled students indicates the perception of a positive effect on learning as a result of working with senior students. Furthermore, feedback obtained from end of module surveys indicates that students prefer the senior pharmacy student rotation over the faculty facilitated experience. Additional information from graduates will be evaluated to determine the impact of this experience with regard to career choices, and involvement in additional academic-related activities.

**Exposing Students to Careers in Academic Pharmacy at Purdue University School of Pharmacy.** Steven A. Scoular, *Purdue University.* Purdue University has a long tradition of supplying academic pharmacy with many faculty and administrators. In an attempt to encourage more professional degree students to consider...
pursuing post-graduate educational opportunities and a career in academic pharmacy. Several independent efforts have been started by faculty and administrators. These efforts include: 1. Using upper level undergraduate students as teaching assistants in first and second professional year courses. Students receive academic credit and acquire the experience of teaching and tutoring other students. 2. Many students participate in undergraduate research opportunities with a number of faculty exposing the students to both faculty and graduate level courses and their work on them. 3. Students need the opportunity to complete a academic clerkship where they work one-on-one with pharmacy faculty and get a real taste of academic life both in the classroom and lab but also behind the scenes. 5. A career exploration workshop has been developed where students actively explore and report on the benefits, limitations, and requirements of education that is offered in different options, one being pharmacy education. 6. The most recent effort to expose students to academic pharmacy is the Dean's Executive Forum, a weekly seminar class which features a variety of leaders in pharmacy, many of who are Deans at other schools of pharmacy. These academicians share their personal stories with students, describing why they choose a career in pharmacy education.

Education Pathways to Cultivate Future Academic Leadership: An Elective Course and Learning Certificate Program, William C. Lubawy, Heidi M. Anderson-Harper, Mary M. Piascik and Frank Romanelli, University of Kentucky. The University of Kentucky College of Pharmacy utilizes two formal mechanisms to cultivate both interest in academic positions as a career option and the development of skills in educational strategies. The Pharm.D. curriculum requires students to select a series of electives pertinent to a particular eventual career "pathway." The College offers 18 different career pathways, one of which is in the area of education. The education pathway includes at least four elective courses, selected by elective education, with the expectation that the faculty serve as mentors for students and advisors for special projects and/or elective experiential rotations which involve hands-on experiences, journal clubs, group discussions etc. A learning certificate program is available for pharmacy practice residents and graduate students. This program offers a seminar series dealing with: global teaching philosophies and concepts, pharmacy education issues such as outcome based learning experiences and accreditation, active learning and problem solving strategies, development of a teaching portfolio and formal teaching experiences from lectures to small group and clinic teaching. Participants must complete actual teaching activities involving small and large groups with feedback and evaluation as well as either clinic teaching or laboratory instruction to be awarded a certificate. The program has recently been expanded to two off site locations through a statewide telecommunications network.

Enabling Careers in Academic Pharmacy. R. Gary Hollenbeck, University of Maryland. At the UM School of Pharmacy, careers in academic pharmacy are featured in a longitudinal career articulation, planning and development process, with elements in the PharmD program, curricular pathways, residencies, graduate programs and extending even to programs for new faculty. Early and continual exposure to academic careers is provided, and graduate students have multiple opportunities, and academic career faculty serve as mentors for students and advisors for special projects and/or elective experiential rotations which involve hands-on experiences, journal clubs, group discussions etc. A learning certificate program is available for pharmacy practice residents and graduate students. This program offers a seminar series dealing with: global teaching philosophies and concepts, pharmacy education issues such as outcome based learning experiences and accreditation, active learning and problem solving strategies, development of a teaching portfolio and formal teaching experiences from lectures to small group and clinic teaching. Participants must complete actual teaching activities involving small and large groups with feedback and evaluation as well as either clinic teaching or laboratory instruction to be awarded a certificate. The program has recently been expanded to two off site locations through a statewide telecommunications network.

Required gateway courses Pharmacy Practice and Education, and Introduction to Professional Practice I & II, introduce students to the science and profession of pharmacy and include a career pathway workshop. The 1 year elective advanced Elective Educational Opportunities features careers requiring advanced pharmacy practice, skills required in academic and pharmaceutical education.

PharmD/MBA, PharmD/JD, and PharmD/PhD programs facilitate the individual scholarly training and preparation process necessary for an academic career. Teaching Preparation and Skills and Educational Theory and Practice are two specific education electives intended for residents and students interested in careers in academia to enhance their technical skills and their knowledge regarding instructional design and methods. Residents and graduate teaching assistants are all required to teach, and opportunities for additional teaching are provided for individuals expressing interest. A New Faculty/Staff Orientation program informs and clarifies the expectations and responsibilities of faculty, the opportunities and challenges of working with students, and develops knowledge, skills and attitudes for a variety of academic settings.

Experiential Rotations Aimed at Stimulating Interest in Academic Careers, Michelle M. Kalsi, Lynne Sylvia, William McCluskey and Beth Nieman, University of Michigan. Academic career pathways are offered to interested MCPHS students through experiential rotations in addition to informal activities throughout the PharmD curriculum. One of the primary aims of the experiential education program at MCPHS is to provide a wide range of experiences to PharmD students. Students may select up to three elective rotations. Among the elective rotations are several options that allow students to gain an appreciation of the career opportunities available in academia. Students have the opportunity to work with pharmacy practice faculty members as teaching assistants or academic administrators. In addition, students have the opportunity to complete a semester-long rotation in one of five different options, one being pharmacy education. 6. The most recent effort to expose students to academic pharmacy is the Dean's Executive Forum, a weekly seminar class which features a variety of leaders in pharmacy, many of who are Deans at other schools of pharmacy. These academicians share their personal stories with students, describing why they choose a career in pharmacy education.

Excellence grants provide additional support for efforts to recruit and train undergraduate and graduate students to practice their teaching skills, such as assisting with the pharmacy technician sterile products lab and teaching during the summer in the Health Careers Opportunity Program (HCOP) for disadvantaged students. Faculty development for leadership positions is also encouraged through School support for attendance at education meetings, workshops, and seminars. With the support of new faculty members, mentoring has also received renewed attention and effort.

**Fostering Interest in Academic Careers through Structured Academic Clerkship Experiences.** Victoria F. Roche, Naser Z. Alsharif, Robert I. Garis, Amy M. Haddad and Phillip J. Vuchetich, Creighton University. Career choice decisions are among the most important students make, as they profoundly impact one's level of professional and personal satisfaction. The impact of positive role models in making this critical decision cannot be overstated. While pharmacy schools have focused intensively on guiding graduates into rewarding practice or research careers, they have not been explicit in promoting the academy as a viable career path. To allow students an in-depth and focused opportunity to explore the roles, responsibilities and professional joys of academia, we have implemented a four-week experiential rotation entitled the Elective Academic Clerkship. In this clerkship, students work closely with a dedicated mentor in their area of highest interest to learn pedagogic theory and experience with teaching/learning strategies to accomplish thoughtfully constructed goals for the classes they help instruct. Students participate in faculty development activities and research projects, and work on committee assignments and departmental or School projects. Opportunities for reflection are included so that experiences can be put into career-shaping perspective. The syllabus provides faculty mentors the flexibility needed to tailor an experience that best suits each student while enabling them to engage in academic life. Examples of techniques used by faculty in all disciplines to generate enthusiasm for pharmacy education as a rewarding career choice, and student reflections on their experience, will be shared.

**Developing Future Pharmacy Leaders at the University of Nebraska College of Pharmacy.** Edward B. Roche, Clarence T. Ueda and Jon C. Wagner, University of Nebraska. The University of Nebraska College of Pharmacy has developed a multiple-step process for developing future pharmacy and community leaders. These steps include (i) identifying students with leadership experience and/or potential during the admissions interview process; (ii) providing academic careers advice for students who have expressed interest in academic careers; (iii) opportunities exist for the experienced students to develop and expand their leadership and training on leadership through a course in Professional Development in the first year of pharmacy school; (iv) providing leadership opportunities through student organizations and community activities such as the S.H.A.R.I.N.G. Clinic; (v) rewarding leadership through special scholarships and awards; and (vi) recognizing leadership through the student leadership organization Phi Lambda Sigma.

**Cultivating Pharmacy Students’ Interest in Academic Careers Through Expanding Research Opportunities.** Mary L. Wagner, Marc Strugill and A. Scott Mathis, Rutgers University. Pharmacy students interested in pursuing careers in academia and research have several opportunities to develop research experience after graduation through involvement in postdoctoral training programs. The opportunity to participate in research while attending school can improve a candidate's chances of entering into a good post-doctoral training program and provide an opportunity to stimulate interest in research for students unsure of career goals. In the past, the majority of students who have participated in research have pursued a career in academia. However, since the year 2000, 15 new students and many schools have dropped their research requirement for enrolled students. A priority remains to make research opportunities available to students. At the EMSP at Rutgers University, a number of research opportunities are available to the interested student. Students with a 3.5 grade point average can enroll in an Honors Program, where they conduct research in a specific area of interest to them. The opportunity to conduct research in a specific area of interest can be a valuable experience for students interested in pursuing careers in academia. Students are required to develop a formal proposal that addresses a pertinent topic, either by reading and analyzing the literature, or through a poster presentation in the spring semester.

