MEETING ABSTRACTS

114th Annual Meeting of the American Association of Colleges of Pharmacy, Chicago, IL, July 13-17, 2013

RESEARCH/EDUCATION ABSTRACTS

Biological Sciences

Completed Research:

A Novel Continuing Pharmacy Education Program: Overcoming Barriers to Healthcare in Transgender Patients. Kevin Eich, St. John Fisher College, Bernard P. Ricca, St. John Fisher College, Keith DelMonte, St. John Fisher College, Jennifer L. Mathews, St. John Fisher College. Objectives: The Wegmans School of Pharmacy strives to educate and expose students to many topics related to cultural competence, including transgender health. A continuing pharmacy education program (CPE) was utilized to promote a similar opportunity for pharmacists and preceptors. The CPE aimed to educate those currently in practice so they may model the behavior which is reflective of the school’s mission of providing appropriate care and services to all patients. Method: The CPE was offered to any practicing pharmacist, preceptor, faculty or student interested. The first hour included current pharmacotherapy guidelines and counseling tips. The second hour consisted of a panel discussion with local transgender patients. An anonymous, voluntary survey was administered at the conclusion of the presentation and included both demographic and presentation-specific questions. Correlation data from the Likert-Scale survey responses were analyzed using median and Kruskal-Wallis tests. Results: Several significant differences between groups of attendees were found. Preceptors and pharmacists were more concerned than pharmacy faculty about the reaction of their heterosexual patients to creating a transgender friendly environment. Those with previous training about and/or experience with transgender patients felt more capable of promoting a transgender friendly environment and indicated greater understanding of and comfort with transgender-related concepts. Implications: Transgender patients rely heavily on the expertise and accessibility of their pharmacist, but little formalized education related to their healthcare needs has been provided in the past. Within our curriculum students are now provided with these training opportunities. Of equal importance was to also include area pharmacists and preceptors with similar educational tools.

A Predictive Validity Study of the HUSOP Preadmission Test on First Professional Year Pharmacy Courses. Vera C. Campbell, Hampton University, Neelam Azad, Candace N. Sampson, Hampton University, Patricia L. Richards-Spruill, Hampton University, Francis Ndemo, Hampton University, Symphonie Grant, Hampton University, Letitia Jones. Objectives: To examine the validity of Hampton University School of Pharmacy’s (HUSOP) Preadmission Test (PAT) scores for predicting final grades in the first year courses, viz., Anatomy and Physiology (A&P), Physiological Chemistry (P.Chem), and Pharmaceutics. Method: The PAT was administered to potential students at the conclusion of the interview. The test was composed of eight quantitative, eight physical science, and eight biological science questions. Data was collected from 132 students. The data collected included PAT score, entering GPA, composite PCAT score, and final grade for A&P, P.Chem, and Pharmaceutics. Descriptive statistics, correlation, and regression analysis were used to determine the validity of the preadmission test for predicting final grades in the aforementioned courses. Results: PAT scores, entering GPA and composite PCAT scores positively correlated with the final grades for A&P, P.Chem, and Pharmaceutics. The PAT and the composite PCAT showed comparable correlations to the course grades. While the entering GPA showed a positive albeit a weak correlation with course grades. There was also a strong correlation between the final grades of each of the first-year courses. Implications: Success in these first year courses often predict how well a student will perform in subsequent years of the program. Therefore, the PAT may serve as an additional indicator of success rate in the first year. Furthermore, the PAT may help identify potential incoming students who may require additional academic support and remediation opportunities to successfully complete the program in a timely manner.

An Educational Board Game to Assist in Learning Autonomic Nervous System Pharmacology. J. Shawn Jones, University of Charleston, Lindsay R. Tinch, University of Charleston, Emmanuel Odeng-Otu, University of Charleston, Michelle L. Herdman, University of Charleston. Objectives: To examine whether playing a board game can assist 2nd-year PharmD students enrolled in a Pharmacology course in learning Autonomic Nervous System (ANS) Pharmacology. Method: From a required P2 Pharmacology course in which 72 students were enrolled, 22 students volunteered to play the board game. Game play preceded an in-class exam that included 42 ANS questions (ANSQs) and 8 questions on another topic that were used as control questions (CTLQs). Participants were given a pre-test, consisting of general ANS pharmacology questions. The objective of the board game was to move a game piece from one of four vertebral regions down the neurons to the end target cell. Drug and pathway component cards were drawn to determine advancement in the game, with the end goal of completing both a parasympathetic and a sympathetic pathway. After game play, a post-test consisting of the same questions as the pre-test was given to assess educational improvement. Scores for pre-test, post-test, whole exam, and ANSQs were compared among participants. Also, scores for exam, ANSQs and CTLQs were compared between board game participants (PART) and non-participating (NPART) classmates. Results: Board game participants scored progressively higher between the pretest and post-test (P=0.002), exam (P<0.001) and ANSQs (P<0.001). Additionally, PART scores were higher than NPART scores for exam (P=0.036) and ANSQs (P=0.009). Difference in PART and NPART CTLQ scores was not significant (P=0.161). Implications: A board game can be used to assist PharmD students in learning Autonomic Nervous System Pharmacology and in improving their exam scores.

Application of Genomic Principles to Pharmacotherapy of Cancer. Christopher L. Farrell, Presbyterian College, Amy Messeranith, Presbyterian College, Nancy G. Pedigo, Presbyterian College. Objectives: The importance of personalized medicine in pharmacotherapy is emphasized in the PCSP curriculum, from the beginning. The P1 pharmacy students participate in a Biotechnology Laboratory course where they are taught the underlying principles of pharmacogenomics (PGx). In parallel courses, Biochemistry and Immunology, students learn molecular biology and immunotherapies. At the beginning of the PGx exercise, the students are given a brief overview of cancer genetics
followed by instructions on methods specific to the laboratory exercise. **Method:** Each lab group isolated tumor DNA from a colorectal cancer cell line and prepared a polymerase chain reaction (PCR) for the oncogenic marker BRAF. The students used high resolution melting peak analysis to determine the presence of somatic mutations in 3/13 cancer cell lines. The students formulated the proper course of treatment for each cell line based on the tumor genomics. A survey was conducted at the end of the PGx laboratory to determine the effectiveness of the exercise. **Results:** The results of survey from the lab exercises (2011-2012) showed positive feedback from the majority of respondents. Based on a 5-point scale, students rated the class high for effectiveness of the exercise in conveying the information and teaching the students techniques used in pharmacogenomics. **Implications:** The PGx laboratory exercise prepared PCSP students with an understanding of how genetic markers can be used to give clinical insight into predicting the utility and efficacy of drugs in oncology pharmacotherapy. Further, their interest in learning more about pharmacogenomics and professional roles in personalized medicine was inspired.

**Aromatherapy Science: Enhancing the “Essence” of Pharmaceutical Science Elective Courses.** Emily R. Esposito, Sullivan University, Michael L. Smith, Sullivan University, Maria Lourdes Ceballos-Coronal, Sullivan University, JoAn S. Klein, Spencerian College Massage School, David B. Cleary, Sullivan University, Ajoy Koomer, Sullivan University, Yuan Zhao, Sullivan University, Neil Patel, Sullivan University, Hieu T. Tran, Sullivan University. **Objectives:** To evaluate the relevance of aromatherapy science in relation to current pharmacy practice. **Method:** With the increase in alternative medicine and essential oil use, pharmacists today require knowledge of alternative sources of healing and potential medication interactions. This PY2 elective was designed to provide a unique experience from team-taught faculty while focusing on active learning skills. Concepts related to common essential oils and their therapeutic uses, toxicity, bioactivity, contraindications, and clinical studies were introduced. Reinforcement of key principles established a link between aromatherapy and Pharmaceutical Sciences in the following areas 1) exploring the pathophysiology of aromatic smells, 2) essential oil extraction (Medicinal Chemistry), 3) calculating essential oil volumes for blending (Pharmaceutical Calculations), and 4) designing and blending essential oil mixtures (Pharmacology and Compounding). Course evaluations and student self-assessments were utilized to measure student interest, course design, and knowledge of alternative healing avenues and the relationship within clinical practice. **Results:** Using an online survey system (SurveyMonkey), all (20) students completed a post-course evaluation and self-assessment. Students were overwhelmingly enthusiastic about selecting this elective and gaining knowledge on aromatherapy science as it relates to the field of pharmacy. The majority of the students agreed that the course was well designed, prepared them to identify potential essential oil and drug interactions, and evaluated current literature on essential oil use. **Implications:** By introducing the topic of aromatherapy to the pharmacy student, we prepare a new generation of healthcare professionals with awareness of alternative medicine and suggest a niche for continuing education courses for community pharmacists.

**Beyond Vaccinations: Development, Implementation, and Assessment of a Vaccinology Elective.** Ramil Sapinoro, St. John Fisher College. **Objectives:** At present, all 50 states allow pharmacists to administer vaccinations placing pharmacists in a critical role to promote the importance of immunizations. Understanding the scientific foundation of vaccinations is imperative for pharmacy students. As a result, a science-based Vaccinology elective course was developed to focus the student’s general understanding of the immune system towards the biological aspects of vaccination. The objective of this study was to evaluate the course in an effort to improve content and format for future offerings. **Method:** The 2-credit Vaccinology elective combines didactic presentations, small-group formats, and in-class demonstrations to introduce students to the principles of rational vaccine design, development, pharmaceutical intervention against disease, and past and current vaccine applications. Students in the course were assessed by two examinations and small-group presentations. **Results:** To date, the elective course has been offered twice and 45 students have successful met the learning outcomes of the course. Results of the course evaluations indicated that 89% of the respondents reported assignments and projects aided in their understanding of the course content. Further, 89% of respondents reported the information presented in this course to be useful for their future careers. Students commented in the course evaluations their appreciation for inclusion of the historical progression of vaccines into the modern-age of medicine. Suggestions by students for future topics include more information on experimental vaccines under research and development. **Implications:** An elective course covering the biological aspects of vaccination in a pharmacy curriculum complements the expanded role of pharmacists as educators and advocates of vaccines.

**Characterization of HU-331 as a Cannabinoid Quinone Inhibitor of Topoisomerase II.** Kellie M. Regal, Lipscomb University, Susan L. Mercer, Lipscomb University, Joseph E. Deweese, Lipscomb University. **Objectives:** Topoisomerases are essential enzymes that are involved in DNA metabolism. Due to the double-stranded DNA cleavage mechanism, topoisomerase II is an effective target for anti-cancer drugs, such as doxorubicin. However, doxorubicin causes cardiac toxicity and induces DNA damage, which contributes to secondary cancers. A cannabinoid-based quinone HU-331 has been identified as a potential anticancer drug that demonstrates more potency in cancer cells with less off-target toxicity than doxorubicin. Reports indicate that HU-331 does not promote cell death via apoptosis, cell cycle arrest, caspase activation, or DNA strand breaks. However, the precise mechanism of action is poorly understood. We proposed that HU-331 inhibits topoisomerase function by inhibiting the ATPase domain of the enzyme. **Method:** We employed biochemical assays to study the mechanism of action of HU-331 against purified topoisomerase II. These assays examined DNA cleavage, ligation, and relaxation and ATPase function of topoisomerase II. **Results:** Our results demonstrate that HU-331 inhibits topoisomerase II-mediated DNA relaxation at micromolar levels. We find that HU-331 does not induce DNA strand breaks, decreasing the risk of secondary cancers. When added prior to the DNA substrate, HU-331 blocks DNA cleavage and relaxation activities of topoisomerase II. Our results also show that HU-331 inhibits the ATPase function of topoisomerase II. **Implications:** We have thus far concluded that HU-331 impacts the catalytic activity of topoisomerase II by inhibiting the ATPase function. These results provide a promising foundation for the potential of HU-331 as an anticancer drug. Future studies will explore the ability of HU-331 to block cleavage and relaxation activities.

**Chronic Modulation of Protein Kinase A by Bucladenosine on Glial Anti-inflammatory Gene/Proteins Expression.** Jerrod Paul Logue, Texas Southern University, Amruthesh C. Shivachar, Texas Southern University. **Objectives:** A metabolically stable analog of cyclic-AMP, bucladenosine (dibutyryl-cAMP; DBC), has been recently shown to be a potent anti-inflammatory agent. However the cellular mechanisms of its action remain unclear. Treatment with DBC has previously been shown to induce morphological changes in...
Development and Optimization of Protein Disulfide Isomerase Inhibitors for Potential Antithrombotic Properties. Christine N. Galinski, Western New England University, Alissa A. Scalise, Western New England University, Carol Khodier, Broad Institute, Partha P. Nag, Broad Institute, Christopher Dockendorff, Broad Institute, Jacqueline Wurst, Broad Institute, Lynn VerPlank, Broad Institute, Sivaraman Dandapani, Broad Institute, Benito Munoz, Broad Institute, Robert Flaumenhaft, Beth Israel Deaconess Medical Center/Harvard Medical School, Daniel R. Kennedy, Western New England University. Objectives: The catalytic activity of protein disulfide isomerase (PDI) is an initiating event in thrombus formation and therefore an attractive potential target for antithrombotic therapy. In this study, we sought to identify a second generation PDI inhibitor to improve the potency and specificity of the first generation inhibitor, the flavonoid rutin. Method: PDI activity was assayed by measuring the catalyzed reduction of insulin, as the turbidity of aggregated insulin chains can be measured by absorption at 650 nm. Initially, a high throughput screen assayed approximately 350,000 compounds of the Molecular Libraries Small Molecule Repository. Results: Two compounds, a piperdine (IC50 300-600 nM) and a bromo indole (IC50 600-800 nM) were chosen from the primary screen for further study. The selectivity of the piperdine and bromo indole were initially assessed by evaluation of their activity in the other bioassays performed within the NIH Molecular Libraries Probe Production Network. The inhibition of PDI by piperdine was unique amongst all of the 380 biochemical assays in which it has been tested, while the the bromo indole had confirmed activity in <0.5% (2/473) of assays, suggesting improved specificity for PDI over rutin, which was active in almost 6% (35/588). Importantly, within the thiol isomerase family, both compounds demonstrated over 100-fold selectivity for PDI compared to ERp5, ERp57 and thioredoxin. Implications: The compounds identified in this assay will serve as leads for the development of a second generation of PDI inhibitors as a new class of antithrombotics with improved potency and specificity compared with quercetin flavonoids.

Development of Cardiac Dysfunction in Childhood and Potential Molecular Mechanisms. Miaozong Wu, Marshall University, Ravi Kumar Arvapalli, Marshall University, Srinivasarao Thulluri, Marshall University, Cuifen Wang, Marshall University, Nandini Manne, Marshall University, Henry Driscoll, Marshall University, Lucy Dornon, Marshall University, Paulette Wehner, Marshall University, Eric Blough, Marshall University. Objectives: The incidence of childhood obesity is increasing rapidly and is thought to be a significant risk factor for cardiovascular disease in later life. The objective of study was to determine how the development of obesity at young age progressively affects cardiac structure and function. Method: Four week old male lean control and obese Zucker rats were provided standard laboratory rodent food (LabDiet 5001) and tap water ad libitum for 26 weeks. At 5, 13, and 27 weeks of age, animals were randomly selected and subjected to echocardiography to evaluate cardiac structure and function. Blood analysis, insulin tolerance tests, measures of cardiac oxidative stress and inflammation were analyzed throughout the study. Results: Compared to lean controls, food intake in obese animals was 51.4% higher during 26 weeks of study, and body weight was 59.5% heavier at 30 weeks old (P ≤ 0.05). Obese animals developed cardiac hypertrophy at 5 weeks, and heart mass was 33.1% heavier than lean control at 30 weeks (P ≤ 0.05). Echocardiography showed an age-associated deterioration of cardiac structure and function in the obese animals, including aortic and pulmonary insufficiencies. Additional analysis demonstrated a progressive impairment in glucose metabolism and insulin sensitivity, hyperlipidemia, increased cardiac lipid accumulation, elevations in reactive oxygen species levels and inflammatory signaling (CD40 and SDF-1α) with obesity. Implications: These results suggest excessive food intake-induced obesity impairs cardiac structure and function in childhood, and these alterations are associated with the progressive development of hyperlipidemia, insulin resistance, inflammation and oxidative stress. Supported by Bristol-Myers Squibb.
Differential Modulation of Kappa Opioid Receptors Expression by Acrylamide: Implications to Neurotoxic Mechanism. Abir T. El-Alfy, Chicago State University, Michelle Dudek, Rainier Celi. Objectives: Recent research efforts have focused on understanding the neurotoxicity of acrylamide, driven by the increased awareness of its presence in cigarette smoking, drinking water, and foods cooked at high temperatures. The primary objective of this study was to evaluate the effect of acrylamide on kappa opioid receptors (KOR) expression in both central and peripheral nervous tissues. Method: Three week-old male Wistar rats were administered acrylamide daily (p.o., 30 mg/kg doses, n=6/group) for twenty one days. Neurobehavioral effects were assessed twice per week using locomotor activity, weight, hind-limb heel splay, fore-limb and hind-limb grip strength. At the end of the 21 days, different brain regions, spinal cord, and sciatic nerve tissues were dissected, and western blot analyses were performed using KOR-specific antibodies. Results: Acrylamide treatment induced significant characteristic neurotoxic symptoms: increased heel splay (p<0.01), decrease in hind-limb grip strength (p<0.001), and decrease in locomotor activity (p<0.01). Western blot results revealed that acrylamide treated samples display a statistically significant down-regulation of KOR expression in the motor cortex (p<0.05) and cerebellum (p<0.01), while a significant increase was observed in the sciatic nerve (p<0.01). Implications: Results of this study suggest a tissue specific regulation of KOR expression by acrylamide in juvenile animal model. Such regulation might explain the acrylamide effect on pain sensation previously reported in humans as well as experimental models.

Evaluating the Use of the Interrupted Case Method as an Effective Teaching Technique. Kristine L. Ossman, St. John Fisher College, Amy L. Parkhill, St. John Fisher College. Objectives: The ability to solve problems efficiently and effectively is an important skill for pharmacists. The interrupted case method is a teaching technique that mimics the way pharmacists analyze problems on a daily basis. Since it is important for teaching faculty to utilize the most effective techniques when educating pharmacy students, we evaluated whether the use of the interrupted case method was an effective teaching technique. Method: As part of the Systems Pharmacology V course, third year pharmacy students (n=78) attended two class sessions taught by a P4 student on the supportive care of chemotherapy-induced gastrointestinal toxicities using the interrupted case method. A mock patient case was gradually presented to the students in parts during the lecture. Before discussing each part of the patient case, student understanding was assessed through the use of Turning Point questions. At the conclusion of the second day of class, student survey forms were distributed. Results: Survey questions were evaluated using a Likert Scale (1= strongly disagree; 5= strongly agree). Students who completed the surveys reported that they could: describe the pathophysiology of chemotherapy induced nausea and vomiting or CINV (SA/A = 97%), describe the classes of medications used to treat CINV (SA/A = 94%), recognize, prevent, treat common oral tract/GI tract complications associated with the use of chemotherapy (SA/A = 97%), and that they thought the technique was effective (SA/A = 97%). Implications: The interrupted case method is an effective teaching technique that may be used to help improve student learning in pharmacy courses.

Evaluation of an Elective Service Learning Course on Cancer Biology and Treatment. Amy L. Parkhill, St. John Fisher College. Objectives: Cancer topics are challenging to pharmacy students, who often lack exposure to cancer patients and oncology pharmacy. Service learning is a strategy that incorporates community service in order to facilitate student interest in difficult topics and to encourage student engagement. This report describes the development and impact of an elective course that incorporated service learning opportunities to enhance didactic lectures given on fundamentals of cancer biology and treatment. Method: The course was offered to second and third year pharmacy students (n=9). The first half of the course included didactic lectures on cancer biology, treatment, and supportive care. The remainder of the course included a tour of a cancer center by a clinical pharmacist and in-class meetings to discuss service learning projects. Students worked with cancer support organizations (Teens Living with Cancer and Hope Lodge) to develop patient information materials and to assist in organizational activities. At the end of the course, students completed course evaluations and a service-learning impact assessment. Survey questions were evaluated using a 5 or 7 point Likert Scale (1= strongly disagree; 5 or 7= strongly agree). Results: Students learned valuable information in the class (6.44/7) and course objectives were met (6.44/7). Students reported that service learning: enhanced understanding of class sessions (4.86/5), facilitated the application of course concepts to everyday life (5.00/5), increased desire to serve community (4.57/5), and increased career exploration (4.29/5). Implications: By including service learning, we created personal and real-life connections with the material and increased student desire to work with cancer patients and the community.

Evaluation of Student Confidence of Science Between Didactic and Team-based Learning Formats. Rebecca J. Gryka, Cedarville University, Tracy Frame, Cedarville University, Mary E. Kiersma, Manchester University College of Pharmacy, Aleda M. Chen, Cedarville University, Lorin Sheppard, Manchester University College of Pharmacy, Stephanie M. Cairor, Cedarville University School of Pharmacy. Objectives: To evaluate student perceptions of science between didactic and team-based learning (TBL) formats at two universities. Method: A 21-item instrument was administered at the beginning and conclusion of a biochemistry course at two universities (one TBL, one didactic). The instrument examined student perceptions of science utilizing the theory of planned behavior (TPB) domains of perceived behavioral control, subjective norm, and attitude toward science. Results of this study suggest a significant increase in student desire to work with cancer patients and the community. Pre-post assessments were evaluated using paired t-tests and differences between universities were evaluated using independent t-tests. Results: The TBL university (N=53, 100% response) and the didactic university (N=58, 92% response) students completed both instruments. There were significant differences in baseline responses on one perception (e.g. apply science knowledge in my future career) and one confidence question (e.g. apply knowledge of mechanisms and dysregulation to disease management) (p<0.05). Student perceptions of science improved significantly on 7 of 13 questions for TBL (p<0.05) and 12 of 13 questions for didactic (p<0.05). Student confidence in learning science concepts improved significantly on all questions for TBL students (p<0.001) and on 7 of 8 questions for didactic (p<0.05). Combined analyses of both schools showed significant results on 12 of 13 perceptions and 8 confidence questions (p<0.05). Implications: Based on the results, TBL and didactic lecture in a biochemistry course were equivalent in improving student perceptions and confidence in learning science concepts. Either approach could be considered based on faculty preference.

Expression of an RNA Editing Enzyme is Altered by Antidepressant Drug Treatment. Monsheel S. Sodhi, University of Illinois at Chicago. Objectives: RNA editing is a post-transcriptional process which alters RNA sequence. RNA editing is catalyzed by enzymes
called Adenosine Deaminases Acting on RNAs or ‘ADARs’. Our previous work shows that the cortical expression of one of these enzymes, ADAR1, was increased in postmortem major depressive suicide subjects. We now test the hypothesis that this alteration in expression is a result of the antidepressant drug treatment received by the patients.

**Method:** A large cohort of postmortem subjects were recruited with DSM-IV diagnoses of major depressive disorder (n = 83) and were tested for the presence of antidepressants in toxicological screens postmortem. These screens indicated that patients were either positive (n = 45) or negative (n = 38) for the presence of antidepressant drug. Total RNA was extracted from the gray matter of the dorsolateral prefrontal cortex of frozen postmortem brain using standard methods. Expression levels of ADAR1 and ADAR2 were measured by quantitative PCR.

**Results:** Antidepressant positive patients showed increased ADAR1 expression relative to the antidepressant negative group (F = 5.3, df = 1, 82, p = 0.02). The expression of other ADAR enzymes, ADAR2 and ADAR3, did not differ in the two groups.

**Implications:** These findings indicate that some associations between psychiatric disorders and altered RNA editing which have been reported in postmortem studies may be confounded by the drug treatments administered to the patients but not to the control subjects. Antidepressant drugs bind to proteins within the monoaminergic systems, their downstream effects may include the modulation of RNA editing, by mechanisms which require further investigation.

**Generation of Topoisomerase IIa Mutants with Altered Etoposide Sensitivity.** Elizabeth G. Gibson, Lipscomb University, Lisa Y. Straughn, Lipscomb University, Joseph E. Deweesee, Lipscomb University.

**Objectives:** Topoisomerases are abundant nuclear enzymes that regulate DNA topology and remove knots and tangles in the genetic material by employing a double-stranded DNA cleavage mechanism. While the anticancer agent etoposide is highly effective at inducing topoisomerase II-mediated DNA damage, etoposide is also metabolized into a catechol and a highly active quinone. To further understand the mechanism of the metabolites, we are developing topoisomerase IIa mutants with altered sensitivity to etoposide.

**Method:** Based upon published studies, we identified amino acid positions that may influence enzyme response to etoposide. Using a PCR-based mutagenesis process, we mutated Gly462 to Ala, Asp463 to Glu, Arg487 to Lys, Ala492 deletion, Gly534 to Arg, and Pro716 to Leu. We used biochemical assays to analyze the DNA cleavage, ligation, and relaxation activities of the mutant enzymes in the presence and absence of etoposide.

**Results:** Our results demonstrate that four mutants are functional (R487K, D463E, ΔA429, and G534R), one mutant has activity too low to quantify (G462A), and one is currently being analyzed (P716A). In the presence of etoposide, D463E cleaves near wild-type (WT) levels, while ΔA429, R487K, and G534R respond less. When the ratio of enhancement in the presence of drug (versus no drug) is compared, ΔA429 has the highest level of enhancement and R487K and G534R have the lowest level.

**Implications:** Based upon cleavage enhancement in the presence of etoposide, ΔA429 is more sensitive while R487K and G534R are less sensitive to etoposide. These enzymes will allow for detailed assessment of the mechanism of etoposide metabolites.

**Identification and Characterization of Endogenous LXR Ligands in Ventral Midbrain Development.** Kyle M. Sousa, West Coast University.

**Objectives:** The liver X receptors (LXR-alpha and LXR-beta) are ligand-dependent nuclear receptors activated by oxidized derivatives of cholesterol (oxysterols). In a previous study, we demonstrated that LXR receptors promote ventral midbrain neurogenesis in vivo and in human embryonic stem cells. However, no endogenous midbrain LXR ligands have so far been identified. We set out to identify endogenous LXR ligands and characterize their function and specificity towards defined neuronal populations in the developing mouse midbrain.

**Method:** Here we used LC/MS, LXR-activation reporter assays to identify brain endogenous LXR ligands. We also utilized several types of rodent primary cultures, embryonic stem cells, organotypic cultures, and zebrafish models to demonstrate that the identified ligands exhibit different mechanisms of actions and effects in developing midbrain.

**Results:** We identified 24(S),25-hydroxycholesterol (24,25-EC) and cholic acid as two distinct LXR ligands in the ventral midbrain. Each ligand regulated the development of distinct midbrain neuronal populations by recruiting specific transcriptional coactivators (SRC-1 and ASC-2) and/or transcriptional repressors (N-CoR and SMRT).

**Implications:** These data represent an important step towards understanding the role of lipids in brain development and define a new class of regulators of neuronal development. These LXR ligands may lead to improvements in dopaminergic differentiation of human embryonic stem cells and their application in drug development and cell replacement therapeutic modalities for Parkinson’s Disease.


**Objectives:** After a 2010 self-study revealed a weakness in professional development, a concerted effort was made to implement and assess an improved professional development plan with strategic and diverse programming that addresses the needs of faculty and staff in a school of pharmacy.

**Method:** A needs assessment was conducted prior to the development of an improved professional development program. Areas of most interest to faculty and staff were identified and offered over a two year period. Prior to and after implementation of the program, the Faculty Development section of the AACP Faculty Survey was used to assess faculty satisfaction with development activities. In addition, an electronic in-house survey of specific activities was used to assess the quality and usefulness of offered programs.

**Results:** A diverse array of professional development activities was offered over a two year period, and included five webinars, six half-day live seminars and monthly roundtable discussions. Topics offered in response to faculty needs included grant writing, technology in the classroom and writing and evaluating test questions. Faculty answering agree or strongly agree on each of the Faculty Development questions of the AACP Faculty Survey increased by an average of 29% in the year after implementation. In addition, in-house surveys revealed that 90% of faculty were satisfied or very satisfied with the programs offered.

**Implications:** The implementation of a successful professional development program requires assessing and responding to the needs of faculty in all areas of their career, and evolving to the changing needs and interests over time.

**Improvement of Academic Performances in a Pharmacy Didactic Course with the Initiation of Competency-Based Assessment.** Yuan Zhao, Sullivan University, Maria Lourdes Ceballos-Coronel, Sullivan University, Ajay Koomer, Sullivan University, Abeer M. Al-Ghananeem, Sullivan University, Hieu T. Tran, Sullivan University.

**Objectives:** To assess the academic performance of PharmD students at SUCOP with the introduction of competency-based curriculum.

**Method:** Competency-based curriculum is the ultimate goal in preparing SUCOP PharmD students to perform and function independently as future practitioners. The course was delivered in a customized scheme.
allowing students to study one topic at a time before moving on to another topic. This approach allocates mastery of each topic with the integration of concepts in a sequential manner. A pioneered assessment change in the PY1 Pharmaceutical Biotechnology course allowed comparison of the academic performances of Class 2014 and 2015. The Class of 2014 had two exams and one cumulative final exam with an overall passing score of 69.5%. The Class of 2015 had four competency exams and one competency cumulative final exam with requirements to pass every exam in the course with a minimum score of 69.5%. All the scores were input in Sigma Plot version 11; scores from each exam were normally distributed based on Shapiro-Wilk test. A student t-test was further used to compare both groups. **Results:** The scores showed a better average of final exam scores and overall scores for Class of 2015 with competency assessments. The unpaired student t-test result was $P < 0.05$. Data suggests that the conversion of competency-based assessment, significantly improved students’ academic performance. **Implications:** Competency-based curriculum is an effective learning performance skill that comprises a hierarchy of knowledge, didactic learning approach and clinical performance that could impact pharmacy practice.

**In Vitro Treatment of SKOV-3 Cells with Genistein and Resveratrol Activates Caspase-dependent Apoptosis.** Eric A. Sessions, Pacific University Oregon, Michael Buege, Drake University, Deepa Rao, Pacific University Oregon, Pramod B. Mahajan, Drake University. **Objectives:** Genistein (GEN) and resveratrol (RES) have known anticancer properties. The objective for this work was to determine if the co-administration of RES & GEN (1:1) can cause apoptosis as measured by caspase 3/7 activation and poly ADP ribose polymerase (PARP) cleavage. **Method:** The individual drugs or RES:GEN 1:1 combination were used to treat SKOV-3 for 48 hr to determine cell viability and caspase 3/7 activation (n = 3). SKOV-3 cells were seeded in 10 cm petri dishes and treated with RES, GEN, or RES:GEN 1:1 at 3 concentrations (n = 3). PARP cleavage was assessed by SDS-PAGE followed by Western Blotting using rabbit anti-PARP-1 antibody, which specifically interacts with the 116-kDa intact PARP-1 as well as the 89-kDa caspase cleavage product. Detection of the antigenic polypeptides was carried out using the anti-rabbit IgG-HRP conjugate and a chemiluminescent substrate kit. **Results:** The IC50 values for RES, GEN and RES:GEN 1:1 were 57.0 ± 1.20, 80.2 ± 1.78 and 35.1 ± 1.88 μM respectively and all activated caspase 3/7. Combination analysis indicated that RES:GEN 1:1 was synergistic. PARP analysis indicated presence of a protein band corresponding to 89 kDa in samples treated with RES, GEN or RES:GEN clearly indicates caspase activation. The production of the 89 kDa polypeptide appears to increase in a treatment concentration dependent manner. **Implications:** Based on our study RES and GEN can individually or in combination activate apoptosis in SKOV-3 cells. Our observations may have implications for combination therapy for ovarian cancer using these two phytoestrogens.

**Indirect Modulation of the Endocannabinoid System by Nutmeg Extracts: Potential Therapeutic Applications.** Abir T. El-Alfy, Chicago State University, Sharon Joseph, Akshar Brambhatt, Ebah A. Abourashed, Chicago State University. **Objectives:** The primary objective of this study was to evaluate the interaction of various nutmeg extracts with the endocannabinoid system. **Method:** Total nutmeg extract was prepared and successively extracted with four solvents of increasing polarity in the following order: n-hexane, dichloromethane, ethylacetate, and methanol. All extracts were fingerprinted by HPLC analysis. The extracts were evaluated for binding to the cannabinoid receptors as well for inhibition of endocannabinoid degrading enzymes, FAAH and MAGL. **Results:** None of the nutmeg extracts showed binding affinities to CB1 or CB2 receptors. The total extract showed concentration dependent inhibition for both FAAH and MAGL. The dichloromethane and ethylacetate fractions showed the highest enzyme inhibition. The IC50 values of FAAH and MAGL inhibition by the ethylacetate fraction were 15.21 and 3.84 μg/mL, respectively. Further fraction yielded two fractions that inhibited FAAH at IC50 values of 0.27 and 0.02 μg/mL, and MAGL at 0.04 and 0.21μg/mL. The IC50 values of FAAH and MAGL inhibition by the dichloromethane fraction were 32.00 and 32.86 μg/mL, respectively. Further fractionation yielded fractions ME.35.1 and ME.77.1. Fraction ME.77.1 did not inhibit FAAH or MAGL enzymes, while fraction ME.35.1 inhibited both enzymes with IC50 values of 15.93 and 7.49 μg/mL. **Implications:** The current study revealed that nutmeg extracts indirectly modulate the endocannabinoid system, and might have potential therapeutic applications especially in mood disorders.

**Integrating Popular Culture as a Tool to Supplement Infectious Disease Concepts in a Pharmacology Course.** Ramil Sapinoro, St. John Fisher College. **Objectives:** Popular culture narratives can inform and influence people’s beliefs about health, medicine, and social issues. Creating connections between lecture concepts and popular culture narratives can potentially engage students and enhance teaching from the classroom into the real world. The objective of this study is to evaluate the usefulness of incorporating House, M.D. episodes in a traditional classroom-based Systems Pharmacology course. **Method:** Three House, M.D. episodes were integrated into a 6-week Infectious Disease unit in which topics included Principles of Antimicrobial Therapy, Microbial Agents, and Chemotherapeutic Agents. At the conclusion of the Infectious Disease unit, students were asked to voluntarily complete an anonymous eight-question paper survey to seek feedback regarding the utility of the House, M.D. episodes as a learning tool. **Results:** The overall survey response rate from the class was 79% (N = 62). Of the surveyed students, 100%, 94%, and 92% responded Strongly Agree/Agreed that the House, M.D. episodes were applicable to the complementary course material, that they learned new and valuable information from viewing House, M.D. episodes, and the House, M.D. episodes had clinical relevance to pharmacy education, respectively. Students commented that the episode associated with the HIV-1-infected patient was most useful. **Implications:** Integrating popular culture narratives can serve as an effective learning tool to complement in-class lectures and relating concepts/themes to real-life scenarios.