**Elective Fourth Professional Year Academic Rotation.** Donald R. Miller, North Dakota State University. Objective: In response to calls for increasing the interest of pharmacy students in academic careers, a six-week, fourth year rotation was developed and implemented for the 2001-02 school year. Methods: The rotation was offered by one faculty member, with a second member acting as secondary preceptor. The student meets with the preceptor daily and attends as many meetings as possible with the preceptor. In addition, the student works independently on his or her own projects. Objectives for this rotation are: to assist the preceptor in his classroom teaching and be primarily responsible for teaching at least one classroom session; to write an article that explores the role of committees and administrators; and to effectively use drug information resources to assist pharmacists through the ND Institute for Pharmaceutical Care. Results: This rotation has been a good experience for the students and the preceptor. Two students elected the rotation in 2001-02. They were involved in multiple-choice development, and engaged in some of the practice and applied teaching skills, but in small research projects, book reviews, and publications. Implications: The NDSU College of Pharmacy will continue to offer this rotation and look for impact it will have on students careers.
Experiential Rotations in Pharmacy Education. Kimberly Broedel-Zaugg, Jeffery C. Allison, and Martha A. Swecton, Ohio Northern University. Ohio Northern’s Raabe College of Pharmacy requires PharmD candidates to complete nine advanced practice rotations. Candidates may choose an elective education rotation with a faculty member at the college. During this rotation PharmD candidates are introduced to the University's expectations of faculty members which include teaching, scholarship, and service. A faculty member mentors the PharmD candidate and teaches the candidate about instructing, assessing and grading course grades, post-graduate education, and career choice date were collected. Students' overall satisfaction with the rotation was also determined. Results: Since 1995, 49 (6.7%) out of 735 students participated in this rotation. The mean GPA of these students was 3.2 (range 2.4-3.8) while the overall median grade in the therapeutics course was B-. Of the 49 students, 53%, pursed postgraduate training in pharmacy education. Of the 49 students who graduated before 2000, 4 (22%) ultimately accepted faculty positions. Students expressed satisfaction with the experience. Conclusion: The elective teaching rotation was an effective experience, with 53% of students entering post-graduate training and 22% of the 1995-1999 graduates becoming full-time faculty.

Teaching Scholarships as a Tool to Enhance Academic Career Choice. Martin J. Ohlinger and Curtis D. Black, University of Toledo. Objective: AACPs Strategic Plan implies implementing strategies to "promote academic careers." The University of Toledo College of Pharmacy has developed a Teaching Scholarship (TS) program to that end, meanwhile providing assistance in manpower-intensive professional development courses. Methods: Students finishing their second professional year apply for one of 23 TSs. Each TS provides a one-year tuition waiver and stipend in return for ten hours per week instructional assistance. Working with faculty preceptors, TS recipients engage in developing and delivering undergraduate courses, supervising professional practice development laboratories, coordinating experts to give seminars, conducting research, developing curricula, and preparing course effectiveness: 1. completing their TS evaluating their experience and any influence it had on career choice; 2. undergraduate students evaluate TS recipients' helpfulness, preparedness, approachability and contribution to professional development. Results: On a five-point Likert scale [5=strongly agree], undergraduate students rated TS recipients very helpful (4.6/5) and prepared (4.6/5) for the specified assignments. Students were very satisfied with TS recipient approachability (4.9/5) and felt they made a significant contribution to professional development (4.8/5). As previous TS recipients graduate this May, they will be surveyed on the influence of their teaching experience on career choice. Conclusion: As previous results indicate, the University of Toledo Teaching Scholarship program is an effective tool to help promote academic careers. Implications: The TS program assists faculty in presenting courses, facilitates student learning, and has significant potential to stimulate interest in academic careers.

Introducing Students to the Many Faces of Pharmacy. Melissa S. Medina, Lester A. Reinke, Keith A. Swanson and Michael E. Burton, University of Oklahoma. Many schools offer practice experiences to expose students to the potential career options. Traditional experiences in retail and hospital settings are the most widely used practice experience sites. To less traditional sites such as laboratory and administrative careers, we have implemented specific practice development and practice experiences. Our primary goal is to foster awareness and interest in these two settings and potentially influence participation in these areas before and after graduation. We have implemented four specific experiences to achieve this goal. The first is an informal introductory seminar series on laboratory and clinical research and graduate education. The second experience expands this seminar offering a research rotation course in the following term. This experience allows students to observe a clinical or basic science research setting and acquire hands-on experience. We then invite students to apply for one of two summer research programs, the Summer Toxicology program or the Summer Neuroscience program as our third experience. In these programs, students receive more direct experience and mentorship in the laboratory. For our last experience, students in their final year may enroll in research or academic administration practicums. Students gain an in-depth understanding of these two areas by completing a scholarly research project with a designated faculty member. We feel that these combined experiences result in well-balanced practice experiences that allow students to explore areas they may not have otherwise considered for their future careers.

Description and Analysis of an Elective Teaching Rotation. Cynthia Sanoski, Eric Boyce, Liza Takya, Andrew Peterson and Cathy Poon, University of the Sciences in Philadelphia. Objective: Entry-level PharmD students are required to complete eight, five-week rotations during their final year. Students may select a teaching rotation as an elective. We describe the rotation with a faculty member. We feel that these combined experiences result in well-balanced practice experiences that allow students to explore areas they may not have otherwise considered for their future careers.

Academic Longitudinal Rotations. Sandra G. Scimeca, Norma J. Owens and Anne L. Hume, University of Rhode Island. The University of Rhode Island has always promoted the potential roles for its graduates in academia. Doctor of Pharmacy (PharmD) students have opportunities to gain directed experiences in research and scholarship through special project courses offered by College faculty. Emerging initiatives to encourage an academic career path include the development of a combined PharmD-PhD degree program and a sustained commitment to foster students' interests in residencies which emphasize teaching. Since the mid 1990s, the College has also offered academic longitudinal rotations for sixth year PharmD students who have a specific interest in gaining experience in classroom teaching or scientific writing. Students spend 4 hours per week during the academic year, as well as a 5 week project during the summer before entering the program. In this academic teaching longitudinal, students are introduced to the methodology of effective teaching. Students collaborate with individual faculty to develop case studies, facilitate small group discussion sessions, provide one formal lecture, and develop exam questions. In the academic writing longitudinal, students select a faculty member with whom to write either a major manuscript for publication or to collaborate on smaller writing projects for a local or regional audience. Every year at least 3 to 4 PharmD students choose an academic longitudinal rotation and many of these individuals subsequently have entered a residency or graduate program after receiving their degree.

Participation Creates Opportunities for Leadership. L. Clifton Fuhrman, Jr., Wayne E. Buff and Farid Sadik, University of South Carolina. One of the goals of the University of South Carolina College of Pharmacy is to develop students professionally, through their participation in professional organizations. By virtue of their participation in organizations and other extracurricular activities, the students then begin to take ownership of the pharmacists profession. Pharmacy graduates typically become leaders who can successfully maintain their future profession. The College has diverse organizational opportunities for student participation; ASP, SSPH, SNPHA, KE, Kappa Psi and Kappa Psi Little Sisters, CPFI and Student Government are available options. Students are recognized by Rho Chi and Phi Lambda Upsilon for academic excellence. Among the group of approximately 90%! of our students are members of at least one organization, and they perform public service programs such as Project Immunization, Poison Prevention Week, National Pharmacy Week, as well as offering their services at the Free Medical Clinic. Our student organizations participate in state and national professional meetings, and members have served as national officers. Faculty members at the College also demonstrate involvement in leadership, with 100% having membership in at least one national professional organization;
Cultivating Academic Leaders through a Vision Realized. Carmita A. Coleman, Arvind Arora, John F. Hancock, Hampton University School of Pharmacy. Hampton University School of Pharmacy has set a determined path to develop pharmacists able to advance the profession of pharmacy. As stated in its Vision Statement, "The School of Pharmacy envisions the delivery of its programs in an environment constructed to sensitize the pharmacy graduate to the importance of diversity of cultures, the need for lifelong learning, and a lasting respect for health. " With the graduation of its inaugural class in May 2002, the first of its dreams were realized. Most of these graduates are pursuing residency training leading to the formation of practitioners ready to tackle the rigors of academia. By providing innovative coursework, practice experiences, research, and professional development, students are taught with skills necessary to improve the profession. Integrated concepts of basic, clinical, and administrative sciences are presented simultaneously providing a layering of information. Advanced technology allows continuous access to network and database infrastructure through both wired and wireless capabilities. Critical thinking skills are seamlessly developed through didactic case studies, early experiential education, fourth-year clerkships, and interactions with faculty in research activities. Students and faculty present research findings at both state and national symposia. Hampton University School of Pharmacy fosters leadership within its student body by exemplifying leadership within its faculty. Faculty serves as officers and on Boards in several pharmacy organizations including the National Pharmaceutical Association, Association of Minority Health Professionals, and International Society of Hypertension in Blacks.

Encouraging Pharmacy Academic Leadership. Stanley S. Weber, University of Washington. The School of Pharmacy at the University of Washington provides many opportunities to encourage the development of academic leadership qualities in students. It is clear that students learn best when they are actively involved in the learning settings where they can put their knowledge and skills to practical use and one important method is for an individual faculty member to work with an interested student acting as a mentor and a positive example. These are often formalized into "Special Project" courses. This involved learning models and teach many of the problem solving, communication, and discipline-specific skills necessary for a successful academic career. One unique collaborative teaching/learning course is Pharmaceutical Care Systems. PY3 students are selected to become tutors and during winter and spring quarters these students practice what they will be teaching, focusing on and teaching other students. A student-centered approach allows the student to learn to be "standardized patients" and how to give feedback to the interviewer. They also learn how to be facilitators and change agents. We have recently implemented the PLF Fellowship for Excellence in Pharmacy Education. The purpose of the fellowship is to provide the opportunity to acquire research and teaching skills needed to become outstanding faculty. The experience must have an emphasis on therapeutics, but can be in the areas of drug metabolism, drug interactions, pharmacoepidemiology, pharmacoeconomics, and pharmacoeconomics. Developing academic leaders is an important activity at the University of Washington.

PharmD as a Preceptor Four-Hour Course. Robert D. Scalley and Sheila L. Kasten, University of Wyoming. The recruitment of pharmacy students into academic careers is an ongoing challenge for pharmacy educators. Another challenge is convincing new practice faculty that they are not "preceptors" but rather interactive members of a collegial body with unique responsibilities. One effective method in an academic setting was developed to facilitate an experience in didactic pharmacy education. Additionally, responsibilities of faculty at a university level and characteristics of faculty honored for excellence in teaching were explored. Pharmacotherapy at the University of Wyoming emphasizes problem solving and critical thinking through discussion of case-based topics. A two-hour topic, treatment of migraine headache, was assigned to the student. Tasks included development of goals and objectives for the topic; preparation of cases and graded problem set material for inclusion in the course manual; evaluation and grading of class discussion, and development and assessment of a post-discussion quiz. Class participants were given the opportunity to evaluate the student's teaching performance. Meetings with representatives of the university's Center for Teaching and Learning were arranged to facilitate an understanding of the components of a course syllabus, and critique of the present course syllabus was subsequently undertaken by the student. Interviews with faculty from outside the College of Health Sciences, recognized for excellence in teaching, were conducted to identify programmatic aspects that lead to excellence in teaching. Issues involving the balance of teaching, scholarly activity and service were also explored.

EDUCATIONAL RESEARCH

Student Perceptions of a Course Management E-System on a Classroom Learning Community. Kathleen Boje, University at Buffalo.
Objectives: Introduction to Pharmaceutics/ Important Advances in the area of Pharmaceutics and its role in determining the efficacy of UBLearns (aka Blackboard, a course management e-system) to promote student critical thinking in a learning community. Methods: A 33-question survey solicited student perceptions of UBLearns’ impact on the classroom learning community and student active-constructivist learning processes. Results: Forty-one of 42 students (97.6%) completed the survey. A classroom learning to inanimate objects primarily were more likely to approach the instructor either in or out of class. UBLearns did not enhance the development of social relationships: 25% of the students were more likely to interact with other students about course-related topics. UBLearns did not enhance the development of social relationships between students and faculty, and 2. student active -constructivist learning processes.

Effect of a Review Course on Perceived Barriers to Success on Pharmacy Licensure Examinations. Jill S. Burkiwicz and Nancy F. Fjortoft, Midwestern University- Chicago. Objectives: To identify the needs and perceived barriers to success on the NAPLEX and MPJE and to determine the impact of a review course on those needs and perceived barriers. Methods: A survey was administered immediately prior to and immediately following a 3-day NAPLEX/MPJE review course. The survey assessed candidate's concerns about non-academic factors and anticipated performance, confidence, attitude, and feelings toward the exam. Results: A total of 164 pre-course surveys and 126 post-course surveys were completed by 211 candidates (overall response rate 68.7%). Candidates' top concerns with taking the exam included: forgetting the information already known (48.3%), lack of knowledge (16.5%), computer format of the exam (9.1%). Overall, the review course increased candidate confidence of anticipated successful performance (P<0.001). Males were more confident than females after the review course (P=0.043). Self-assessed ability levels in 4 of 8 content areas were statistically significantly improved by the review course (P<0.05). Students appeared to be better prepared for the NAPLEX and MPJE and future pharmacy practice. A review course in preparation for licensure examination is a valuable tool to address concerns with the examinations and increase confidence in ability to successfully pass the licensure exams.

Multiple Choice Questions in a Therapeutics Course. Jean Carter, Sarah J. Miller and Michael P. Rivey, University of Montana. Objective: Professional testing services overseeing credentialing recommend avoidance of negatively worded multiple choice questions (mcq's), stating that these questions test reading abilities rather than the content of the question and do not contribute to performance by third-year pharmacy students on negatively versus positively worded questions in a therapeutics course. Methods: A total of 149 mcq's items written by three instructors over four years and their corresponding item analysis records were reviewed to determine type of wording and psychometric properties and each item's averaged students choice distribution. The choice distribution was then split into positively worded questions and negatively worded questions were compared across and within instructors using t-tests. Results: All three instructors consistently used some negatively worded questions. There was no difference between the mean point biserals for positively and negatively worded questions across all three instructors for all four years, which were 0.22 and 0.19, respectively (P=0.46). Corresponding values for each instructor individually were not statistically significant. Item difficulty did not vary by wording with 75.7% for the positively worded questions and 76.4% for the negatively worded questions (P=0.83). Corresponding values for each instructor individually were not statistically significant. Implications: Our limited data indicate that negatively worded mcq's perform similarly to positively worded questions and may be an acceptable method for ensuring construct validity when written appropriately. Implications: Frequent make decisions based on exclusion, the question of whether negatively worded questions are appropriate for health care credentialing examinations should be further explored.

Predicators of Pharmacy Student Perceptions to Teacher’s Randomized Class Questionnaire and the Effectiveness of In-Class Active Learning. Philip M. Mcop,iped, Nova Southeastern University. Objectives: There were two main objectives: (i) Development and use of a scale to determine the variability in student perceptions of teacher's randomized class question methodology and (ii) determination of what factors might influence student differences in these perceptions. Methods: A ten-item Likert scale with five possible responses from strongly disagrees to strongly agrees was developed. Student demographics, scores on the Personal Report of Communication Apprehension, scores on the Myers-Briggs Type Indicator, and where the students believed they were in the class based on teacher input which was statistically linked to the responses on the new scale. Descriptive statistics were assembled; and, then hierarchical regression was used to predict which of the factors predicted student scores on the new scale. Results: 21% of the 170 student respondents reported disliking the randomized question methodology. These same respondents were younger, reported high levels of communication apprehension (P<0.05), were more likely to interact with other students about course-related topics. Furthermore, the randomized question methodology can provide a vital student want to be recognized by the teacher in a distance-learning environment.

Academic Factors Affecting Success in Various Courses in the Pharmacy Curriculum. Robert Greenwood, Antone Al-Achi, Richard D'Elia, James Junker, Larry Swanson and Daniel Teat, Campbell University. Objectives: Success in pharmacy school may be affected by social, economic, and academic factors. This study focuses on the academic background the student attained before matriculating into the pharmacy program. Methods: We examined retrospectively PCAT scores, science grades and overall GPAs as predictors of academic success in various professional pharmacy courses. A multiple regression analysis model was used with a priori of 0.1 for significance. Results: Overall entering GPA predicted academic success in the following: Biostatistics, Nonprescription Medications, Therapeutics I, Therapeutics III, Therapeutics IV. Pharmacy in the U.S. Healthcare, Biopharmaceutics, and Pharmacy Marketing and Management. Science GPA was a significant predictor for success in all courses. Implications: Younger introverted pharmacy students need to develop skills to become more active learners in the classroom setting. Furthermore, the randomized question methodology can provide a vital student want to be recognized by the teacher in a distance-learning environment.

Investigating the Relationship Between Communication Laboratory Techniques and Pharmacy Students' Perceived Self-Efficacy and Communication Apprehension. Jan K. Hastings and Donna S. West, University of Arkansas for Medical Sciences. Objectives: This study evaluates the effects of two different methods of conducting laboratory sessions on pharmacy students' communication effectiveness, self-efficacy, and communication apprehension. Methods: Approximately 70 pharmacy students enrolled in a communication course were randomly assigned to either a traditional, instructor-directed laboratory section or a self-directed videotaped laboratory section. Students completed the Pharmacist Communication Skills Inventory at the beginning and after taking their communications laboratory course. The instrument measures the students' communication apprehension and self-efficacy. All students were assessed at the end of the course using a standardized patient exam. Using SPSS 10.1, descriptive statistics and dependent sample t-tests were conducted to compare the two laboratory groups. Results: No differences on pharmacy students' communication effectiveness, self-efficacy, or communication apprehension were found between the two lab sections. Overall, students' perception of self-efficacy improved between the beginning and the end of the communications course. Implications: Self-directed role-playing and videotaping of a patient counseling session is equally effective in helping students improve their communication skills and overcome communication apprehension. The use of a self-directed lab requires less time commitment on behalf of the faculty; and therefore, should be explored as an option when teaching a communications course to pharmacy students.