**Longitudinal Curricular Activity by Graduating Pharmacy Students, a Poster Child for Integrated Learning.** Reza Karimi, Pacific University Oregon, Doug A. Meyer, Pacific University Oregon, Brad S. Fujisaki, Pacific University Oregon, Susan M. Stein, Pacific University Oregon. **Objectives:** To evaluate the effectiveness of a learning activity surrounding the preparation and presentation of pharmacotherapeutic posters by graduating students. Effectiveness was assessed from the perspectives of the poster presenters as well as the target audience. **Method:** Self-selected members of the graduating (P3) class built eleven teams to work on a longitudinal curricular activity (LCA) to prepare and present pharmacotherapeutic posters. Criteria for generating posters were provided. The effect of the LCA on comprehensive examinations, including NAPLEX, was compared between graduating students who participated (participants; n = 38) and graduating students who chose not to participate (nonparticipants; n = 52). In addition, the benefits of the LCA to first year (P1), second year (P2), and P3 were assessed. **Results:** Our comparative data
indicated that participants performed better than nonparticipants on a commercial comprehensive examination (p = 0.011) and NAPLEX (p = 0.017). In addition, the participants indicated that the LCA provided a unique training tool to learn how to create and present a professional poster. Furthermore, our assessment data indicated that P1-P3 students and faculty members believed that the presented posters assisted P1-P3 students to engage in curricular discussions and learning. Guided by assessment data, an improvement of the LCA effectiveness is in progress. Implications: The LCA is a learning activity providing benefit for the entire program. It connects graduating students to their peers during their final year of study; improves graduating students poster generation and presentation skills; assists graduating students in preparing for NAPLEX; and engages all pharmacy students in curricular discussions and student learning.

Natural Expression of C-reactive Protein and Its Isoforms in a Mouse Model of Alzheimer’s Disease. Balwant Chauhan, Roosevelt University, Lawrence A. Potempa, Roosevelt University, Francesca J. Davis, University of Illinois at Chicago, Neelima B. Chauhan, University of Illinois at Chicago. Objectives: The prototypic acute phase reactant, C-reactive protein (CRP), has been associated with inflammation. CRP has been appreciated as a hepatically produced, highly soluble serum pentamer, whose exact role in inflammation remains unknown. Recently, a distinctive, naturally occurring structural isoform of CRP has been identified. Termed mCRP, this isoform is expressed on individual CRP subunits which have markedly reduced solubility. mCRP is a tissue based form of CRP, found in both intra- and extra-cellularly. In vitro, mCRP is the predominant bioactive form of CRP, having strong pro-inflammatory activities. As inflammation contributes to both the progression and aggravation of Alzheimer’s disease (AD), we investigated expression of different isoforms of CRP in AD brains. Method: We used Western Blot analysis of whole brain homogenates of a 5XFAD mouse model of AD. Results: We report that mCRP but not CRP cross reactive epitopes are naturally expressed in transgenic diseased brains. Quantitative expression of mCRP was higher in diseased brains compared to non-transgenic littermates, and was decreased when mice were passively immunized intranasally with anti-AD 6E10 antibody (which is specific for Aβ). Two monoclonal antibodies reactive with different epitopes of mCRP were similarly reactive in our analyses. Implications: The predominant antigen (reactive with mAb 8C10) identifies a region of mCRP that defines a lipid raft, cholesterol binding site. These data show that naturally occurring mCRP is expressed in brains of AD mice in apparent correlation with exacerbation of disease. The exact role of mCRP in inflammatory AD is under investigation.

Pharmacy Student and Faculty Attitudes Toward and Utilization of Extra-credit Opportunities. Michelle L. Herdman, University of Charleston, Ashley Bailey, University of Charleston, Lindsey Acree, University of Charleston, Fadi M. Alkhateeb, Texas A&M Health Science Center. Objectives: To describe pharmacy faculty and student views regarding extra-credit opportunities in professional pharmacy courses, as well as determining which types of extra credit faculty offer and how students utilize those opportunities. Method: At one pharmacy school questionnaires were sent to 220 pharmacy students (17 items) and 22 faculty members (16 items) via a web-based survey tool. The survey items inquired about attitudes and utilization of extra credit and demographics. Results: The overall response rate was 72.7% of faculty and 71.4% of students. Most of responding faculty offered some form of extra credit in their courses (87.5%), and the extra credit activity offered most often was bonus questions added to exams, quizzes, or assignments (50.0%), followed by an extra optional assignment (35.7%). Faculty offered extra credit with the intent of helping students with borderline (50.0%) or failing grades (35.7%). When asked which types of extra credit most helped their grades, students chose bonus questions and dropping the lowest grades, which matched with faculty’s most frequent offerings. The majority of students (86.5%) believed that extra credit helped their overall grade in a course, and 66.1% of students participated whether or not the activity could improve their grade. Most students (55.3%) felt that the extra credit activities helped them retain course information, and 63.6% felt more motivated to perform well in a course with extra credit offerings. Implications: Faculty members are offering extra credit activities that students feel are beneficial to their learning, motivation, and grades.

Positioning Pharmacogenomics in Pharm D curriculum In US Pharmacy Colleges. Gargi Patel, University of South Florida, Kevin B. Sneed, University of South Florida, Yashwant V. Pathak, University of South Florida. Objectives: Pharmacogenomics is rapidly evolving area helping optimize medication therapy using an individual’s genetic code to identify opportunities for increased or decreased adverse effects or changes in efficacy. Pharmacists must arm themselves with the knowledge and skills specific to pharmacogenomics in order to fully integrate this expanding area into patient care and turn this into a great opportunity. The purpose of the paper is to explore positioning of Pharmacogenomics in Pharm D curriculum. Method: The web search included Pharmacy colleges curriculum, using AACP website. Colleges were classified in four groups geographical, 3 vs 4 years, for profit and non-profit institutions. Total 127 college curriculums were studied for independent courses in Pharmacogenomics in Pharm D curriculum and in which year it is placed. Results: We found that only 20 colleges had a separate course on pharmacogenomics. Northeast region 9, Southeast 5, West coast 5. Other two zones colleges did not have a specific course for Pharm D curriculum. Most of the colleges with independent courses taught 2nd or 3rd year. Many also have genomics course as elective in second year. Four year curriculum was more inclusive for genomics course than 3 year curriculums. Older colleges were slow in responding to Pharmacogenomics inclusion in curriculum. Newer colleges were more ready to include the Genomics course in the curriculum. Implications: The pharmacy educational community needs to accelerate their reaction to the necessary changes in the curriculum and need to aggressively impart genomics education to be in the forefront of Pharmacy personalized medicine evolution giving edge to their students.

Revisiting the Biotransformation of the Antimalarial Compound Artemisinin. Paulo Carvalho, Notre Dame of Maryland University, Susan Unfried, Notre Dame of Maryland University, Katlyn Gourley, Notre Dame of Maryland University, Peter Hoffman, Notre Dame of Maryland University. Objectives: Artemisinin derivatives are the latest weapon in the therapeutic antimalarial arsenal. However, their bioavailability is less than ideal, and better alternatives are needed for improved action. A paper published in 2004 by Parshikov et al. reports the biotransformation of artemisinin by the fungus Cunninghamamella elegans into 7-hydroxyartemisinin, with a yield of 21%. Our group is revisiting this work through a collaborative effort with Biology/Chemistry undergraduate students in their senior year, who are working on a research elective project for graduation. The objective of this work is to improve the yields of 7-hydroxyartemisinin, while fostering collaboration between departments within the University. Method: Four different variants of the fungus were grown, showing different abilities to metabolize artemisinin. The influence of pH variation in the course of the experiment, different times and temperature
of incubation and different solvents used to dissolve and introduce artemisinin in the fungus culture were also analyzed. The metabolites were analyzed by HPLC and characterized by NMR. **Results:** Up to this point the yields of 7-hydroxyartemisinin were inferior to what is reported in the literature. We intend to continue working on the growth conditions seeking better yields, and hope this collaborative effort will open the doors for other similar projects. Once we have established a method that produces good yields of 7-hydroxyartemisinin, we will scale-up the production in order to have material for semi-synthetic work on the structure. **Implications:** It is expected that the bioavailability of 7-hydroxyartemisinin and its derivatives will surpass the antimalarial artemisinin derivatives currently in the market.

**Science Applications for Patients, Pharmacists, and Scientists, Implemented by First Year Pharmacy Students.** Reza Karimi, Pacific University Oregon, Fawzy Elbarbary, Pacific University Oregon, Sigrid C. Roberts, Pacific University Oregon, Jeff Fortner, Pacific University Oregon, Deepa Rao, Pacific University Oregon. **Objectives:** To assist first year pharmacy (P1) students in integrating P1 curricular content, enhancing student learning, and preparing P1 students for their intern roles to effectively communicate with pharmacists, patients, and scientists (faculty) during their course of study at a PharmD program. **Method:** A unique longitudinal curricular activity, Science Applications for Patients, Pharmacists, and Scientists (SAPPS), was designed by faculty and implemented by P1 students. A comprehensive list of criteria was provided and 15 student teams were built. Each team was assigned to work on one specific drug to produce a professional insert advertisement that presented integrated P1 curricular content. A survey instrument was generated and implemented to assess the effectiveness of the SAPPS activity and 72 students (72%) completed the survey. **Results:** Our assessment results showed that approximately 70% of students believed the SAPPS activity promoted active learning, encouraged students to be self-directed learners, and increased their knowledge base in: pharmacology, drug information, counseling points, interpreting package inserts, literature searches, professional presentations, student teamwork, and the integration of the knowledge and skills developed through the didactic portions of the P1 curriculum. To a lesser extent (approximately 60%), P1 students believed the SAPPS activity promoted their critical thinking skills, provided an effective summary of different medications, and promoted “analysis level” as defined by Bloom’s Taxonomy. **Implications:** The SAPPS activity can create a collaborative learning environment where P1 student teams can produce and present integrated curricular materials, in the form of drug advertisements, to build a path into their intern roles.

**Student-Involvement in Faculty Scholarly Output through an Independent Research Elective Course on Dietary Supplements.** Mohammed A. Islam, West Coast University. **Objectives:** To design and implement an elective course which involved students’ research of primary literature on dietary supplements and writing review articles for publication in peer-reviewed journals. The goal of this research elective course was to help students gain science-based knowledge of dietary supplement and integrate to evidence-based patient care. **Method:** During author’s tenure at LECOM School of Pharmacy, four students were enrolled in the elective course to work on projects related to “dietary supplements and cardiovascular health” in spring 2012. At the time of enrollment students completed cardiovascular pharmacology and therapeutic topics. Students were given an overview on how to retrieve, analyze, and interpret scientific literature, and write a review article for publication. Students independently reviewed primary literatures on the dietary supplements, evaluated data, and completed writing review articles. Faculty advisor assessed students for originality and aptitude of research, participation in weekly research meetings, and overall research activity by using a weighted rubric. Students’ manuscripts were evaluated and graded by the course coordinator and two other faculty members. **Results:** Students successfully completed the course and demonstrated scholarly output. The course generated 3 full length review articles—one is in press and two articles are in the process of submission. **Implications:** This course provides students with evidence-based knowledge of the researched dietary supplement. This course model benefits both students and faculty. Students benefit by sharpening their analytical and critical thinking skills as well as enriching their dossier with a scholarly publication. Beyond the rewards of mentoring and coaching students, faculty benefit from this collaboration by furthering their scholarly endeavors.

**Synthesis and Anti-inflammatory Activity of Some Enhydrazones.** Ivan Edafogho, University of Saint Joseph, Hanan Zamil, Kuwait University, Charles I. Ezeamuzie, Kuwait University. **Objectives:** The objectives of this research were to synthesize novel enhydrazones, and evaluate them for anti-inflammatory activity. Enhydrazones are synthetic compounds containing a hydrazino group linked to a keto group through a carbon-carbon double bond. **Method:** The synthesis of new cyclic enhydrazones was achieved by reacting beta-hydroxyketo compounds with appropriate hydrazino derivatives. Peritoneal macrophages were induced in mice by intraperitoneal injection of 2% thioglycolate. Cells were recovered by peritoneal lavage and purified by adherence to plastic plate. Cultured adherent macrophages were pretreated with the enhydrazones or vehicle and then stimulated with lipopolysaccharide (LPS) for 8 h. Tumor necrosis factor alpha (TNF-alpha) release into the supernatant was quantified. The inhibition of TNF-alpha release was used as the index of anti-inflammatory activity. **Results:** Eight (8) novel enhydrazones were synthesized and characterized by spectral and elemental analyses. On testing the enhydrazones in vitro for anti-inflammatory activity against the release of the pro-inflammatory cytokine - tumor necrosis factor-alpha (TNF-alpha), LPS-activated mouse peritoneal macrophages, it was found that five of the eight enhydrazones were potent inhibitors of LPS-induced TNF-alpha release from mouse macrophages. The concentrations producing 50% inhibition (IC50 values) ranged from 0.3 micromolar to 4.6 micromolar. **Implications:** The presence of a simple aromatic ring attached via an NH-NH group appeared to be critical for anti-inflammatory activity as analogs with dinitrophenyl substitution had little or no activity. These results show that enhydrazones represent a novel group of compounds with potential anti-inflammatory effects.

**Synthetic Cannabinoid Analog, WIN 55212-2, Induced Glial Neurotransmitter transporter and Cannabinoid 2 Receptor (CB2R) Expressions.** Kruti Shah, Texas Southern University, Amartuithesh C. Shivachar, Texas Southern University. **Objectives:** Cannabinoids, the active components in marijuana plant extracts, affect learning and memory by modulation of synaptic plasticity via glutamate neurotransmission. The purpose of this study was to investigate if chronic exposure to WIN 55212-2, a potent aminooalkylindole cannabinoid receptor agonist, affects glial glutamate transporter expression in the brain. **Method:** Cultures of rat cortical astrocytes were treated for 1 or 5 days with WIN 55212-2 (1 microM) and the expression levels of astroglial-specific, glutamate transporter-1 (GLT1), glutamate aspartate transporter (GLAST), cannabinoid CB1 receptor (CB1R) and CB2 receptor (CB2R) subtypes were detected by immunocytochemical double-label studies in conjunction with quantitative western blot analyses. **Results:** Immunocytochemical analysis showed an increase in the...
The POGIL teaching strategy can increase student performance on exams solving. The intent of this project is to determine if adoption of the higher-order thinking skills such as critical thinking and problem solving is an active learning, team-based guided inquiry learning (POGIL) is an active learning, team-based guided inquiry learning (POGIL) strategy that has been shown to aid in development of critical thinking and problem solving. The framework of flipping the classroom which has been implemented for three semesters within the same large, didactic, basic science course is presented. Method: A section of a required, didactic basic science course which covers several topics in microbiology was flipped. Students were required to view on-line lessons in preparation for active learning-based classroom exercises. Students were queried to determine: 1. Their previous understandings of and experiences with active learning methodologies 2. Their attitudes and impressions of the flipped classroom as a learning conveyance; 3. Changes in their attitudes and impressions when the same instructor succeeded the flipped classroom with traditional PowerPoint-based lecturing methods. Data was collected over three contiguous years. The influence of active learning exercises on student exam performance was monitored using student surveys given immediately following the flipped classroom session, after the course’s end but before final assessment. Results: 1. As a group there appears to be growth acceptance if not outright preference for active learning modalities as represented by the flipped classroom by more recent enrollees. 2. The preference for particular classroom exercises followed no trend, however. Nevertheless, exercises that demanded higher in-class performance were less preferred. 3. Student exam performance on questions with cognate in-class exercises was higher than questions that were not directly presented in class. Implications: Course coordinators might consider introducing a flipped classroom methodology into their instruction in light of a student population that is increasingly savvy with Internet technologies and on-line experiences.

The Use of POGIL Teaching Strategy Increases Student Performance in an Introductory Pharmaceutical Sciences Course. Robert P. Soltis, Drake University; Nathan J. Verlinden, Drake University; Nicholas Kruger, Drake University. Objectives: Process-oriented guided inquiry learning (POGIL) is an active learning, team-based teaching strategy that has been shown to aid in development of higher-order thinking skills such as critical thinking and problem solving. The intent of this project is to determine if adoption of the POGIL teaching strategy can increase student performance on exams in an introductory pharmaceutical sciences course. Method: Introduction to Pharmaceutical Sciences is a 3-credit hour team-taught course. In 2011, the entire course was delivered using a format that was primarily lecture-based. In 2012, half the course was taught using the POGIL strategy. Student performance on exams in 2011 and 2012 was compared. The comparisons included overall performance on exams and performance on questions classified as requiring either lower order thinking skills (knowledge, comprehension) or higher order thinking skills (application, analysis). Results: On those exams in which a lecture-based teaching approach was used in both 2011 (N=112) and 2012 (N=111), student performance did not change (mean+/−SD; 82.6%+/−10 vs 82.5%+/−10, p=0.93). On those exams in which the POGIL strategy was used, student performance significantly increased (80.0%+/−9 vs 83.9%+/−9, p=0.0001). On those questions classified as requiring higher order thinking skills, student performance significantly increased (75.8%+/−13 to 83.1%+/−13, p=0.0001) when the POGIL strategy was used. Performance on lower order thinking skills was unchanged (92.0%+/−10 vs 91.6%+/−11, p=0.70). Implications: The use of the POGIL teaching strategy increased student performance on questions requiring higher order thinking skills, suggesting the strategy is effective in promoting problem solving and critical thinking skills.

Using Classroom Technology for Pre- and Post-Lecture Reviews. Melinda E. Lull, St. John Fisher College; Andrea N. Traina, St. John Fisher College; Jennifer L. Mathews, St. John Fisher College. Objectives: Review of course lectures is an important part of student learning, but holding on-site review sessions is often difficult. The objectives of this study were to create a variety of activities utilizing different technologies to review materials before and after instruction in the classroom. Method: Review activities were prepared for multiple courses in the first and second year pharmacy curriculum. Three different technologies were utilized: ECHO360® lecture capture, PowerPoint®, and Prezi®. Throughout the course of two semesters, materials were made available to students, and data were collected on the utilization of each review. In addition, students were surveyed on the usefulness of these reviews using a Likert scale of 1-5 (1 = strongly disagree; 5 = strongly agree). Results: Review materials were readily used by students in multiple courses. ECHO360® videos made available as post-lecture review received 140 cumulative views (N=79 students), representing an increased viewership of 389% over the videos of lecture sessions. Similarly, pre-lecture review videos received 68 cumulative views (N=75 students), representing a 343% increase in viewership. PowerPoint® review modules presented as pre-class reviews were viewed an average of 54 times (N=75 students). Student perceptions of the review activities were overwhelmingly positive with an average of 92% of students agreeing or strongly agreeing that the reviews were beneficial, good preparation, and should be conducted in the future. Implications: The use of classroom technologies to conduct out-of-class review sessions represents a viable and effective option to improve student understanding, preparation and participation.

Zerumbone Inhibits Prostate Cancer Cells Growth and Increases Paclitaxel Sensitivity Where JAK2/STAT3 Signaling is Active. Arup Chakraborty, Roseman University of Health Sciences; Jessica Jorvig, Roseman University of Health Sciences. Objectives: High levels of IL-6 and aberrant activation of its downstream signaling proteins Janus kinase 2 (JAK2) and STAT3 (a transcription factor and oncoprotein) are tightly associated with poor prognosis of prostate cancer. JAK2-targeted therapy appears to be an emerging field in the treatment of prostate cancer. We evaluated for the first time the effect of a phytochemical isolated from Asiatic edible ginger, zerumbone, in prostate cancer. AIM: 1. Determine the effect of zerumbone on JAK2/STAT3 pathway in hormone refractory prostate cancer.
cancer cells. 2. Evaluate the combined effect of paclitaxel (PTX) with zerumbone in killing hormone-refractory prostate cancer cells. **Method:** We have used MTS assay, RT-PCR and western blot. **Results:** DU145 and PC3 are hormone refractory aggressive prostate cancer cell lines. Zerumbone inhibited constitutive and induced JAK2 activation in both cell types and STAT3 activation in DU145 only since, STAT3 activation is absent in PC3. As a result, zerumbone induced significant cytotoxicity in DU145 cells but not in PC3 cells. Zerumbone also blocked major prostate cancer associated gene expressions and induced apoptosis in DU145 cells. Interestingly, zerumbone also synergistically increased PTX sensitivity in DU145 cells. **Implications:** Prostate cancer is a heterogeneous disease with diverse aberrant signaling. We have shown that zerumbone has a potential to be used as a therapeutic agent in androgen insensitive prostate cancer where JAK2/STAT3 signaling is overactive. Secondly, combining zerumbone with PTX for chemotherapy of prostate cancer might be a new strategy to improve the clinical response and reduce the severe side effects of PTX.

**Chemistry**

**Completed Research:**

**Chemical Profiling of Botanical Supplements – Outcomes of a Capstone Project on Borututu Bark.** Ehab A. Abourashed, Chicago State University, Vaiidehi Thakkar, Jadwiga Zawada. **Objectives:** A capstone project was utilized to introduce a team of 4th year student pharmacists to the area of drug discovery. The objective was to profile, isolate and identify the major chemical constituents of an herbal dietary supplement (bark of Cochlospermum angolense, or Borututu), that is currently finding its way to the market as an antioxidant supplement. **Method:** A traditional phytochemical approach was adopted to isolate and identify the major constituents. For isolation and purification, a combination of organic solvent extraction and chromatographic techniques, such as flash, chromatotron, TLC and HPLC, were used. For compound identification, molecular structures were determined by spectroscopic methods, mainly NMR and MS, as well as computational predictions. **Results:** Two major constituents of borututu were successfully isolated, purified and identified as the carotenoids, cochloxanthin and dihydrococlaxonthin. **Implications:** This project demonstrates that professional pharmacy students can be involved in successful chemistry-based rotations that provide them with further insight about the origins of many of the drugs that they routinely work with. They also learn to utilize their organizational and intellectual skills to meet the challenge of discovering new natural products that often exist as part of a complex matrix in medicinal plants. The obtained results can be utilized as preliminary data towards further investigation of borututu bark.

**Design and Implementation of a Laboratory-Based Drug Design and Synthesis APPE.** Ashok E. Philip, Union University, Blake Watkins, Union University, Mark A. Stephens, Union University. **Objectives:** The mission of the UUSOP is to develop comprehensively trained practitioners equipped to meet immediate and future demands of pharmaceutical science and patient care. Accordingly, research APPEs were developed in the areas of drug design and synthesis. **Method:** Prior to starting research APPEs, students complete an advanced lab-based elective that includes training in chemical synthesis techniques and the basics of molecular modeling. Students utilize molecular modeling tools (Sybyl®-X2.0 by TriposTM) to perform structure-based, de novo design of ligands and pursue library synthesis utilizing solution-phase, parallel synthesis protocols. Students invest a minimum of 40 hours weekly working on research goals and preparing a poster to be presented at a local, regional, or national meeting. Students are evaluated based on their research efforts. **Results:** Student participation in these APPEs has resulted in molecular modeling of an anti-infective target protein, docking studies, library synthesis of novel carbamate ligands, progress toward the total synthesis of an anti-cancer natural product, numerous poster presentations at university research symposium, and a keynote presentation at a local meeting of the American Chemical Society. **Implications:** We have successfully developed a mechanism to attract and engage pharmacy students in the areas of drug design and synthesis. These research APPEs are an integral part of the UUSOP experiential curriculum. They are strictly student-driven with emphasis on student ownership of all elements of research activity. These APPEs offer students the opportunity to participate in drug discovery efforts and exposure to a view of pharmacy not routinely available in a traditional curriculum.

**Formative Assessment of a P1-year Biochemistry Module Using Index Cards as the Response Medium.** Srirdhar Anand, St. John Fisher College, Amy L. Parkhill, St. John Fisher College, Christine R. Birnie, St. John Fisher College. **Objectives:** To obtain formative assessment in a P1-year biochemistry-centered course using index cards to record student feedback at the midpoint and endpoint of the lecture sequence. **Method:** Index cards were distributed to students at the midpoint and endpoint of a teaching block in an integrated biochemistry course sequence. At midpoint (lecture#6) each student was provided one index card and prompted to list up to three positive points about the course content and delivery, and up to three areas for course improvement. At the endpoint (lecture#12), each student was provided a second index card, and prompted to list up to three changes made in response to earlier suggestions. The responses were recorded anonymously. Data from notecards were coded to identify themes. **Results:** The student responses obtained at the midpoint (67/70) and the endpoint (47/70) emerged under four main areas: organization of slides; lecture delivery; verbal elaboration of slide content; and student engagement. Detailed analysis indicated that at the midpoint 22.4% of respondents sought additional diagrams and visual aids, with 21.3% noting the implementation in the endpoint evaluation. At the midpoint, 55.2% of students requested that the lecture pace be decreased, and 38.3% acknowledged at the endpoint that a favorable change had been made. 10.6% acknowledged in their endpoint responses that the instructor had suitably addressed their learning needs and engaged them better in the classroom. **Implications:** This formative assessment method provides the instructor useful information that can be used to enhance student learning and classroom engagement.

**Gotcha! An Exercise Suitable for Large Lectures Designed to Catch Pharmacy Students’ Misconceptions About Acids and Bases.** Susanne T. Nonekowski, The University of Toledo, Brandon D. Slotterbeck, The University of Toledo. **Objectives:** To address a common pharmacy student misconception regarding the interpretation of acid dissociation constant data. **Method:** An exercise suitable for a large lecture was developed using an Audience Response System (ARS or clickers) in which pharmacy students (n=176) classified the manner in which various functional groups ionized. Students were subsequently given the pKa values of these functional groups to determine if they improperly used the data to make their classifications.
Additional instruction was provided using a case study to demonstrate the proper use of pKa data to predict the tendency of various functional groups ionizing at different pHs, but not the manner in which they ionize. Students were assessed at 3 and 12 weeks post-instruction. The results of the assessments were compared to those from a cohort of pharmacy students (n=196) from the previous year that did participate in the ARS exercise. Results: ARS participating students consisted of PharmD students in their first professional year (n=106) and juniors in the Bachelor of Science in Pharmaceutical Science Program (n=70). The exercise revealed that 18% of the class did change their classification based on the pKa data. Post-instruction assessment at 3 weeks revealed a 20% decrease in the number of students who still practiced pKa data misconceptions. Furthermore, this improvement was still evident 12 weeks after the learning exercise which supports that permanent conceptual change was accomplished. Implications: These learning exercises show promise as a means of addressing and encouraging a student-driven correction of a common fundamental chemistry misconception.

Incorporating a Pharmacy Student Teaching Assistant in an Undergraduate Medicinal Chemistry Course. Matthew J. DellaVecchia, Palm Beach Atlantic University, Alyssa M. Claudio, Palm Beach Atlantic University, Jamie L. Fairclough, Palm Beach Atlantic University. Objectives: This exploratory study developed and assessed an innovative educational approach whereby a pharmacy student served as a teaching assistant (TA) in an undergraduate medicinal chemistry course. Method: A first-year pharmacy student TA developed a novel lecture and class assignment pertaining to the medicinal chemistry of performance enhancing drugs (PEDs). A Likert-scale survey tool assessed undergraduate students’ perceived knowledge of the medicinal chemistry of PEDs before and after the pharmacy student-led assignment and their perception of the pharmacy student’s involvement as a TA in the course throughout the semester. Results: Analyses were conducted using SPSS/PASW v.20. The 14-item survey instrument was shown to be reliable (Cronbach’s alpha = 0.825) with good construct validity. Results of a Wilcoxon Signed Ranks test indicated a significant increase in students’ perceived confidence in their knowledge of the medicinal chemistry of PEDs after the pharmacy TA’s lecture and project (p-values less than or equal to 0.001). Undergraduates (80.0%) responded favorably to the TA’s lecture. The majority (62.6%) agreed that TA availability increased their confidence for doing well in the course. Comments regarding the pharmacy student-led project and the TA’s involvement in the course were overwhelmingly positive. Implications: Involving a pharmacy student as a TA may be regarded as an effective, perhaps novel, way to infuse new learning tools. A significant increase in students’ perceived confidence in their knowledge of the medicinal chemistry of PEDs after the pharmacy TA’s lecture and project (p-values less than or equal to 0.001). Undergraduates (80.0%) responded favorably to the TA’s lecture. The majority (62.6%) agreed that TA availability increased their confidence for doing well in the course. Comments regarding the pharmacy student-led project and the TA’s involvement in the course were overwhelmingly positive. Implications: Involving a pharmacy student as a TA may be regarded as an effective, perhaps novel, way to infuse new learning tools.

Investigation of Physicochemical Drug Properties Utilizing PubChem: An iPads in the Classroom Activity. Susan L. Mercer, Lipscomb University. Objectives: An iPads in the classroom exercise was developed to emphasize chemical aspects of the Top 100 Prescription Drugs including organic functional groups, acid/base chemistry, Lipinski’s Rule, chirality and conformational change delivered in didactic courses within the first year of the professional pharmacy curriculum. The goal of this experiment was to have students apply their knowledge and comprehension regarding these fundamental concepts to currently used drugs in an interactive format. Method: Students (79) were randomly placed into 25 groups and each assigned an iPad to work with over a 2-hour period. Each group was permitted to tailor their experience by selecting three drugs of choice from the Top 100 Prescription Drugs List which coincided with their Pharmacy Practice coursework. Students utilized PubChem to determine chemical and general pharmacological aspects of their selected drugs and briefly investigated clinical trial activity. Results: Over 92% of students agreed to strongly agree that the exercise enhanced their understanding of functional groups related to their identification, acid/base characteristics and H-bond donor/acceptor capability. Nearly 85% of students agree to strongly agree that the exercise enhanced their understanding of drugs as 3-dimensional structures containing stereo-centers and rotatable bonds. Implications: Students gained a more thorough understanding of these fundamental concepts when applied to currently used drugs and enjoyed learning in an active environment with current technology. Over 94% of students agree to strongly agree that this exercise should continue to be offered as part of the professional pharmacy curriculum.

Online Pre-assessment Tools and Their Role as Predictors of Success for Pharmacy Students. Mustapha A. Beleh, University of Michigan, Janis Rood, University of Michigan. Objectives: To establish the predictive value of pre-assessment tools as compared to pre-pharmacy markers in the success of pharmacy students; to assess the proficiency of pharmacy students in the areas of chemistry and statistics; and to evaluate the efficacy of online learning modules as active learning tools. Method: Predictors of success analysis examined the correlation between scores on pre-assessment tools along with a number of educational parameters, such as PCAT and undergraduate GPA, and success in pharmacy school, as defined by pharmacy GPA. Online self-assessment modules for chemistry and statistics were used to evaluate proficiency of students in each area. Improvement in scores of the chemistry assessment after the use of online learning modules was used to evaluate such modules. Results: All pre-pharmacy markers were found to be predictive of success in pharmacy school to varying degrees. Pharmacy GPA was significantly higher for females (p < 0.05; two-tailed t-tests), indicating a role for gender. Undergraduate GPA, math and sciences undergraduate GPA and PCAT scores were all positively correlated with pharmacy GPA across all four years, with correlation coefficients ranging from 0.2169 to 0.4251. The weakest correlations were observed with PCAT scores, whereas the strongest correlations were observed with math and sciences undergraduate GPAs. The pre-assessment scores showed similar correlation to success in pharmacy school. The online learning modules seemed to be effective in improving the knowledge base of struggling students, although the improvement was at times seen regardless of the use of the modules. Finally, the statistical assessment indicated apparent deficiencies in the understanding of concepts in all six sections tested. Implications: The varying predictive power of pre-assessments and all pre-pharmacy markers considered offers colleges of pharmacy solid tools for making good admissions decisions, as well as targeting potentially struggling students. The use of online learning modules falls in line with professional initiatives and student expectations, and their success as active learning tools exhibits a new niche with struggling students.

Preparation of Fluorinated Organic Compounds. Allison D. Hart, Purdue University, Mark V. Rioski, Purdue University, David A. Colby, Purdue University. Objectives: The objective of this research was to develop a stable salt of hexafluoroacetone trihydrate to be used for the preparation of fluorinated organic molecules. Method: We found that a solution of hexafluoroacetone trihydrate and 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU) in diethyl ether precipitated a stable amidinate salt.
The salt was shown to contain no water by NMR and X-ray crystallography studies. This salt was shown by NMR studies to release fluoriform gas in solution and incorporate trifluoromethyl groups into a number of organic molecules. **Results:** We developed an air-stable, non-hygroscopic salt that releases fluoriform gas in situ and can be used to fluorinate organic molecules that did not previously contain fluorine atoms. **Implications:** Fluorination of organic molecules is a useful strategy for making pharmaceutical compounds more resilient to biological metabolism. Current methods of using gaseous fluoriform for fluorination reactions pose challenges for scientists. We have developed a novel reagent that allows chemists to incorporate fluorine into organic molecules without the use of gaseous fluoriform.

**Student Experiences with the Second Year of an E-Portfolio Program in a College of Pharmacy.** Robin M. Zavod, Midwestern University/Downers Grove, Sandra K. Tooley, Midwestern University/Downers Grove, Kathy Komperda, Midwestern University/Downers Grove, Ana C. Quinones-Boex, Midwestern University/Downers Grove, Jennifer Phillips, Midwestern University/Downers Grove, Huzefa Master, Midwestern University/Downers Grove, Amy Lullo, Midwestern University/Downers Grove, Christie Schumacher, Midwestern University/Downers Grove, Susan R. Winkler, Midwestern University/Downers Grove, A. Michael R. Spunt, Midwestern University/Downers Grove.

**Objectives:** Reflective portfolios were incorporated into the professional curriculum to promote student reflection, document student progressive achievement of the ten curricular outcomes, and to provide a mechanism for continuous professional development. The study objective was to evaluate the students’ experiences with the e-portfolio curriculum, including the value of available resources, as well as approaches to the project. **Method:** The instrument used was modified from the first professional year course to reflect changes in course delivery and deliverables. After piloting with the course’s peer mentors, the survey was administered electronically (via SurveyMonkey™) to students enrolled in Reflective Portfolio II (N=217) after submission of their progressive achievement entries and receipt of their faculty evaluations. **Results:** Second year response rate (30%) was similar to first year (40%). The percentage of students who scored the value of the lecture content and Blackboard as “not valuable” increased (39% to 60% and 39% to 47% respectively). The value of the faculty advisor workshop session remained relatively constant (40% and 43% somewhat valuable). Fewer students contacted their faculty advisor for assistance (37% first year; 27% second year) and fewer used the rubric (85% first year to 54% second year). In both years entries were completed in Microsoft Word within 1-2 weeks of the due date and it took the same amount of time entry. **Implications:** Given student familiarity with the program, these results are somewhat expected. Their feedback spurred changes in the delivery of the first and second year portfolio courses (implemented in Fall 2011 and Fall 2012 respectively).

**Synthesis of Intermediates Towards the Total Synthesis of the Potential Anticancer Compound Callyspongamide.** Paulo Carvalho, Notre Dame of Maryland University, Alice Chong, Notre Dame of Maryland University, Lich Dang, Notre Dame of Maryland University, Hye In Kim, Notre Dame of Maryland University, Andy Liu, Notre Dame of Maryland University, Sylvia Okrzesik, Notre Dame of Maryland University, Megan Thacker, Notre Dame of Maryland University.

**Objectives:** Our group is working towards the total synthesis of Callyspongamide, a natural product extracted from a marine sponge, which has shown some anticancer activity. As the amount extracted was less than 0.003 g, we want to synthesize and test Callyspongamide for anticancer and antifungal activity. **Method:** The students had the opportunity of following the retrosynthetic approach to synthesize intermediates and exposure to using reagents necessary for the total synthesis of Callyspongamide. Standard Organic Synthetic methods were employed; such as hydroxyl group protection/deprotection, organometallic mediated carbon-carbon coupling, and oxidation. Standard purification methods were also performed; such as Thin Layer Chromatography and Column Chromatography. **Results:** The intermediates synthesized to date will allow for the synthesis of Callyspongamide and derivatives for further testing of their biological activity. **Implications:** Our Pharmaceutical Sciences Research Elective course gives our Pharmacy Students the opportunity for hands-on experience with academic research. For some this may be their awakening call towards a career teaching in the Pharmaceutical Sciences.