Redesign of Communications Skills for Pharmacists Course to Achieve Student Performance Expectations. Diane R. Johnson and Candace V. Barmatin, Mercer University. Objectives: A student feedback course survey was redesigned to enhance student performance of: (i) empathy skills, and (ii) assertiveness skills. Methods: The Dick and Carey Model of Instructional Design was used and produced the following changes: A hybrid format was chosen whereby lecture material was placed on CD-ROM, so that content delivery was improved over the previous year. Pre- and post-classroom segments and reflective journals were added; classroom application activities were increased; patients made in-class presentations on disease states. Keller's ARCS Model of Motivation was used in designing CD-ROM modules and application activities. The instructor evaluated student performance of skills by reviewing the presentation (content and presentation) and using a validated evaluation instrument. Students rated each course change on a five point scale, 1=poor, 5=excellent. Results: Students rated the value of the CD-ROM modules as 4.07 (SD=0.77); the journal assignments as 3.41 (SD=0.99); and the patient speakers
as 4.54 (SD=0.64). Student performance data was compared to the previous two-year average using paired Student’s t-tests. The redesign of the pathway was successful in that students in the redesigned course achieved performance expectations for assertiveness and over 80% achieved performance expectations in empathy. Performance expectations were achieved by less than 5% of students from previous years. Implications: Hybrid formats can create in-class time for learning and may be particularly useful for skill-building. 

**Results:** 

Significant differences in overall performance as well as positive student evaluations were positive in both pathways. 

**Objective:** To assess the extent to which critical thinking skills and dispositions are related to both the academic and clinical performance of pharmacy students. 

**Methods:** This investigation used a convenience sample of 120 students who were participants in a record review of two classes of Doctor of Pharmacy students at Shenandoah University’s School of Pharmacy (classes of 2000 and 2001). Records were obtained from 102 students. Each entering student is required to take the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Dispositions Inventory (CCTDI) during orientation prior to the first professional year. Both tests have been shown to be valid and reliable. These results were assessed in relationship to students’ didactic grade point average (GPA) for the first three professional years and clinical performance during fourth-year rotations. 

**Results:** Pearson correlations revealed that both the CCTDI and CCTST were significantly related to students’ didactic GPA. The CCTCTI was significant at the 0.05 alpha level (P=0.025), while the CCTSTI was significant at the 0.01 alpha level (P<0.001). In addition, the CCTDI was significantly related to students’ fourth-year clinical GPA at the 0.05 alpha level (P=0.018), while the relationship between the CCTSTI and clinical GPA was significant at the 0.10 alpha level (P=0.092). 

**Implications:** Critical thinking skills are critical to both academic and clinical performance and should be given for improving and assessing critical thinking skills in pharmacy curricula. 

**Quality and Quantity of Medication Errors’ Instruction in Schools of Pharmacy Curricula: A Descriptive Study.** 

**Objective:** To assess the extent to which medication errors are included in the pharmacy curricula of Schools of Pharmacy in the United States. 

**Methods:** A cover letter and survey was sent to the 82 Deans of Colleges of Pharmacy in the United States in April 2001 asking for assistance in completing the survey by distributing it to pertinent faculty members responsible for teaching topics pertaining to medication errors throughout the curriculum. The survey was developed in collaboration with an industry expert in medication errors. 

**Results:** Thirty-six surveys were returned (48% response). Five returned protocols were incomplete. Both the quality and quantity of medication errors’ inclusion in pharmacy curricula varies significantly. For example, 27 of the sampled schools reported that the topic “failure mode” was discussed while only 6 schools reported “quality improvement” as a topic of discussion in the pharmacy curriculum. 

**Implications:** Given the well documented magnitude of medication errors occurring yearly in the United States, and the associated direct and indirect costs, it seems imperative that schools of pharmacy integrate into their curricula an adequate amount of instruction pertaining to medical errors. Thus, this study illuminates the need for schools of pharmacy to articulate and standardize a minimal level of medication error instruction for pharmacy curriculum. 

**Effectiveness of Pharmacy Calculation Education via the Internet: A Comparison Between a Campus-Based and a Campus-Bridge format.** 

**Objective:** In Fall, 2001, Creighton University initiated the first ever, entry level web-based Doctor of Pharmacy degree whereby all didactic courses, with the exception of laboratory-based courses and clinical rotations, are delivered via internet. The content of this course in the web-based pathway was identical to the campus-based pathway. The purpose of this project is to assess the effectiveness of content delivery via the internet by comparing student performance in the pharmacy calculations class offered by the same instructors in both the web and campus pathway. The methods: While different methods of content delivery were used with the campus and web-based students, identical examinations were used to test performance in the courses. Pathway effectiveness was quantitatively assessed by comparing final mean scores in the two pathways using an Independent Student’s t-test with a significant level defined as P < 0.05. 

**Results:** Mean scores in the campus-pathway were 84.4 (± 4.35) and 92.14 (± 4.91) respectively (P = 0.118). Instructor and course evaluations were positive in both pathways. 

**Implications:** The absence of significant differences in overall performance as well as positive student evaluations suggest that a web-based approach may be used successfully to teach pharmacy calculations. 

**Impact of Distance-Learning Technology on Student Performance.** 

**Objective:** To compare the outcomes of distance learning technology as a function of student location in four pharmacotherapy courses. 

**Methods:** Four courses in the osteopathic medical school (Neurology and Psychiatry) were required during the fall semester for third-year pharmacy students at Texas Tech. Students enrolled participate locally (Amarillo) and distantly (Lubbock and Dallas) via interactive, live audio/video connections. Off-site students often feel at an academic disadvantage. To assess the merit of this assumption student grade point average (GPA) before enrollment in the course and final grade point average (GPA) after enrollment (Amarillo=83.46, Lubbock=83.01, Dallas=83.01; P=0.05 for all comparisons). There were no significant differences in student performance in the pharmacotherapy courses between local and remote sites (P=0.05 for all comparisons). Student performance in each pharmacotherapy course correlated with GPA (Bone-Joint Disorder r=0.593, P=0.01; Dermatology r=0.520, P=0.01; Neurology r=0.395, P<0.01; Psychiatry r=0.277, P=0.05). 

**Implications:** Results indicate that student outcomes in pharmacotherapy courses using distance-learning technology do not differ. This information is valuable considering the increased use of this technology in pharmacy school curricula. 

**Five Year Curricular Review of the Nesbitt School of Pharmacy Using Summative Assessment.** 

**Objectives:** This study was conducted to facilitate an objective curricular review. 

**Methods:** A database containing the grade point averages (GPA) for all students enrolled in the School of Pharmacy from 1996 and 2000 was developed. The database was analyzed by JMP and SPSS, was considered significant if P < 0.05. 

**Results:** There was no difference in academic performance of any of the past five classes as measured by their average yearly GPA. There was no difference between the fall and spring semesters’ GPA, however, there was a trend for the GPA to be lower in the spring semesters (P=0.064). The average GPA for advanced practice, social and administrative sciences and clinical science courses were significantly higher than the GPA for pharmacotherapeutics and basic science courses. This trend was also reflected in that the two highest average GPA were in advanced practice courses and the two lowest average GPA were in basic sciences. When correlations were observed between course, some could significantly predict future academic performance. Some courses significantly correlated performance in future courses. 

**Implications:** This review suggests that each class performed at an equal academic level each year regardless of possible differences in academic qualifications. The students perform better in courses based on clinical skills rather than basic sciences. Lastly, courses were predictive for the performance in another course but not until late in the curriculum sequence. 

**Desired Characteristics of and Student Satisfaction with Introductory Pharmacy Practice Experience: Assessment of The EPOC Program.** 

**Objectives:** To assess the efficacy of the Early Patient-Oriented Care (EPOC) program, a longitudinal introductory practice experience (IPE) in which students provide clinical pharmacy services to hemodialysis outpatients, incorporates the desired attributes of an IPE and to assess student satisfaction. 

**Methods:** Published criteria for determining that an IPE meets the attributes of an IPE. The students were asked to determine if our Early Patient-Oriented Care (EPOC) program, a longitudinal introductory practice experience (IPE) in which students provide clinical pharmacy services to hemodialysis outpatients, incorporates the desired attributes of an IPE and to assess student satisfaction. 

**Results:** Preceptors and students ranked EPOC similarly as providing the desired characteristics of an IPE and to assess student satisfaction. 

**Implications:** EPOC incorporates the desired characteristics of an IPE providing students a highly satisfactory learning experience.
to half of each class in order to control for a learning effect from seeing the same tests multiple times.

Results: Increased CST scores were noted for each cohort (table). The increases were unlikely to be from a learning effect because students who took version A again in 2001 scored no better than students who took version B. There was no increase in CCTDI scores at any time.

Implications: Pharmacy students at this College appear to increase in generic critical thinking ability after the four-year curriculum.

Cost-benefit of a Postbac Certificate in Pharmacotherapy: Comparison Among Medical, PharmD and Nurse Practitioner Students. Michael S. Monaghan, Paul D. Turner, Bruce L. Houghton, Kimberly A. Gait, Brenda Bergman-Evans and Eugene C. Rich, Creighton University. Objectives: Are pharmacy students' drug choices more cost-effective? To address this question, we surveyed senior-level medical and PharmD students and nurse practitioners about their drug use.

Methods: A cross-sectional survey design was used. Three clinical vignettes representing common ambulatory problems were used to assess cost-effectiveness of prescribing/therapeutic recommendations. Each vignette offered four medication choices of equal efficacy but widely varying costs and a relative value index was used to calculate the cost of prescribing. The Kruskal-Wallis One-Way ANOVA with Bonferroni-adjusted Mann Whitney U post hoc comparisons was used to assess group differences.

Results: Fifty-nine medical, 53 PharmD, and 17 nurse practitioner students volunteered to participate. There were significant differences among groups for the total composite cost (P < 0.001) and for all three of the specific case scenario items (tendinosis 2 = 23.7, P < 0.001; hypertension 2 = 23.6, P < 0.001; UTI 2 = 10.6, P = 0.005). Both medical and nurse practitioner students were more expensive in their composite treatment costs than were pharmacy students (P = 0.001, P = 0.002, respectively). There was no difference between medical and nurse practitioner students in terms of overall cost effectiveness.

Implication: Pharmacy students were more cost-effective. Whether this difference was due to curricular differences or differences in interactions with pharmaceutical sales representatives have yet to be determined.

Evaluation of a Diabetes Certificate Program. Kimberly S. Plake and Renae Chesnut, Drake University. Objective: To evaluate the effects that additional training from a diabetes certificate program has on pharmacists' practice of diabetes care.

Methods: The goals of the diabetes certificate program, Developing Skills for Diabetes Care, are to increase pharmacists' knowledge of diabetes regarding its pathophysiology, complications, treatment, and monitoring. A survey was administered to evaluate the program's effects on pharmacists' practice of diabetes care. Surveys were focused on provision of services, patient contact, and reimbursement rates. The survey was given as a pretest to a group of pharmacists (n=30) beginning the program and was sent to all pharmacists completing the certificate program (n=126).

Results: Response rate for the pretest was 100% and 49.2% for the mailing.

After completing the program, 66% of pharmacists provided some type of diabetes care services as compared to 44.4% of the pretest respondents (t^2=3.523, P = 0.06). Pharmacists completing the program had higher rates of providing blood glucose monitoring (t^2=6.621, P = 0.01), nutrition education (t^2=6.568, P = 0.01), and patient goal setting (t^2=10.852, P = 0.001). Although not statistically significant, those in the curriculum group more frequently provided blood glucose monitoring training, foot checks, and dosage adjustments. A higher percentage of pharmacists billed for their diabetes services after completing the program (t^2=4.038, P = 0.04).

Implications: From these data, it appears that a diabetes certificate program can help pharmacists begin testing and caring for their diabetic patients.

Pharmacists' Perceived Improvement in Performing Pharmacy Practice Tasks After Graduation from a Postbacalaureate PharmD Program. L. Douglas Ried and Sven Normann, University at Buffalo, L. Douglas Ried and Sven Normann, Howard O. Wachsmann, Jr., Creighton University. Objectives: To assess the learning attitudes of Gen X pharmacy students and compare them with the learning attitudes of non-pharmacy students Gen-Xers.

Methods: An anonymous survey which was based upon a previously conducted study was developed and distributed to third year professional students. This instrument ascertained a number of items including: "Are they "frustrated with" or a "lot (4) better or worse.

Results: Eighty-four of eighty-eight surveys were completed for a response rate of 95%. All respondents were classified by date of birth as Gen-Xers. The majority of respondents indicated that the most important quality of an instructor was that they "frustrated with" or a "lot (4) better or worse. The item we used was "How much better (or worse) that the average pharmacy school grade should be." Results: Eighty-four of eighty-eight surveys were completed for a response rate of 95%. All respondents were classified by date of birth as Gen-Xers. The majority of respondents indicated that the most important quality of an instructor was that they "frustrated with" or a "lot (4) better or worse. The item we used was "How much better (or worse)." The majority of respondents felt that an average pharmacy school grade should be a "B" and that grades should be based upon "knowledge and performance" or "improvement over time." These results are similar to responses made by non-pharmacy student Gen-Xers.

Implications: In order for instructors to be effective educators of Gen-Xers, they must understand the values that shape their perceptions of learning. This survey begins to provide some understanding of the beliefs specifically held amongst pharmacy students Gen-Xers.

Does Time Management Affect Test Anxiety? Shailendra Gupta and Sujit S. Sansgiry, University of Houston. The detrimental effect of anxiety on academic performance for students is a well-documented phenomenon. To improve academic performance in students, it is important to understand the underlying causes of anxiety. Objectives: The objective of this study was to evaluate the relationship between time management and test anxiety among pharmacy students.

Methods: A questionnaire was developed with previously validated scales to measure anxiety and time management.

Time management and study strategies was measured using a five-item, five-point strongly agree (5) strongly disagree (1) scale. Test anxiety was measured using a ten-item five-point scale where the anchors were 'Not at all typical of me' (1) to 'Very much typical of me' (5). The questionnaire along with items to collect demographic data was distributed to all students in the College of Pharmacy during the Spring 2001 semester. Results: A total of 199 students participated in the study. The mean age of the students was 26 years with majority being female (72.5%). Students indicated that they found it difficult to combine (3.1 ± 1.21) and organize (3.4 ± 1.11) their study and leisure time. Their stress on time management scale was low (1.430 ± 0.5). Time management scores were negatively correlated to test anxiety score (25.533 ± 8.29) (P < 0.001).

Implications: When interventions are successful in improving time management skills there will be a commensurate decrease in test anxiety; increasing overall academic performance.

Effectiveness of Human Anatomy Education for Pharmacy Students via the Internet: A Comparison Between Campus-based and Web-Based Student Performance. Phillip Vuchetich, Andrea Zardetto-Smith and Michael Monaghan, Creighton University. Objectives: In Fall 2001, Creighton University initiated the first ever, entry level web-based Doctor of Pharmacy degree program for post-baccalaureate students. The web-based courses and clinical rotations, are delivered via internet. The content of this course in the web-based pathway was identical to the campus-based pathway. The purpose of this project is to assess the effectiveness of content delivery via the internet by comparing student performance in the human anatomy class of students in two different pathways to the same disease pathways.

Methods: While different methods of content delivery were used in the on-campus and web-based students, identical examinations were administered to students in both pathways. Comparing mean student cumulative scores using the Mann-Whitney U test quantitatively assessed pathway effectiveness. Comparing student exam results made a qualitative assessment of content delivery via both pathways. Results: The mean cumulative scores for the campus-based and web-based pathways were 86.38 (± 4.76) and 85.86 (± 5.19) respectively (P = 0.722). Instructor and course evaluations were similar in both pathways.

Implications: The absence of significant differences in overall performance as well as positive student evaluations suggest that a web-based course may be used successfully to teach diabetes pathways.

Qualitative Grounded Theory Study on Master Teaching of Clinical Pharmacy Preceptors on Patient Care Rotations. Karen K. Schultz and Howard O. Wachsmann, Jr., Shandahou University. Objectives: There is an urgent need to have balance between student learning in the theory of pharmacy and development of their skills as an expert in the practice of pharmacy. Good clinical teaching is paramount to creating empowered students and practitioners. This study offers an emerging model of master clinical teaching emphasizing teachable moments between students, clinical preceptor, and the clinical environment.

Methods: This is a non-hypothetical inductive case study using qualitative, grounded theory research methods. The lead investigator and his researchers recorded interactions between the master preceptors and their students by direct observation and audio tape. In-depth interviews with participants confirmed researcher observations.

Results: An emerging model of interactions between
Characterization of Current Preceptor Development Programs. Cynthia J. Boyle, University of Maryland; Stan Carr-Lopez, University of the Pacific, Resemim Kassam, University of British Columbia, Nancy E. Kawahara, Western University, Mara A. Kieser, University of Wisconsin-Madison, Carla J. See, West Virginia University. Objectives: To describe existing preceptor development programs within AACP. Methods: A subcommittee of the joint Preceptor Development Task Force of the Pharmacy Practice Section and the Professional Development Special Interest Group developed a survey which was sent to the professional experience program contact at each AACP college or school. Among key information factors collected were: use of the AACP "Training Pharmacy Preceptors" program, learning objectives, format, AFCE contact hours, fees, development responsibility, assessment documentation, session length, percentage of preceptors' participation, and ideas for AACP assistance. Results: Surveys were due March 1, 2002, in order to allow time for analysis prior to the 2002 AACP Annual Meeting. Implications: A concurrent project of the task force is a survey of preceptor needs. Identification of gaps between needs and existing programs will direct future preceptor development efforts.

Study of Tutorial Group Process and Student Achievement. Robert M. Cisneros and Heidi M. Anderson-Harper, University of Kentucky; Kent Krueger, Jill Salisbury-Glennon, Bruce Berger and David Shannon, Auburn University. Objectives: To determine: (i) if differences exist in observed tutorial group activity among pharmacy student tutorial groups, (ii) if differences exist in individual student achievement among student tutorial groups, and (iii) if a relationship exists between tutorial group process and individual student group member achievement in PBL. Methods: Tutorial groups will be composed of consenting second year pharmacy students and consenting faculty. Baseline demographic data, pharmacy GPA, PCAT scores, and learning styles, as assessed by the Kolb's Learning Style Inventory (LSI) and the Modified Self Directed Learning Readiness Scale (MSLQ), will be obtained. Measures of student achievement will be obtained at baseline and at the end of the study. These include: readiness for self-directed learning as measured by the Self-Directed Learning Readiness Scale (SDLRS), critical thinking skills as measured by the California Critical Thinking Skills Test (CCTST), learning motivation as measured by the Motivated Strategies for Learning Questionnaire (MSLQ), and knowledge as measured by usual module assessment methods. Analysis will be conducted to determine if differences in group activity and achievement exist. Further analysis will be conducted to determine the relationship between group activity and individual group member achievement in PBL. Implications: Insight will be gained about the relationship between tutorial group behavior and achievement in PBL, use of tutorial groups in a hybrid system, and specific areas of training needed for students and facilitators.