**The Use of an Online Education-specific Platform ‘PIAZZA’ to Improve Course Outcomes.** Srikanth Kolluru, Texas A&M Health Science Center, James T. Varughese, Texas A&M Health Science Center. **Objectives:** To facilitate active student discussion with an online, education-centered forum ‘PIAZZA’ in order to reinforce important concepts taught in the medicinal chemistry component of a pharmacotherapeutics course. **Method:** Piazza is an online searchable platform geared towards academic discussions. A third year integrated pharmacotherapy course was enrolled on this platform to facilitate discussions of the course’s medicinal chemistry component. Students could ask, answer, and explore content, as well as build on submitted answers in wiki style, in collaboration with classmates. Instructor endorsed student responses with correct answers and led follow-up discussions. We collected student perceptions of Piazza via survey. **Results:** In a post-activity qualitative survey, a majority of the students appreciated the less stressful, online interaction with peers and faculty. For 15 medicinal chemistry class contact hours in a course, we had 83 posts on Piazza with 303 total contributions, 107 student responses and 546 minutes of group discussion time. 94% of the questions received student responses and 89% of those were endorsed by the instructor. They particularly liked review discussions just before the exams, organization of the online course page, reinforcing complex material and guidance on the learning objectives that needed to be focused. Piazza fostered personal exploration of content by the students, which led to better performance on examinations. **Implications:** Involving the use of an online, education-centered platform in which students actively discuss class topics was an effective means of increasing class engagement in the course and knowledge of course material. Piazza can be utilized for any course and across disciplines.

**Use of Novel Interactive Molecular Graphics to Teach Principles of CYP450 Drug Metabolism.** Arthur G. Cox, South University, Kellan T. Passow, St. Olaf College, Robert M. Hanson, St. Olaf College Department of Chemistry, Vicky V. Mody, South University, Samit U. Shah, Keck Graduate Institute School of Biopharmacy, Lilia Z. Macias-Moriarit, South University. **Objectives:** This study evaluated the efficacy of novel molecular graphics animations to teach principles of CYP450 metabolism. The ability to manipulate virtual molecules while watching scripted animations was hypothesized to be beneficial to understand concepts of drug binding, induced fit, isoform selectivity, irreversible inhibition, and nonlinear pharmacokinetics. **Method:** A tutorial covering principles of CYP450 was developed and hosted on the website Proteopedia, facilitating cross-discipline collaboration and use in distance education. Interactive molecular graphic animations illustrated basic and advanced concepts.
Animations were built within Proteopedia and displayed in a web browser through the Jmol molecular visualization applet. Animated transitions were included to connect key principles and facilitate information retention. First year pharmacy students (n = 132) were given pre and post-tests and surveyed on perceived effectiveness. Data analysis was performed using IBM SPSS® Statistics software. **Results:** Ninety-five percent of the 122 students that participated in the survey agreed that their ability to understand all the key concepts was significantly increased using the scripted animations. Median increases in all 6 categories between pre-test and post-test scores were significant when examined using Wilcoxon Signed Rank Test (p < 0.0001). Confidence increased in understanding all concepts from pre-test to post-test in the range of 2.9-31.1% (16.9% ave). **Implications:** This form of molecular graphics is effective in teaching medicinal chemistry principles and easy to implement. Concepts otherwise difficult to describe and comprehend can be effectively illustrated. Importantly, student confidence in ability to explain and visualize complex subjects, such as non-intuitive pharmacokinetics of CYP450 metabolism, was enhanced after reviewing the animations.

**Vitamin C Analysis Illustrating the Integration and Application of Scientific Principles and Pharmacy Practice in Students.** Kelly J. Clark, South University, Michaela M. Almgren, South University. **Objectives:** South University School of Pharmacy uses an integrated curriculum to deliver information to students in the Pharm.D program. The integrated nature of laboratory emphasizes to first-year students how basic science is directly applicable to pharmacy practice. This laboratory was performed complementary to Biochemistry coursework. Students observed redox reactions of an antioxidant while exploring vitamin-C levels present in natural vitamin-C sources and manufactured vitamin-C enriched products. **Method:** Titration determined the amount of vitamin-C in selected samples. In Biochemistry, principles of redox reactions, antioxidants, and vitamin-C’s role in health maintenance were discussed. Prior to experiment, students predicted amounts of vitamin-C in given samples. At the end students ranked each vitamin-C source based on their analysis. A post-exercise discussion occurred allowing accuracy. The quiz assessed students’ understanding of biochemistry principles and pharmacy practice applications. **Results:** A total of 130 students performed the lab exercise. Once finalizing their observations, majority of students were able to independently develop recommendations for the amount of non-pharmacologic sources containing vitamin-C a patient needs to consume to meet RDI. Student mastery of laboratory objectives was assessed with a post-exercise quiz. The average score for post-assessment was 88.2%. Students were able to utilize this knowledge in Pharmacotherapy and apply it to patient counseling. **Implications:** Laboratory experiments can present students the opportunity to discover parallels between basic science and its pharmacy practice applications. We believe that our students are better able to grasp the importance of scientific concepts to have a deeper appreciation of their clinical applications after this exercise.

**Continuing Professional Education**

**Completed Research:**

**Comparison of Communications Styles Amongst an Inter-Professional Student Cohort.** Amber V. Buhler, Pacific University Oregon, Amy Coplen, Pacific University Oregon, Bobby Nijjar, Pacific University Oregon. **Objectives:** To investigate the discipline-specific pattern of communication styles amongst students in an allied Inter-Professional Health Professions Campus. With an increased emphasis on working in inter-professional teams, understanding the differences in communication strategies within different health professions can help our students better adapt to these environments. **Method:** All first year students in Pacific University Oregon’s Schools of Audiology, Dental Health Science, Masters of Health Administration, Occupational Therapy, Pharmacy, Physician Assistant, Physical Therapy, Professional Psychology, and Speech Language Pathology were required to complete a brief questionnaire on communication styles as part of their campus-wide introductory inter-professional education course. This questionnaire allowed students to rank their responses to 4 style types: Director, Presenter, Mediator, and Strategist. **Results:** 401 students comprising all of the allied health professions completed the questionnaire. Preliminary analysis suggests that there are significant differences in the dominant communications styles between students in our sampled health professions. Pharmacy and Masters of Health Administration had the highest percentage of students identifying as “Strategists.” Other differences suggested that Occupational Therapy and Audiology/Speech Language Pathology students had unique style breakdowns, while the other health professions shared relatively similar profiles. **Implications:** As Universities strive to create inter-professional education programs for our students, and as students are asked to work in increasingly inter-professional settings, the impact of communication on team dynamics becomes crucial for the quality of patient care. These results suggest that there are in fact differences in the communications profiles of students within different health professions programs, which in the worst case may contribute to difficulties in communications, but, if tapped for its potential, could be used to increase team productivity. It is important for students to be aware of their own personal styles as well as those of their co-workers, and for educators to be aware of these differences to improve their management of inter-professional team education.

**Development of a Continuing Professional Development Learning Statement to Document Pharmacist Learning.** Coralynn B. Trewet, The University of Iowa, Jennifer R. Moulton, The Collaborative Education Institute. **Objectives:** To develop a learning statement to document pharmacist learning in a continuing professional development (CPD) portfolio used for maintenance of license. **Method:** The Delphi method was utilized to develop and design the pharmacist learning statement. Select pharmacists were sent a series of questions regarding CPD portfolio contents to determine similar viewpoints. Two series of questions were utilized to build consensus toward a final learning statement document. Following the first round of open ended questions, a second round of questions ranking the answers by agree, disagree, undecided, unclear with final consensus determined if greater than 75% selected agree and less than 10% selected disagree. **Results:** The focus group consisted of 13 pharmacists who completed both series of questions. The second round ranked approximately 20 answers for each of the five questions. Following the second round, consensus was reached to develop a learning statement. The focus group determined the following necessary elements and components; training program on CPD process must be completed, learning plan must be self-directed, a worksheet must be completed with a learning objective and description of activity, description of knowledge and skills obtained, description of outcome of learning including impact on practice. The final step was the successful development of a CPD learning statement approved by the Board of Pharmacy. **Implications:** As a result of this study, a learning statement was developed as a mechanism to document CPD. The use of this tool will serve as the documentation of learning in the pharmacist CPD portfolio submitted for maintenance of license.
Evaluation of a Skills-based Continuing Professional Education Program for Practicing Pharmacists. Erika L. Kleppinger, Auburn University, Lori B. Hornsby, Auburn University, Jillian Blair Thomas, Auburn University, Anne Marie Liles, Auburn University, Kristi W. Kelley, Auburn University, Haley M. Phillippe, Auburn University, Amy R. Donaldson, Auburn University, Emily McCoy, Auburn University, Jessica Bellone, Auburn University. Objectives: To determine the impact of a skills-based continuing professional education (CPE) program. Method: A CPE program was developed to improve participant knowledge and confidence in performing skills through participation in active learning activities. The program focused on five basic skills: blood pressure measurement, peak flow meter counseling, inhaler technique counseling, glucose meter education, and counseling on insulin administration. Participants voluntarily completed pre- and post-program surveys. The pre-program survey included questions to assess participants’ frequency of and potential barriers to providing each service in addition to 16 knowledge-based questions. The post-program survey included the same knowledge-based questions and questions to assess the program’s impact on the change in provision of these services. Results: A total of 53 participants (77%) completed both surveys. Participants were from various practice settings (61% community pharmacy) with a majority (85%) in practice a minimum of 10 years. Before the program, >50% responded to providing all but one service (inhaled technique counseling) either “less than once per month” or “never”. The most common barrier cited was lack of time followed by concerns regarding abilities or knowledge. The average score for knowledge-based questions increased from 62% (9.9/16) to 81% (12.9/16). At the conclusion of the program, 65% felt more confident in their abilities to perform these skills and 35% anticipated providing the services more frequently. Most participants (83%) stated they preferred this type of skills-based CPE program over traditional formats. Implications: Participant knowledge, confidence, and anticipated frequency of providing these skills increased as a result of a skills-based CPE program.

Impact of an Interdisciplinary Continuing Education Program Regarding Patient Adherence on Knowledge and Practice Changes. Michael A. Hegener, University of Cincinnati, Karissa Y. Kim, University of Cincinnati. Objectives: To determine the impact of an Interdisciplinary Continuing Education (CE) program on knowledge and change in practice. Method: Pharmacists and prescribers were invited to participate in a 2 hour interdisciplinary CE program. After a short didactic portion, participants worked interprofessionally to identify barriers to adherence and complete a patient case that reinforced the detection and management of nonadherence. Participants answered the patient case questions independently via use of an audio aid. A short didactic portion, participants worked interprofessionally to identify barriers to adherence and complete a patient case that reinforced the detection and management of nonadherence. Participants completed a program evaluation form immediately after the program and an online change in practice questionnaire 6 weeks following the program. Results: 26 pharmacists and 12 prescribers attended the program. 28 participants (73.4%) completed a program evaluation form. All participants indicated the program objectives were met and 10 prescribers (83.3%) indicated the probability of changing practice due to the program was high. During the patient case, 89% of participants were able to select an appropriate dialog opener for discussing nonadherence with patients and 96.7% were able to identify effective strategies to overcome nonadherence. Of the 13 participants that completed the change in practice questionnaire, 5 (38.5%) reported making changes to their practice as a result of attending the program and 2 reported experiencing barriers to implementing change. These barriers included resistance at the medical office and already feeling overburdened. Implications: Although participants indicated all program objectives were met and performed well on the patient cases, only 5 reported making changes to their practice. Additional methods for influencing change in practice need to be investigated.

Improving Adherence Counseling Skills: An Interprofessional Education Seminar Using Standardized Patients. Holly A. Gerzina, Northeast Ohio Medical University, Timothy R. Ulbrich, Northeast Ohio Medical University, Heather N. May, Northeast Ohio Medical University, Susan M. Fosnight, Northeast Ohio Medical University, Daniel L. Krinsky, Northeast Ohio Medical University, Cassandra L. Konene, Northeast Ohio Medical University. Objectives: Continuing pharmacy education (CPE) in the health professions needs to move beyond outcomes of participation and satisfaction. CPE needs to enhance professional competence and performance. Simultaneously, education needs to prepare pharmacists to practice interprofessional health care delivery. An objective of this educational seminar was to increase competence of pharmacists and other health care providers in counseling techniques to improve medication adherence. Specifically, this program was designed to improve counseling skills using standardized patients (SPs) who are trained to role-play a case scenario and provide feedback to trainees. Method: A day-long seminar was conducted for pharmacists, nurses, and physicians. Educational activities included a pre-seminar simulated medication regimen; lectures and a panel discussion; and pre & post-session simulated counseling encounters with SPs. Post-encounter, SPs provided feedback on participant’s counseling skills. Participants completed an evaluation of the outcome of the program including intention to change practice. Results: Forty-six of the 47 participants (24 pharmacists; 22 nurses; 1 physician) took part in the SP-based simulations. 100% of the pharmacists, nurses, and the physician indicated that the educational activity provided would positively impact their practice. Implications: The use of SPs in continuing professional education provides an innovative method to teach and enhance competence in counseling skills. Ultimately, this may improve the health status of the patient and the community.

Innovative CPE for Preceptors with an Emphasis on Bioterrorism Preparedness. Sherry A. Jimenez, St. John Fisher College, Keith DelMonte, St. John Fisher College, Mary Beth Riedeau, Texas A&M Engineering Extension Service (TEEX) Emergency Services Training Institute (ESTI), Alissa K. Cornacchia, St. John Fisher College. Objectives: The purpose of this study was to ascertain preceptor interest and satisfaction with a 2-day continuing education course that focused on Bioterrorism Mass Prophylaxis and Preparedness training. To date, very few pharmacists have been involved or trained locally. Offering this education specifically to pharmacists is a vital step to assuring that we have trained personnel to address the community need in the event that mass prophylaxis is mandated. Method: A 4-question pre-activity Qualtrics® survey was conducted to quantify pharmacists’ interest in the topic. Two surveys were conducted at the end of the program to assess the course and instructors; a 14-question post-activity Qualtrics® survey was designed in accordance with ACPE CPE guidelines and a 23-question paper survey was administered by FEMA instructors. Results: One hundred-eighteen (N=177, 67%) respondents were interested in attending this training. Forty-one (N=43, 95%) reported having basic, little or no knowledge, skills and abilities with the subject matter before the course. Thirty-five (N=43, 81%) reported having an advanced or intermediate level after the course. Forty-three (N=43, 100%) agreed or strongly agreed that programming met the learning objectives. Thirty-five (N=37, 95%) rated the overall program as “good” or “excellent”. Twenty-three (N=43,
54%) reported the point-of-dispensing (POD) practical exercise as the most valuable part of training. All respondents (N= 43, 100%) reported that the course increased their knowledge, skills and abilities. **Implications:** Offering this training to U.S. pharmacists is an innovative topic for preceptor development and essential to securing trained personnel for mass prophylaxis preparedness.

**Instilling Self-directed Learning among Student Pharmacists: Development, Implementation, and Evaluation of Professional Development Longitudinal Courses.** Hoai-An Truong, University of Maryland Eastern Shore School of Pharmacy, Deanna J. Dunn, University of Maryland Eastern Shore School of Pharmacy, Chelsea McSwain, University of Maryland School of Pharmacy School of Pharmacy, Cynthia J. Boyle, University of Maryland Eastern Shore School of Pharmacy. **Objectives:** Describe the development, implementation, and evaluation of Professional Development longitudinal courses, including the application of the Continuing Professional Development (CPD) model and community service-learning component, within a Doctor of Pharmacy program to promote self-directed life-long learning. **Method:** The Accreditation Council for Pharmacy Education calls for professional development initiatives and service-learning within schools’ curricula. The School’s general and professional student outcomes include professional development and community service, to which longitudinal course outcomes are mapped. The course syllabi were developed and approved by the curriculum committee, and course activities were assigned throughout two professional years. Application-based learning activities included attendance and reflection for the professional development seminar series, Board of Pharmacy or state pharmacy association meetings, Legislative Day advocacy, and at least 15 hours of service-learning annually. **Results:** Two longitudinal courses, PHAR561 and PHAR562, were offered in 2012. The overall course evaluation scores were 4.02 and 4.16 for PHAR561 and PHAR562, respectively, based on a 5-point Likert scale (5 = strongly agree). The students felt that the curriculum vitae development guidance and service components were most helpful for their professional development. The students’ main concern was the late afternoon time of day to which the course was assigned. Collectively, the students have performed over 1800 hours of community service hours in both healthcare and non-healthcare settings primarily on the Delaware-Maryland-Virginia (Delmarva) Peninsula. **Implications:** Students provided favorable responses about the courses and preparation for their professional development to become self-directed life-long learners. The courses also support the School’s impact and community outreach on the Delmarva Peninsula.

**Need Survey of Post-qualification Education Requirements of Caribbean Pharmacists.** Amusa A. Adesayo, Roosevelt University. **Objectives:** To determine the post-qualification education requirements among practicing pharmacists in the Caribbean and the factors influencing decision to pursue courses of study. **Method:** An online survey was conducted among the practicing pharmacists in the Caribbean. Questionnaires were designed and developed using “Survey Monkey”. The questionnaires were disseminated via online mode through the administrative office of the Caribbean Pharmacists Association (CPA). Closed-ended questions were used to request information on factors that influence decision to or not to enroll on professional, CE and formal graduate programs in pharmacy. **Results:** 68 respondents from 17 Caribbean countries completed the survey during the period of 3 months of study. More than 47% were above 40 years of age while only 22% were below age 30 years. Respondents were from Trinidad & Tobago (36.8%). Most of the respondents currently hold BSc (42.5%), associate degree (18.8%) or diploma (18.8%) in pharmacy. Majority of respondents signified intention to pursue certificate/diploma courses or CE programs of short duration (85.3%) while 14.7% declined. On the other hand, 57% would like to pursue formal graduate masters/doctorate in pharm sciences while 11 % would not. Lack of interest was due to work and family commitment, training location and course fees. **Implications:** The low tendency to pursue formal graduate education in pharmacy in the Caribbean has significant implication for the schools of pharmacy which have been finding considerable difficulty in attracting pharmaceutical scientists and lecturers to its academic positions in recent years. It also has implications for research and development, distribution chain management and quality assurance services in the Caribbean.

**Pharmacist Competence and Conviction on Barriers Faced by Diverse Populations Following a Continuing Education Symposium.** Marissa C. Salvo, University of Connecticut, Jill M. Fitzgerald, University of Connecticut, Diana M. Sobieraj, University of Connecticut. **Objectives:** To assess the impact of continuing education symposium participation on pharmacists’ competence and conviction on health literacy and barriers faced by diverse populations as related to medication safety and adherence, self-management, and overall patient care and to assess if participation stimulated changes in the pharmacists’ practice. **Method:** A daylong, knowledge and application-based, pharmacist continuing education symposium was designed to provide strategies for use to enhance the pharmacist-patient relationship and to improve patient and population health care. All attendees were asked to complete an anonymous 10 item questionnaire using a 5-point scale before and after attending the symposium to measure their competence and conviction. Using an online survey tool, 5 months after the symposium, pharmacists were asked if symposium participation stimulated practice change. Pre- and post-symposium median scores for each survey question were compared using the Wilcoxon Sign Rank test and a p-value of < 0.05 was considered statistically significant. Practice change information was descriptively reported. **Results:** Forty-three of 102 (42%) attendees completed the pre- and post-survey. Statistically significant improvements in confidence and conviction were found for all questions asked. Twenty-six attendees (26%) responded to the online practice change question. Twenty-two implemented at least one change in their practice. **Implications:** Participation at the symposium significantly improved pharmacists’ confidence and conviction with respect to health literacy and barriers faced by diverse populations, focusing on medication safety and adherence, self-management, and overall patient care. Additionally, participation stimulated change within the pharmacists’ practice.

**Reframing Continuing Pharmacy Education in Massachusetts.** Anita Young, Northeastern University. **Objectives:** Assess the attitudes and opinions of pharmacists regarding their motivation toward self-directed, lifelong learning. Examine the present state of continuing pharmacy education in Massachusetts Identify alternative approaches to continuing pharmacy education that are innovative, effective, cost-effective, and appealing to pharmacists. Provide scientific research into the advancement of continuing pharmacy education. **Method:** This is a descriptive, cross-sectional study. Descriptive studies help identify characteristics used to create a picture describing what is happening in a particular population(Cresswell, 2009; Fraenkel & Wallen, 2009; Light, Singer, & Willett, 1990). The results presented here will describe the attitudes of pharmacists toward self-directed learning by identifying the motivators, obstacles, characteristics, and activities that increase or decrease pharmacists’ participation in self-directed learning. A validated survey was administered to a convenience
Use of a Learning Statement to Document Continuing Professional Development with a Traditional CPE Activity. Cora Lynn B. Trewet, The University of Iowa, Susan S. Vos, The University of Iowa, Jennifer R. Moulton, The Collaborative Education Institute. Objectives: The objective of this study was to assess the use of a learning statement as a method of documenting continuing professional development (CPD) with a traditional continuing pharmacy education (CPE) activity. Method: Pharmacists were asked to complete the CPD learning statement during a traditional 1 hour CPE activity. Pharmacists were not given specific instructions on completing the form. Following the activity, the learning statement for each pharmacist was assessed for each of the following components: learning objective defined, learning objective met, degree of learning, benefit to practice, practice change plans, and commitment to implementing practice change. Results: The CPD learning statement was completed by 30 pharmacists. One or more learning objectives were defined by 27 pharmacists with 80% (n=24) stating their learning objectives were met. The majority of pharmacists described their learning as moderate (n=16, 53%) with 37% (n=11) indicating learning was major or substantial. There was variability when asked benefit to practice with the most common answer being moderate (n=10) or major (n=10) learning. Nearly all (80%) pharmacists listed a specific plan in their practice with nearly all (83%) rating their level of commitment to that practice change as 4 or 5 on a 1-5 scale. Implications: Pharmacists during a traditional CPE activity were able to document learning objectives and quickly summarize the impact of their learning, benefit to their practice and future plans as a result of learning. The data collected from this study will be used to further assess the CPD process for maintenance of licensure.

Theoretical Models:

Effect of Changing Grading Scale on Pharmacy Student GPA’s. Kyle Odenwelder, University of Maryland Eastern Shore School of Pharmacy, Jayesh R. Parmar, University of Maryland Eastern Shore School of Pharmacy, Lynn Lang, University of Maryland Eastern Shore School of Pharmacy, Nicholas R. Blanchard, University of Maryland Eastern Shore School of Pharmacy, James L. Junker, University of Maryland Eastern Shore School of Pharmacy. Objectives: To determine
the effect of modified grading scale on the grade point average (GPA) of pharmacy students. Currently, the grading scale is 3.0 for acquiring 85-94 points out of 100 points and a 4.0 for a 95 points or greater. The modified grading scale will be 3.5 for students receiving a 90-94 points. **Method:** The study involved retrieving the course and assessment block grades that comprised the students’ transcripts. The student names were blinded and the list of students was randomized using Microsoft Excel. Statistical analysis was done at 95% confidence interval using two-sample t-test to compare the means of the students GPA for the current and modified grading scales for the SP1 year, SP2 year and Cumulative total. **Results:** The study indicated significant difference in all three categories i.e. SP1 year, SP2 year and Cumulative total on comparing the means of the current grading scale to the modified grading scale. The mean of the SP1 modified scale was 3.51 compared to 3.4 for the current scale (p-value<0.05). The mean of the SP2 modified scale was 3.49 compared to 3.37 for the current scale (p-value<0.05). Finally, the mean of the cumulative modified scale was 3.50 compared to 3.39 for the current scale (p-value<0.05). Based on the results we reject the null hypothesis. **Implications:** The study poses an important question i.e. Would pharmacy students be more motivated to improve their performance academically given these results? Future studies would need to be conducted to assess the improvement in student performance, should the modified scale be implemented.

**Experiential Education**

**Completed Research:**

A Flipped Education Model for Medication Therapy Management Core Elements in an IPPE Course. Patrick T. Rocafort, University of Maryland, Kathleen J. Fuller-Pincus, University of Maryland, Lisa Lebovitz, University of Maryland, Nicole J. Brandt, University of Maryland. **Objectives:** To evaluate the impact of a Flipped Education Model (FEM) on students’ perception of the emphasis on terminal performance outcomes (TPOs) related to Medication Therapy Management (MTM) core elements early in the PharmD curriculum. **Method:** A survey was administered to University of Maryland School of Pharmacy P2 students (n=138) who had been taught the five MTM core elements in an IPPE course utilizing the FEM, as well as to a control group of P1 students (n=137) who did not take the FEM class. Five survey items assessed perception of the curriculum’s effectiveness at emphasizing pre-defined MTM core element TPOs. The differences between FEM-exposed and non-exposed students were compared for these 5 items. **Results:** Fem-exposed students perceived that the curriculum emphasized gathering and use of specific information to identify patient medication-related problems (31.4% v. 14.5%, p=0.002, 99%CI 3.1-30.6%); developing a patient care plan to manage each medication-related problem (18.1% v. 6.8%, p=0.008, 99%CI 0.4-22.1%); and communicating with health care providers (9.8% v. 3.1%, p=0.002, 99%CI 1.7-17.9%) and patients (20.3% v. 4.9%, p=0.0001, 99%CI 7.5-33.1%). FEM-exposed students indicated that the curriculum did not significantly emphasize working with patients and health care providers to identify and resolve problems related to medication use (10% v. 5.2%, p=0.17, 99%CI -0.4% v. 17.0%). **Implications:** Early introduction of MTM core elements improved student perception of curricular emphasis overall. Of note, curricular emphasis on communicating with health care providers and patients was statistically significant, but working with health care providers was not. These results will inform ongoing improvements in the PharmD curriculum to prepare students for all elements of MTM.

**APPE Course Requirements Enhance Student Perceptions of Journal Club Presentations.** Christopher M. Miller, University of Kentucky, Michael C. Berger, University of Kentucky, Anne Policastri, University of Kentucky, Anne Policastro, University of Kentucky. **Objectives:** The Clinical Education Center (CEC) concept was implemented to enhance students’ APPE experience during the 2007/2008 rotation year. Students are required to give professional presentations at CEC educational meetings attended by preceptors and peers. This study was conducted to determine if the new APPE teaching competencies which include journal clubs for two required APPE courses have improved student perception of this experiential competency. **Method:** The global syllabi were updated for the acute care/inpatient and ambulatory APPE experience in conjunction with implementation of a six week APPE model during the 2011/2012 rotation year. Teaching competencies were required including journal club presentations. Rotation sites were visited and experiential competencies were reviewed, explained, and implemented. A comprehensive survey is conducted each year using a likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree) to assess student perceptions of the journal club activity. **Results:** Rotation sites in the CEC area have implemented the journal club teaching competency per audit of the electronic portfolios. Student survey data from the first four years of CEC operation never exceeded 3.0 on the likert scale for student perceived satisfaction and value of this activity. The 2011 data, prior to implementation, showed an average student rank of 2.75 (n=24) versus 3.3 for the 2012 data (n=15) post implementation. **Implications:** Implementation of the mandatory teaching experiential competencies is having a positive impact on student perception of journal club presentations. More students are choosing to give these optional presentations at CEC educational meetings demonstrating more skill and confidence.

An APPE Student Run Medication Education Program to Improve Patient Satisfaction in a Teaching Hospital. Anita Stonehill-Ridner, The University of Toledo, Steven J. Martin, The University of Toledo. **Objectives:** To describe an inpatient medication education program being delivered by APPE students at the University of Toledo Medical Center and evaluate its effect on patient satisfaction through HCAHPS scores. **Method:** Patient counseling is focused on the two medication questions from the patient satisfaction surveys, which relate to information provided to patients on medication indication and side effects. Counseling is delivered primarily by APPE students; pharmacists and residents provide guidance and supervision. Over the past 2 years we have trained 65 APPE students to provide counseling to approximately 4000 patients. **Results:** This program has resulted in improved hospital-wide HCAHPS scores. We evaluated our patients’ response of “always” to the 2 medication related survey questions, and the results appear to correlate with patient encounters. The program was piloted on one unit of the hospital; at 3 months our scores on the 2 medication questions for that unit reached 100%. Based on positive results from the pilot, the program was expanded. Our hospital-wide scores improved for both questions, as follows: medication indication the baseline score was 55% (1st percentile) and at 2 years 68% (10th percentile), and side effects the baseline score was 26.6% (1st percentile) and at 2 years 48% (33rd percentile). **Implications:** Over time we continue to revise the program to improve its efficiency and purpose. This includes prioritizing patients and having a greater focus on elderly patients, patients on multiple medications, and patients admitted with a high readmission rate disease state, for which we have recently started inpatient diabetes and heart failure education.
An Evaluation of Student-Initiated APPE Change Requests for 2012-2013. Maryann Z. Skrabal, Creighton University, Rhonda M. Jones, Creighton University, Kelli L. Coover, Creighton University, Michael S. Monaghan, Creighton University. Objectives: APPE schedule changes increase experiential office workload. They may affect site relationships if students are incorporated into a site’s activities and the APPE is cancelled. The purposes of this study are to evaluate student-initiated APPE change requests and to determine ways to deter or minimize change requests and their impact on workload and site relationships. Method: Change request submissions, emails, and phone logs were examined for student-initiated change requests during the 2012-2013 APPE year. Data collected included student name, student pathway (campus or distance), reason for change request, and whether change requested was granted or denied. The Chi-Square Test was performed to compare requests between the campus and distance pathways. Results: There are 185 students completing APPEs during the 2012-2013 year, of which 112 are campus and 73 are distance-based students. 52 student-initiated changes were requested, from 7 (13%) campus students compared to 45 (87%) distance students (p<0.0001). Common reasons included: housing (16; 31%), family issues such as health or childcare (8; 15%), personal/mental/physical health (8; 15%), pregnancy (4; 8%), relocation (3; 6%) commute distance (3; 6%), and ‘other’ such as educational, license, etcetera (10; 19%). All change requests for ‘personal’ extenuating circumstances were granted. Implications: Based on this information, the following alternatives are being considered: charging a fee for change requests as a deterrent and to compensate for workload, allowing no changes in APPE schedule regardless of extenuating circumstances, and/or charging an additional administrative fee for distance students since they contribute more to workload throughout the curriculum.

An Interprofessional Simulation to Assess Students’ Knowledge and Perceptions of a Pharmacist Role at Discharge. Lisa M. Meny, Ferris State University, Margaret C. de Voest, Ferris State University. Objectives: To assess students’ knowledge and perceptions of a pharmacist role at discharge following an interprofessional simulation (IPS). Method: An IPS of in-patient rounding was developed for pharmacy, nursing, occupational therapy, physical therapy and physician assistant students from two state universities. Forty third year pharmacy students were randomly assigned to participate in the simulated rounding experience with the remaining 107 serving as a control group. All students in the simulation group were assigned to an interprofessional team consisting of a combination of the above mentioned disciplines. Teams met prior to the simulation to review and create a care plan from the patient case. The care plan created was used during the simulation with a standardized patient. Pre and post survey assessments were used to assess students’ knowledge of a pharmacist’s role at discharge and their confidence in performing these tasks. Results: One-hundred forty-seven students completed the pre-survey and 67 completed the post-survey. Students reported being more comfortable communicating with other healthcare providers (agree/strongly agree) following the simulation (88% vs. 93%). They reported being more comfortable developing a discharge plan (agree/strongly agree) compared to pre-survey (52% vs. 70%). However, there was no difference in student knowledge following this simulation as measured by a grading rubric of pharmacist roles at discharge (29% vs. 27%). Implications: No statistically significant difference in student knowledge was observed regarding the role of a pharmacist at discharge after a single interprofessional simulation.

Assessing Student Pharmacists’ Understanding and Practical Application of HIPAA. Ashley S. Crumby, Purdue University, Monica L. Miller, Purdue University. Objectives: To identify deficiencies in student pharmacists’ knowledge regarding the application of HIPAA in the practical setting. Method: Student pharmacists in the third professional year at Purdue University College of Pharmacy completed an online survey regarding HIPAA information via Qualtrics™. This survey consisted of free text questions, multiple choice questions, and five real life scenarios. The content of the questions aimed to assess the students’ knowledge of HIPAA concepts as well as the ability to demonstrate knowledge application to real world clinical scenarios. Demographic data and answers to the questions were analyzed using descriptive statistics. Results: 117 students completed the assessment. All respondents received HIPAA education through the pharmacy curriculum and 93% received additional training through pharmacy employers. Only 35% accurately defined HIPAA while 98% knew fines were associated with violations. When asked to list protected health information, most students included incorrect examples such as gender and weight. Of the five violations presented, students were only able to correctly identify two as HIPAA violations. Students struggled to identify violations with electronic storage of protected health information and disclosure of information to parents of a minor. Implications: Data regarding HIPAA knowledge and application among student pharmacists is currently lacking. The project results will provide data about practical application of HIPAA knowledge. The benefit to the pharmacy education community is the potential identification of real world situations in which students are not applying HIPAA rules appropriately. The results can be used to create more targeted education in pharmacy school curricula.

Assessing Student Proficiency and Confidence in Providing Medicare Part D Assistance. Berit Gundersen, University of the Pacific, Suzanne M. Galal, University of the Pacific, Chrissy Go, University of the Pacific, Peter Lai, University of the Pacific, Kiran Kaur, University of the Pacific, Zohal Fazel, University of the Pacific, Rajul A. Patel, University of the Pacific, Joseph A. Woelfel, University of the Pacific, Sian Carr-Lopez, University of the Pacific. Objectives: To assess the impact of coordinated didactic, simulation-based, and experiential learning on pharmacy students’ knowledge, confidence and efficiency utilizing the Medicare Plan Finder Tool. Method: Forty-two pharmacy students participated in a two-semester Medicare Part D course in which didactic, simulation-based and experiential learning methods were employed. An electronic survey was administered at three time periods; prior to and after didactic and simulation-based learning, and after the experiential component. The survey evaluated pharmacy student’s confidence and abilities to accurately and effectively navigate the Medicare Plan Finder Tool (available at www.medicare.gov), answer plan specific Part D questions, and also answer general questions about the Medicare benefit. Efficiency was measured as time to complete an exercise using the Plan Finder Tool. Students received 18 weeks of didactic education and simulation-based training. The experiential component consisted of twelve community-based outreach events over a 5-week period during which students provided Part D assistance to Medicare beneficiaries. Results: Student confidence and efficiency using the Plan Finder Tool significantly improved at each successive time point (p<0.01). Student knowledge was significantly improved both on the last day of class and after outreach completion as compared to the first day of class (p<0.01). No significant change in knowledge was found between the last day of class and completion of outreach. Implications: Basic knowledge improved with the didactic and simulation-based portion of the course. The experiential component enriched student...
learning by enhancing student confidence and efficiency in helping Medicare beneficiaries.

Assessing Pharmacy Students Preparedness for Emergencies in a Simulated Environment Using a Validated Instrument. Deanna W. McEwen, The University of Georgia, Trina J. von Waldner, The University of Georgia, Catherine A. White, The University of Georgia, Michael J. Fulford, The University of Georgia. Objectives: • Assess student’s familiarity within the 8 domains of emergency preparedness. • Assess the efficacy of didactic and experiential education, as encompassed by simulation methods of emergency preparedness. Determine the impact the educational innovation had on student competency and perceived benefit. Method: Familiarity was assessed through the use of a validated instrument – the Emergency Preparedness Information Questionnaire (EPIQ). P2 students (n=63) were given the questionnaire before didactic training and simulations and again upon completion of the educational innovation. Training and simulation activities included the incident command system, issues in triage, isolation, and quarantine, emergency communications, biological and chemical agents, and the pharmacists’ role in mass dispensing and mass triage. Results: The mean of the students’ ratings were compared using a Paired-Samples t-test. The results showed there was a significant difference (p<.05) in the means from pre- to post-questionnaire. On pre-questionnaire, 77.8% of the students said they were not familiar with response activities; after engaging in the activities, that percentage dropped to 1.6%. Additionally, students demonstrated competency in the use of a mass dispensing algorithm and principles of mass triage. Implications: Data from the validated instrument will guide the structure of future activities designed to improve student competency in the area of emergency preparedness. A further benefit of these activities is to better position pharmacists in their practice site to prepare for and respond to emergencies.

Assessment of Community Preceptors on Early Experiential Rotations for P1 Students with Minimal Didactic Education. Robert B. Stanton, Marshall University, Stephanie L. Anderson, Marshall University, Kimberly A. Broedel-Zaugg, Marshall University, H. Glenn Anderson Jr., Marshall University. Objectives: To assess community preceptors’ opinions of an early P1 experiential rotation where the students have received minimal didactic education. Method: Community preceptors were anonymously surveyed regarding their opinions on assessing students who were very early in their professional academic career as to the benefit of the student, the benefit to the preceptor, and to the benefit of the pharmacy. The online survey tool Qualtrics was used to obtain opinions anonymously. The survey consisted of two major domains and five questions within each major domain. The first domain ascertained opinions on the overall philosophy of the early P1 rotations and not on specific issues. Results: An online survey using the online Qualtrics survey tool was developed and a link to the survey was sent to the 26 community preceptors. Of the 26 preceptors, 24 (92.3 %) responded to the anonymous survey. Some preceptors had multiple students while other preceptors only had one student during the first semester. Generally, the preceptors felt taking students was beneficial. However, this was not unanimous. Implications: Only 50% of community pharmacies felt that precepting students was beneficial to their pharmacy which implies that SOPs need to focus on methods that encourage precepting students early in their academic career. This despite that 23 of 24 preceptors felt that the student benefited from the experience.

Assessment of Health Science Students Engaged in an Interprofessional Fall Prevention Program. Ann M. Ryan-Haddad, Creighton University, Kelli L. Coover, Creighton University, Teresa Cochran, Creighton University, Lisa Black, Creighton University, Judy Gale, Creighton University, Ann Tripp, Creighton University School of Nursing, Kathy Flecky, Creighton University, Joy Doll, Creighton University, Kristine Gauthier, Creighton University School of Nursing, Yongyue Qi, Creighton University. Objectives: Increasing momentum to deliver health care in interprofessional teams requires development of learning experiences that improve student attitudes towards team function. The purpose of this project was to assess students’ attitudes toward the healthcare team while participating in an interprofessional fall risk assessment program in a senior independent living facility. Method: Ninety-six nursing, pharmacy, occupational and physical therapy students participated in an interprofessional fall risk assessment program, completing discipline-specific screens (medication review, Berg Balance Screen, home safety evaluation) for 45 seniors. Students in the experimental group viewed team training videos, while “control” students did not. Both groups received an educational handout on Interprofessional Teams. Students were grouped in interprofessional teams to generate client-centered recommendations based on discipline-specific data. Dependent variables included online completion of the Modified Team Skills Scale (MTSS) by students prior to and following the learning experience. Wilcoxon Signed-ranks test and analysis of covariance (ANCOVA) were employed in data analysis. Results: Scores for both control and intervention groups improved significantly on post-tests for the survey. All scores improved significantly from pre- to post-measures on all questions of the MTSS; however, training videos did not influence post-score changes for the intervention group. Implications: This opportunity provided students authentic application of clinical skills in an interprofessional team. Because both groups demonstrated significant improvement in scores, it is possible that elements of the interprofessional experience, beyond the training video, resulted in improved team skills.

Assessment of an Alternative Activity to Increase Cultural Competency Knowledge and Reflection. James J. Pitcock, The University of Mississippi, Jasmine S. McKee, The University of Mississippi. Objectives: Student concerns about a required cultural competency activity during their Ambulatory Care APPE led to the development of an alternative activity for knowledge acquisition and reflection. Method: Group 1 was comprised of students completing the currently required activity. Group 2 was comprised of Jackson-area students that completed the required and alternative activity. A 14-item perception survey, as well as a 10-item cultural competency knowledge exam was administered. This voluntary and anonymous survey was approved by the University of Mississippi IRB. Results: Fifty-two of 67 students in group 1 and nine of 35 students in group 2 completed the 14-item perception survey. Overall, only 18 respondents felt the current activity made them culturally competent. The nine students completing both activities felt the alternative activity increased general knowledge of different cultures (p=0.01), changed their behaviors during patient interactions (p=0.01), and led to more thinking about cultural competency outside of healthcare-related activities (p=0.01). In total, 13 of the 14 items were statistically significant in favor of the alternative activity increasing knowledge, influencing behavior, and enhanced cultural competency reflection. Forty-nine students in group 1 and eight students in group 2 completed the exam with average scores being 50.2% and 60.0%, respectively (p=0.101, Cohen’s d 0.698). Implications: Data was presented to the Professional Experience Program director. The alternative activity will be introduced to all ambulatory care preceptors this spring with the goal of adopting the new activity for the 2013 – 2014 academic year.
Assessment of Factors Affecting the Use of Instructional Instruments During Pharmacy Practice Experiences. Justin R. Cornewell, Manchester University College of Pharmacy, Kimberly A. Perkins, Manchester University College of Pharmacy, Ezza Iflikh, Manchester University College of Pharmacy, Mary E. Kiersma, Manchester University College of Pharmacy, Ahmed Abdelmageed, Manchester University College of Pharmacy. Objectives: With the advent of the recent ACPE outcomes required for experiential education, many methods have been developed to assess these outcomes. One method is a workbook, a compilation of purposefully designed exercises, which accompanies student pharmacists while on rotations. The objective of the study was to assess the factors affecting the use of instructional instruments during pharmacy practice experiences. Method: A 21-item survey was developed to determine the instructional and assessment tools during introductory and advanced pharmacy practice experiences. Members of the Experiential Education Special Interest Group were invited to participate in an online survey. Survey questions focused on the use of instructional tools, length of time using the instrument, how often it is updated, and how and how the tool graded. Descriptive statistics were performed using SPSS v. 21.0. Results: Ninety-five schools completed the survey (6.6% response rate). Most pharmacy schools utilized another instrument (66.3%) in comparison to a workbook (33.7%). Many universities updated their instrument on a needed basis (22.9%, N = 41) in comparison to annually (13.4%, N = 24). Schools that identified with using an instrument graded the instrument as pass/fail (12.8%, N = 23), letter grade (15.1%, N = 27) and completion (28.8%, N = 5). Schools reported grading their workbook on either a pass/fail (8.9%, N = 16), letter grade (4.5%, N = 8), and completion (8.4%, N = 15). Implications: The use of a workbook based IPPE is a revolutionary educational concept. The workbook may provide the opportunity for students to learn in a structured manner and provide building blocks for deeper understanding.

Baseline Assessment of Issues Encountered After Transition to an APPE Electronic Portfolio Review Process. Michael C. Berger, University of Kentucky, Christopher M. Miller, University of Kentucky, Anne Policastro, University of Kentucky. Objectives: To describe a baseline assessment of common issues encountered and process improvements plans after transition to an electronic APPE portfolio. Method: 104 APPE students had their portfolio assessed by a faculty member primarily responsible for portfolio reviews. Email communications between the experiential faculty member and APPE student were retrospectively reviewed to determine the portfolio related issues. Data was analyzed to determine the issues related to experiential requirements that occurred most frequently and required resubmission or clarification. Results: Thirty-four students (33%) had no issues with their portfolios. Seventy students (67%) had one or more issues identified with their portfolios, with one issue being the most common (n = 26). The most common issues were experiential requirements related to the renal dosing patient care note (n = 19), quality assurance activity (n = 14), formulary management activity (n = 9) and presentation for public or health screening (n = 9). Implications: This assessment provided useful information to improve the APPE portfolio process. It was evident that many students were unclear about the requirement expectations. In part, this has been remedied by including best practice examples for students and preceptors on the experiential website Future approaches to process improvement being considered include developing more documented formal guidelines for the students. Specifically, consideration is being given to video presentations, virtual student meetings, and preceptor development activities related to the portfolio.

Comparison of Introductory Pharmacy Practice Experiences Among U.S. Pharmacy Programs. Patricia J. Horosz, Western New England University, Christine N. Galinski, Western New England University, Joshua J. Spooner, Western New England University, Daniel R. Kennedy, Western New England University. Objectives: Introductory Pharmacy Practice Experiences (IPPEs) are universally required in the Pharm.D. curricula, yet great variance exists in their design. Minimal research exists evaluating programmatic integration of IPPEs within curricula. Our purpose was to identify the various IPPE formats utilized by pharmacy programs regarding curriculum placement, frequency of experiences, and overall design. Method: A 20 question online survey was developed and distributed to the Assistant/Associate Dean of Experiential Affairs (or equivalent) and other experiential affairs professionals at 129 pharmacy programs nationwide. Results: Overall, the survey response rate was 90/129 (70%). Among responders, 89% start IPPE experiences in the first professional year. IPPEs are predominantly scheduled exclusively throughout the semester (39%) or during and outside of the semester (38%). There is great variance in the number of rotations students must complete (mean: 3.9; mode: 2; range: 2-11). Most programs prohibit students from completing IPPEs in the same pharmacy chain (72%) or hospital (71%) where employed, and from completing two rotations at the same site (60%). A slight majority (55%) utilize program faculty members as IPPE preceptors; 82% allow a maximum of 2 students per preceptor per rotation. Implications: The trends identified herein will allow pharmacy experiential programs to compare and contrast their IPPE curriculum. While clear trends regarding the structure and requirements for IPPEs exist, institutions incorporate programmatic aspects that address their own unique needs. Further research can be conducted to analyze the perceived benefit preceptors, students, and faculty find regarding the different IPPE designs.

Creating International Opportunities and Practice/Professional Visions in the Pharmacy Classroom. Kerry K. Fierke, University of Minnesota, Margarette L. Kading, University of Minnesota. Objectives: An elective pass/fail course was designed at the University of Minnesota College of Pharmacy to expose students to various countries’ practices of pharmacy. The objective of the course was to provide the student with an International perspective and appreciation for the diversity of pharmacy throughout the world, allow the student to incorporate positive aspects of global practice into their vision, and develop in the student an open-mindedness to other ways of thinking, doing, acting. Method: Students met for two-hour class periods over six weeks for the one credit course. Students were asked to develop a practice vision at the start of the course. During class, students connected with pharmacists from Germany, Brazil, Taiwan, Kenya, Serbia, and Tanzania via Skype to learn about pharmacy in each country. A discussion followed each Skype session, and students submitted a reflection on their learning each week. At the conclusion of the class, students presented their practice/professional vision, incorporating any philosophical changes based on what they learned during the course. Student reflections and practice/professional visions were analyzed for themes at the conclusion of the course. Results: Three main themes resulted from analysis of student reflections and practice/professional visions: 1) overall global health awareness, 2) compare and contrast each country’s “best practices,” and 3) recognition of each country’s unique characteristics and the influence on pharmacy practice. Implications: The development of the innovative Skype-based course provided an opportunity for all students, regardless of financial ability, to experience pharmacy on a global level and enhance their individual practice/professional vision.
Curricular Assessment: Using an Online System to Document Patient Encounters During APPE. Susan S. Vos, The University of Iowa, Jay D. Currie, The University of Iowa, Sandra J. Johnson, The University of Iowa, Jennifer L. Seyfer, The University of Iowa, Laura Umlah, The University of Iowa, Kathryn Draus. Objectives: Providing patient-centered care is an essential aspect of learning during Advanced Pharmacy Practice Experiences (APPE). Documenting patient encounters allows students to appreciate the breadth of patient care, and provides an opportunity for assessing the quantity and variety of patient care. The objective of this paper is to establish and assess a mechanism for student documentation of patient care encounters during APPE. Method: During the entire APPE year, students documented patient care via an online documentation system (E*Value™PxDx Case Logger). Each patient encounter was classified by organ system. Students were required to document a minimum of 70 patient encounters with three in each organ system. Students were encouraged to enter additional encounters beyond the minimum. Types of information collected included patient age, gender, ethnicity, medications, organ system, type of intervention, drug therapy problem, and the student’s role. Students generated reports to monitor progress. Experiential administrators reviewed entries and provided periodic feedback and progress. Results: Students reported 10,518 patient encounters (mean=95 encounters/student). The highest number of encounters occurred with the cardiovascular system (29%). The least number of encounters were reported in dermatology (3%), neurology (5%), urology/nephrology (5%), and respiratory (5%). The most common interventions were medication counseling, medication reconciliation, patient interview and dose adjustment. Implications: Regardless of APPE selections, each student encountered a variety of patients during the APPE year. Documentation of a student’s breadth of clinical patient exposure remains an important aspect of curricular completeness. Collecting exposure to organ system categories during the APPE year allows for ongoing assessment of the college’s curriculum.

Determining Differences in Student Activities on Hospital Practice IPPEs and APPEs. Elizabeth P. Pitman, University of Houston, Catherine L. Hatfield, University of Houston, Elizabeth A. Coyle, University of Houston, Nancy D. Ordones, University of Houston, LeShawn Smith, University of Houston, Kevin W. Garey, University of Houston. Objectives: Many colleges of pharmacy are working to differentiate student activities on hospital pharmacy IPPEs vs. APPEs. The goal of this survey was to determine differences in types of technical, dispensing, clinical, drug information and pharmacy management activities students are involved in during IPPEs and APPEs. Method: A 56-activity survey was developed by faculty members from the University of Houston College of Pharmacy (UCHCOP) in which students rated on a scale (not exposed, observed or participated) their IPPE or APPE participation during hospital pharmacy practice rotations. Surveys were emailed to all students at UHCOP who participated in a hospital pharmacy IPPE or APPE during May 2011-May 2012. Survey results were assessed to determine a difference in activities observed or participated in IPPE vs APPE. Statistics were calculated using chi-square analysis (SAS Ver 9.3). Results: 239 surveys were emailed and 130 students responded (54%). In over 80% of the activities, APPE students observed and participated to a greater extent than IPPE students. Increased APPE student participation included technician activities in which IPPE students had completed training to the same extent as APPE students. Implications: APPE students were found to be more actively participating in all facets of experiential activities, including activities for which skill set training had been completed. These results may help guide IPPE and APPE Directors on the activities students are performing on experiential rotations and to better educate pharmacist preceptors concerning the vision of the experiential curriculum.

Development and Implementation of a Certificate of Achievement in Leadership. Lisa M. Lundquist, Mercer University, C. Lea Bonner, Mercer University. Objectives: To develop and implement a College-issued Certificate of Achievement in Leadership (CAL) that develops students’ leadership skills through didactic and experiential courses. Method: The components of CAL were completing a didactic elective course and APPE focused on leadership. A 2-credit hour elective course was offered for P2/P3 students focused on development of leadership skills, self-awareness of strengths, and advocacy. Pre-/post-course questionnaires were administered to assess students’ perceptions of leadership development. Perception was ranked on a 4-point Likert scale with 4=strongly agree and 1=strongly disagree. Questionnaires were assessed using chi-square analysis (SAS Ver 9.3). Results: Over three years, 69 students completed the leadership elective course and 65 (94%) voluntarily consented for participation within the curriculum. Students’ perceptions of leadership improved from pre- to post-course in each domain (leadership can be learned; describing strengths; role model; non-positional leadership; affecting change; collegial relationships). Students viewed class (mean±SD) as professionally rewarding (3.83±0.47) and were interested in continuing leadership development (3.80±0.50). Thirty students took the leadership APPE in 2012-2013; 27 students in 2013-2014. In the first two years, 25 students will receive CAL upon graduation. Limitations include scheduling with other APPEs, preceptor availability, and students’ geographical preferences. Implications: CAL provides students with knowledge, skills, and foundation in leadership and advocacy through didactic and experiential education to excel upon entry into the profession.

Doctor of Pharmacy Student Attitudes Toward the Homeless—Implications for Education and Practice. Erin Johanson, Roseman University of Health Sciences. Objectives: 1. Gather baseline data measuring P1, P2, and P3 pharmacy students’ attitudes toward homeless patients. 2. Measure pharmacy student levels of interest and empathy in working with this population. Method: Following Roseman University Institutional Review Board approval, the Pharmacist Alitudes Toward the Homeless (PATHI) 46-item survey was administered to students in the P1, P2, and P3 classes for voluntary participation. Results: Total response rate was 27% for P1 students, 31% for P2 students, and 42% for P3 students. 27% of students had experience working with the homeless, 73% did not. Data was reported as descriptive statistics. Items were answered using a 6-point Likert scale. The majority of students (86%) agreed that “Homeless people have the right to basic health care” and (83%) that “Pharmacists have a duty to care for the homeless.” Other responses indicated disagreement in comfort counseling homeless persons and managing pharmacists. Five demographic variables were also reported (class, gender, age, previous experience working with homeless patients or not, and political affiliation). Implications: Attitudes can impact health care and ultimately patient outcomes. Future studies are planned to compare attitudes specifically of PharmD students who participate in rotations working with homeless. Results gained from this study and future studies have the potential to impact public health components of the didactic and experiential curricula as well as aid in education and training to provide more comprehensive and compassionate pharmaceutical care to the homeless.
Empowering Pharmacy Students to Better Care for Older Adults. Stephanie M. Seaton, University of Pittsburgh, Zachary A. Marcum, University of Pittsburgh School of Medicine Division of Geriatric Medicine, Christine M. Ruby, University of Pittsburgh. Objectives: To determine the effect of implementing geriatrics-focused teaching methods on 1) student-perceived attitudes toward older adults and 2) student-perceived level of achievement on course abilities. Method: All second-year (P2) students at the University of Pittsburgh School of Pharmacy were enrolled. Specific geriatrics didactic content was developed and delivered before two planned experiential sessions with older adults at community centers. Student attitudes were measured with the validated 14-item Geriatrics Attitudes Survey (pre/post). Self-assessed course abilities (pre/post) were measured by a scale developed for this study. Change scores were calculated for each student and Wilcoxon signed rank tests were used to determine the level of statistical significance among the paired samples. Results: A total of 106 P2’s (mean age 21.5 years, 65% female, and 79% Caucasian) completed both the pre- and post-surveys. While 2/14 items on the Geriatrics Attitudes Survey showed a significant change, all 9 items on the self-perceived course ability scale significantly improved. Improvement was reported in 54 (49.5%) and 78 (71.6%) of P2’s attitudes and self-perceived course ability scales, respectively. In univariate analyses, a positive improvement in attitudes was associated with being married and having ≥3 contact hours per week with older adults at a pharmacy intern location. Improvement in course abilities was associated with female sex and pharmacy intern location (p<0.05). Implications: Implementation of geriatrics care-focused teaching methods had an overall positive effect on the students’ attitudes and achievement in course abilities.

Evaluating Attendee and Student Perceptions of a University Community Health Fair. Kelly Lempicki, Midwestern University/Downers Grove, Jason G. Alegro, Midwestern University/Downers Grove, Jennifer J. D’Souza, Midwestern University/Downers Grove, Carrie A. Sincak, Midwestern University/Downers Grove. Objectives: The University Community Health Fair is an interdisciplinary event that was created by pharmacy students to educate members of the community on health-related topics. It has grown over the past 10 years to involve the provision of free health screenings and influenza immunizations. The purpose of this study was to evaluate knowledge gained by health fair attendees and perceived benefits from attendees and students participating in the event. Method: A “pre-survey” was distributed to attendees before they entered the health fair. After participating in the health fair, attendees voluntarily completed a “post-survey”. Both surveys included the same six multiple choice health-related questions to assess if and what knowledge was gained while attending the event. The post-survey also included questions on attendees’ perceptions of pharmacists’ activities. In addition, we surveyed student volunteers on their perceptions of volunteering and interdisciplinary work. Results: Of the six health-related knowledge questions asked, five questions showed overall improvement after attending the health fair. The greatest improvement was identifying normal body mass index. Correct answers increased from 64.5% (respondents = 79) to 78.4% (respondents = 37). Attendees felt most comfortable with pharmacists recommending OTC medications and answering medicine-related questions. They felt least comfortable with pharmacists recommending medicine changes. Students perceived volunteering as an overall positive and beneficial activity as part of their professional education. The majority of students believed that providing community services was part of their professional responsibility. Implications: The University Community Health Fair not only benefitted its attendees but provided a great hands-on experience for the participating students.

Evaluating Clinical Faculty Peer Review of Practice. Jean Y. Moon, University of Minnesota, Shannon L. Reidt, University of Minnesota, Anne M. Schulho-Feulner, University of Minnesota, Megan R. Undeberg, University of Minnesota. Objectives: Assess the perceived value clinical faculty find in a peer review of practice. Method: All clinical faculty (n = 18) were given an electronic 30 item survey across eight areas of clinical faculty practice-related activity: practice development, practice innovation, practice dissemination, clinical teaching, clinician development, clinical service, experiential teaching, and promotion (three questions each). Attitudes and perceived benefit of the peer review process were assessed using a five point Likert scale (strongly agree, strongly disagree) with comments. Results: Respondents included 14 (78%) faculty with an average appointment time of six years with 11 holding the rank of assistant professor and three associate. Peer review was found to be beneficial to clinical faculty, mostly in the areas of practice development (> 50% “agree” or “strongly agree”) and portions of practice dissemination (50% agree on importance). Thirty-three percent or more “disagreed” or “strongly disagreed” that the peer review affected practice innovation, experiential teaching and portions of development, service, and promotion. Faculty were evenly divided on portions of development and experiential teaching. Comment themes included valuing the reviewer role, wanting more specific feedback, appreciating a practice peer perspective, and gathering ideas and from others. Implications: Practice faculty are challenged to leverage their practice into teaching and scholarly activities; however, faculty often need feedback to accomplish this. With a junior clinical faculty majority, this peer review process of practice demonstrates that additional mechanisms to provide feedback on these eight areas may be needed. Overall, clinical faculty find value in the peer review process.

Evaluating Student Pharmacists’ Sterile Product Compounding Competency Development During Health System Pharmacy Practice Experiences. Theresa M. Kerr, Southern Illinois University Edwardsville, Jacklyn A. Harris, St. Louis College of Pharmacy, Tricia M. Berry, St. Louis College of Pharmacy, Cynthia A. Wuller, Southern Illinois University Edwardsville, William R. Wuller, Southern Illinois University Edwardsville. Objectives: To determine the extent of competency development student pharmacists’ received related to sterile product compounding during health system introductory (IPPE) and advanced pharmacy practice experiences (APPE). Method: A survey, administered via Survey Monkey, was distributed to student pharmacists in the classes of 2012, 2013, and 2014 at two neighboring schools of pharmacy to obtain information about sterile product preparation activities occurring during IPPEs and APPEs. The 8-question survey gathered information on the type of experience (IPPE/APPE), facility characteristics, training provided by the site and sterile product preparation activities students were able to observe and/or participate in. Results: From a cohort of 599 students, 260 (43.4%) responded. There were 181 (70%) IPPE responses and 79 (30%) APPE responses. Of these, 22% indicated no training was provided on sterile product preparation by the rotation site. Training methods provided by the practice sites varied widely with no trend toward consistency. Examples of training included watching staff before being allowed to compound (77%), discussion with staff (34%) or self-study (27%) on USP <797>, and watching a video (19%). (Students could choose multiple training options.) Results also demonstrated that students were far more likely to observe rather than participate in sterile product compounding. Implications: Pharmacy educators can no longer assume...
that sterile product competencies will be consistently developed during IPPE and/or APPE. Schools of pharmacy must consider increasing the amount of didactic instruction and laboratory skills practice as a component of the pre-experiential curriculum. Additionally, schools should collaborate with practice sites to foster consistency of sterile product training.

**Evaluation of Changes Made to an Outcomes-based Integration between Pharmacy Practice Skills and IPPE Courses.** Dana P. Hammer, University of Washington, Jennifer Danielson, University of Washington, Eddy Ho, Madison Lee, Teresa A. O’Sullivan, University of Washington, Stanley S. Weber, University of Washington. **Objectives:** Determine if changes made to 2 course series helped students to perform better during their first IPPE. **Method:** Two outcomes-based, integrated, required 1st-year course series were designed to better prepare students for IPPE, the rest of the curriculum, and future pharmacy practice. One series was an introduction to pharmacy practice skills-based set of courses; the other was an IPPE preparatory seminar series. After year 1 of implementation, changes were made to improve content alignment and student preparation. Data reviewed to determine effectiveness of changes were: 1) Preceptor evaluations of IPPE students, 2) Student self-evaluations of IPPE, and 3) end-of-year curricular evaluations from students. Preceptor and student self-evaluation data were analyzed via chi square. End-of-year curricular evaluations were analyzed via content analysis. Students’ previous work experience was also analyzed via chi square to ensure similarity of the two academic years compared. **Results:** Fifty-nine vs. 65% of students from year 1 to year 2 had previous pharmacy work experience (p = 0.46). Overall preceptor and student self-evaluations from year 1 to year 2 were not statistically significantly different but certain individual competencies were. Qualitative analysis of end-of-year curricular evaluations showed more year 2 comments about integration between the 2 courses. Interestingly 93% year 2 students felt prepared for the 1st IPPE vs. 96% year 1. **Implications:** While most quantifiable results were not statistically significantly different, the increase in qualitative unsolicited comments about course series’ integration led us to believe that changes made had a positive impact on students, even if not demonstrated in their overall IPPE performance.

**Evaluation of Cultural Competence Using Service-Learning Introductory Pharmacy Practice Experiences.** Deanna W. McEwen, The University of Georgia, Yvette Q. Getch, The University of Georgia, Michael J. Fulford, The University of Georgia, Lindsey H. Welch, The University of Georgia, Lori J. Duke, The University of Georgia. **Objectives:** To implement cultural competence learning activities within a service-learning introductory pharmacy practice experience using an integrated connected curricula approach that assesses changes in students’ transcultural self-efficacy perceptions after each learning component. **Method:** P(2) and P(3) students (211) were introduced to cultural competency domains and service-learning pedagogy through four on-line seminar modules: Caring for the Patient, Cultural Competence within Pharmacy Practice, Effects of Chronic Disease on the Pediatric Population, and Becoming a “Reflective Practitioner” - Introduction to Critical Reflection. After completing the on-line modules, students completed 40 IPPE hours with an array of community partners. Students were assessed using a validated Trans-cultural Self-Efficacy tool for Multidisciplinary Healthcare Providers (cognitive, practical, and affective domains) during three points in time: pre-module, post-module, and post-experience. **Results:** Perceptions of increased cultural competency were analyzed using a paired-samples t-test and were statistically significant for all subscales after each interval of time. The cognitive subscales scores were 6.68 (pre-module), 8.08 (post-module), 8.44 (post-experience). The practical subscale scores were 6.84 (pre-module), 8.27 (post-module), and 8.48 (post-experience). The affective subscale scores were 8.1 (pre-module), 8.77 (post-module), and 8.93 (post-experience). **Implications:** Developing culturally competent skills and attitudes is an important provision improving direct patient care. By providing the students an IPPE to apply cultural competence cognitive components within a practical setting, student learning in the areas of cultural awareness and levels of confidence in cultural competence were improved.

**Evaluation of a Health Literacy IPPE Module on Student Knowledge and Confidence.** Susanne G. Barnett, University of Wisconsin-Madison, Beth A. Martin, University of Wisconsin-Madison. **Objectives:** To evaluate the impact of a health literacy module in an Introductory Pharmacy Practice Experience (IPPE) on student health literacy knowledge and confidence in identifying and assisting low health literate patients. **Method:** Two second-year Doctor of Pharmacy student cohorts (2011 and 2012, N=260) completed a 20-hour health literacy module in community pharmacies. The module incorporated a student’s presentation to pharmacy staff about health literacy and suggestions for improving identification and assistance of low health literate patients. Preceptors could anonymously submit an evaluation assessing presentation impact and commitment to change (5-point scale; 1 = not at all committed; 5 = very committed). Students voluntarily completed pre/post surveys to measure knowledge (13-items) and confidence (13-item 11-point unipolar scale). Between group assessments were performed using Pearson’s Chi-squared and unpaired t-tests. **Results:** Response rates for the pre/post surveys were 47% and 31%, respectively. Student knowledge assessment total scores significantly improved following completion of the module (p<0.0001). Confidence summed scores significantly improved after module completion (p<0.0001). Preceptors who completed surveys for 125 (48%) student presentations reported an increased awareness of health literacy needs within their community (59%). Of preceptors reporting the likelihood of making practice changes as a result of student presentations (64%) the mean [SD] commitment to making these changes was 4.1 [0.1]. **Implications:** The IPPE health literacy module was successful in improving student knowledge and confidence in working with low health literate patients while impacting IPPE pharmacy practice sites through increased awareness and reported commitment to practice changes.

**Evaluation of Drug-related Problems by Student Pharmacists in a Patient Centered Medical Home.** Becky L. Armor, The University of Oklahoma, Christina F. Bulkley, The University of Oklahoma, Teresa H. Truong, The University of Oklahoma. **Objectives:** The objective of this project is to quantify, describe, and categorize identified drug-related problems (DRPs) and their subsequent recommendations made by fourth-year student pharmacists as part of an ambulatory care experiential rotation. **Method:** This is a retrospective study that assessed the number and type of DRPs found, number and type of recommendations made, and number and type of recommendations accepted by the physician. Additionally, it included the number of students and physicians that participated, the average number of DRPs found per student, the average number recommendations made per student, and the average percentage of recommendations accepted per student pharmacist. **Results:** From June 2011 to October 2012, thirty-eight students completed 99 medication reconciliation sessions. Six attending physicians participated in the project. The students...
Expanding Global Experiential Training Opportunities Through a Partnership with HCJB Global. Cathy L. Worrall, South Carolina College of Pharmacy, Christian Younts, South Carolina College of Pharmacy. Objectives: Through a collaborative partnership with HCJB Global, the South Carolina College of Pharmacy (SCCP) established a new elective advanced pharmacy practice experience (APPE) in Ecuador in 2012. The main objectives for this APPE were to help students better appreciate cultural and societal differences and to improve the pharmaceutical care of patients abroad. A secondary objective was to broaden students’ medical Spanish speaking skills. Method: Students were required to speak fluent Spanish to be considered for this rotation placement. An affiliation agreement was executed and a preceptor identified at the hospital. SCCP worked with the preceptor and translator to establish the rotation syllabus and convert rotation documents from English to Spanish. Students secured their travel and accommodations with the assistance of HCJB Global. The rotation was evaluated using SCCP’s standardized preceptor/site evaluation tool and an additional international rotation survey. Results: Two students completed the APPE. Both students agreed or strongly agreed that they felt welcome at the site and were incorporated into daily activities at the clinic; gained unique knowledge and skills and returned home with new perspectives about themselves and their culture; gained unique insights regarding differences in pharmacy practice abroad; and made significant contributions to patient care. Both students recommend this site/preceptor to other students. Implications: This APPE provides an opportunity for Spanish-speaking students to engage in pharmaceutical care in a Latin American country and helps students broaden their medical Spanish communication skills. Resources must be available to address language barriers between the College and the preceptor/site.

Expanding Global Experiential Training Opportunities Through a Partnership with Palmetto Medical Initiative. Cathy L. Worrall, South Carolina College of Pharmacy, Christian Younts, South Carolina College of Pharmacy. Objectives: Through a collaborative partnership with Palmetto Medical Initiative (PMI), the South Carolina College of Pharmacy (SCCP) established a new elective advanced pharmacy practice experience (APPE) with the Marinda Kitara Medical Clinic in Marindi, Uganda in 2012. The main objectives for this APPE were to help students better appreciate cultural and societal differences and to improve the pharmaceutical care of patients abroad. A secondary objective was to broaden students’ medical Spanish speaking skills. Method: An affiliation agreement was executed and a preceptor identified at the clinic. SCCP worked with the preceptor to establish the rotation syllabus. PMI scheduled travel and accommodations for the students and provided pre-travel education/training to prepare students for the experience. The rotation was evaluated using SCCP’s standardized preceptor/site evaluation tool and an additional international rotation survey. Results: Six students completed the APPE in 2012. Two additional students’ rotations were cancelled due to an E-bola virus outbreak. These students were given the opportunity to reschedule their rotation. All six students agreed or strongly agreed that they felt welcome at the site and were incorporated into daily activities at the clinic; gained unique knowledge and skills and returned home with new perspectives about themselves and their culture; gained unique insights regarding differences in pharmacy practice abroad; and made significant contributions to patient care. They all strongly agreed that they would recommend this site/preceptor to other students. Implications: Eight students are scheduled to complete this APPE in 2013-2014. PMI is establishing a new clinic in Veijo, Nicaragua, which will open additional global training opportunities for our students.

Expanding IPPE Grading Options to Better Distinguish Student Performance. Teresa J. Lubowski, Albany College of Pharmacy and Health Sciences, Terrence T. Towers, Albany College of Pharmacy and Health Sciences, Laurie L. Briceland, Albany College of Pharmacy and Health Sciences. Objectives: In 2010, IPPE preceptors provided feedback on our Pass/Fail grading policy, specifying the lack of ability to recognize outstanding or barely passing performance; this was typified by grades for community IPPE (288 Pass, 0 fail) and institutional IPPE (212 Pass, 1 Fail). We proposed expanding our grading policy to address this. Method: To address, we expanded our grading policy to: Pass with Honors (PH); Pass (P); Pass with Reservation (PR); and Fail (F). Preceptors were instructed to assign PH for “top 10%” student; PR required written justification. Results: Following implementation of expanded grading policy in 2011, the reported grades were: community: 153 PH (55%); 121 P; 1 PR; and 1 F; Institutional: 171 PH (59.5%); 114 P; 2 PR; 0 F. These results lead us to believe that “Pass with Honors” was being too liberally assigned. Thus, for the following year, we further fine-tuned our approach and initiated a computer-generated grading suggestion, determined from the preceptor’s evaluation (Likert scale rankings). The preceptor had the option to accept the computer-generated grade, or increase/decrease that grade, with a qualifying statement to justify the adjustment. For Community: PH decreased from 55% in 2011 to 39% in 2012; the computer suggested PH for 61 students (25.3%). For Institutional: PH decreased from 59.5% in 2011 to 56.5% in 2012; the computer suggested 119 (43.5%) PH. Most common justifications for increasing from P to PH were: the student was highly motivated, very professional, and capable. Implications: Expanding IPPE grading to include PH and PR has enabled better grade distribution. Even with computer-generated grading, preceptors adjusted grades and more liberally assigned PH.