Alternative Medicine Instruction in U.S. Schools of Pharmacy. Arjun Dutta, Monika Dafary and Patricia Ayuk-Agbé, Howard University. Objectives: To document the prevalence, scope, and diversity of pharmacy school education in complimentary and alternative medicine and to obtain information about the organizational and academic features of these courses. Methods: A survey was developed to assess the frequency and nature of alternative medicine instruction in U.S. pharmacy schools. An 11-item survey was mailed to all schools of pharmacy in the U.S. The surveys were addressed to academic pharmacists. The survey was pilot tested for its validity and was mailed to all schools of pharmacy in the U.S. The surveys were addressed to academic or curriculum deans at each of the 85 pharmacy schools. The survey specifically elicited responses about existing or planned instruction in alternative medicine, and pharmacists were asked to rate the importance and expected characteristics of courses in alternative medicine. Implications: The results of this survey will help delineate the present nature of alternative medicine instruction in pharmacy schools across the country in light of the increasing demand for alternative therapies by consumers.

Hierarchical Structure Evaluation of Bloom's Taxonomy and Marzano's New Taxonomy Using Rasch Analysis. Terrence R. Jackson, University of Illinois-Chicago, JoLaine R. Draugalis, University of Arizona, Everett Smith, University of Illinois-Chicago, Woodie M. Zachry III and Marion K. Slack, University of Arizona. Objectives: The purpose of this study is to evaluate the hierarchical ordering of items as determined by two classification schemes, Bloom's Taxonomy and Marzano's New Taxonomy using Rasch analysis. Rasch analysis was previously performed on a 25 item authentic assessment and demonstrated good fit statistics (item difficulty ranging from -1.90 to 2.46 logits) supporting the item difficulty hierarchy. The item hierarchy differed between what was predicted based on Bloom's Taxonomy and what the Rasch analysis data showed. The items identified: 1. there was less agreement among judges than expected regarding which of Bloom's six categories the assessment item best represented, and 2. judges reported that classification of some items was difficult using Bloom's Taxonomy. Marzano (2001) offers a New Taxonomy based on his 43 years of information gathering and study of Bloom's Taxonomy. When judges used Marzano's New Taxonomy, agreement improves; however, Rasch analysis of the data suggested the need for a larger number of judges.
Methods: With the collection of additional data, Rasch fit statistics will be used to investigate whether items which are being scored as failures are also problematic. Additionally, Rasch analysis will provide information to evaluate whether a judge perceived and used the categories in the same manner as other judges.

CD-ROM and Web-Based Technology in a Patient Assessment Course. Rhonda M. Jones, Creighton University. Objectives: The Internet is ripe with web sites that offer patient-based data for learning basic assessment skills, such as blood pressure measurement. Accessing these sites in an organized fashion may enhance student learning. The purpose of this project was to develop a CD-ROM and web site for a patient assessment course and obtain student feedback concerning the usefulness of this technology. Methods: A course web site was developed using Easy CD Creator. Components of the CD-ROM included course syllabus, schedule, assignments, lecture notes, slide shows, patient cases, laboratory exercises, and Internet resources. A course web site was published at www.tripod.com. The web site included the same information as the CD-ROM and was used to provide new information throughout the semester. At the end of the semester, student opinions and feedback were obtained using a survey that included both Likert scale and open-ended questions. Results: The data will be utilized to formatively assess and revise the course accordingly.

Utilization of Personal Digital Assistants (PDAs) as a Resource for Pharmacy Students During Experiential Learning. Melanie W. Pound, Richard H. Drew and D. Byron May, Campbell University. Objectives: (i) evaluate the prevalence of undergraduate PharmD students using a PDA during experiential learning programs; (ii) assess the perceived utility of the PDA-based vancomycin dosing program; and (iii) determine PDA drug information resources utilized by students. Methods: From October 2001 to March 2002, participating pharmacy students beginning adult internal medicine rotations completed a survey to determine student demographics, PDA use history and the level of expertise with vancomycin dosing. The students then received a PDA-based vancomycin dosing tutorial prepared by the investigators. A survey completed at the end of the two-month rotation was administered to determine their satisfaction with the tutorial and other PDA-based medical resources. Results: Preliminary findings show 23/30 (77%) students own a PDA and use this as a drug information resource. A total of 17/22 (77%) ranked themselves "Poor-Fair" regarding vancomycin dosing competency prior to the use of the tutorial. The primary medical source utilized was Epocrates®. The vancomycin module was found to be very helpful and students subsequently rated their vancomycin dosing competency as "Good-Very Good" by 92% of respondents. Final results will be presented at the meeting. Implications: PDA-based drug information may be a beneficial learning tool. Comments: The high prevalence of students owning PDAs is high and appears to be a beneficial medical resource. PDA-based tutorials may also be a beneficial learning tool.

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Pharmaceutical Care Plans: An Assessment of Patient Follow-Up. Cora-Lynn Becker, Drake University. Introduction: Development of pharmaceutical care plans is essential for optimizing therapy goals, documents a monitoring schedule and written patient record, and resolves preventable and current drug therapy problems. This study assessed care plans that were submitted as an eligibility requirement to participate in Iowa Pharmaceutical Case Management (PCM), a Medicaid program beginning in the fall of 2000 for 2700 contracted for care sites. Objectives: The objectives were to: (i) determine PDA drug information use; and (ii) assess pharmacist follow-up of patients with identified drug therapy problems. Methods: A total of 754 care plans were assessed for drug therapy problems and causes, as well as pharmacist follow-up. Categories of drug therapy problems and causes described by Tomochko et al. (American Pharmaceutical Journal 1995;NS35(4):30-9) were used for the study. Follow-up was identified in one of three categories: 1. actual, 2. none, or 3. intention to follow-up. Further assessment in the study examined the relationship between actual follow-up and practice site, training of the pharmacist, type of disease, and classification of the drug therapy problem. Results: This study showed that pharmacists document a wide variety of drug therapy problems and causes. Less than one-third of the care plans included documentation of follow-up. There was an association between practice site and follow-up (P=0.003) and between follow-up and classification of drug therapy problems (P=0.037). There was no relationship between the pharmacist and whether or not a pharmacist completed an Iowa based training program (ICP) (P=0.997), nor did an association exist between follow-up and type of disease (P=0.083). Conclusions: Follow-up in patients with drug therapy problems was less than optimal. Pharmacists must document patient monitoring and follow-up in order to turn the pharmaceutical care philosophy into practice.

The Synthesis of Selective and Potent Agents Against Toxoplasma gondii and Mycobacterium avium Dihydrofolate Reductase. Lisa R. Biondo, Duquesne University. Introduction: Opportunistic infections caused by pathogens such as Pneumocystis carinii and Toxoplasma gondii are the leading cause of death among AIDS patients. In addition, Mycobacterium avium also afflicts these patients. Two dihydrofolate reductase (DHFR) inhibitors, 

trithemoprim (TMP) and trimethoxat (TMO) are agents that are clinically used to treat opportunistic infections. However, neither TMP nor TMO is effective in therapeutic doses when administered alone because they are not both selective and potent. Therefore, it is necessary to design and synthesize a series of compounds that will be highly selective, as well as potent inhibitors of the DHFR from the opportunistic pathogens. Rationale: Gangjee et al. reported a series of 2,4-diamino-5-methyl-6-arylpyrrolo[2,3-d]pyrimidines, some of which have shown good in vitro potency and selectivity. In order to conduct a more extensive structure-activity relationship (SAR) study, seven additional compounds were synthesized with novel variations in the side chain. Methods: The reaction of malonitrile and acetic acid provided 2-amino-3-cyano-4-methylfuran, which was then condensed with guanidine to afford the 2,4-diamino-5-methyl-6-arylpyrrolo[2,3-d]pyrimidine core. The first compound was obtained via an oxidative ariolution of the pyrrolpyrimidine with the appropriate arylithiols. Some of the substituted arylithiols were not commercially available and were synthesized from the corresponding anilines by diazotization and treatment with potassium ethyl xanthate. Results: The compounds are currently being evaluated as inhibitors of PCDHFR, tgdHFR, and mDHFR. Rat liver DHFR will serve as the mammalian reference and selectivity ratios of each compound will be determined. Conclusion: The proposed compounds were successfully synthesized which should afford a more accurate SAR study.

Establishing Collaborative Working Relationships Between Pharmacists and Physicians. Kelly A. Brock, University of Iowa. Introduction: Collaboration between pharmacists and physicians may produce a more effective health care system. Pharmacists and physicians working together to manage drug therapy may be important to improve therapeutic decisions and may lead to better therapeutic monitoring. Despite the potential benefits from pharmacists and physicians working collaboratively, we know little about such collaborative working relationships. Methods: Collaboration with a pharmacy was studied in depth at ten community pharmacies, using a multi-case design. A personal interview and a quantitative mail survey were used to collect information. Twenty-four variables believed to influence the development of pharmacist-physician collaboration were studied. Two researchers independently judged the stage of collaboration for each case and rated the influence of the variables on the development of collaboration. Results: Four pharmacies were rated as having achieved early stage collaboration (little or no collaboration), while six pharmacies had achieved late stage collaboration (definite collaboration). Joint care activities, bi-directional communication and care collaboration, and caring for mutual patients supported the development of later stage collaboration. Increased accessibility to patient information and to the physician facilitated the development of new expectations in the relationship, which included the physician being more receptive to the pharmacist's recommendations. Adding value to the medical practice and physician convenience was important to the development of collaboration. Dependence became more balanced as the relationship developed into later stage. Conclusion: The development of collaboration between pharmacists and physicians is influenced by characteristics of exchanges occurring between them. Continued study of collaborative working relationships between physicians and pharmacists is needed to assist health care practitioners in developing a team-based approach to patient care, allowing physicians and pharmacists to work together to coordinate patient care.