Experiential Guidelines: Preceptor Perceptions of Importance and Implications for Preceptor Development and Training. Rucha S. Bond, The University of New Mexico, Donald A. Godwin, The University of New Mexico, Megan E. Thompson, The University of New Mexico, Kristina M. Wittstrom, The University of New Mexico. Objectives: To evaluate preceptor perceived importance of experiential tasks recommended by ACPE Appendix C Guidelines and to identify differences in perceived importance of recommended activities between preceptors in diverse practice setting and/or of varying years of practice. Method: An anonymous survey was conducted to assess the relative importance preceptors placed on ACPE recommended skills and abilities in new pharmacy practitioners. Ranked results were analyzed by practice settings and years of practice. Results: A total of 183 participants responded for a 50% response rate. The majority of responses (87.2%) rated all tasks as Very Important or Important with less than 10% of responses rating tasks as not important. “Effective communication and interactions with patients and
other healthcare workers” received the highest overall rating for all practice settings. The next highest overall rating was “Counseling patients” with 81.3% of all respondents marking this task as Very Important. Counseling was also the highest rated task for those in Community, Institutional and Outpatient Clinic practice settings. The activities with the lowest percentage rating of Very Important were “Conducting physical assessment” and “Preparing and compounding extemporeaneous products”. Implications: Our findings suggest that preceptors do not rate all tasks recommended by ACPE as important in individual practice settings. Given that the tasks listed in the survey should be considered very important for a successful pharmacy practice, identifying the tasks rated as less important can be used to design educational activities for preceptors to improve pharmacy experiential education.

Gauging Student Confidence in Diabetes Educating after Participation within an Inter-Disciplinary Service Learning Experience. Brett Feret, The University of Rhode Island, Russell Poisson, The University of Rhode Island, Lisa B. Cohen, The University of Rhode Island. Objectives: To determine how students’ perceptions of their ability to be an informational resource for pediatric patients with Type 1 diabetes changed after completing a service learning experience as a camp counselor for Camp Surefire. Camp Surefire is an overnight camp program specifically designed for children and teens (age 6-14) with Type 1 diabetes. Ten P1 or P2 pharmacy students participated in this experience over 2 years for service learning introductory pharmacy practice experience (IPPE) hours. Method: An online IRB approved pre-survey (n=10) was given to the students who would be participating in the experience. An identical 12 question survey (N=9) was administered after completion. The survey contained 12 questions using a 5 point Likert scale. The questions assessed the students’ confidence in interacting with patients about their diabetes management, their knowledge, and their ability to converse with other health care professionals. Results: Analysis of the results show that after completion experience, students were more confident in their abilities to help pediatric patients with their diabetes care. The degree of improvement was most pronounced with regard to counseling patients on diabetes supplies such as glucometers (2.7 to 5.0; p<0.001) and insulin pumps (2.1 to 4.1, P<0.001). Implications: The results of these surveys show that immersing pharmacy students in their P1 or P2 years to patients with diabetes or other chronic medical conditions can have a profound impact on their knowledge base and confidence. The data also supports the use of overnight summer camps as an effective and educational service learning experience.

Health Science Students’ Recommendations to Reduce Fall Risk in an Interprofessional Fall Prevention Program. Ann M. Ryan-Haddad, Creighton University, Kelli L. Cooper, Creighton University, Teresa Cochran, Creighton University, Lisa Black, Creighton University, Judy Gale, Creighton University, Ann Tripp, Creighton University School of Nursing, Kathy Flecky, Creighton University, Joy Doll, Creighton University, Kristine Gauthier, Creighton University School of Nursing. Objectives: A new goal of Healthy People 2020 is to improve the health, function, and quality of life for older adults. Fall injuries often lead to a fear of falling, limited mobility, and reduced quality of life. The objectives of this project were to implement a fall risk assessment program and document interprofessional team recommendations to reduce fall risk. Method: Ninety-six nursing, pharmacy, occupational and physical therapy students participated in an interprofessional fall risk assessment program, completing discipline-specific screens (health history, medication review, Berg Balance Screen, home safety evaluation) for 45 independent living seniors. Students were grouped in interprofessional teams to generate client-centered recommendations based on discipline-specific data. Recommendations were provided in a fall risk report card to the seniors. Results: During the fall risk assessment program, there were a total of 676 recommendations made by students to reduce fall risk (306 Pharmacy, 132 Nursing, 79 Physical Therapy, 159 Occupational Therapy). Implications: This fall risk assessment program provided students an opportunity to practice clinical skills as an interprofessional team. Seniors received assessments not typically provided in an independent living community. It is anticipated that interventions will be implemented to reduce fall risks and allow these senior participants to continue living in this community.

Identification of Curricular Measures Associated with Inferior APPE Performance. Allison A. Cardona, Vaughn L. Culbertson, Idaho State University, Catherine A. Cashmore, Idaho State University. Objectives: ACPE standards require a variety of valid and reliable assessment tools be used to improve student learning. The primary goal of this study was to identify currently available curricular measures that may be useful as early assessment markers of poor APPE performance, defined as a grade of C or lower. Method: Student scores on annual knowledge base exams, GPA in core professional courses, timed case studies midterm and final exams, and APPE performance data were compiled from 128 students over the past two years. Class rank percentile scores were calculated for each composite measure. The rank percentile data was then averaged and presented as a composite rank score for each student. Results: Sixteen percent of students with the lowest P1-P3 GPA accounted for 43% of students performing poorly in APPE, while 9% of students with the lowest mean case studies exam score accounted for 71% of poor APPE performance. Annual knowledge base assessment exam scores were not associated with poor APPE performance. A composite rank score of all three composite scores provided no additional benefit. Implications: These data suggest correlations between academic performance in several key curricular measures with poor APPE performance, and may facilitate development of a weighted formula with high sensitivity and specificity for predicting APPE performance.

Impact of Advanced Practice Ambulatory Care Pharmacy Students on High Risk Geriatric Patients with Hypertension. Jennifer Malinowski, Wilkes University. Objectives: 1) To evaluate outcomes of an interprofessional service initiated by the Wilkes University School of Pharmacy and The Wright Center for Primary Care on patient blood pressure goal attainment in a high risk geriatric population with hypertension. 2) To evaluate the value of a pharmacy student medication reconciliation service on patient safety in a high risk geriatric patient population with hypertension. 3) To summarize student evaluations and perceptions of the integrated, medication reconciliation process. Method: The population of focus included 47 patients greater than or equal to 75 years old with blood pressure exceeding 140/90 mmHg on 2 or more recent consecutive visits. Patients had more than 5 chronic conditions and were on multiple medications. Upon check-in, patients were provided with a list of their current medications on file and asked to correct for any inconsistencies through the “Patients as Proofreaders” campaign. Following initial triage by the medical assistant, advanced practice ambulatory care pharmacy rotation students (2 students per 5-6 week rotation) supervised by a pharmacy preceptor reviewed each patients’ medication profile and met with patients to verify and reconcile medication lists and intervene appropriately. Potential and actual adverse events were captured in the electronic medical record and reviewed with each provider live in a prioritized manner. Monthly data reports were generated and sent
to the Patient Safety Pharmacy Collaborative data base for review. Students completed a preceptor and site evaluation using a standardized form to capture perceptions and satisfaction with the process. **Results:** Sixty four percent of patients met blood pressure goals within 4 months of interprofessional team-based care; over 70% of patients remain at blood pressure goal one year later. The most common potential adverse events identified included lab/diagnostic tests indicated but not ordered, improper medication use by patient, and potential drug-drug interactions requiring patient education. Pharmacy students with preceptor guidance identified a total of 206 potential and adverse events (4.4 potential/actual adverse events identified per patient). Current trends show a reduction in potential and actual adverse events (0.2 potential/actual adverse events). 100% of students surveyed strongly agreed that they would recommend the rotation to other students (n=8). Written comments consistently suggest that students found value in the patient interaction process and the involvement in a federal government research initiative. **Implications:** Documenting the value of pharmacy student contributions in patient safety and interprofessional team outcomes is extremely relevant as the growing demand for quality sites continues. Advanced practice pharmacy students identified and corrected over 4 potential and actual adverse events per patient during initial medication reviews. Interprofessional teams that included pharmacy students improved blood pressure goal rates within 4 months and sustained blood pressure goals at one year.

**Impact of Intravenous Admixture Simulation on Students Entering Pharmacy Practice Rotations.** Patricia Jusczyk, University of Hawaii at Hilo. **Objectives:** Objectives of this study were to evaluate the impact of the addition of laboratory training sessions for pharmacy students in the first year PharmD curriculum, specific to the compounding of sterile intravenous (IV) admixture, prior to participating in hospital experiential rotations as part of introductory pharmacy practice experience (IPPE). (1) Assess individual areas of IV lab training, overall training, and perceived benefit of training by students and hospital pharmacy preceptor; (2) Obtain data relative to students’ prior hospital experience and experience with preparing sterile products prior to the course. **Method:** Prior to experiential rotations, students completed structured training sessions in the principles of aseptic technique and intravenous admixture preparation, including simulation of hospital procedures. Ninety students are divided into 6 small groups. Students were surveyed at the end of the hospital experiential rotation to assess the course pre-rotation training, activities encountered during the hospital rotation, and training or experience in IV admixture prior to the course. **Results:** Most students (79%) had little or no prior experience with sterile preparation. Students reported very positively that the IV training sessions benefited them in the following areas: familiarity with IV admixture products and devices at the practice site; recognition of medication safety techniques; addressing a need for, or a gap in knowledge relative to compounding IV admixtures. Perceived greater benefit in hands-on activities including use of the laminar flow hood, compared to lecture and video training. Overall, 96% of students agreed that they were able to use what they learned in the training sessions while on rotation and 83% agreed that the training increased their confidence. Hospital preceptor noted students were coming to the hospital with a basic understanding of procedures and requirements, as set by the United States Pharmacopeia Chapter 797 practice standards for sterile compounding, and that they were better prepared for IV admixture activities. **Implications:** The addition of simulation training allowed students to be exposed to skills and activities they would likely encounter during IPPE rotations. Hands-on intravenous admixture preparation, prior to hospital practice rotations, provides benefits to pharmacy students and to the hospital site. Prior hospital experience, or time spent preparing sterile products prior to the course, did not affect the perceived benefit of the training to the students. Results seen in this action research are based on one class year of pharmacy students and results may vary with incoming classes. Also, changes may occur at the hospital rotation site relative to IV admixture practices.

**Impact of a Blended-Learning Approach on Student Engagement, Performance, and Satisfaction in a Pharmacotherapy Course.** Nastaran Gharkholonarehe, University of North Carolina at Chapel Hill, Jacqui McLaughlin, University of North Carolina at Chapel Hill, Jo Ellen Rodgers, University of North Carolina at Chapel Hill. **Objectives:** Pharmacotherapy 444 is a required course for second year students in the Eshelman School of Pharmacy Doctor of Pharmacy program. In the spring of 2013, three cardiology lectures were modified to a blended-learning approach. Foundational content was off-loaded to self-paced on-line instructional materials to allow dedicated time in-class for active learning. The purpose of this study was to assess student engagement and satisfaction with this approach. **Method:** One hundred sixty students enrolled in this course. Measures of student engagement, including attendance and participation in off-loaded materials, were collected. Surveys measuring student perceptions of blended learning were administered. This study was IRB exempt. **Results:** Self-paced instructional materials were viewed by 20% of students prior to the first lecture, 42% prior to the second lecture, and 78% prior to the exam. Attendance in the course was minimally impacted by the blended-learning approach (92% vs 95%). The majority of students agreed that learning foundational content prior to class (54%) and applied in-class activities (65%) enhanced learning. While 70% preferred videos or annotated slides over other delivery methods for off-loaded material, 83% reported being unlikely to review materials prior to class if a conflict occurred the same day. Most students (69%) reported graded assignments as the best incentive for preparing for class. **Implications:** Students value learning foundational content prior to class to allow time in-class for active learning; however, few will review pre-lecture materials when conflicts arise. Future research will examine aspects of the blended-learning approach that correlate with student performance.

**Impact of a Clinical Research Rotation on Publishing Research and Pursuit of Post-Graduate Training.** Jacob Marler, The University of Tennessee, Kiana Y. Curry, Med Communications, Katie J. Suda, The University of Tennessee. **Objectives:** ACPE standards recommend exposure to scholarship and research. In Spring 2011, a unique clinical research Advanced Pharmacy Practice Experience (APPE) was established where students design a research project, perform data analysis, and develop a manuscript by the conclusion of the experience. The purpose of this study was to evaluate the pursuit of residency training and participation in the publication of research for students completing the clinical research APPE. **Method:** Students in the clinical research APPE submitting abstracts/publications and pursuing residencies were evaluated and compared to the University of Tennessee annual residency matriculation rate. Chi squared and Fisher’s exact tests were used for statistical analysis. A p-value <0.05 was considered significant. **Results:** From Spring 2011—Spring 2013, 18 student pharmacists (39% P3s, 61% P4s) completed the clinical research APPE. 33% of students published or submitted original research manuscripts to peer-reviewed journals and 56% submitted abstracts.
for presentation at national pharmacy and medical meetings. Students pursuing residency training after graduation was greater in the APPE students (54%) than the overall student pharmacist population (25-31%) (p=NS). Of the graduated students that completed the APPE, 100% who were interested in pursuing residency training matched with a PGY1 program. Implications: This rotation exposes student pharmacists to clinical research by providing experience in conducting a project and producing manuscripts/presentations. Although not significant, students completing this APPE were twice as likely to pursue residency training after graduation. Clinical research rotations may be considered for inclusion into pharmacy curriculums, especially for students interested in pursuing post-doctoral training and positions in academia.

**Impact of a Debate on APPE Students’ Recognition of Critical Thinking and Professional Skills.** Lauren E. Odum, University of Missouri-Kansas City, Daniel S. Aistrope, University of Missouri-Kansas City, Jennifer A. Santee, University of Missouri-Kansas City, Kelly A. Cochran, University of Missouri-Kansas City, Ray Bacon, University of Missouri-Columbia. Objectives: Limited data exists for utilizing a structured debate as an effective learning strategy during APPEs. The objective of this research is to determine if students identify an improvement in critical thinking and professional skills by participating in a debate. Method: Five debates occurred over the course of two years. APPE students were assigned to teams and were provided a guide including instructions and tips for preparation. Following each debate, students completed a survey of 16 items. Students indicated their level of agreement of improvement in various skills/abilities using a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). Results: The survey response rate was 97% (n=38). Only one student participated in two debates. Over 50% of respondents reported an improvement in knowledge and professional skills/abilities with a median score of “4”. Examples of these items included improved teamwork, self-directed learning, critical literature evaluation skills, selection of best evidence, impromptu reasoning skills, professionalism, and ability to provide professional and evidence-based recommendations. The four items in which ≤50% of respondents reported improvement included confidence in public speaking, presentation skills, time management, and proficiency conducting a literature search. The median score on these items was a “3”. Implications: Overall, students agreed that this activity enhanced their skills during APPEs with the exception of speaking, time management, and literature search skills. This activity may be a useful active learning tool for other Schools of Pharmacy to refine critical thinking and professional skills.

**Impact of New Didactic Curricular Design on Student Performance in APPEs.** Cherokee Layson-Wolf, University of Maryland, Lisa Lebovitz, University of Maryland. Objectives: The objective of this research is to identify and describe the impact of changes in didactic coursework on student performance on (APPE) rotations. The University of Maryland School of Pharmacy didactic curriculum was redesigned and was fully implemented for the Class of 2013. Over-arching changes established three semesters of integrated pathophysiology, pharmacology and therapeutics topics beginning in the spring of P1 followed by an additional two semesters of advanced pharmacotherapy in P3, as well as a complementary 6 semester sequence (P1-P3) of abilities-based laboratories and OSCEs. During the curricular transition, evaluation criteria for Advanced Pharmacy Practice Experience (APPE) rotations remained consistent and thus the impact of “old” and “new” didactic coursework could be compared. Method: Preceptors complete APPE evaluations of students in the E-value rotation management system, rating student skills as Exceeds Competency, Meets Competency, Needs Improvement, Significant Deficiency. De-identified data from required APPE rotations were compiled for the Classes of 2012 and 2013. Ten skills common among the Health System, Acute Care, and Community rotations were identified and analyzed. Results: The number of Needs Improvement or Significant Deficiency ratings in the common skillset decreased by 85% or more in all three required APPE rotations. The strength of the average rating of the common skillset improved most in the Acute Care rotations. The most improved skills related to pharmacotherapy. Implications: These data imply that revisions made to the didactic curriculum improved areas of weakness. This evaluation can be utilized to further strengthen the nature of content presented within the new curriculum.

**Impact of Student Pharmacists on Administering and Reporting Pertussis Vaccinations in Uninsured Daycare Workers.** Anne C. Pace, University of Arkansas for Medical Sciences, Schwanda K. Flowers, University of Arkansas for Medical Sciences, Eric Crumbaugh, Arkansas Pharmacists Association. Objectives: Utilize pharmacy students to provide education to daycare centers regarding pertussis vaccine; mobilize APPE students to coordinate and conduct immunization clinics at daycares across the state; provide 2500 pertussis immunizations to uninsured caregivers of infants and children in Arkansas. Method: The Arkansas Pharmacists Association collaborated with the College of Pharmacy to increase the number of experiential students at their site to implement a program funded by the Health Department and the Centers for Disease Control to immunize uninsured daycare workers. After identifying state-accredited daycare centers, student pharmacists educated facility directors; coordinated immunization clinics at daycares across the state; provide 2500 pertussis immunizations. Results: In 2012 pharmacy students educated 750 different daycare facility directors and coordinated 177 on-site immunization clinics. During these clinics pharmacy students and pharmacists provided 2188 Tdap vaccinations, 66% of the total 3323 pharmacist-provided Tdap doses reported to the state registry. In 2011, Arkansas pharmacies reported administering 21 Tdap vaccinations to the registry. The 2012 data represents a 150 fold increase from 2011. Implications: APPE students extended the reach of the association’s efforts by providing needed manpower to the management of the program, as well as assisting pharmacies across the state in providing and reporting pertussis immunizations.

**Implementation and Evaluation of a Complete Block Model for Advanced Pharmacy Practice Experiences.** Kristin W. Weitzel, University of Florida, Randy Hatton, Shands at the University of Florida. Objectives: To determine if participation in a “block” Advanced Pharmacy Practice Experience (APPE) model (students complete all APPEs at a single institution) would a) increase students’ active participation in and contribution to patient care and medication use systems; b) improve quality of student learning activities; c) increase preceptor teaching efficiency; and d) improve preceptor satisfaction. Method: In 2011-12, nine students were selected by competitive application to complete all APPEs at a single institution. Students completed a common Advanced Hospital APPE as their first rotation and participated in year-long research and practice projects. Preceptors were paired longitudinally with students as research/professional advisors. Pre- and post-intervention preceptor focus groups and post-intervention preceptor surveys were administered to determine pilot expectations, outcomes, and effects on preceptor teaching efficiency.
and attitudes. Results: According to focus groups, this APPE model led to comprehensive and in-depth learning experiences and increased students’ participation in patient care and medication use system responsibilities. Students contributed to the institution through longitudinal research and patient care projects. Preceptors reported spending more teaching time students, holding students to a higher level of accountability, and being more satisfied with preceptorship compared with the traditional APPEs. Implications: Since its completion in 2012, this block program has doubled in size and four other large health-systems have implemented similar programs in Florida. This strategy has applications as a cost-efficient model to improve APPE quality and preceptor satisfaction within other institutions and practice settings.

Implementation of Transition of Care Activity in Advanced Pharmacy Practice Experiences: Effects on Student Confidence. Lindsey E. Williams, Anastasia B. Jenkins, The University of Mississippi, Robin P. Parker. Objectives: To determine if a transition of care learning activity integrated into Advanced Pharmacy Practice Experiences increases student confidence in their medication knowledge, patient counseling, and communication abilities. Method: APPE students at Baptist Memorial Hospital participated in an activity involving discharge medication review and counseling. Students received paged notifications of pending discharges and reviewed medication reconciliations for duplications, omissions, proper indications, and interactions; contacting nurse and/or physician if necessary. Students created discharge medication lists, counseled patients, and performed follow-up calls. To assess student confidence, 10 students completing APPEs at BMH-NM between 08/2012 and 02/2013 were asked to complete an 8 question, anonymous survey using Qualtrics® software following completion of the APPE. Questions assessed improvements in students’ confidence of medication knowledge, patient counseling, and communication abilities using a 5-point Likert Scale. Results: 7/10 students completed the survey. Results indicated the activity had the greatest impact on students’ confidence in counseling patients and communicating with nursing staff and patients (71% strongly agree). Students either agreed or strongly agreed that their confidence increased in all areas except in identifying drug interactions and duplications and in communicating with physicians (14%, 17%, 57% neither agreed nor disagreed, respectively). Implications: Students providing direct patient care at the crucial time of care transition allows them to assume great responsibility for patient care and outcomes while increasing their confidence in their abilities.

Improved Examination Performance After Sequential Introductory and Advanced Pharmacy Practice Experiences at the Same Institution. Vincent C. Dennis, The University of Oklahoma, Mark L. Britton, The University of Oklahoma, Richard E. Wheeler, Mercy Health Center, Sandra M. Carter, The University of Oklahoma. Objectives: To determine whether sequential assignment of students to introductory and advanced pharmacy practice experiences (IPPEs and APPEs) at the same health care institution improves their performance on an objective institutional pharmacy practice examination. Method: After developing an agreement with a local health system beginning in academic year 2009-10, student volunteers were sought to participate in sequential practice experiences with the inpatient pharmacy department. Eight students per year were assigned to the facility beginning in their P2 year. IPPEs comprise 20 hours during a calendar month of the fall or spring semester of the P2 year and 80 hours over a 2 week block during the summer preceding the P3 year. P4 students complete 3 consecutive calendar month APPEs of 160 hours each, scheduled in order as an institutional pharmacy system rotation, an acute care rotation, and a medicine subspecialty rotation. An examination consisting of multiple choice questions, short answer responses and pharmacy calculations was administered to all P4 students at the end of their institutional pharmacy system rotation. Results: 22 students completed the sequential IPPEs and APPEs since the 2009-10 academic year compared to 162 students assigned to non-sequential experiences. After adjusting for grade point average, assignment to the sequential IPPEs and APPEs increased average institutional APPE exam score by 3 percentage points relative to non-sequential assignment (p=0.0282). Implications: Facilitating continuity of learning through sequential IPPE and APPE assignments at the same institution may improve student performance on a knowledge-based examination.

Integration of Interprofessional Education Activities within Existing Pharmacy and Nursing Courses. Lynn Stevenson, Auburn University, Jennifer Schuessler, Auburn University School of Nursing, Bonnie Sanderson, Auburn University School of Nursing, Salisa C. Westrick, Auburn University. Objectives: To implement and evaluate interprofessional education (IPE) activities within existing pharmacy and nursing courses. Method: Two IPE pilot projects were implemented between the pharmacy and nursing schools at Auburn University in fall 2012. One pilot integrated nursing students into patient care activities within existing introductory pharmacy practice experiences (IPPE) and the second pilot integrated student pharmacists into a community assessment and intervention project (CAIP) in a community health nursing course. A 16-question electronic survey was administered to obtain feedback from participating students and faculty. Results: Seventy-three pharmacy students, 9 nursing students, 10 pharmacy faculty and 2 nursing faculty participated in the IPPE pilot. Four pharmacy students, 6 nursing students, 1 pharmacy faculty and 1 nursing faculty participated in CAIP. Sixty-nine (66%) participants completed the survey. Overall feedback was positive (68% excellent/very good) with 91% indicating need to continue IPE collaboration. Opportunities for improvement were issues of scheduling, clearer delineation of expectations, and enhancing feelings of inclusion within established disciplinary-led teams. Themes from qualitative feedback were: 1) knowledge and appreciation about each other roles, expertise and responsibilities and 2) perceived improved patient care through collaboration. Implications: IPE activities are an important component of health professions education. These two pilots identified many positive aspects and some areas of difficulty in integrating IPE activities into existing courses of both school’s curricula. The IPPE pilot was expanded in spring 2013 to include 17 nursing students, 3 nursing faculty, 104 pharmacy students and 15 pharmacy faculty. Plans to continue the CAIP pilot are underway.

Intra-semester Sequencing of an Ambulatory Care IPPE Simulation Component during the 2nd Professional Year Curriculum. Nicholas Leon, Thomas Jefferson University, Gina DeSevo, Thomas Jefferson University, Emily R. Hajjar, Thomas Jefferson University. Objectives: Including simulation as part of introductory pharmacy practice experiences (IPPEs) may help ease the student burden on sites and preceptors. We will examine the impact of simulation sequencing in an ambulatory care IPPE (PHRM 537) on skills based assessments. Method: PHRM 537 randomly assigns students to six weeks of simulation activities followed by six weeks on site at an ambulatory care clinic or vice versa in either the fall or spring semesters. At the end of each semester, all students participating in PHRM 537 undergo a series of assessments: 1) answering a series of drug information (DI) questions; 2) conducting medication adherence counseling; and 3) conducting a medication history. Results: During the fall semester, pass rates for the DI, medication adherence, and
medication history assessments were 28.6%, 90.5%, and 85.7%, respectively, when simulation was experienced first versus 20%, 80%, and 100%, respectively, when the clinic experience occurred first. During the spring semester pass rates, for the DI, medication adherence, and medication history assessments were 37.5%, 54.2%, and 79.2%, respectively, when simulation was experienced first versus 43.5%, 69.6%, and 87%, respectively, when the clinic experience occurred first. Four of six assessments favored having on-site clinic experience first. **Implications:** Students may benefit more when simulation follows on-site clinic experience. Further investigation is warranted to verify these findings. One explanation for these findings could include an increased understanding or acceptance of relevance and applicability of simulation activities after having on-site clinic experience. It is also plausible that the assessments used better reflected activities completed during simulation.

**Introductory Pharmacy Practice Experience (IPPE) Students Identifying Drug Related Problems in Long-term Care Setting.** Nancy D. Ordonez, *University of Houston,* Catherine L. Hatfield, *University of Houston,* Elizabeth A. Coyle, *University of Houston.* **Objectives:** Placing students in the IPPE activities appropriate for their level of knowledge and skills has been a challenge for experiential programs. The goal of this study is to determine if second year pharmacy students (P2) who have not had pharmacotherapy and pharmacology courses are able to identify valid drug related problems in a long-term care setting. **Method:** In fall 2009, P2 students were assigned to visit a long-term care facility on 4 days for 8 hours each. Assignments included various reflection activities and the development of 2 letters to a physician. In the letter, they were to state the detailed problem (drug name, dose, route, lab values) and make a recommendation. Results were tabulated by determining the percentage of types of drug related problems (DRP) encountered by the students and the total number of valid letters. **Results:** 182 of 200 (91%) of letters were deemed appropriate by a consultant pharmacist. The most frequent DRPs found were: potentially interacting medications 16.5%, duplicative therapy 6.6%, laboratory test requests 24.2%, medical condition (too much drug or excess dose) 9.3%, or Beers Criteria issue 18.3%. **Implications:** Based on the results of the study, students were able to identify drug related problems that were deemed clinically appropriate for the long-term care settings. These results will help the experiential program and the curriculum committee determine the optimal IPPE activities for P2 students.

**National Survey of Introductory Pharmacy Practice Experience Programs: Five Years Later.** Trish S. Devine, *Butler University,* Patricia L. Darbishire, *Purdue University.* **Objectives:** To conduct a follow-up survey of Introductory Pharmacy Practice Experience (IPPE) Program Directors to provide a descriptive overview of key program elements and determine whether changes have occurred over time. **Method:** A web-based questionnaire consisting of 37 questions was sent to 107 IPPE program directors in full accredited US colleges and schools of pharmacy to provide oversight of key elements of their school’s IPPE program in 2013. This survey was compared to the National Survey of Introductory Pharmacy Practice Experience Programs. (Darbishire, Devine, Holowaty),Schmetz. National survey of introductory pharmacy practice experience programs. IJPEP. Vol 4, Issue 2, Fall 2008) **Results:** The results identified commonalities, potential trends and barriers in IPPE programs. Increases were seen in schools’ pre-experience requirements for all students and the use of software programs for site placement. Trends identified were the increase of IPPE directors being staff, with Bachelor of Science their highest degree versus faculty with a Doctor of Pharmacy and IPPE rotation site visits decreasing from an average of once a year to every other year. Common barriers occurred in staffing, preceptor training, and institutional site placement. Regardless of barriers 89.2% of the IPPE directors felt their program complies with all aspects of Accreditation Council for Pharmacy Education Guidelines (ACPE) 2.0 compared to 50% of the schools felt they were in compliance in 2008. **Implications:** The survey results can guide schools of pharmacy in developing and enhancing a quality IPPE program in which all of the requirements set by ACPE Guidelines 2.0 are met.

**Novel Experiential Learning Opportunity in Pharmacy Training: Molecular Biology Research Using Cardiac Stem Cell Model.** Wasana K. Sumanasekera, *Sullivan University,* Halley T. Dao, Mehid Jani, Kadi Schultz, Felix Gyanfi, Farhan Abdi, Abeer M. Al-Ghananeem, *Sullivan University,* Maria Lourdes Ceballos-Coronel, *Sullivan University,* Hieu T. Tran, *Sullivan University.* **Objectives:** The main objective of this elective APPE program is to expose Pharm. D. candidates to cutting edge Biochemistry and Molecular Biology hands-on techniques using cardiac stem cells as the experimental model. Secondarily, this APPE experiential rotation provides students with appreciation of how the original research is created for the sake of advancement of science. **Method:** A literature search was performed to ensure the novelty of the APPE experience. Students were exposed to several laboratory techniques including stem cell culture, protein quantification, and detection of oxidative stress markers, DNA synthesis assays, and western blotting. Ten APPE rotations were conducted. Students were assessed on their hands-on techniques, literature search and analysis, presentation, scientific writing, and professionalism. **Results:** Based on a post APPE survey, 60% of students agreed and 40% strongly agreed on the importance of rotation in improving critical thinking skills. 20% agreed and 80% strongly agreed on this rotation as a contributor to improve their reading, scientific writing, and presentation skills. 40% agreed and 60% strongly agreed on the contribution of this rotation in their professional growth and development. 40% agreed, 20% strongly agreed, and 40% disagreed on student’s ability to independently design experiments. Although everybody agreed on the importance of this rotation as a learning experience, 70% agreed and 30% disagreed on the direct impact of the experience in finding future employment. **Implications:** This experience contributes to the development of technical, analytical, and critical thinking skills, and prepares the students to be life-long learners, which are integral to their future career path.

**Pharmacy Students’ Confidence with and Attitudes about Vaccine Administration.** Sheila M. Allen, *University of Illinois at Chicago,* Michelle T. Martin, *University of Illinois at Chicago,* Kristen L. Goliat, *University of Illinois at Chicago.* **Objectives:** The University of Illinois at Chicago College of Pharmacy requires all third year students to participate in an immunization training program as part of the curriculum. The purpose of this study was to assess pharmacy student confidence level with and attitudes about vaccine administration after training. **Method:** A 31-item anonymous and voluntary survey was administered to the class of 2012 at mandatory class meetings during their last year of school. The research was approved by the Institutional Review Board. Descriptive statistics were used to analyze the survey data. **Results:** One hundred sixty surveys were administered with a response rate of greater than 85%. Survey results show that 6% of our students had administered greater than 40 intramuscular injections two months after training compared to 44% after the completion of their APPE rotations. The number of students who were confident or extremely confident in administering intramuscular injections increased from 59% two months after training to 90% at the
completing their APPEs. Eighty-five percent of our students agree or strongly agree to being comfortable administering vaccines to patients two months after training, whereas 98% report being comfortable after the completion of APPE rotations. Implications: Overall, results showed an increase in confidence and comfort with vaccine administration based on the number of vaccines administered. This study led us to question whether our curriculum should require students to administer a specific number of vaccines above current training requirements prior to graduation to aid in the development of confidence and comfort with vaccine administration.

Pharmacy Services on a Domestic Medical Mission Trip Interprofessional Education Introductory Pharmacy Practice Experience. Jeffrey T. Copeland, University of the Incarnate Word, Nicole Farrell, University of the Incarnate Word, Kimberly B. Cauthon, University of the Incarnate Word. Objectives: Provide third year pharmacy students Interprofessional Education (IPE) Introductory Pharmacy Practice Experience (IPPE) opportunities on a domestic medical mission trip. Method: P3 students may participate in a domestic medical mission trip for IPE IPPE credit. The School of Pharmacy partners with the local Christian Medical and Dental Associations (CMDA), Dental School, and Medical School to conduct medical mission trips to underserved populations along the American – Mexican border. The Saturday clinics are held in colonias (impoverished communities frequently without water and electricity) and los barrios (organized and advanced colonia) within Texas. Each trip provides two free clinic sites with each site providing medical care (diagnosis, treatment), dental care (cleanings, fillings, extractions), and consultative pharmacy services for approximately 200 patients per trip. Prescriptions are filled free of charge by a pharmacy retail pharmacy in the nearest city using a pre-arranged voucher system from the company’s $5 formula. Post-trip analyses (reflection, recommendations) are conducted. Rubrics evaluate student performance. Results: Thirty P3 students participated in a total of three mission trips. Pharmacy, medical, dental, and pre-professional students provided care alongside pharmacists, physicians, and dentists. Pharmacy students provided drug information services (domestic and foreign medications) for patients, students, and providers, formulary recommendations, medication counseling, and provided screenings (blood pressure, pulse, temperature, glucose, cholesterol, hemoglobin). Medical personnel provided positive evaluations. Students received IPPE health fair credit. Students indicated a desire to participate in medical missions as a pharmacist following the trips. Implications: These IPE IPPE opportunities will continue. Evaluation for expansion will occur.

Pre–and Post–test Evaluation of Topic Discussion Learning in Ambulatory Care Advanced Pharmacy Practice Experiences. Michelle T. Martin, University of Illinois at Chicago, Louise Parent-Stevens, University of Illinois at Chicago. Objectives: Clinical pharmacists at the University of Illinois Hospital and Health Sciences System developed morning conference as a venue to enhance learning and mastery of basic and specialty ambulatory care topics by fourth year pharmacy students during their required ambulatory care advanced pharmacy practice experience (APPE) rotation. Topics varied based on the module; faculty members presented and led topic discussions in their areas of expertise. An assessment was administered to evaluate the level of knowledge obtained from the topic discussions and to hold students accountable for knowledge of the topics. Method: Fifty-two student pharmacists during 2010-11 and 46 student pharmacists during 2011-12 completed 6-week ambulatory care APPE clerkships in the clinics. Students took a pre-test and an identical post-test to measure their knowledge of ambulatory care pharmacy topics. The scores were compared and analyzed. Results: Post-test scores were significantly higher than pre-test scores in both 2010-2011 (72.5% versus 59.5%, p<0.0001) and in 2011-2012 (74.6% versus 58.8%, p<0.0001). Implications: Topic discussions increased student exposure to multiple disease states during the rotation. Students received credit for knowledge of the material discussed in morning conference; points earned based on the post-test score contributed to their final rotation grades. Using morning conference pre- and post-tests scores as a surrogate for learning, we conclude that students gained knowledge of basic and specialty ambulatory care pharmacy topics during discussion sessions. Future assessment could involve surveying students to determine if the post-test motivated them to focus on the topic discussions.