Binding Affinity of Carbohydrate Derivatives to Helicobacter pylori. Lisa Charneski, Wilkes University. Rational: Helicobacter pylori, implicated in the majority of gastric and duodenal ulcers, is found in the stomachs of adults displaying gastric inflammatory disease. Treatments against H. pylori are somewhat effective, but therapy side effects and bacterial resistance prove difficult to overcome. H. pylori penetrate the gastric mucin layers and colonize the gastric epithelium to evoke cellular damage. Studies show H. pylori's binding is specific to various fucosyl glycocjugates termed Lewis antigens prevalent on red blood cells and on gastric epithelium. Studies involving H. pylori binding to Lewis antigens show simple carbohydrates could inhibit binding. This research is to determine which carbohydrates have optimal binding to H. pylori. Methods: H. pylori were grown in a rich medium of brucilla broth and fetal bovian serum. Then the cells were washed in 10mM HEPES buffer, saline, to remove non-cell bound carbohydrates, including Para-Aminophenylmannonopyranoside, Para-Aminophenylgalacopranoside, and Para-Aminophenylfluorocyanoside, were added. After incubation for one hour in a 37° water bath, with agitation, the concentration of free carbohydrate derivatives was measured using HPLC. The data was compared to a standard curve to calculate the binding of carbohydrates to the bacteria and binding isomers were constructed to calculate the bacterial binding constant of glycosolated derivatives. Results: Preliminary studies demonstrate binding with Para-Aminophenylmannopyranoside and Para-Aminophenylfucopranoside. Data analysis is ongoing. Conclusion: Ligand binding data obtained in these studies will be used into innovative methods to eradicate the bacteria. One such method will investigate the effectiveness of bound ligands to prevent bacterial adhesion to the GI wall through competitive binding principles.

Selective Inhibition of DHFR. Erin M. Falk, Ohio Northern University. With the increasing abuse of the street drug "Ecstasy" (3,4-methylenedioxymethamphetamine [MDMA]), it is critical to understand the potential neurotoxic effects of the drug. Although the biochemical events occurring in the development of the neurotoxicity have not been fully elucidated, recent evidence has shown that MAO-B may play a role in the neurotoxic response. To determine the involvement of MAO-B in MDMA-induced neurotoxicity. Methods: Striatal serotonin (5-HT) and 5-hydroxyindole acetic acid (5-HIAA) levels were determined in the striatum of naive rats after a single dose of MDMA (40 mg/kg, sc) within the striatum. Results: The results indicate that MAO-B plays an integral role in the development of MDMA-induced neurotoxicity while not affecting MDMA-induced hyperthermia. Furthermore, in vivo microdialysis revealed that previous AS treatment failed to alter the acute DA release induced by MDMA (10 mg/kg, sc) within the striatum. These results indicate that MAO-B may play a role in the development of MDMA-induced neurotoxicity while not affecting MDMA-induced neurotoxicity while not affecting MDMA-induced hyperthermia or acute DA release.

Mechanism of Action of Isoflavones in HER2 Containing Breast Cancer Cells. Benjamin L. Maughan, Ursula D. Hahn, University of Buffalo, Buffalo, New York. Objective: Effects of long-term alcohol consumption on cardiac and skeletal muscle damage are well known, while the effects of binge drinking on these tissues is not well defined. Furthermore, women seem to be more susceptible to chronic alcohol consumption than men. The effects of binge drinking on muscle tissue using pathway-specific cDNA microarrays by studying gene expression changes as a function of a biphasic two- and four-week binge drinking experiment in a rodent model were investigated. Gender related differences in gene expression were also investigated. Total body and tissue weights were measured and analyzed. Methods: Phase I and Phase II consisted of two-week and four-week experiments. In Phase I, male six-week-old Sprague Dawley rats received 20% (v/v) ethanol in normal saline, amounting to 10 g/kg/day twice daily via gastric lavage for four days over two weeks. Animals were dosed with ethanol for four days and off for three days to simulate binge drinking. All animals were weighed daily. Control animals received an equivalent volume of normal saline given to ethanol-treated animals. At the end of the experiment, animals were sacrificed, and tissues harvested. Phase II used the same protocol, but included both male and female animals for four weeks (n=24). Total RNA was isolated from selected tissues and gene arrays studies were conducted. Gene expression patterns were compared between ethanol and normal saline-treated animals. Results: Animal weights showed gender related differences in tissue weights and changes in heart weight between ethanol-treated and control animals. Weight gain of female rats was less affected by ethanol treatment compared to male rats. Differences in individual tissue weights were analyzed as percentage of total body weight between treated and control animals were statistically significant. Preliminary studies indicate that alcohol-treated animals have increased regulation of housekeeping genes, namely GAPDH (glycer-aldehyde-3-phosphate dehydrogenase) in the microarray NFkB signaling pathway.

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endothelial cells (HUVEC) were grown in culture at 37°C and 5% CO2. Results: Beta-amyloid and t-BuOOH treatment caused significant cell death in HCN2 cells at 24, 48, and 72 hours. Nicotinamide pre-treatment did not restore nicotinamide in the presence of either toxin, but p53 and p21 levels were decreased by nicotinamide in the presence of t-BuOOH. Conclusion: Initial studies have provided a mixed result in terms of the potential activity of nicotinamide to act as an anti-apoptotic agent; future studies will focus on the neuroprotective effect of other anti-oxidant compounds.

Interaction of the Transport Para-Aminohippurate (PAH) and Acetyl-Para-Aminohippurate (aPAH) in OK Cells. Karalarie A. Turner, University of Maryland. Introduction: Intravenous infusion of para-aminomeric-hippurate (PAH) is often used to determine the capacity of the anionic renal tubule transport system. Approximately 10% of PAH is metabolized to acetyl-PAH (aPAH) in vivo, which also undergoes anionic tubular secretion. However, it is unknown whether aPAH and PAH compete for anionic transport in the kidney. Rational: The anionic transport system has been studied in vitro using the American Opossum Kidney (OK) cell line. The OK cell line can be grown as a polarized monolayer and possesses characteristics similar to those of the proximal tubule. Studies were conducted to evaluate the effect of aPAH on the transport of PAH via the anionic tubular transport system. Methods: OK cells were maintained in Minimum Essential Medium supplemented with 10% fetal bovine serum and incubated at 37°C in an atmosphere of 5% CO2-95% air. Cells were seeded at a density of 4x10^5 cells/cm² on 0.35mm transwell chambers and transport experiments were conducted 7 to 10 days after seeding. Apical to basolateral transport studies were conducted using 15, 30, 60, 90, 200 and 400mM PAH for 60 minutes. Time course studies were conducted using 15mM PAH for 15, 30, 45 and 60 minutes. Results: Transport studies were conducted using 15mM PAH with and without 2.5mM aPAH or 15mM aPAH with and without 2.5mM PAH. Transport was evaluated at 15, 30, 45 and 60 minutes. Samples were analyzed using reversed-phase HPLC with UV detection. Results: There was a linear increase in the amount of PAH transported from the apical to basolateral membrane of OK cells after a 60 minute incubation over the range of PAH concentrations studied. Incubation of cells with 15mM PAH and 2.5mM aPAH showed a 49.6% (P<0.003) decrease in the transport of PAH as compared to PAH alone. Conclusion: The transepithelial transport of PAH was significantly inhibited in the presence of its metabolite aPAH. Further studies will evaluate the exact mechanism of the interaction and determine how this interaction effects the evaluation of tubular transport using PAH in patients.

In vitro Evaluation of Mediators of Amphotericin Infusion Reactions: A Role of Endothelial Cell Cyclooxygenase-2 Stimulation. Amy M. Vrana, University of Nebraska Medical Center. Introduction: Amphotericin B is the drug of choice for many systemic fungal infections. Following administration, amphotericin has been associated with acute and chronic nephrotoxicity and infusion reactions including fever, chills, and rigors. Rational: Previous studies suggest that infusion reactions occur due to the release of the pyrogenic cytokines, IL-1beta and TNF-alpha, from white blood cells and possibly other macrophages located in the thermoregulatory center, which then causes fever and chills. This hypothesis fails to account for the inability of cytokines to cross the blood brain barrier. It is proposed that fever, following amphotericin administration, occurs from the activation of COX-2 and the release of PGF-2 from brain endothelium. Methods: In vitro, brain (BBMECs) and human umbilical vein endothelial cells (HUVEC) were grown in culture at 37°C and 5% CO2. Cells were treated with clinically-relevant concentrations of deoxycholate colloidial suspension (Fungizone®), and supernatants were collected regularly for a 12-hour period. Methods to determine LPS positive levels were also included in each experiment. PGF-2 concentrations were measured using a sandwich-type ELISA and Western blots for the COX-2 protein were performed in BBMECs treated with Fungizone®. Results: PGF-2 concentrations were significantly higher in amphotericin treated media compared to negative controls. The release of PGF-2 between Fungizone® and LPS positive controls was compared and specific inhibition of COX-2 was observed in the presence of PGF-2 release in Amphotericin treated media. The above data is consistent with induction of COX-2 by LPS and Fungizone® and was confirmed by Western blots, which showed an increase in COX-2 protein in BBMECs treated with LPS and Fungizone®. Conclusion: These findings suggest that induction of COX-2 by amphotericin is responsible for the generation of PGF-2 in the brain. This data suggests that COX-2 inhibitors may be clinically useful in the prevention of severe infusion reactions after amphotericin administration.

Constitutively-Active ErbB4 Mutant Inhibits Colony Formation by Human Prostate Cell Lines. Eric E. Williams, Purdue University. Rational: ErbB4 is a member of the ErbB family of receptor tyrosine kinases. The family includes ErbB1 (EGFR), ErbB2/HER2/Neu, and ErbB3/HER3. Over-expression of EGFR and ErbB2 contributes to the development of prostate and other cancers. However, little is known about the role of ErbB4 in prostate tumorigenesis. It is hypothesized that ErbB4 signaling couples to growth arrest, differentiation, and tumor suppression in prostate cells. Methods: Three constitutively-active ErbB4 mutants were previously constructed by individually mutating three amino acids in the extracellular, juxtamembrane domain to cysteine. The mutants are labeled as Q646C, H647C, and A648C. The cysteine allows ErbB to bond intramolecularly through disulfide linkages, resulting in receptor dimerization and activation of the ligand. Three human prostate tumor cell lines (LuCaP, DU-145, and PC-3) were infected with recombinant retroviruses that carry the neomycin resistance gene as well as one of the three ErbB4 mutants. The prostate tumor lines were also infected with recombinant retroviruses that lack an ErbB4 insert and with retroviruses that carry the wild-type ErbB4 cDNA. As a control for viral titers, mouse C127 fibroblasts in parallel were infected. Following infection, the neomycin resistance gene was selected using the antibiotic G418. Specific inhibition of drugresistant colony formation in one or more of the prostate tumor cell lines by an ErbB4 mutant suggest that the mutant is coupled to growth inhibition in that cell line. Results: Preliminary data indicate that the Q646C ErbB4 mutant inhibits colony formation in all three prostate tumor cell lines. This data support the hypothesis that ErbB4 signaling couples to growth arrest in prostate cells. This also indicates that ErbB4 may be a prostate tumor suppressor and that loss of ErbB4 expression in prostate cells may be an important event in tumorigenesis. Future experiments will utilize ErbB4 mutants to identify the ErbB4 biochemical functions that are necessary for prostate cell growth arrest. Other future experiments will begin to dissect the signal transduction pathways that couple ErbB4 to prostate tumor cell growth arrest. Conclusions: The Q646C ErbB4 mutant inhibits colony formation in three prostate tumor cell lines. This data is consistent with growth arrest, differentiation, and tumor suppression in prostate cells.

Engineered Heparin Binding INF-a. Patrick G. Yoder, University of Iowa. Introduction: Cardin and Weintraub first used computer modeling to examine sequences in a variety of proteins that bound heparin and heparin sulfate. Experimental studies in our laboratory utilizing synthetic peptides clearly established that selecting specific basic and hydrophobic amino acids and placing these residues in distinct spatial arrangements could modulate binding affinity. Rational: The next step, to develop a better understanding of the structure and specificity requirements for proteins to bind heparin, is to engineer specific glycosaminoglycan (GAG) binding sites into a protein using recombinant technology and study its interaction with heparin and other GAGS. Interferon alpha (INF-a), an endogenous vertebrate protein, does not bind heparin and has a structure suitable to introduction of a heparin-binding site. Therefore, INF-a was chosen as a target for mutation. Methods: 63 nucleotides encoding amino acid residues of the 5’-type of INF-a was removed and replaced with 63 nucleotides encoding a heparin binding motif found in acidic Fibroblast Growth Factor (aFGF). The recombinant protein was expressed in Escherichia coli using the pLEX expression system. Active protein was isolated with 1% recovery, suggesting poor protein processing. At this point, the recombinant construct was cloned into a baculovirus expression vector (pVL1393) and expressed in insect cells, which are much more adept at processing vertebrate proteins. Results: Preliminary SPR data suggest the BEVS produced recombinant protein (r-INF-a/FGF) is capable of binding heparin much more strongly than the wild type INF-a. Although, antiviral activity of r-INF-a/FGF has not yet been measured, it was noted that the CD loop exposed as in wild type INF-a. Conclusion: Further experimentation is in progress to measure the antiviral activity of r-INF-a/FGF.
underway to understand the structure, heparin-binding affinity, antiviral activity and possible utility of r-IFN-a/FGF as a therapeutic.

NOVO NORDISK PHARMACY PRACTICE DIABETES PROGRAM

Cardiovascular Risk Assessment in Subjects with Type 2 Diabetes in a Community Pharmacy Setting. Dora K. Cheung, University of New Mexico, Objective: To provide information about the incidence and prevalence of cardiovascular risk factors in patients with type 2 diabetes mellitus (DM) in a community pharmacy setting. Methods: Seventy-two type 2 DM patients from six community pharmacies throughout the state of New Mexico completed the cardiovascular disease (CVD) risk factor assessment. The study participants completed questionnaires about their demographics, lifestyle habits, and medical history. Fasting lipid profile, fasting blood glucose, glycosylated hemoglobin A1c (HbA1c), blood pressure, weight, and height were determined for each patient. The results of the assessment were discussed with the patient and a copy of the results along with recommendations was sent to the patient's primary care physician. Results: The majority of our study population is Hispanic (67%). Patients have been diagnosed with diabetes for a mean duration of 9.3 years. Fourteen percent of our patients reported having existing CVD and 83% of our patients have 3 or more risk factors for heart disease in addition to DM. Seventy-six percent of our study population is not at goal for CVD and 83% of our patients have 3 or more risk factors for heart disease in a Community Pharmacy Setting.

PHARMACY TECHNICIAN EDUCATORS COUNCIL

Career Exploration for Pharmacy Technician Students. Mary E. Mohr, Clarian Health Pharmacy Technician Training Program, Objective: To broaden the students' perspective of the many career opportunities available to them after completion of the program and enhance their understanding of their role in the profession. Methods: An observation schedule was instituted before experiential training began allowing the students to observe in five different areas of three hospitals. Field trips were scheduled to Roche Diagnostics, Larue Carter State Mental Hospital, Clarian Investigational Drug Pharmacy, Indiana University Compounding pharmacy, Clarian Diabetes CV1PAC center, and a long-term care pharmacy. A pharmacist was invited to speak to the class about pharmacist involvement in the lipid and coagulation clinics she has implemented. Results: Students participated in roundtable discussions after each field trip. Comments were extremely favorable and indicated that their perception of themselves as professionals and the importance of their role in pharmacy was solidified. The students felt that this should become a regular part of the curriculum and be expanded. Implications: Further expansion is in progress as we are developing a formal course called "Career Exploration" which will meet weekly and consist of field trips, written evaluations and internet searches for career opportunities. Developing an Educational Partnership Linking Pharmacy Students with Pharmacy Technician Students. Barbara H. Snyder, Dolores R. Sewchok, Bidwell Training Center; Sarah L. Bristol, Sneha M. Patel, Gina M. Carbonara, Gary P. Stoehr and Scott R. Drab, University of Pittsburgh, Objective: Expand professional interactions by promoting a better understanding of the role of pharmacists and pharmacy technicians. Methods: Pharmacist students in lesson preparation and presentation. Methods: Educators at Bidwell and faculty at the school of pharmacy met to design and implement an educational rotation for P-4 pharmacy students. Students met with Bidwell educators twice a week for 4 weeks, during which they observed classroom instruction and then prepared and presented on a relevant topic. An evaluation form for both groups of students was used to assess the educational experience. Results: Pharmacy students presented lessons on diabetes, self blood glucose monitoring, study skills, test taking strategies, grapefruit juice-drug interactions, bioterrorism; anthrax and smallpox, sports-enhancing drugs/supplements and HIV/AIDS. Both groups of students enjoyed the experience. Implications: The success of this partnership has led to discussions regarding expanding the rotation and creating an elective teaching course. Future presentation topics include hepatitis, food-drug interactions, patient compliance issues, Alzheimer's disease, and obesity.
**Objective**: Survey pharmacy technicians in an eight county central Texas area concerning the following: what is the perceived role of the pharmacy technician in present practice environment; what perceived benefits may exist for pharmacy technicians resulting from additional education; and, whether or not certified technicians desire a higher level of education and, if so, to identify that level of education. **Methods**: A total of 244 pharmacies were identified in the eight county area. Each pharmacy was sent three copies of the survey with instructions to photocopy more if needed to give all pharmacy technicians an opportunity to complete the survey. **Results**: Most practicing technicians agreed or were neutral regarding the idea of having a formalized training program provided by an education institution. Most technicians felt that a community college is a good source of pharmacy technician education and training, but were indecisive in the length of time needed for training. Technicians’ opinions of the benefits varied, but dealt primarily with increased pay and responsibilities/opportunities. **Implications**: Practicing technicians seem to see a value in formalized education, but do not agree upon the necessity or the benefits. Austin Community College will survey employers to determine how the opinions of the employers match up with practicing technicians before proceeding with an Associates Degree option.