Providing Salt Education to Hypertensive Patients Through an Introductory Pharmacy Practice Experience in Community Pharmacy. Salisa C. Westrick, Auburn University, Lynn Stevenson, Auburn University, Kimberly B. Blake, Auburn University, Benjamin S. Teeter, Auburn University. Objectives: To evaluate the impact of the Salt Education Program for hypertensive adults on pharmacy students’ knowledge, behaviors, and attitudes pertaining to sodium consumption. Method: A pretest-posttest design was utilized to assess the change in students’ knowledge, behaviors, and attitudes related to sodium consumption after participating in the Salt Education Program. This program was conducted in summer 2012 as part of the 2-week Introductory Pharmacy Practice Experience Program in community pharmacies. Second-year pharmacy students were expected to conduct 5-10 in-person interviews with hypertensive patients. Students assessed patients’ knowledge and behaviors related to sodium intake, taught them how to read nutritional labels and select lower-sodium options, obtained information concerning their hypertensive conditions, and measured their blood pressure. Students completed pre-intervention and post-intervention questionnaires in April and August 2012, respectively. Results: Of the 137 students who participated in the program, 130 students completed both the pre- and post-intervention questionnaires (70% female, 78% white). Students demonstrated significant improvements in knowledge scores when pre- and posttests were compared (p<.001). Further, significant improvements in the reported frequency of looking for sodium content of foods when shopping (p<.001) and purchasing low-salt foods (p=.004) were found. Perception of benefits of a low-salt diet for lessening risk of hypertension improved as well (p=.004). There was no change in perceived barriers or self-efficacy in following a low-salt diet. Implications: Changes in students’ knowledge, behaviors and attitudes after participating in the Salt Education program suggested that the program was useful for students.

Psychometric Analysis of Multiple Mini-Interviews as a Pharmacy Admissions Tool. Xueqin Liao, University of Toronto, Chongkui Choi, University of Toronto, Linda MacKeigan, University of Toronto, Andrea J. Cameron, University of Toronto. Objectives: The Leslie Dan Faculty of Pharmacy adopted Multiple Mini-Interviews (MMI) in 2010 to assess non-academic attributes of pharmacy applicants. The MMI format of 10 stations, each a 7-minute interview, was adapted from McMaster University medical school. The objectives are to determine the reliability and predictive validity of the MMI in two cohorts of pharmacy applicants. Method: 580 interviewees in 2010 and 433 in 2011 consented to participate. An intra-class coefficient (ICC) was calculated on MMI scores. Multiple regression analyses were conducted with pre-pharmacy average, PCAT composite score, and MMI score as predictor variables; and gender and age on admission as control variables. Criterion variables were 1st and 2nd-year

GPA and course grades. The incremental R2 between regression models with and without MMI scores was the indicator of predictive validity. **Results:** The ICC was 0.73 in 2010 and 0.75 in 2011. For the 2010 cohort, the MMI contributed an additional 0.3% of explained variance (incremental R2) in 1st year GPA and 0.2% - 2.7% in course grades; in 2nd year, it contributed 0.2% to variance in GPA and 0.1% - 1.4% to course grades. For the 2011 cohort an additional 3.3% of variance was explained in 1st-year GPA and 0.9% - 5.3% in course grades. **Implications:** The MMI is a reliable tool for assessing non-academic attributes of applicants. Its predictive validity was better for the 2011 cohort, which had entered a new, more clinically-oriented curriculum. It is expected that predictive validity will increase in higher years as the number of courses requiring professional attributes increases.

**Qualitative Analysis of Common Issues of Concern Affecting Pharmacy Experiential Education Programs (2011).** Jennifer Danielson, University of Washington, Karen Craddick, University of Washington Medical Center, Teresa A. O’Sullivan, University of Washington, Dayl Eccles, University of Washington, Abby Kwasnik, University of Washington. **Objectives:** To use qualitative research methods to systematically identify common issues facing experiential education (EE) programs and compare findings to previously published results. **Method:** As part of a web-based survey about EE program characteristics disseminated to EE directors at 117 pharmacy schools in 2011, respondents were asked to describe the top 2-3 issues facing their program. Demographic data were collected and free-text responses were analyzed using an iterative, grounded-theory thematic analysis. Two primary investigators (experienced EE director, PY4 student) initially coded responses. Then, responses were independently coded by 3 others (2nd experienced EE director, 2 PY3 students). Agreement (kappa) with primary investigators was calculated. **Results:** Eighty responses were received (response rate 68%). Common themes identified were: 1) site capacity, 2) workload/funding issues, 3) quality assurance, 4) preceptor development, 5) preceptor stipends, 6) assessment, 7) onboarding, and 8) support/recognition from administration. New themes detected since 2001 were preceptor development and onboarding. Site capacity remained the top concern. Very good agreement (kappa range 0.8-0.91) between investigators and 2nd experienced EE director was found for capacity, quality assurance, and preceptor stipends. Good agreement (kappa range 0.64-0.88) was found for all other themes except onboarding. Very good agreement was found between investigators and students for preceptor stipends (kappa 0.92) and assessment (kappa 0.9). Good agreement (kappa range 0.67-0.78) was found for all other themes. **Implications:** Qualitative analysis methods can be used to identify emerging concerns in EE. Compared to 2001, capacity continues to challenge EE programs while preceptor development and onboarding procedures pose new problems. Future research can investigate these issues further so that efforts to address them are implemented.

**Quality Assurance Data Assessing Introductory Community Experiences: Focus on Meeting Pre-APPE Core Domains.** Angela Brownfield, University of Missouri-Kansas City, Valerie L. Ruehter, University of Missouri-Kansas City, Kendall Shackles, University of Missouri-Kansas City. **Objectives:** Describe the outcomes of the quality assurance process used to assess the Introductory Pharmacy Practice Experiences (IPPEs) with Pre-APPE Core Domains and Abilities at University of Missouri-Kansas City. **Method:** Students complete a 2-week community IPPE during the summer between the P2 and P3 years. After completion of the experience, each student is asked to take an anonymous, online, 21-question survey to characterize the experience, identify activities performed, review required assignments, determine to what degree performance competencies were met, and provide feedback for improvement. Preceptors received a similar survey following their last scheduled IPPE of the summer. Descriptive statistics are used to express the data. For all data assessed, a benchmark of 75% was set to demonstrate satisfactory responses. Internal benchmarks were set at 85% and 95%, showing excellent and exceptional responses, respectively. **Results:** The response rate was 87% for students and 70% for preceptors. Both preceptors and students rated performance competencies were met at a high level. Students and preceptors agreed that 16 of the 17 performance competencies were met at the Excellent to Exceptional level. One performance competency (Demonstrate or describe proper administration technique for various drug delivery systems) was met at the satisfactory level for students and exceptional level for preceptors. **Implications:** By surveying students and preceptors following IPPEs, compiled data can be utilized to develop a quality assurance report to be shared with stakeholders demonstrating achievement of performance competencies aligned with Pre-APPE core domains and abilities. Additionally, meaningful course modifications can be made as needed.

**Sequencing of an Ambulatory Care IPPE during the 2nd Professional Year Curriculum.** Nicholas Leon, Thomas Jefferson University, Gina DeSevo, Thomas Jefferson University, Emily R. Hajjar, Thomas Jefferson University. **Objectives:** The Jefferson School of Pharmacy (JSP) has elected to include ambulatory care as part of the required second professional year (P2) introductory pharmacy practice experiences (IPPE). This IPPE consists of 6 weeks of simulation activities and 6 weeks at an ambulatory care clinic. We evaluated the impact that being randomized to experience this IPPE in the fall versus the spring would have on performance on a series of assessments completed at the end of each semester. **Method:** In the ambulatory care IPPE at JSP, students are randomly assigned to participate in 6 weeks of simulation activities on campus followed by 6 weeks at an ambulatory care clinic or visa versa in either the fall or spring semester. At the end of each semester, all students participating in this IPPE undergo a series of assessments: 1) answering a series of drug information (DI) questions; 2) conducting medication adherence counseling; and 3) conducting a medication history. **Results:** During the academic year 2011-2012, all students were randomized to the ambulatory care IPPE in either the fall (n=41) or spring semester (n=47). Pass rates for the DI, medication adherence, and medication history assessments were 21.3%, 87.8%, and 90% in the fall semester and 36.6%, 61.7%, and 89.5% in the spring semester. **Implications:** Performance on the assessments has identified that our students need additional practice in providing appropriate DI responses but are quite capable of performing medication histories. Discrepancies between semesters regarding the medication adherence assessment may be influenced by a number of factors that need further investigation.

**Six-Week APPE Rotation Model with Course and Program Modifications Positively Impacts the Students’ Program Experience.** Christopher M. Miller, University of Kentucky, Anne Policastri, University of Kentucky, Michael C. Berger, University of Kentucky. **Objectives:** The UK Louisville Clinical Education Center (CEC) program enrolls 20-25 APPE students each year. This program is designed for students to complete their APPE training in the Louisville area. The objective of this study was to assess the impact of implementing a six-week rotation model with programmatic changes on perceived student satisfaction and value. **Method:** A six-week APPE rotation model was developed at UK for implementation during the 2011/2012 rotation year. A global syllabus was developed with mandatory experiential requirements for each course. Preceptor sites were visited...
to review the syllabus and course requirements prior to implementation. A twenty-one question survey using the Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree) was used to assess perceived student value of their program experience and was compared to the 2010/2011 data. **Results:** All categories measured for the 2012 (n=15) showed improvement over the 2011 four-week data (n=24). Specifically, students expressed a more favorable view of the CEC educational activities, especially journal clubs (3.3 vs. 2.75) and preceptor facilitated seminars (3.64 vs. 3.21). The learning environment (3.64 vs. 3.17) and schedule of educational activities was more positive (3.57 vs. 3.08). From a student perspective, preceptor opinions of the CEC program have improved (3.85 vs. 3.25). Overall the students’ recommendation of the CEC program is more favorable (3.93 vs. 3.57) and they indicate that the program meets expectation (3.5 vs. 3.2). **Implications:** The six-week APPE model and programmatic changes in experiential and educational activities is having a positive impact on the students enrolled in this program.

**Student Assessment of Introductory Pharmacy Practice Experience Activities’ Appropriateness and Impact on Self-Confidence.** Kristopher Harrell, The University of Mississippi. **Objectives:** This study examined student feedback related to currently required introductory pharmacy practice experience (IPPE) activities, particularly the appropriateness and perceived impact of the completion of these activities on student self-confidence as practitioners. **Method:** Third year pharmacy students were asked to voluntarily complete a survey regarding their thirteen required IPPE coursework activities. Students rated the degree to which the activities were appropriate for their corresponding experience (community or institutional), as well as the extent to which completing the activities improved their self-confidence as practitioners. Results were analyzed in aggregate and stratified based on activity practice and type. **Results:** 51 of 53 (96%) third year students participated. Overall, 81% of student responses were either strongly agree (SA) or agree (A) that the IPPE activities were appropriate (community 78% and institutional 84%). When asked if the activities increased their self-confidence as practitioners, overall 71% of the responses were either SA or A (community 67% and institutional 75%). Likewise, the activities that students reported increased their self-confidence the most were completion of a non-prescription patient consult (86% SA/A), preparation of an admixture using aseptic technique (84% SA/A), and review of the patient medical chart and monitoring of laboratory parameters (84% SA/A). Students reported their public health project activity had the least impact on their self-confidence (39% SA/A). **Implications:** Results from this study reveal that students overall believe their required IPPE activities are appropriate, and upon completion of most of the activities their self-confidence as practitioners is enhanced.

**Student and Preceptor Perceptions of the Impact of Smartphone Drug Information Applications on APPE Performance.** Renee Holder, Roseman University of Health Sciences, Anthony C. Fermin, Roseman University of Health Sciences, Jintu John, Roseman University of Health Sciences. **Objectives:** To determine pharmacy student and preceptor perceptions of how smartphone drug information (DI) application use affects student performance during advanced pharmacy practice experiences (APPEs). **Method:** The research protocol was approved by the Roseman University of Health Sciences (RUHS) IRB review. A questionnaire was developed based on past research using non-validated instruments. Sections included baseline characteristics, perceptions, and rating of DI application features. The questionnaire was piloted with two pharmacy students and two preceptors; questions were then revised for clarity with a consensus by the investigators. An online questionnaire (SurveyMonkey) invitation was sent to current RUHS pharmacy students on APPE, recent graduates (classes of 2011-12) and current APPE preceptors for both the Henderson, NV and South Jordan, UT campuses. **Results:** Response rates of 14.7% and 27.2% were achieved for the student and preceptor groups, respectively. Students were more likely than preceptors to respond that smartphone DI applications increased their overall performance on rotation (91.6% vs. 46.7%), increased their ability to find correct answers (91.6% vs. 75.6%), decreased time to find correct answers (84.2% vs. 63.3%), and increased retention of drug knowledge (73.7% vs. 28.9%), all p <0.01. Neither group was likely to respond that use decreased professional image (12.6% vs. 14%). **Implications:** Pharmacist preceptors and students should be aware of the disparity in student and preceptor perceptions of performance related to the use of smartphone DI applications. Students can recognize their self-evaluation may be falsely enhanced when using smartphone DI applications, while preceptors can recognize student confidence is increased with use.

**Student-Perceived Impact and Value of Individual IPPEs during Postgraduate Residency and Employment Interviews.** Lindsey H. Welch, The University of Georgia, Whitney L. Unterwagner, The University of Georgia. **Objectives:** To determine specific IPPE activities which were most interesting to interviewers in various postgraduate pharmacy employment opportunities and to determine if students perceived the exposure and skill set provided during IPPEs gave them a competitive advantage over other candidates. **Method:** The 2012 graduating class was surveyed to assess which aspects of the IPPEs were discussed during the interview process and what types of postgraduate positions were secured. The various IPPEs included opportunities in wellness clinics, service-learning summer camps, and post-graduate residency awareness, among others. Incorporated skills included patient communication, physical assessments (BP, glucose, cholesterol, etc.), pharmaceutical care plan construction, physician correspondence, and immunization administration. **Results:** 115 students completed the survey. Of students securing a postgraduate position, 59% were in community pharmacy and 32% were in residency programs. Regardless of position secured, 55% of students had interviews where specific IPPEs were discussed, the most popular being the wellness clinics, immunization administration, and service-learning summer camps. The specific IPPEs mentioned varied based on type of postgraduate position. The vast majority of students felt confident in their skill set (81%) and that IPPEs made them a more competitive candidate for their postgraduate positions (91%). Of students who interviewed for residency positions, 79% matched with a program and 97% of those who matched did so with one of their top three programs. **Implications:** The skills and experiences developed during IPPEs can play a role in the future competitiveness of students for postgraduate positions. Employers can benefit from skills and confidence developed during IPPEs.

**Students’ Perceptions of a Two-week Block Institutional Introductory Pharmacy Practice Experience.** Melissa M. Chesson, Mercer University, Amy C. Grimsley, Mercer University, Nicole L. Metzger, Mercer University. **Objectives:** To develop and implement a two-week, 80 hour institutional Introductory Pharmacy Practice Experience (IPPE) for third year pharmacy students and to assess students’ perceptions of the experience. **Method:** An institutional IPPE program was developed and conducted over a two week block. Each year, students experienced dispensing and clinical pharmacy activities.
at an academic medical center as facilitated by faculty, pharmacists, and residents. A 23-item survey using a 5-point Likert scale and three open-ended questions was administered to assess students’ perceptions of IPPE. Descriptive statistics were used to evaluate results and Student’s t-tests and Mann Whitney U were used to compare data from each year. Results: Fifty-two students (94.5%) completed the survey. Students agreed that participation in IPPE was worthwhile and would aid in preparation for Advanced Pharmacy Practice Experiences (APPE) (mean scores 4.7, respectively). The majority of students agreed that IPPE increased their knowledge and understanding of institutional pharmacy practice and the role of clinical pharmacy specialists (mean scores 4.6 and 4.7, respectively). Students reported that rounding with clinical pharmacy specialists, time in the inpatient pharmacy, and participation in a code response simulation were the most enjoyable (mean scores 4.6, 4.2, 4.4, respectively). There were no significant differences between survey question responses from year one and year two. Implications: The majority of students reported positive perceptions of the IPPE program. A two-week, 80 hour IPPE program can improve students’ understanding of institutional pharmacy practice and aid in preparation for APPEs.

Students’ Perceptions of Simulated Order Verification and Medication Reconciliation Using Hospital Training Software. Nicole L. Metzger, Mercer University; Melissa M. Chessen, Mercer University; Amy C. Grimsley, Mercer University. Objectives: Develop an order verification and medication reconciliation simulation using hospital training software and assess students’ perceptions of the simulation over two years. Method: A training patient with medication orders and home medications was built into hospital software. Institutional IPPE students reconciled the medications and decided whether or not to verify the inpatient orders based on the patient’s history and labs. A survey, including eight, 5-point Likert scale questions and two open-ended questions was administered to assess students’ perceptions of the simulation. Descriptive statistics were used to summarize survey results, and mean overall scores from each year were compared by Student’s t-test. Results: Fifty-five students (100%) completed the survey; 30 in year one and 25 in year two. Combined data showed 93% agreed that the simulation enhanced their learning (mean 4.3) and 78% agreed that the simulation stimulated their interest in institutional pharmacy (mean 3.95). Most students agreed that the simulation was realistic (98%), taught valuable clinical decision making skills (100%), and integrated information from previous courses (96%) (mean scores 4.4, 4.5, 4.5, respectively). The overall mean score was significantly higher in year two compared with year one (4.47 vs. 4.04; p=0.002), as well as the scores for 6 of the 8 questions. Implications: Students reported positive perceptions of the simulation in both years, though perceptions of the simulation improved in year two. Hospital training software can be used to simulate the pharmacist’s role in order verification and medication reconciliation, as well as advance clinical decision-making.

The Current State and Needs of Preceptor Development Training: Results of a National Preceptor Development Survey. Maryann Z. Skrabal, Creighton University; Nora L. Stelter, Drake University; Christina M. Seeger, University of the Incarnate Word; Mara A. Kieser, University of Wisconsin-Madison; Meri D. Hix, Southwestern Oklahoma State University; Kristin W. Weitzel, University of Florida; Elizabeth A. Cardello, American Pharmacists Association; Robert L. Talbert, The University of Texas at Austin; Paul D. Turner, Creighton University. Objectives: To determine current state and needs of preceptor development training from preceptors involved in providing experiential education to student pharmacists and residents. Method: The preceptor survey was piloted, peer-reviewed, and edited prior to administration. Experiential Administrators were emailed a link to an online, web-based questionnaire and asked to forward the link to their preceptors. Reminders were sent to experiential administrators to send to their preceptors throughout the 4-week collection period during late fall 2012. The survey assessed preceptors’ experience and future needs regarding training and development. Results: 4800 responses were received. Current state: 71% of preceptors responding are trained with the majority completing web-based (67%) or live training (63%). Live, school-sponsored training (57%) is the most common training used, followed by Pharmacist’s Letter PTRN (50%). Largest barrier to training is time (55%). Needs: Web-based online training was cited most often as preferred method (44%). Preferred length of time for modules is 30 minutes (51%). How to give feedback (83%), how to evaluate students (79%), and professional communication skills (64%) were topics most important to preceptors. Complete results as well as correlations across preceptor demographics and responses will be presented. Implications: Quality preceptors are essential to properly educate student pharmacists, so it is important to respond to their development needs. These results will support recommendations regarding preceptor development training to help insure as many preceptors receive quality training as possible. This, in turn, should provide higher quality precepting and education of future pharmacy professionals.

The Impact of International Inter-professional APPEs on Student Perceptions of Other Health Professionals. Denise A. Solits, Drake University. Objectives: To measure the impact of inter-professional Advance Pharmacy Practice Experience on student perceptions and attitudes of other health care professionals. Method: From March 2012 through January 2013 confidential surveys were completed by medical, physician assistant and pharmacy students from the US and UK who participated in inter-professional experiences at Hillside International Health Care, a rural primary care clinic in southern Belize between March 2012-Jan 2013. Survey items were based on a five-point likert scale and included student’s discipline, demographics, how students viewed working in an interdisciplinary group, how inter-professional collaboration affected understanding of other disciplines and how working in inter-professional teams impacted their approach to patient care. Results: 88 students completed the survey: 34% medical, 32% physician assistants, 27% pharmacy, and 6% physical therapy students. 97% strongly agreed that students worked well together. 82% strongly agreed the inter-professional component of the rotation added value to their training. 97% agreed or strongly agreed they would be interested in additional inter-professional opportunities. 88% of the students agreed that the experience improved their understanding of the abilities of other health professionals. 87% said the experience would increase their willingness to communicate with other professionals. 98% of respondents agreed or strongly agreed that working in an interdisciplinary team leads to patient care outcomes that they could not have achieved alone. 99% strongly agreed or agreed learning with students from other disciplines will help them become more effective healthcare team members. Implications: Health professional students perceive benefits from team-based training, improved patient care and welcome further team-based experiences.

The Influence of Required Confidential Student Evaluations of Advanced Pharmacy Practice Experience (APPE) Preceptors. Mark A. Stephens, Union University; Sean R. King, Union University; David Kuhl, Union University. Objectives: To assess the influence of required confidential student evaluations of advanced pharmacy
practice experience (APPE) preceptors. **Method:** In 2012, all APPE students were required to complete a 17-item, non-confidential preceptor evaluation. Students were required to complete an identical confidential preceptor evaluation. A 4-point Likert-type scale was used where 1 equaled strongly disagree and 4 equaled strongly agree. Comparisons were made between the paired non-confidential and the confidential evaluations at the a priori alpha level of 0.05. **Results:** Paired confidential and non-confidential preceptor evaluations were completed for 417 of 429 (97.2%) advanced rotations. Results indicated student responses did not differ significantly between the two evaluations (p > 0.05). Student responses did change in over 17% of the confidential evaluations. Eleven percent of these evaluations included changes from agree or strongly agree to disagree or strongly disagree. The evaluation question most frequently changed was, “my preceptor evaluated me honestly and fairly” (18/46, 39.1%). The evaluation question least frequently changed was “my preceptor answered my questions or directed me where to find answers” (2/46, 4.3%). Thirteen students accounted for 67.4% of the changed evaluations. **Implications:** Accreditation requires schools to assess the quality of preceptors. Quality assessment relies partly on honest and appropriate student evaluations. Required confidential student evaluations of preceptors did not significantly differ from non-confidential evaluations. These results indicate confidential student evaluations of preceptors should not be mandatory due to the lack of frequent changes. Confidential evaluations should remain available for students who may be reluctant to honestly evaluate preceptors.

**The Impact of Student Health Care Professionals on a Short-term Medical Mission Trip.** Emily M. Scopelliti, Shenandoah University, Jenny J. Kim, Shenandoah University, Rebecca A. Falter, Shenandoah University. **Objectives:** To describe student pharmacist impact on patient care through documented interventions and to evaluate student health care professional’s perceived competence concerning therapeutic knowledge through participation in a medical mission trip. **Method:** Clinical interventions made by student pharmacists were prospectively collected during four clinic days. Intervention data included adult and pediatric dosing recommendations, medication recommendations, therapeutic substitution based on available formulary, and counseling. A pre-survey and post-survey was anonymously administered to all pharmacy and physician assistant student participants. The survey consisted of questions based on a Likert scale, which assessed perceived competence of medication knowledge and opinions regarding their participation in an interdisciplinary environment. **Results:** Student pharmacists made 624 interventions, including 420 patients counseled, 78 dosing changes, 63 pediatric dosing calculations, 35 therapeutic substitutions and 28 medication recommendations. A total of 25 student health care professionals completed the survey. Significant improvements were found in all questions pertaining to medication knowledge (p < 0.005). There was not a significant difference in regards to opinions concerning the medical mission trip’s effect on improving clinical skills (p = 0.414) and understanding of an interdisciplinary health care setting (p = 0.564) due to initial positive opinions in the pre-survey. **Implications:** Participation in the medical mission trip allowed student pharmacists to provide therapeutic interventions as a member of an interdisciplinary team. It also provides a unique opportunity for student healthcare professionals to practice clinical knowledge and improve perceived clinical competence in a direct patient care setting.

**The “ABCDs” of Interprofessional Screenings: Aspirin Therapy, Blood Pressure, Cholesterol and Diabetes.** Melanie K. Claborn, University of Arkansas for Medical Sciences, Victoria S. Seaton, University of Arkansas for Medical Sciences, T. Scott Warmack, University of Arkansas for Medical Sciences. **Objectives:** To provide student led interprofessional, free health screenings and consultations targeting heart attack, stroke and diabetes prevention for the underserved Northwest Arkansas community. **Method:** The interprofessional team included individuals from the University of Arkansas for Medical Sciences (UAMS) College of Pharmacy, College of Medicine, College of Nursing and supportive staff. The screenings were open to the community with an increased focus on the underserved Hispanic and Marshallese populations prevalent in Northwest Arkansas. The screenings included monitoring of blood glucose, hemoglobin a1c tests, cholesterol panels, blood pressure, and cardiovascular screenings. Follow-up consultation included interpretation of the results and recommendations for the patient’s plan of care. At risk patients were provided with area medical clinic information for follow-up as well as educational materials to help with preventative health education (aspirin therapy and smoking cessation). **Results:** A total of 179 patients received screening services. Of the patients screened, 42% of the patients had an indication for aspirin, 23% had elevated blood pressure, 69% had abnormal cholesterol results, 19% of patient reported smoking, and 22% had an abnormal hemoglobin A1c. All of the patients who had abnormal results at each screening were provided education and follow-up as necessary. **Implications:** An interprofessional team can play an important role in detecting, educating and referring screened individuals at high risk for cardiovascular disease. This project provided preliminary data and relationships for future interprofessional projects at the UAMS NW campus.

**Use of Critical Reflection in an Interprofessional Education Human Simulation Experience.** Nora L. Stelter, Drake University, Michelle M. Bottenberg, Drake University, Geoff Wall, Drake University, June F. Johnson, Drake University. **Objectives:** Reflection guides students in making connections between previous and current learning. Well-designed critical reflection generates, deepens, and documents learning. The objective of this project is to describe the use of critical reflection on competency achievement in an Interprofessional Education Human Simulation Experience. **Method:** Third year student pharmacists enrolled in a skills lab course were assigned to participate in an Interprofessional Education (IPE) Human Simulation Experience at a local medical school. Pharmacy, medical, and nursing students worked together to diagnose and treat a simulated patient. A pharmacy faculty member attended each experience as part of the interprofessional faculty team. A critical reflection assignment was developed using the E*Value online platform that focused on the four Core Competencies for Interprofessional Collaborative Practice. Students reflected on their simulation experience and self-assessed their performance addressing each competency area. The pharmacy faculty assessed student performance and provided feedback. **Results:** Seventy students and three faculty members participated. Recurrent themes from student reflections included: increasing confidence in finding and communicating answers and asking questions; appreciating the need for accuracy as well as urgency; practicing patient-centered care; and increasing awareness of other healthcare providers’ roles. Students rated themselves higher as compared to faculty members in the first three competency areas (Values/Ethics, Roles/Responsibilities, and Interprofessional Communication). The ratings were equal with the fourth competency (Teams/Teamwork). **Implications:** The use of critical reflection was well received by students. Implementation of a similar modality may be a valuable way to document critical thinking and competency achievement by students in other IPE experiences.
What Makes an Excellent Preceptor? Predictors from Student Pharmacists Evaluations. Shardae Young, The University of Iowa and Iowa VA Health Care System, Susan S. Vos, The University of Iowa, Matthew Cantrell, The University of Iowa, Robert F. Shaw, Iowa VA Health Care System. Objectives: Our primary objective was to identify predictors of preceptor excellence as rated by student pharmacists. Assessing the correlation between years as preceptor and “excellent” ratings and evaluating percentage of adjunct faculty versus tenured, tenured-track, and clinical-track faculty evaluated as “excellent” were secondary objectives. Method: Student pharmacists were required to complete a 15-item evaluation of preceptors at the end of each Advanced Pharmacy Practice Experience. Student evaluations between May 2009 and May 2012 were included. Terminal degree, years as a pharmacist, and years as a preceptor were collected. Multivariate logistic regression was conducted to determine independent predictors for the primary outcome. Analysis of secondary outcomes was conducted using a Chi-square test. Results: 4700 student evaluations and 606 preceptors were included. Adjunct faculty comprised 93.5% of the preceptors while 6.5% were identified as tenured, tenured-track, or clinical-track faculty. Preceptors who showed an interest in teaching and related to the student as an individual, encouraged discussion, were available, provided feedback, served as a role model, were organized, and spent increased time with the student were more likely to be rated “excellent” by students (p value range = 0.00 to 0.004). Teaching title (adjunct vs. tenured, tenured-track, or clinical-track faculty) and years as a preceptor were not significant predictors of excellence. Implications: The increase in pharmacy schools, changes in required hours for experiential education, and required preceptor development highlights the need to understand what makes an excellent preceptor. Identifying predictors of excellence may assist in the creation of preceptor development programs.

Theoretical Models:

An Evaluation of Student and Preceptor Perceptions of Feedback in Pharmacy Experiential Education. Daniel A. Mickool, University of New England, James R. Krebs, University of New England. Objectives: To evaluate the perceptions of students’ and preceptors’ in the feedback process in experiential learning. Method: Two methods were used in this research project in the form of an electronic survey and live, in-person interviews. The first was an electronic survey created using Google Documents. Google mail is supported by the University of New England and from that a database of approximately 200 preceptors was created to query. Consent forms approved by the University were distributed to those who responded favorably to participation in the study. The results from the questions were tabulated by Google docs. The second method used was live interviews with Doctor of Pharmacy students. Forty students were randomly chosen from students who have completed introductory or advanced pharmacy experiences beyond their didactic work. The students who elected to participate were given consent forms and then completed the interview with the investigators. The interviews were conducted at the University of New England College of Pharmacy in the Office of Experiential Education. The interviews were brief and the students spoke candidly about their experiences at pharmacy practice sites and with their preceptors. The interviews were read carefully by the investigators and themes were coded. For example, oral feedback, written feedback, intimidating/non intimidating. Results: From the Preceptor Electronic Survey we discovered that six preceptors with a response rate of 30% had one to five years experience, two preceptors had ten to twenty years, and two preceptors had greater than 10 years. All of the preceptors answered that they liked to be a preceptor for pharmacy students and all of them said they gave periodic feedback to their students. Six out of ten preceptors gave daily feedback to their students and the remainder gave weekly feedback with preference for midpoint and final evaluations for their students. All of the preceptors surveyed felt their students showed improvement after the feedback was given. Seven of the preceptors identified not enough time as a barrier to effective teaching and all of the preceptors answered they were willing to learn ways to become a better preceptor. The preceptors identified the following in order of priority as a resource to them for improving skills: online self study, newsletters, and live continuing education. The student interviews helped us determine information about feedback from preceptors to students. All of the students responded that feedback was given to them face to face at their practice sites. Most of the students responded that informal feedback was given during daily without prompting. One student asked for feedback frequently which prompted the preceptor to give the feedback daily. All of the students responded that feedback was comfortable to receive and even constructive feedback was well delivered from their preceptors. Students indicated they wanted feedback either daily or weekly. The last question in the survey was open ended and asked how feedback could be improved. Responses varied from “summary of major points to review”, “give time to reflect on feedback and continue the discussion the next day”, “be open about negative feedback and give it more often if needed”, “use a checklist”, “preceptors should relate their experiences as students so we can better relate to them”, “use the rubric as a guide for feedback”. The same student who articulated using the rubric as a guide mentioned the principle of “beginning with the end in mind” would like the rubric used from the beginning of the feedback process. Implications: While this was a small study, it helped us gain insight to identify some resources for our preceptors to become better teachers. The preceptors in the field have full time careers at pharmacy practice sites and volunteer their time teaching students. It was encouraging to see that all of the preceptors liked teaching pharmacy students and didn’t have to do this as a requirement. The resources that the preceptors identified were mostly online self study programs which may indicate their lack of time for onsite programs. Most of the preceptors identified having not enough time as a barrier to effective teaching so we see a possible link to the lack of time as a barrier to onsite education as well. As we evaluated the interviews from the students we were able to gain their insight and perceptions of feedback in experiential education. For example, all of the students expressed a level of comfort in receiving face to face feedback without intimidation. Approximately 30% of the preceptors surveyed were willing to participate in this study. This raised some concern because we may not have the same level of engagement from those who did not respond. We may need to go back and ask these preceptors similar questions regarding resources, abilities to teach, and the methods in which they provide feedback to our students. The goal of the study was to include 20-40 respondents. The final number was 21. The time of the data collection was during the summer months when many students are on break or at practice sites out of the region. One of the outcomes was to evaluate the frequency of feedback both from the preceptor’s view and from the student’s. Both groups reports frequent feedback and liking frequent feedback. Further, none of the students who participated in the interviews were students at pharmacy practice sites where preceptors did not respond to the survey. There may be opportunity to learn about the feedback process from this group who did not respond. Additional research needs to be completed to determine the resources needed to help
Development of Practice Journal Club using Adult Learning Theory to Facilitate APPE Student Journal Club. Mary K. Gurney, Midwestern University/Glendale, Samantha Karr, Midwestern University/Glendale. Objective: Develop a practice journal club based on Knowles’ andragogy and Kolb’s experiential learning construct to provide Advanced Pharmacy Practice Experience (APPE) rotation students with a general approach to understanding a prospective clinical trial and prepare for their journal club presentation. Method: Andragogy and experiential learning theory focus on the adult learner as integral to the learning process. Both frameworks involve the adult learner moving from a dependent learning mode to a self-directed learning mode and prior experience is viewed as a learning tool in the process. The practice journal club was developed from several resources including The Pharmacist Letter journal club (ACCORD-EYE trial), literature evaluation guides, and a journal club survival guide. Faculty member backgrounds (SK, KB ambulatory care pharmacists; MG social and administrative science) allow for the exploration of different perspectives. Results: Students are provided the practice journal club materials the week prior to beginning their APPE rotations with SK and KB. During the first week of rotation, SK, MG, KB and the APPE students participate in the practice journal club during a 2-hour block. This provides ample time to walk through the article and the critical-thinking processes each utilizes in evaluating journal articles. Implications: The use of adult learning theory to develop a practice journal club provides APPE students the opportunity to move from a dependent learning mode to a self-directed learning mode. Anecdotally, students appear to have a clearer understanding of expectations and how to prepare for journal club on these two faculty rotations.

Experiential Education - Incorporating Active Learning Therapeutic Topics in APPE Rotations. Martha W. Pauli, California Northstate University, Justin Bouw, California Northstate University, Vasudha Gupta, California Northstate University, Paul Nguyen, California Northstate University, Welly Mente, California Northstate University, Joe Hubbard, California Northstate University. Objective: California Northstate University College of Pharmacy (CNUCOP) has incorporated active learning components into the 4th year APPE rotations through “Weekly Summit” meetings. These meetings were planned to allow an enhancement of the students’ education beyond the rotation experience. Method: Students meet 3-4 times in each 6-week APPE Block in assigned Hubs (in person or through virtual connection) for a Therapeutic Topic, identified by faculty input and student prioritization, and centered on clinical use of medications. Therapeutic Topics are written by the 6 Hub Coordinators, utilizing their existing and complimentary expertise. The Therapeutic Topic is assigned one week ahead by uploading on our APPE computer system the required readings, goals and objectives, and study questions. Additionally, a “drug formulary” chart is provided where APPE students identify key clinical pearls of drug use, and then upload their completed drug formulary the night before the Weekly Summit session. A 20-question Individual Readiness Assessment Test (IRAT) is utilized as the first summit component. A discussion of the correct answers and a “white board session” follow, based on readings and drug formulary information. Results: Outcomes of IRAT questions, and student participation in the ‘white board sessions’ are assessed and used as benchmarks for student evaluations. Students rated the Therapeutic Topics highly, suggesting an enhancement to their educational experience in APPEs. Implications: CNUCOP’s exclusive Team Based Learning curriculum prepares students to continue the active learning process, which they began in the didactic classroom component, as they rotate through 4th year APPEs.

Integrating Introductory Pharmacy Practice Experiences and a Didactic Course to Engage Students in Public Health Promotion. Shih-Ying (Audrey) Hsu, West Coast University, Craig Hitchman, West Coast University. Objective: Describe an innovative approach to integrate Introductory Pharmacy Practice Experiences (IPPE) and a required public health course (Health Promotion and Disease Prevention) to engage students in public health promotion. Method: One component of the public health course for first-year pharmacy students is to develop a public health event that can be implemented in community settings. Students utilize Community Practice IPPE sites to provide a realistic patient population and platform for subsequent presentation of said event. The public health course provides students with knowledge, skills, and needs assessment tools to determine an appropriate public health event; students complete a series of structured assignments that guide them through the development process. During weekly IPPE site visits, students perform need assessments of the community, discuss with their preceptor and identify the topic for their event, plan and market the event, and implement this event to the community during their final IPPE visit. Prior to implementation, students will present their plan and receive feedback during the public health course. Results: Three expected outcomes are proposed based on the theory of planned behaviors: 1. Change in students’ perception toward the role of community pharmacists in promoting public health 2. Change in students’ attitude toward engaging in programs focusing on health wellness and disease prevention 3. Perceived self-efficacy in developing and implementing public health initiatives in community settings. Implications: Curricular integration of a practice-based clinical experience (IPPE) and an evidence-based didactic course could increase pharmacy students’ awareness of, and motivate them to engage in health promotion and disease prevention.

Library and Information Science

Completed Research:

A Spoonful of Sugar: Helping Pharmacy Faculty Take Copyright Law. Rienne Johnson, Northeast Ohio Medical University, Kevin A. Caslow, Northeast Ohio Medical University, Beth Layton, Northeast Ohio Medical University, Richard J. Kasmer, Northeast Ohio Medical University. Objectives: Health sciences faculty have difficulty locating images permissible for reposting each year in the course management system. The library developed a directory of permissible image resources, to augment the lecture image audit service. The directory was developed for four broad topic areas: general, basic sciences, clinical medicine, and pharmacy. Method: A data analysis of LibGuides usage statistics between July 1, 2011, and December 31, 2012, was undertaken to examine usage of the directory. Analysis of the guide statistics, paired with the number of audits requested in the same time frame, will allow us to assess how well the guide meets the needs of our faculty. Results: The guide has received 2,690 hits during our study period. In fall 2011, the guide received 409 hits; in fall 2012, 901 hits, more than double the usage. The most popular guide segments are “Image Use in Presentations”, “Citing Images”, and “General Image Resources”, with usage +/- 300 hits during the trial. Fall 2011 audit requests
averaged two a month, while fall 2012 audit requests decreased to an average of less than one audit a month. **Implications:** The guide has seen increasing use since its creation, and faculty members are utilizing the guide to locate their own images, decreasing the need for the audit service. Using image resources from the directory allows repeated use without worrying about copyright compliance, saving faculty time. Decreased audit requests, when compared to increasing guide use, demonstrate a need to continue developing and hosting the resource.

**Eliminating Plagiarism Through Citation Education.** Rienne Johnson, Northeast Ohio Medical University, Heather McEwen, Northeast Ohio Medical University, Michelle L. Cudnik, Northeast Ohio Medical University, Beth Layton, Northeast Ohio Medical University, Richard J. Kasmer, Northeast Ohio Medical University. **Objectives:** Successful health professions students learn more than clinical knowledge and skills; proper attribution of resources is an essential component of the health sciences curriculum. Many students enter educational programs with substandard knowledge of citation methods and what constitutes plagiarism. **Method:** In a first-year evidence-based medicine course, library staff educated medicine and pharmacy students on citing resources and avoiding unintentional plagiarism. Two topical library guides were developed as tools for student reference. These two strategies are intended to improve attribution on the literature review assignment. Two assignments will be reviewed. Guide usage statistics from the assignment periods will be analyzed, and compared with graded faculty rubrics, which identified citation errors on the assignments. **Results:** The guides saw 770 hits during Assignment 1’s duration, and over 3750 hits for Assignment 2’s duration. The primary citation issue from Assignment 1 showed students using the article title as the in-text citation, rather than the author. Students also only used the year in the in-text citation. Assignment 2 citation issues included using multiple citation styles, the use of superscripts in the reference list, and an inability to cite database content. During both years, students included all authors in the reference list, rather than using et al. **Implications:** Fewer Assignment 2 papers had citation issues, but the problems were more varied. This approach addressed prevalent citation issues, but there is room for improvement, especially in regards to creating a reference list. The lecture and guides will be updated to address citation issues seen in prior students’ assignments.

**Evaluating Library Instruction: Examining the Impact of Role-Play Instruction.** Jennifer R. Martin, The University of Arizona, Marion K. Slack, The University of Arizona. **Objectives:** Over a four-year period, role-play instruction was used to demonstrate to third professional year students how to locate relevant literature for their research project proposals. In the first year, little instruction was provided for literature searching techniques; currently, students have had library-related instruction in other classes. The objective of this study is to compare comments from the first and fourth years in order to modify the instructional presentation to best meet students’ changing needs. **Method:** The worksheet accompanying the role-play had two questions that asked students what was helpful about the presentation and what would make the presentation more helpful. Comments were analyzed by identifying themes and summarizing the comments. **Results:** Identified themes included more in-depth discussion of resources, the literature search process, and other suggestions. In the first year, multiple comments indicated students found the process demonstration and the interaction between the librarian and student most helpful. In the fourth year, the interaction was not mentioned and there were limited comments on basic search strategies. Instead, students wanted to learn more about new resources such as a research methods database and bibliographic management software. **Implications:** Since role-play has been implemented, student needs appear to have changed from the first year to the fourth year from very basic information to more advanced skills and knowledge. Based on this information, the class will be changed to focus more on advanced library skills. The example illustrates that collecting feedback can identify students’ changing needs and assist instructors with modifying the class content to accommodate.

**Librarian and Faculty Collaboration Pushes Traffic to Library Subject Guide.** Xiaomei Gu, The University of Iowa. **Objectives:** By examining web analytics data, this poster discusses what makes a pharmacy subject guide popular. **Method:** The Liaison Librarian to the College of Pharmacy has customized and continues to update a web-based subject guide for the PharmD curriculum. Among hundreds of subject guides developed at the University of Iowa Libraries, this guide has been consistently ranked as the most popular. This poster examines the subject guide’s web analytics data for the last two years. **Results:** The Pharmacy guide received a total of 129, 998 hits in 2011 and 149,103 in 2012. In both years, Pharmacy Practice Laboratory (PPL) course management website accounted for most of the traffic (77,674 hits in 2011 and 91,762 hits in 2012), comprising more than half of the total hits. The second biggest traffic source was direct traffic (7,908 hits in 2011 and 13,462 hits in 2012), meaning users know the URL. Other major traffic sources included library website, College of Pharmacy website, Google and Bing. **Implications:** At the University of Iowa, information literacy has been increasingly incorporated into the PharmD curriculum, and the Liaison Librarian shares the teaching load of drug information and literature searching skills with two faculty members in PPL. PPL website being the biggest traffic source for the Pharmacy guide suggests collaboration between the librarian and the faculty has been effective in promoting library resources and making them popular.

**Reference Services at the Point of Need: A Pilot Project of Providing Librarian Office Hours.** Xiaomei Gu, The University of Iowa. **Objectives:** To describe a Pharmacy Librarian’s pilot project of providing physical and virtual office hours and discuss the successes and challenges. **Method:** Up until Spring Semester 2012, the librarian’s involvement in pharmacy education was primarily limited to formal classroom teaching. In Fall Semester 2012, she started to hold office hours to reach out to students beyond the classrooms. To help spread the word, the College of Pharmacy Center for Teaching sponsored a kickoff reception. The onsite office hour was held in the College of Pharmacy building for an hour each week, and the virtual office hour was held using Skype and Google + for another hour on a different day of the week. **Results:** Ten visits were received during the 13 onsite office hours (1 from a PharmD student, 6 from graduate students and 3 from faculty). No visits were received online. Overall, the pilot project achieved the librarian’s goal of reaching out to students. The only challenge she had was the lack of visible office space in the Pharmacy building. This limitation was minimized by using clearly marked signs. She felt encouraged to continue onsite office hours in the coming semester. Virtual assistance will only be provided upon request. **Implications:** Since most library resources are now available online and can be accessed anytime anywhere, people don’t visit the library building as often as they used to. Office hours not only allow librarians to provide services at the point of need but make their expertise more visible.
Relationship Between Student Confidence and Cumulative GPA Upon Completion of Didactic PharmD Coursework. Lisa Lebovitz, University of Maryland, Stuart T. Haines, University of Maryland, Deborah A. Sturpe, University of Maryland, David S. Roffman, University of Maryland, Richard N. Dalby, University of Maryland. Objectives: Social-cognitive theory suggests that both self-confidence and actual ability to perform a skill influence the likelihood of an individual engaging in that behavior. The objective of this study is to evaluate the relationship between self-reported student confidence and measured academic ability at the end of the didactic pharmacy curriculum. Method: The University of Maryland School of Pharmacy requires all students to complete an annual survey to measure perceived self-confidence in meeting the program’s terminal performance outcomes (TPOs). This survey tool presents three case scenarios; each is followed by a list of tasks essential to addressing the problems in the case. Each task is anchored to the TPOs. The survey is administered upon matriculation and each spring thereafter. Students are asked to envision themselves in each scenario and rate their current confidence to perform the tasks. Each student’s cumulative grade point average (C-GPA) is obtained from the Banner registration system. A Pearson coefficient correlation was calculated to compare mean self-confidence with C-GPA at the end of the third professional year of the program. Results: Mean self-confidence improved from “low” level to “knowledgeable” for most tasks over P1-P3 years. Mean P3 C-GPA averages 3.35/4.00 (SD=0.35). No correlation was found between confidence and C-GPA (r=−0.03). Implications: Student self-confidence to complete essential pharmacy practice skills at the end of the didactic curriculum is not correlated with academic performance as measured solely by C-GPA. Further research is warranted to confirm these findings and to evaluate if other measures of academic ability provide a better correlation.

Student and Faculty Perceptions of Lecture Recording in a Doctor of Pharmacy Curriculum. Lena M. Maynor, West Virginia University, Ashleigh Landis, Mary K. Stamatakis, West Virginia University, David P. Elliott, West Virginia University. Objectives: The primary objective of this study was to describe the perceptions of students and faculty on the impact of lecture recording in a doctor of pharmacy curriculum. Secondary outcomes included assessing the impact on student attendance and faculty concerns regarding lecture recording. Method: This study was approved by the Institutional Review Board at West Virginia University (WVU). Second and third professional year pharmacy students completed an anonymous survey regarding their perceptions of lecture recording. Pharmacy faculty completed a separate anonymous survey regarding their perceptions of lecture recording. Results: Seventy surveys were distributed to the second year class, and 72 surveys were distributed to the third year class. Seventy completed surveys were returned from each class. Most students (73%) rated classroom capture as at least somewhat helpful, with no statistical difference between classes. Forty-six percent of the total student cohort reported being more likely to miss a class that was recorded; however, relatively few students (10%) reported using recordings as a substitute for attending class. Twenty-six of 46 faculty responded to the survey. Faculty concerns with lecture recording included decreased attendance (27%), professionalism/socialization (23%), understanding of material (18%), performance for individual students already struggling academically (14%), and overall course performance (10%). Other reasons (5%) and no concerns (3%) were also reported. Implications: The true impact lecture recording on student performance has not been fully elucidated. With increased use of recording technology, a better understanding of how recordings are utilized and true impact on student performance needs to be assessed.

Theoretical Models:

Novel Approach to an Assessment Committee. Lisa Lebovitz, University of Maryland, Fadia T. Shaya, University of Maryland, Richard N. Dalby, University of Maryland. Objectives: The objective was to form an assessment committee that could effect meaningful evidence-based changes with faculty buy-in and resource commitments. Method: In 2011 the University of Maryland School of Pharmacy formed an assessment committee (AC) consisting of all associate deans plus a faculty member from each department. The AC’s general charges were to review the strategic plan goals and institutional data, gather feedback from relevant stakeholders, and recommend and implement any changes. In 2011-2012, the AC gathered feedback by sending a representative to department or committee meetings. In 2012-2013, the feedback mechanism expanded to open meetings. A community town hall was also held for feedback on environmental goals. The associate deans have access to campus data that might otherwise not be available to faculty, which has enabled the AC to delve further into questions raised during the assessment process. Results: Increased transparency has enabled the school to maintain focus on the strategic plan goals and program strengths and weaknesses. Faculty on other standing committees are aware of the breadth of institutional data available for evidence-based decision making. AACP faculty survey data indicates that the assessment committee is perceived as increasingly effective (24% increase between 2009 and 2012). Implications: Institutional goals and program outcomes often extend beyond the scope of any one faculty committee, as does control of the resources and policies that may be necessary to implement changes. A leadership committee with faculty representation, and open communication, is important for real continuous quality improvement and building a culture of assessment.

Pharmaceutics

Completed Research:

Active Learning & Technology: A Feasibility Pilot Study with Student Participation Technology. Jerry Nesamony, The University of Toledo, Michael J. Peeters, The University of Toledo. Objectives: Class participation technology has been used in attempts to facilitate students’ active learning. In a 1-year PharmD pharmacuetics course, this study implemented technology to evaluate feasibility. Method: This course spanned two semesters (Fall/Spring). In 1st half of Fall, no student participation technology was used in the class, but 2nd half of Fall used clickers. No participation technology was used in 1st half of Spring, but blogging was implemented in 2nd half. To assess feasibility, students were asked for perceptions with each technology, and the course instructor’s perspective was sought. Additionally, two 5-question quizzes were administered during each half of both courses. Quizzes were created using Bloom’s Taxonomy and similar difficulty among all quizzes was double-checked using test results. For statistical analysis of quizzes, we compared combined quiz1+2 with quiz3+4 and quiz5+6 with quiz7+8 by paired t-test. Results: Of 110 students, 97% felt more engaged in class using clickers and 90% preferred using clickers over not. For blogging, 28% felt more engaged in class while 27% preferred blogging to not. In Fall, quiz1+2 and quiz3+4 improved (7.86 vs 8.21, p=0.032) with Cohen’s d = 0.24 (small). While in Spring, quiz5+6 & quiz7+8 declined (7.32 vs 6.60, p=0.005, d=0.32 [small]). Average quiz standard error of measurement was 0.83. The instructor thought both technologies seemed helpful and neither was cumbersome to implement. Implications: Students preferred clickers and felt more engaged in class, however...
students preferred blogging much less and felt less engaged. While pilot quiz data had limited reliability, feasibility was conducive.

**Assessment of Student Compounding Skills at St. Louis College of Pharmacy.** Rasma S. Chereson, St. Louis College of Pharmacy, Noha Salama, St. Louis College of Pharmacy, Rhonda Bilger, St. Louis College of Pharmacy. **Objectives:** Compounding competence is integral to pharmacists’ education, demonstrating the importance of science, critical thinking and accuracy in providing patient therapy. In an earlier study at our school assessing compounding accuracy, students were not told their work would be assayed. The current study evaluated whether student performance would improve if they knew beforehand that their preparations would be analyzed. **Method:** Students (n=232, 99M) formulated an aqueous solution with one active ingredient substituted with FD&C Red dye #40/lactose mixture (1:200). Aliquots were spectrophotometrically analyzed at 500nm and the corresponding concentrations calculated using a standard curve (1.5-18mcg/ml). The percent error was calculated and statistically compared to earlier reports (t-test, P<0.05). Data comparison was performed based on gender. The mean ± SD for the absolute percent error values was calculated. **Results:** The mean ± SD of the percent error (8.7 ± 12.7%) was not significantly different from prior evaluation (8.6 ± 16.5%). Gender didn’t significantly influence compounding accuracy (8.03 ± 10.96 vs.9.71 ± 14.72 for females vs. males). The gender data was comparable to previous studies (8.2 ± 15.1 vs. 9.2 ± 18.7 for females vs. males). In this study, 75.4% of the students accurately compounded with <10% error vs. 75.3% in the previous study. **Implications:** Students demonstrated accuracy in compounding skills regardless of whether they knew their preparations would be analyzed or not. Additionally, competency was demonstrated in two classes over 2 consecutive years with the majority of students meeting accuracy limits (±10%) set by the Missouri Board of Pharmacy. Early intervention to improve accuracy is still needed for those who did not meet this specification.

**Combination Nanocarriers (CHE-EVR) for Treatment of Ovarian Cancer Targeting Downstream Signaling Pathways (HIF-1 & mTOR).** Wahath G. Alani, Oregon State University, Bhuvana Shyam Doddapaneni, Oregon State University. **Objectives:** Our objective is to develop a new nanocarrier for ovarian cancer treatment based on the combination EVR and CHE. **Method:** PEG2000-b-PLA1800 (15 mg) and CHE (0.5 mg) were dissolved in 0.5 mL of acetonitrile. The organic solvent was evaporated; the resulting polymeric film was reconstituted with 0.5 mL DD H2O. The formed micelles were centrifuged and filtered through 0.45μm filter. A similar method was followed for EVR (0.5 mg) and combination micelles. The loading ratio for combination micelles of CHE-EVR was 1:1. Micelles were characterized for size and drug entrapment efficiency by DLS and HPLC methods respectively. **Results:** The average size of the CHE and EVR loaded PEG-b-PLA micelles was 27.32 ± 1.12 nm and 28.10 ± 0.14 nm respectively. The poly dispersity index of CHE and EVR micelles were 0.139 ± 0.019 and 0.153 ± 0.019 respectively. Entrapment efficiencies for the estrogen targeting cyclodextrin which were synthesized and characterized through multi-step reactions and spectral methods. Adamantane were also conjugated to the PEG terminal to serve as a guest molecule moiety for the estrogen targeting cyclodextrin which were synthesized and characterized through multi-step reactions and spectral methods. Adamantane doxorubicin prodrug was functionalized with gossypol in the PEG terminal through reductive amination. Enhancing apoptosis (comparing IC50 values) was observed in undifferentiated and differentiated cells with both types of liposomes compared to bortezomib alone in the Alamar Blue® assay. **Implications:** The results indicate that encapsulation of bortezomib into ceramide liposomes may enhance apoptosis on osteoblast and osteosarcomas cells and thus may be useful for osteosarcomas in addition to multiple myeloma.

**Enhanced Apoptosis with Bortezomib Encapsulated in Liposomes: A Comparison of Cationic and Ceramide Liposomes.** Gabriel Park, Annette Gilchrist, Midwestern University/Downers Grove, Medha Joshi, Midwestern University/Downers Grove. **Objectives:** Multiple myeloma (MM) is a malignancy of terminally differentiated B-lymphocytes. The standard of care for MM is bortezomib, a compound capable of inducing myeloma cell apoptosis. We propose development of cationic and ceramide liposomes loaded with bortezomib for effective apoptosis induction. Both cationic liposomes and ceramides are known to induce apoptosis through independent mechanisms. **Method:** Using MC3T3, a mouse osteoblast precursor cell line and U2OS, a human osteosarcoma cell line, we established bortezomib treatment resulted in a time- and dose-dependent decrease in metabolic activity, indicative of enhanced apoptosis. Liposomes were prepared by dry film evaporation, characterized for particle size, zeta potential, and loading efficiency. The metabolic activity of undifferentiated and differentiated cells after treatment with ceramide and cationic liposomes loaded with bortezomib was checked in comparison to bortezomib alone using the Alamar Blue® assay. **Results:** The average size of liposomes was found to be ~200 nm with polidispersity index 0.2. The zeta potential for ceramide liposomes was found to be -4.16 mV and +37 mV for cationic liposomes. The percentage loading of bortezomib as determined by HPLC was found to be 17% for ceramide liposomes 27% for cationic liposomes. Enhanced apoptosis (comparing IC50 values) was observed in undifferentiated and differentiated cells with both types of liposomes compared to bortezomib alone in the Alamar Blue® assay. **Implications:** The results indicate that encapsulation of bortezomib into ceramide liposomes may enhance apoptosis on osteoblast and osteosarcomas cells and thus may be useful for osteosarcomas in addition to multiple myeloma.

**Estrogen-anchored Multifunctional Micelles Designed for Site-specific Delivery of Doxorubicin Prodrug in Breast Cancer Therapy.** Juanjuan Yin, University of South Florida, Shufeng Zhou, University of South Florida. **Objectives:** The efficacy and applicability of anticancer drugs are greatly restricted by severe systemic toxicities and drug resistance. Targeting drug delivery strategies is an active area of research and it has been developed to prevent the shortcomings of chemotherapy. Nano-scaled drug delivery systems hold tremendous potential for the treatment of neoplasms. In this study, multifunctional estrogen anchored polymer micelles have been designed and prepared, and it is aimed to deliver therapeutics as well as accessorial agents such as antioxidants to estrogen positive cancer cells, the polymer micelles were constructed by covalent and non-covalent interactions to release the drug in a controlled way. The multifunctional micelles are expected to enhance the drug uptake by cancer cells and spare normal tissues compared to conventional chemotherapy. **Method:** The PEG-PLA di-block co-polymer was functionalized with gossypol in the PEG terminal through reductive amination. Adamantane were also conjugated to the PEG terminal to serve as a guest molecule moiety for the estrogen targeting cyclodextrin which were synthesized and characterized through multi-step reactions and spectral methods. Adamantine doxorubicin prodrug was prepared and encapsulated the polymer micelles. In vitro competition experiment of ER positive (MCF-7) and negative (CRL 1954) for the targeting and non-targeting micelles was at varying concentrations were assessed. The in vitro drug release profile was determined by dialysis and fluorescence measurement, and targeted drug binding in vitro was quantified by flow cytometry and confocal microscopy. The cytotoxicity of the different micelles was measured and the biomarkers related to free Dox-induced cardio-toxicity were also examined at the cellular level. **Results:** In our preliminary study, estrogen anchored multifunctional micelles were
successfully synthesized and their structures were confirmed. Cellular uptake experiments demonstrated an efficient and preferentially targeted delivery of drugs into ER-positive carcinomatous cells. **Implications:**

The targeted polymer micelles possess high drug association and sustained drug release properties with good biocompatibility and physiological stability. It targeted specific to ER positive cancer cells. Estrogen anchored multifunctional micelles might be promising as an anti-tumor treatment. Drug internalization via endocytosis was confirmed.

**Evaluating Pharmacy Student Learning in Pharmaceutics Course Utilizing Student Assessment of Learning Gains (SALG) Instrument.**

Rajesh Vadlapatla, University of Saint Joseph, Yingnan Zhao, University of Saint Joseph, Sukhvir Kaur, University of Saint Joseph. **Objectives:** To identify and evaluate the specific learning gains that the student perceive in pharmaceutics course in a modified-block style pharmacy curriculum. **Method:** SALG survey was sent to seventy six first year professional pharmacy students three months after the delivery of the course. The information on eight specific sections of SALG (forty questions in total) was collected anonymously, using the Blackboard survey tool. **Results:** Out of seventy six students invited, forty eight students (63%) completed the survey. Overall, students rated the course to be well delivered with more than ninety-one (91%) reported at least "good gains" on all questions of the sections over-all perception, understanding of the class contents, and instructional approach employed in the class. The students termed group work as the most beneficial twenty different course items were to their learning using SALG instrument. Anonymously, using the Blackboard survey tool.

**Implications:**

SALG instrument is a very useful tool in evaluating student learning in pharmaceutics course. Employing this evaluation tool allows instructors to analyze and modify their teaching methods.

**Evaluation of Students’ Perceptions Regarding Their Learning within a Pharmaceutics Course Sequence.**

Hillary Aphaisuwan, Midwestern University/Glendale, Bill J. Bowman, Midwestern University/Glendale. **Objectives:** To determine students’ perceptions regarding 1) how beneficial different aspects of a pharmaceutics course sequence were to their learning, 2) which course items were most and least beneficial, and 3) what should be added to improve student learning. **Method:** During the 2010-2013 academic years (n = 3), a survey instrument was distributed and collected at the conclusion of the pharmaceutics course sequence. The instrument asked students to rate how beneficial twenty different course items were to their learning using a four-point scale. The instrument also asked students to indicate which item was most beneficial, which was least beneficial, and what should be added to improve student learning. **Results:** The response rate was 98% (n = 442). All course items were utilized by at least 97% of students except for supplemental readings (63%). Review questions (3.93 ± 0.29) and course instructor’s knowledge (3.93 ± 0.26) were rated as having the highest mean level of benefit while supplemental readings had the lowest (2.90 ± 0.26). Compounding activities (n = 125) and review questions (n = 95) were most frequently indicated as most beneficial while pre-lab assignments (n = 52) and supplementary readings (n = 47) were most frequently indicated as least beneficial. Open lab sessions appear to be the most common theme with regard to what should be added to improve student learning. **Implications:** Students seemed to perceive the items that enabled them to practice the course material as being more beneficial to their learning. In addition, the lack of a comprehensive text for the pharmaceutics course sequence may be reflected in the lower perceived benefit of the supplemental readings.

**Evaluation of Students’ Perceptions Regarding their Development within an Introduction to Teaching and Learning Elective.**

Bill J. Bowman, Midwestern University/Glendale. **Objectives:** To determine students’ perceptions regarding 1) how beneficial different aspects of an Introduction to Teaching and Learning elective course were to their development, 2) which course items were most and least beneficial, and 3) what should be added to improve student development. **Method:** The elective was offered during the fall and winter quarters of the 2012/2013 academic year and enabled second year pharmacy students to serve as lab instructors for the pharmaceutics courses and to participate within educational philosophy discussions. A survey instrument was distributed and collected at the conclusion of the elective. The instrument asked students to rate how beneficial various course items were to their development using a four-point scale. The instrument also asked students to indicate which item was most beneficial, which was least beneficial, and what should be added to improve student development. **Results:** The response rate was 100% (n = 16). Lab instructor keys (3.94 ± 0.25), pre-lab sessions (3.75 ± 0.58), and laboratory instruction (3.73 ± 0.46) were rated as having the highest mean level of benefit. Laboratory instruction (n = 9) and pre-lab sessions (n = 7) were most frequently indicated as most beneficial while the educational philosophy discussions (n = 4) were most frequently indicated as least beneficial. Providing additional feedback on laboratory instruction was the most common theme with regard to what should be added to improve student development. **Implications:** Students seemed to perceive the course items that directly prepared them to teach as being more beneficial to their development than the items that explored teaching and learning from more of a philosophical perspective.

**Formulation and In Vivo Evaluation of Novel Particulate Breast Cancer Vaccine.**

Lipika Chablani, St. John Fisher College, Suprita A. Tawde, Akorn Pharmaceuticals, Archana M. Akalkotkar, Mercer University, Martin J. D’Souza, Mercer University. **Objectives:** This study aims to formulate and evaluate a novel particulate breast cancer vaccine in a murine model. **Method:** The 67NR murine breast cancer cells were used to prepare the whole cell lysate. The total protein content of the lysate was determined using Bio-Rad DC protein assay. Buchi spray dryer was used to formulate the microparticulate vaccine. Particles were characterized for surface morphology and size. For in vivo studies 4-6 week old Balb/c female mice were primed and boosted every alternate week with successive doses of vaccine particles (n = 6 in each group). Blood samples were collected one week after each dosing to detect serum IgG levels. After the final booster, a group of animals was challenged with 10^6 live 67NR cells subcutaneously. Challenged animals were observed for tumor growth. Another group of vaccinated animals was sacrificed and the lymphatic organs were collected to analyze T cell population by flow cytometry. **Results:** Total protein content of the lysate was 2-4mg/mL. The yield of spray drying process was 60-65%/w/w. The average particle size of the vaccine particle was 1.3-1.7um. Serum antibody levels were significantly higher in vaccinated animals when compared to controls (p < 0.001) confirming activation of humoral response. Vaccinated animals were protected from tumor challenge for significantly longer intervals than controls (p < 0.001) depicting vaccine efficacy. The T-cell population was significantly higher than the control animals showing activation of cellular immune response. **Implications:** The novel approach to formulate particulate breast cancer vaccine proves to be a promising mode of immunization against breast cancer.

**Formulation of Extended-release Dosage Forms by Spray Drying.**

Gerald Enriquez, Brandon Oravec, Chicago State University, Duc P. Do, Chicago State University. **Objectives:** Oral administration remains the most convenient route of drug delivery. Despite some progress, oral extended-release dosage forms have not yet reached their full...
potential in the clinic. The aim of the present study was to formulate and evaluate extended-release oral dosage forms by spray drying. **Method:** Drug-loaded microspheres were prepared by a spray drying method using biodegradable polymers. Once prepared, the drug-loaded microparticle powder was placed into hard gelatin capsules. Prepared formulations were characterized for their physicochemical properties. Scanning electron microscopy (SEM) was used to analyze the size, surface morphology, and size distribution of the drug-loaded microspheres. Raman spectroscopy and FTIR were used to evaluate the chemical integrity of the encapsulated drug in the biodegradable microsphere drug formulations. Additionally, thermal stability of the drug in the polymeric matrix was analyzed using differential scanning calorimetry (DSC). Release studies of drug-loaded microspheres and capsules containing drug-loaded microspheres were carried out as per the USP guidelines. **Results:** SEM analysis indicated that microspheres were less than 2-μm in size. The average Zeta potential measurements were approximately -30 mV. DSC and FTIR spectra showed that the drug-encapsulated in the microspheres were stable. Furthermore, both microsphere and capsule-encapsulating microsphere formulations were shown to provide extended-release of the drug over 24 hours. **Implications:** Gelatin capsules containing biodegradable microspheres show potential for effective delivery of oral extended-release drug formulations.

**Identification of Factors that Affect Student Performance in a Pharmacy Calculations Course.** Edward M. DeSimone, Creighton University, Justin A. Tolman, Creighton University, Yongyue Qi, Creighton University. **Objectives:** In this exploratory study, the objective was to identify factors that affect or are associated with student performance in the Calculations in Pharmacy Practice (calculations) course in two diverse data sets: admissions data and course-related activities. **Method:** This study involved first professional year students (115 campus and 74 distance) in the fall of 2012 who were enrolled in the required calculations course. The dependent variable in all observations was the final percentage grade for each student. Among the independent variables was a thirteen-item Pharmacy Calculations Assessment Exam (PCAE) internally developed for this course and the externally validated Health Sciences Reasoning Test (HSRT) which provided scores in five areas of critical thinking and a composite score. Admissions data included admissions status, pathway, gender, age, pre-pharmacy GPA, Pharmacy College Admission Test (PCAT) score, and more. **Results:** ANOVA showed a significant effect of admission status (Admit, High Alternate, Medium Alternate, Low Alternate) on the numeric final course grade (p<0.01). There were no effects for interviewer ranking, pathway, gender, degrees, and age (p>0.05). The following showed significant correlation with the final course grade: pre-pharmacy GPA, pre-pharmacy science GPA, PCAT score, PCAE score, and the HSRT composite score (p<0.01). **Implications:** The data show that admissions status and location on the “wait list”, GPA, and PCAT score may have a predictive effect for student performance in the calculations course. In addition, these results will contribute to the on-going discussion of the use of the PCAE and Health Sciences Reasoning Test as part of the pre-admissions process.

**Implementation of Fresh Pedagogical Tools to Enhance Student Learning of Pharmaceutics in 3 Year PharmD Program.** Ravikiran Panakantis, Roosevelt University, Amusa S. Adebayo, Roosevelt University, Christianah M. Adeyeye, Roosevelt University, Ruth Adewuya, Roosevelt University. **Objectives:** Delivery of pharmaceutics is challenging to PharmD students especially in a 3 year accelerated program owing to the subject matter and their first exposure to applied biology, chemistry, physics and mathematics components of the course. The major objective was to evaluate the effect of group exams and pre-lecture quizzes on the educational outcomes (learning and performance) for Roosevelt University College of Pharmacy (RUCOP) students. **Method:** PY1 2012 students were given in-class quizzes based on the previous lecture before the beginning of every new lecture for Pharmaceutics- 521: Drug delivery lecture. Also, immediately after every exam, students were asked to take a group exam after the formal exam. A comparative analysis of the PY1 students’ learning and performance in Pharmaceutics- 521: Drug delivery lectures in 2011 (when there was no pre-lecture quiz and post-exam group exam) was made using the PY1 2012 students data. In addition, group-based presentation topics adapted from the biochemistry course presentation topics were integrated with pharmaceutics dosage forms and delivery concepts to make students understand the relevance of drug formulations to various disease states. Statistical significance was determined by unpaired t-test. **Results:** The class average of the students improved from 72.8% ± 5.3% to 80.1%±5.7%. Subsequent analysis by unpaired t-test showed a marked trend (0.06) in improvement of students performance in pharmaceutics–drug delivery course from year 2011 to that in 2012. **Implications:** In-class quizzes and group exams appeared to enhance students understanding of the concepts. In addition, the integrated class presentations using disease states in biochemistry further improved students’ performance.

**Increasing Student Understanding of Treatment and Recovery from Chemical and Behavioral Addictions.** Steven G. Oakes, University of Wisconsin-Madison, Orly Vardeny, University of Wisconsin-Madison. **Objectives:** To develop, implement and evaluate a “Recovery Project” (RP) to increase student understanding of chemical/behavioral addiction treatments. **Method:** Times and locations for support meetings were identified for the 2012 spring semester. Course coordinators contacted inpatient and outpatient treatment centers and the Oxford House to secure approval for students to visit the facilities. Third-year pharmacy students taking the two-credit elective course Substances of Abuse and Treatment in the spring semester of 2012 were required to choose one meeting or facility to visit. Students submitted a one page summary of their impressions of the meeting or facility. On the last day of the course, all students were grouped with others who had made a similar visit. Each group of students talked about their experiences and impressions. Upon completion of the course, 45 out 45 students were anonymously surveyed about the RP. **Results:** Students attended Alcohols Anonymous, Narcotics Anonymous, treatment centers (one outpatient, one inpatient, one outpatient/inpatient), Oxford House, Overeaters Anonymous, Gamblers Anonymous, Sex Addicts Anonymous and SMART Recovery. On a six point scale (1=strongly disagree to 6=strongly agree), students strongly agreed the RP was a worthwhile addition to the course (5.5, 91%) and having each student speak about their impressions was valuable (5.2, 86%). **Implications:** The RP was well received by students and greatly widened student exposure and understanding of addiction recovery. The RP program has been expanded to include more options in the 2013 spring term course with an increased enrollment of 69 students.

**Integration of iPads Into a Pharmacy Classroom.** Shawn D. Spencer, Fairleigh Dickinson University, Yong Guo, Fairleigh Dickinson University, Sandeep Vansal, Fairleigh Dickinson University, Gail B. Rattinger, Fairleigh Dickinson University, Anastasia M. Rivkin, Fairleigh Dickinson University. **Objectives:** To examine student perceptions on using iPads in the classroom. **Method:** At Fairleigh Dickinson University School of Pharmacy, students were given iPads for use in the classroom to improve student engagement during classes. This study sought to evaluate whether deployment of iPads provides
a means of enhancing the learning experience through “lightweight”, “immediate” and “finger-tip” access to e-textbooks, lecture slides, and internet research. Students were surveyed on their utilization preferences for the iPads, and their perceptions on whether use in the classroom positively affected learning. **Results:** Seventy-one of 81 students completed the survey. The majority of students reported utilizing iPads to actively engage with the material in the classroom. For instance, 87% reported using iPad for internet research and looking-up information during class and 63% reported using iPad for pharmacy-related apps at least daily. However, students did not prefer iPad for accessing e-textbooks (21%) or for note-taking (10%). The most common uses for iPad were accessing lecture materials (31%) and looking-up information (31%) compared to reading e-textbooks (11%), note-taking (14%) and recording audio (10%). Interestingly, 70% of students felt more “motivated” to learn using iPad whereas 62% of students indicated it was easier to assimilate course-related information. Most students (78%) felt iPad “enhanced learning” when prompted to use by faculty with 61% of students responding that overall iPad use “positively affected their learning”. **Implications:** This study provides insights on how iPad use can support student learning in pharmacy classrooms.

**Kinetics and Mechanism of Apomorphine Hydrolysis.** Abeer M. Al-Ghananeem, *Sullivan University*, Sarah Baltzley, *Sullivan University*, Yuan Zhao, *Sullivan University*, Maria Lourdes Ceballos-Coronel, *Sullivan University*, Hieu T. Tran, *Sullivan University*. **Objectives:** The aim of this study was to investigate the hydrolytic kinetics of apomorphine hydrochloride (APO) and establish the drug pH-rate profile. **Method:** The hydrolytic kinetics of apomorphine hydrochloride (APO) was investigated by using reversed-phase high-performance liquid chromatography (HPLC) with UV detection. The HPLC method was validated over the range of concentration studied. The influences of pH and temperature on hydrolysis of APO were studied in aqueous solutions. Stability studies were performed under nitrogen blanket to minimize oxidative degradation and allow aqueous hydrolysis only to establish the pH-rate profile for the compound. **Results:** Apomorphine in aqueous solution tends to undergo rapid oxidation especially when exposed to light and oxygen. The hydrolysis followed pseudo-first-order kinetics at 30 °C. The log kobs-pH profile indicated that the optimal stability range was at pH 2.5 - 6.0. Rate constants have been determined for reactions run over a pH range of 2-10. The rate constant of overall hydrolysis as a function of temperature under the given conditions obeyed the Arrhenius equation. Analysis of the alkaline-induced degraded solution of APO by HPLC revealed at least three degradation products: apomorphine-o-dione, apomorphine-p-dione, and oxoapomorphine. The limits of quantitation of the HPLC method were 0.1mg/mL for APO. The linearity of APO showed a correlation coefficient of 0.9999 over the 0.1 mg/mL - 10 mg/mL concentration range. **Implications:** The current work illustrated a better understanding of apomorphine behavior in aqueous solutions without the influence of air oxygen. The HPLC method is applicable for rapid, sensitive, and simultaneous determination of apomorphine.

**Pharmacy Career Awareness of High School Students Post-Roosevelt University College of Pharmacy Career Trek Session.** Ruth Adewuya, *Roosevelt University*, Christiania M. Adeyeye, *Roosevelt University*, Amusa S. Adebayo, *Roosevelt University*, Ravikiran Panakantis, *Roosevelt University*. **Objectives:** The aim is to expose students to the profession of pharmacy through a career talk and a hands-on participation in a Pharmaceutics compounding lab. **Method:** Three sets of high school students - sophomore to senior (total of 41) participated in the Career Trek Session. During the visit students were given a Career talk and later participated in compounding a semi-solid dosage form (lip balm). A pre-and post-visit survey was given to assess their knowledge of pharmacy profession using a Likert scale (5 = Very strong, 4 = Strong, 3 = Average, 2 = Weak, 1 = Very weak). **Results:** A total of 41 students participated in the Career Trek Session. Eighty-six percent of the students were female. 44%, 34%, 15%, and 7% of the students that responded were of Asian, Caucasian, Latino.
and Pacific Islander/African American descent respectively. The pre-survey results showed that 66% of the students rated their knowledge of the pharmacy profession as average, 10% strong and 24% weak. In contrast, the post-visit survey showed 15%, 44%, and 41% of students rating their knowledge as very strong, strong and neutral respectively. It also indicated that 98% of the students viewed the Career Talk and laboratory experience as helpful in giving them an overall understanding of the profession of pharmacy. **Implications:** The HS Career Trek session improved significantly the knowledge of the students of pharmacy profession and careers. The hands-on laboratory compounding exercise further enhanced their interest in Pharmacy as a career.

**Pharmacy Students’ Appreciation of Quality Compounded Preparations Using Product Analysis.** Alyssa M. Pignato, St. John Fisher College, Vivek S. Dave, St. John Fisher College, Christine R. Birnie, St. John Fisher College. **Objectives:** Pharmacists in any practice setting are expected to provide extemporaneous compounded quality products for patients. It is important for pharmacy students to understand and appreciate the evaluation process involved in ensuring the quality of preparations. Currently, pharmacy school curricula lack emphasis in this area. The objective of this research was to assess students’ understanding of the importance of quality of compounded preparations. **Methods:** First-year pharmacy students (n=77) at St. John Fisher College, Wegmans School of Pharmacy participated in a routine compounding laboratory exercise in which the final product was analyzed using UV-spectrometry. Students were given an opportunity to reflect upon the laboratory experience and comment on potential sources of error during their compounding process. In addition, students were provided an optional survey to evaluate the laboratory exercise. **Results:** Survey data indicated that 87.0% of students strongly agreed/agreed that the exercise improved their understanding of the importance of quality in compounded pharmaceutical products. A majority (85.7%) of students believed this exercise enabled them to prepare compounded products more accurately in the future. Students’ written comments cited common sources of error, including inaccurate weighing, contamination, and product loss during both the compounding process as well as during sample preparation for analysis. **Implications:** Integrating an analytical method during a routine laboratory can further enhance students’ understanding and appreciation for quality of compounded products. It can also provide students a chance to reflect on potential sources of error in an attempt to improve compounding techniques in the future.

**Pre-Clinical Evaluation of a Novel Microbicide Delivery System for HIV-1 Prevention.** Simi Gunaseelan, West Coast University, Gunaseelan Krishnan, Philippe Gallay, Michael Bobardt, Charlene Dezzutti, Richard Maskiewicz. **Objectives:** Microbicides, products applied vaginally or rectally, are effective at preventing HIV transmission. However, many products (e.g., peptides, antiretroviral drugs) are reactive/incompatible in the existing diffusion/hydration/dissolution based delivery systems. To overcome the issues of extended delivery and product compatibility, the use of a novel subliming solid matrix-based delivery system is described here. **Method:** The microbicides C5A, tenofovir fumarate, emtricitabine, dapivirane, UC-781 and IQP0528 were employed as representatives of a range of molecular structures and physicochemical properties. Hydrophobic, chemically inert subliming solid matrices, utilized for microbicide formulations and achieving a defined range of sustained release rates, included norborne, hexamethyleneclotrisoxane, perfluoroundecane, perfluorododecane and cyclododecane. Rates of matrix sublimation and concomitant microbicide release were determined in vitro. Formulations were tested for cellular toxicity and durations of anti-HIV-1 activity by constant release of microbicides from the sublimable matrices. **Results:** Subliming solid matrices release microbicides by surface erosion achieved through sublimation. Zero order sustained microbicide release was achieved in vitro, at rates independent of microbicide structures and properties, and controlled exclusively by sublimation enthalpies of each hydrophobic matrix material. The matrices provided prolongation of anti-HIV-1 activity relative to bolus microbicide administration, when evaluated in cultured human ectocervical tissue, macrophages, and TZM reporter cells. No evidence of matrix toxicity was observed after continuous exposure to macrophages, T-lymphocytes, PBMC cells and ectocervical explants. **Implications:** Subliming matrices offer unique attributes that will allow steady-state delivery of any microbicide, over durations ranging from weeks to months, by employing, simple, stable, and readily available matrix materials, suggesting novel delivery capabilities.

**Progression of Student Competence – A Focused Approach that Leads to Continuous Curriculum Improvement.** Quamrun N. Masuda, Appalachian College of Pharmacy, Charles R. Breese, Appalachian College of Pharmacy, Randy C. Mullins, Appalachian College of Pharmacy, Eusra R. Shams, Appalachian College of Pharmacy. **Objectives:** To demonstrate the progression of student competence throughout the curriculum and the use of competence data in continuous curriculum improvement. **Method:** Appalachian College of Pharmacy (ACP) monitors and measures student learning outcomes at program level, using a multidimensional Milestone Exam. This ongoing assessment helps the College measuring the preparedness of the students to address health related needs of rural and underserved communities, which is the prime mission of the College. Starting with the 2009-2010 academic year, the College has progressively measured selected competencies at program level through the Milestone Exam. The Milestone Exam results are then reviewed to identify strengths and opportunities for improvement. This culture of competence-assessment driven quality improvement process runs in a cyclic manner at ACP. The overall assessment sequence at ACP progresses through identifying program learning goals, aligning goals with the curriculum, gathering evidence of student learning, transforming the learning evidence to competencies, and using the evidence for improvement. **Results:** Mistone committee proposed interventions to (i) improve pharmaceutical calculation aptitude, by integrating this throughout the curriculum and encourage self paced learning, (ii) improve communication skills by introducing OSCE style patient counseling early in the curriculum, (iii) enhance knowledge retention by introducing unique active learning activities to promote student participation in activities and foster the philosophy of ‘learning by doing’. Subsequent Milestone Exam results have demonstrated improvement in all three areas. **Implications:** ACP is in communication with the other Colleges of Pharmacy to provide competence based assessment and Benchmarking and two colleges have already used the exam.

**Simultaneous Projection of Three Different, Synchronized PowerPoint Presentations to Improve Student Engagement and Learning.** Steven G. Oakes, University of Wisconsin-Madison, Orly Vardeny, University of Wisconsin-Madison. **Objectives:** To develop, implement and evaluate a multiple projection lecture (MPL) presentation methodology focused on improving student engagement and learning compared to the standard PowerPoint format. **Method:** A multiple video output computer system was configured to allow simultaneous connection to three projectors and three presenter monitors. The software program PowerShow (OfficeOne, Minnetonka MN) was used as a PowerPoint add-on to allow synchronized projection of three
**American Journal of Pharmaceutical Education 2013; 77 (5) Article 109.**

different, distinct PowerPoint shows at the same time. Third-year pharmacy students taking the two-credit elective course Substances of Abuse and Treatment in the 2012 spring semester viewed 20 hours of MPLs compared to 10 hours of conventional single projection PowerPoint presentations. Upon completion of the course, 45 out 45 students were anonymously surveyed about the MPLs. **Results:** On a six point scale (1 = strongly disagree to 6 = strongly agree), students agreed the MPLs were an improvement in presentation format compared to the conventional PowerPoint format (5.4, 90%). Students agreed MPLs improved ability to stay focused and involved in the presentation (5.2, 87%), improved comprehension and understanding of the presented material (5.1, 85%) and improved retention of the material presented (5.05, 84%). **Implications:** The MPLs were well received by students and were recognized by students as an improvement over conventional PowerPoint presentations. Students further agreed MPLs improved student engagement and student learning during the lecture. MPLs have been incorporated into three other courses at the school. Continued innovations are being made to the MPLs to further improve student engagement and learning.

**Stability of Levetiracetam Oral Solution Re-packaged in Plastic Syringes.** Fang Zhao, St. John Fisher College, Daniel Prohotsky, St. John Fisher College, Susan Hughes, University of Rochester, Medical Center. **Objectives:** With the increased use of levetiracetam oral solution in hospitals, there is a need to re-package this solution product in plastic oral syringes to facilitate dispensing and dosing. Without any stability data, these re-packaged syringes can only be assigned a maximum beyond-use date of 14 days when stored at controlled cold temperature based on USP <795>. This study was designed to evaluate the long-term stability of levetiracetam solution in oral syrags for up to 6 months. **Method:** Commercially available levetiracetam oral solution (100 mg/mL) was drawn into 1-mL and 10-mL amber polypropylene oral syringes. The samples were stored at refrigeration (2-8°C) or room temperature (21-25°C), and they were pulled for evaluation at monthly intervals for up to six months. At each time point, the samples were evaluated by visual inspection, pH measurement, and high performance liquid chromatography (HPLC). A separate forced stability study was conducted to confirm that the HPLC method was stability indicating. **Results:** Over the period of 6 months storage, there was no significant change in visual appearance or pH for any of the levetiracetam stability samples. The HPLC results indicated that levetiracetam retained 97-108% of the initial concentration in 1-mL and 10-mL oral syringes at both refrigeration and room temperature. **Implications:** Commercial levetiracetam 100 mg/mL oral solution was stable for up to 6 months in amber polypropylene oral syringes stored at both refrigeration and room temperature conditions.

**Student and Community Impact of a Novel Service Learning Advancing Pharmacy Practice Experience (APPE).** Christine R. Birnie, St. John Fisher College, Jennifer L. Mathews, St. John Fisher College. **Objectives:** Recognizing the importance of providing students with novel advanced pharmacy practice experiences (APPE) a new service learning rotation was established, providing students with an opportunity to integrate meaningful community service with instruction and reflection. The rotation was evaluated to assess the impact on both students and community partners. **Method:** Six week APPE rotations were established at four non-profit organizations in the local Rochester, NY community. Rotation assignments included an individualized project with the community partner, a daily journal of activities, a presentation for the local community, an article or other scholarly work and a final reflection paper. At the completion of the rotation, both students and the community partners completed surveys including Likert-Scale (1-5) and open-ended questions. **Results:** Six students successfully completed the APPE rotation at four different sites. Students strongly agreed (5) that the service learning experience increased their desire to serve their communities, deepened their commitment to civic responsibility and strengthened their collaborative skills as a team member. Community partners strongly agreed/agreed (4-5) that the projects students completed met the needs of the organization, were useful to their sites and displayed a high level of quality. All community partners indicated a desire to continue the collaboration with future students. **Implications:** The Service Learning APPE rotation offered an enriching learning environment for the student, while providing tangible service to a non-profit organization in the local community. The rotation proved beneficial for both parties involved.

**The Development and Assessment of a Pharmaceutical Biotechnology Elective Course at a Doctor of Pharmacy Program.** Aladin A. Siddig, University of Charleston, Jennifer Worley, University of Charleston, Fadi M. Alkhateeb, Texas A&M Health Science Center, David A. Latif, University of Charleston. **Objectives:** The major goal of this course is to expose pharmacy students to cutting-edge advances in Pharmaceutical Biotechnology throughout the utilization of both basic science knowledge and clinical application. **Method:** Pharmaceutical Biotechnology is a three semester credit hour elective course, and is open to second and third year PharmD students. It is structured into three main major sections: Basic sciences, therapeutic classes of biologics, and the regulatory and economic environment related to biotechnology. In addition, each student was required to choose a biotech drug to do a review as well as presentation at the end of the class. **Results:** Course assessment results, student evaluations, and informal verbal feedback from the 18 students in the fall 2009 guided refinements to this elective for the 26 students who took it during the fall of 2010. The mean course evaluation in both two years was 4.8 on a Likert scale anchored at Strongly Disagree (1) and Strongly Agree (5). In addition, the evaluation comments were positive, and some will be used to improve the structure of the course for the next time it is taught. Students demonstrated they mastered the material taught throughout the curriculum, with 73-90% receiving an A in the course and 10-27% receiving a B. **Implications:** This course reflects significant trends and cutting-edge advances in pharmaceutical biotechnology, including specific therapeutic agents and their applications. The students gained understanding of practical pharmaceutical applications, making this an indispensable tool and professional reference for student pharmacists.

**The Use of Technology as a Replacement to Pharmacy Compounding Pre-Laboratory Lecture.** Elise Almagambetova, St. John Fisher College, Anthony Corigliano, St. John Fisher College, Lipika Chablania, St. John Fisher College, Christine R. Birnie, St. John Fisher College. **Objectives:** To evaluate student perception to the use of a podcast in place of a traditional pre-laboratory lecture. **Method:** A lecture podcast was created using the Echo360 lecture capture system and posted online via the Blackboard course management system. The podcast was used as a replacement to an in-class lecture based on preliminary aspects of pharmaceutical compounding. It served as a pre-laboratory introduction. Following the podcast, a voluntary survey was administered using Qualtrics® online survey software to seek each student’s feedback regarding the utility of podcasts and preferences for its future use in the same course. **Results:** A total of 63 out of 79 students responded to the survey. Of these, 97% of respondents reported watching the podcast and 59% of respondents reported watching parts or all of the podcast more than once. Among the respondents, 95% thought the podcast was an effective learning tool and 79% of the

Use of Collaborative Assessment to Enhance Individual Student Understanding. Ira Buckner, Duquesne University, Peter L.D. Wildfong, Duquesne University, Carl A. Anderson, Duquesne University. Objectives: The objective of this project was to determine the extent to which collaboration between students during quizzes might enhance their ability to master a subject. Method: A new assessment approach was used in a college pharmacy course taken by pharmacy students in their first professional year. This course typically has roughly 180 students. The assessment strategy involved 3 elements. First, each student was asked to independently answer a set of questions based on recent lectures. Then, they were allowed to discuss one of the questions in groups, before providing a revised answer. Content from the quizzes was readadressed on subsequent exams which were completed independently. Exams included both questions included in the collaborative element of the quizzes and questions which were not been. A similar assessment approach was used in the same course the following academic year with the exception that the collaborative section occurred before the individual section on the initial quiz. Average scores on related questions from each element were compared. Results: Not surprising, the overall performance was always better during the collaborative section. As a group the students were always able to arrive at the correct answer. The long term improvement in exam performance was much less significant. Implications: It was clear that this form of assessment helped address some of the anxiety experienced by students when faced with material for the first time on a formal assessment. Although the approach was well received by the students, effects on student learning were less dramatic.

Web-based Self-Paced Active Learning Modules in Developing Prescription Drug Knowledge During First Professional Year. Quamrun N. Masuda, Appalachian College of Pharmacy, Eusra R. Shams, Appalachian College of Pharmacy. Objectives: To promote the effectiveness of student centered self-paced learning in gaining prescription-drug knowledge. Method: The present work describes the use of the course management software ‘Moodle’ for generating and administering dynamic practice modules for top 100 prescription drugs. These modules were initiated in the pharmacutes (PHA 0124) course during the first semester of the first professional year, and are now reinforced in pharmaceutical compounding course (PHA 0175) during the second semester. A total of nine practice modules were developed encompassing the learning domains of ‘Product Names’ (brand and generic), ‘Dosages forms’, ‘Dosage regimen’, ‘Indications’, ‘Mechanism of Action’, ‘Contraindications’, and ‘Adverse Drug Reactions’. These modules were added as self-paced active learning exercises and comprised 9% of the course grade. The modules were created using the built-in question formats of the ‘Moodle’, which allowed creating ‘knowledge’ and ‘comprehension’ levels questions as related to Bloom’s taxonomy in regards to exam question complexity. The gained aptitude was assessed in proctored settings to ensure closed-book performance. Results: Class average was 98.4% with standard deviation of 0.27. Students’ evaluation indicated that the pedagogy helped them learn the modules without stress. This assignment also helped the course faculty to monitor and demonstrate progression of students’ learning with regards to the program outcome ‘Patient Care’ and corresponding competence (EOC V). Implications: Contemporary NAPLEX questions are designed with relatively higher proportion of weightage encompassing drug knowledge. With the addition of ‘Drug Knowledge’ modules, the College has taken a positive approach in improving NAPLEX passing statistics.

The Use of Negative versus Positive Reinforcement in the Development of Pharmacy Skills. Deborah L. Elder, The University of Georgia, Michael J. Fulford, The University of Georgia. Objectives: Compare the effects of negative and positive reinforcement for developing pharmacy skills. Method: First year pharmacy students attended one of four (36 students per section) bi-weekly pharmacy skills laboratories. Prior to the lab, students attended in-class lectures and viewed instructional videos covering the application of quantitative methods in non-sterile compounding. A review of tasks and instructions were given at the beginning of each lab. Two of the four sections received instruction that emphasized negative outcomes if instructions were erroneously applied. The remaining two sections received the same instructions but with an emphasis on positive outcomes. All groups completed the same tasks. Tasks included the proper use and care of prescription balances; weighing powders, granules, and crystals; measuring liquids, and preparing aliquots (liquid/liquid, solid/solid/liquid and solid/liquid). Task specific grading rubrics and in-lab exams were used to assess student performance. Independent samples t-tests were conducted to compare average lab activity, exam, and weighted lab/exam scores between students that received positive and negative reinforcement. Results: The mean scores on lab activity grades of students receiving negative reinforcement were 3.5 points higher than those receiving positive reinforcement. This difference in means was significant at the p = 0.0001 level. Implications: Teaching strategies that include negative reinforcement may prove beneficial in developing pharmacy skills.

Transdermal Drug Delivery of Apomorphine Using Microneedles. Abeer M. Al-Ghananeem, Sullivan University, Ahmad Malkawi, Hayder Saeed, College of Medicine, University of Kentucky. Objectives: The aim of this study was to investigate in vitro transdermal delivery of apomorphine through porcine skin using microneedle technology. Method: The transdermal delivery of apomorphine across porcine stratum corneum was determined using metal rollers that consist of several plates bearing microneedles of graded lengths (0.25 mm and 0.50 mm). The skin permeation studies were carried out using skin excised from porcine ears mounted in Franz diffusion cells system and rolled with a disk without microneedles and with rollers fitted with microneedles of each size. Apomorphine gel formulation (0.20 mL) with antioxidant was applied to the skin and apomorphine permeation was analyzed using UPLC/MS. Results: Permeation measurements using microneedles’ treated and untreated skins demonstrated that the viable stratum corneum was an important barrier to apomorphine permeation. Gel formulation with microneedles treated skin exhibited superior skin permeation compared to the same formulation when applied to skin without microneedles pretreatment. The enhancement in drug efflux in microneedles treated skin was up to 40% after 4 hours. The apomorphine efflux was not significantly different between the 0.25 mm and the 0.50 mm microneedles skin treatment. Implications: The results in the present work suggest the feasibility of microneedles technology for the transdermal delivery of apomorphine. Microneedle rollers with 0.50 mm or shorter lengths could be an attractive modality for the transdermal delivery of apomorphine.

respondents thought that additional podcasts should be included in the course. Also, 44% of the respondents wished a podcast be used as a replacement to formal classroom lecture. Implications: Student perception of the podcast was generally positive. For the type of material covered, most students preferred the podcast in place of traditional lecture, or to serve as a supplement to the material presented in the classroom. The podcasts provided the students the ability to review the material covered at their own pace and at a time convenient for them. Both attributes were perceived to be advantageous over traditional lecture.

The Use of Negative versus Positive Reinforcement in the Development of Pharmacy Skills. Deborah L. Elder, The University of Georgia, Michael J. Fulford, The University of Georgia. Objectives: Compare the effects of negative and positive reinforcement for developing pharmacy skills. Method: First year pharmacy students attended one of four (36 students per section) bi-weekly pharmacy skills laboratories. Prior to the lab, students attended in-class lectures and viewed instructional videos covering the application of quantitative methods in non-sterile compounding. A review of tasks and instructions were given at the beginning of each lab. Two of the four sections received instruction that emphasized negative outcomes if instructions were erroneously applied. The remaining two sections received the same instructions but with an emphasis on positive outcomes. All groups completed the same tasks. Tasks included the proper use and care of prescription balances; weighing powders, granules, and crystals; measuring liquids, and preparing aliquots (liquid/liquid, solid/solid/liquid and solid/liquid). Task specific grading rubrics and in-lab exams were used to assess student performance. Independent samples t-tests were conducted to compare average lab activity, exam, and weighted lab/exam scores between students that received positive and negative reinforcement. Results: The mean scores on lab activity grades of students receiving negative reinforcement were 3.5 points higher than those receiving positive reinforcement. This difference in means was significant at the p = 0.0001 level. Implications: Teaching strategies that include negative reinforcement may prove beneficial in developing pharmacy skills.

Transdermal Drug Delivery of Apomorphine Using Microneedles. Abeer M. Al-Ghananeem, Sullivan University, Ahmad Malkawi, Hayder Saeed, College of Medicine, University of Kentucky. Objectives: The aim of this study was to investigate in vitro transdermal delivery of apomorphine through porcine skin using microneedle technology. Method: The transdermal delivery of apomorphine across porcine stratum corneum was determined using metal rollers that consist of several plates bearing microneedles of graded lengths (0.25 mm and 0.50 mm). The skin permeation studies were carried out using skin excised from porcine ears mounted in Franz diffusion cells system and rolled with a disk without microneedles and with rollers fitted with microneedles of each size. Apomorphine gel formulation (0.20 mL) with antioxidant was applied to the skin and apomorphine permeation was analyzed using UPLC/MS. Results: Permeation measurements using microneedles’ treated and untreated skins demonstrated that the viable stratum corneum was an important barrier to apomorphine permeation. Gel formulation with microneedles treated skin exhibited superior skin permeation compared to the same formulation when applied to skin without microneedles pretreatment. The enhancement in drug efflux in microneedles treated skin was up to 40% after 4 hours. The apomorphine efflux was not significantly different between the 0.25 mm and the 0.50 mm microneedles skin treatment. Implications: The results in the present work suggest the feasibility of microneedles technology for the transdermal delivery of apomorphine. Microneedle rollers with 0.50 mm or shorter lengths could be an attractive modality for the transdermal delivery of apomorphine.
Theoretical Models:

Structure of the Day: Practical Innovative Technology-based Activity to Enhance Students’ Learning through Inter-departmental Collaboration. Denise Simpson, Cedarville University; Miriam Ansong, Cedarville University. Objectives: To assess the impact of this technique on students’ ability to integrate science into practice. Method: Concepts of formulary management and its applications in clinical practice is a challenge faced by many first professional year pharmacy students. This challenge may be attributed to a lack of foundational knowledge and practical skills at this level. Preparing students for lifelong learning mandates early exposure to practical application of concepts. This warrants the need for students to integrate knowledge, skills, abilities, and attitudes in clinical practice. An institutionally structured curriculum permits concurrent administration of standalone but related courses through inter-departmental collaboration. Connecting the dots in drug information, medicinal chemistry, pharmacology, and pharmacokinetics was identified as a creative means to accomplish this goal. A comprehensive literature search to identify existing models was conducted in Pubmed, IPA, Embase, CINAHL, and alternate resources from inception to 2013 without success. A Pre-class interactive technology-based “Structure of the Day” activity was created utilizing the Moodle course platform, Accelerex, and Soft chalk software. Students identified functional groups on new molecular entities, determined the relationships to pharmacological properties, pharmacokinetic profiles, and their applications to drug formulary management. Application activities via in-class discussions and debate were implemented to assess knowledge, attitude and ability to integrate the basic sciences into skill-building activity. Results: The expected outcome was captured through the sequential activities facilitated by an audience response system. Details will be presented at the conference. Implications: The investigators plan to implement this technique in the curriculum.

Pharmacy Practice

Completed Research:

A Blended Approach to Improve Student Learning in Making Nonprescription Medication Recommendations. Denise L. Walbrandt Pigarelli, University of Wisconsin-Madison, C. Blaire Bundy, Timmo Dugdale, Alan Barnicle, Joshua H. Morrill, Steven G. Oakes, University of Wisconsin-Madison. Objectives: To develop, implement and evaluate blended learning using a virtual interview case-scenario (VICS) followed by classroom discussion to improve student ability to make nonprescription recommendations. Method: The School of Pharmacy and the ENGAGE program constructed a VICS for use in the 2012 fall semester for a 2-credit elective Nonprescription Medications course. Students completed the VICS, separately uploaded therapy recommendations from a list of 15 medications and brought a copy of their recommendations to class two days later. During class, each of the 15 medications was discussed, and students were encouraged to make any desired recommendation changes to their documents. Documents were then collected from 105 students, and differences from original recommendations were analyzed. Three days later, 90 of 115 students completed an anonymous online survey about the VICS and the classroom session. Results: Students agreed the classroom session increased student confidence and improved student understanding of proper product recommendations. This blended learning approach enhanced the use of the VICS alone and will be incorporated for additional topics in fall 2013 when the course will be required for all DPH-3 students. Implications: The interactive classroom session increased student confidence and improved student understanding of proper product recommendations. This blended learning approach enhanced the use of the VICS alone and will be incorporated for additional topics in fall 2013 when the course will be required for all DPH-3 students.

A Health-Education Program for Elementary-School Children Managed by Pharmacy Students. Kelly L. Matson, The University of Rhode Island, Katherine K. Orr, The University of Rhode Island. Objectives: To develop and implement a health fair for elementary-school children led by pharmacy students consistent with Healthy People 2020 goals. Method: Pharmacy students developed activities and provided youth-orientated health fair in Spring 2012. Elementary students were assessed by anonymous pre- and post tests addressing their knowledge of health promotion and healthy lifestyles. Pharmacy students were evaluated by anonymous pre- and post-surveys for knowledge of health-related topics, communication skills and perceptions of pharmacist’s role in education. Results: 78% of elementary students improved their score average by 2.9% + 1.73%. 51.9% of pharmacy students completed match-paired assessments. All stated they would implement at least one practice or communication skill learned. Pharmacy students’ knowledge of health-related topics, value of learning to improve their practice, and confidence in applying knowledge to practice improved by: 12.7 + 5.17%, 1.6 + 1.77%, and 7.5 + 3.21%, respectively. Knowledge of health promotion strategies and pediatric communication skills improved 20.4% and 15.7%, respectively. Application of health promotion and communication skills improved by 10.6% and 8.9%, respectively. Imporance of the pharmacist’s role in health education activities improved by 9% and knowledge of health-related topics improved with range of 4-22%. The collective value of learning scores improved slightly; however, baseline scores were already high. Implications: Majority of children increased their knowledge of good nutrition, physical activity and healthy habits through participation aligning with Healthy People 2020 as observed through score improvement of general health questions. Pharmacy students’ recognition of the healthcare needs of children is essential to counsel as practitioners.

A Novel Approach to Service Learning Based on the First Year Doctor of Pharmacy Curriculum. Gilbert A. Steiner, Campbell University. Objectives: During their second semester of the Doctor of Pharmacy program at Campbell University College of Pharmacy & Health Sciences, students are required to initiate, develop, conduct and assess a service learning project which provides a service to a specific group or agency utilizing knowledge and/or skills gained from courses taken during the P1 year. Method: Students, working individually or in groups of up to four, are instructed to approach any member of the first year Doctor of Pharmacy faculty with an idea to provide a service which will reflect the content of that instructor’s course(s). If the faculty member thinks the idea has merit, he or she will work with the students to develop 2-5 objectives for their project. The students are then to get approval for the project from a person of authority at the target group or agency. Prior to implementing the project, the course master must approve the project. Following its completion, the students must submit a reflection in which they assess the degree to which the objectives were met. They must also describe the number of people served and the response of the target audience, any challenges they experienced and how the project could be improved. Finally, they reflect on how the project augmented their education. Results: Since the program’s inception in 2008, students have undertaken more than 200 projects serving an aggregated audience of more than 10,000.
people. In their reflections, students have indicated that they particularly benefit from implementing classroom theory in real-world situations, while serving the needs of others. Four areas of study are responsible for about 80% of all projects. Microbiology/Immunology and Clinical Biochemistry are each responsible for 25% of the projects completed, while Pharmacy in the US Healthcare System and Pharmaceutical Care Skills attract 15% of the students each. **Implications:** This approach to service learning allows the students to develop an area of their interest, translating coursework into practical applications while meeting community needs. Students also benefit from learning to identify these needs and developing project organizational skills.

**A Novel Spin on the Traditional SOAP Note.** Kim G. Adcock, The University of Mississippi, Allison M. Bell, The University of Mississippi, Shirley M. Hogan, The University of Mississippi, Daniel M. Riche, The University of Mississippi, Katie S. McClendon, The University of Mississippi. **Objectives:** Students consistently have difficulty performing pharmacokinetic calculations as evidenced by poor scores on an application-based exam that has a calculations and pharmacokinetics focus. To improve student outcomes, a graded written assignment requiring pharmacokinetic calculations and interpretation was assigned. **Method:** For a pharmacokinetic-focused patient case, the weekly written assignment included an assessment of aminoglycoside concentrations for a cystic fibrosis exacerbation. The students were required to generate a pharmacokinetic consult ‘SOCAP’ note which included the following sections: subjective, objective, calculations, assessment and plan. Student outcomes on the application exam were compared to previous years in which the SOCAP note was not a graded assignment. **Results:** Students performance on the SOCAP note was less than desirable with a mean score of 71. The class mean for each section was 95 (subjective), 70 (objective), 62 (calculations), 36 (assessment) and 73 (plan). However, analysis of the performance on the first-order kinetics portion of the application exam following this assignment did demonstrate an improvement compared to the previous year, though not statistically significant. This analysis may have been influenced by the large difference in sample size due to the smaller class size compared to the previous year. **Implications:** By changing from the standard assignment to a more pharmacokinetic-focused assignment, the students’ performance on a summative pharmacokinetic assessment improved. The ‘SOCAP’ note, an innovative alteration to a classic educational tool, proved advantageous for students to be able to improve their skills to perform and interpret pharmacokinetic calculations.

**A Novel Student Project on Patient Health Literacy and Pharmacist Perception.** Jeannie K. Lee, The University of Arizona, Christina Mnatzaganian, University of Hawaii at Hilo, Angel Fabriguze, Tina Phan, Jill M. Augustine, The University of Arizona. **Objectives:** To describe a novel PharmD research project where students compared patients’ actual health literacy levels with perceived levels by community pharmacists and shared their insights regarding the experience. **Method:** Three students recruited patients from 2 independent pharmacies and measured their health literacy level using Rapid Estimate of Adult Literacy in Medicine (REALM) scale. The final score was converted to a grade-based reading level for ease of understanding. Two pharmacists were surveyed about the perceived health literacy level of their patients, and their responses were compared to the measured health literacy levels. Upon completion of the project, students reported their findings in a formal report and provided their insights on the project along with advice for future students. **Results:** Thirty subjects’ health literacy levels were assessed using the REALM survey. Twenty-eight of the 30 patients scored in the highest literacy level of 4, which correlates to ≥9th-grade reading level. No differences were found between subjects’ measured health literacy levels and those perceived by the pharmacists. The student-reported benefits of this research project were: increased understanding of conducting patient-oriented research and increased awareness of the impact of health literacy on patient understanding of health information (gained through research preparation). Reported difficulties include: gaining permission from pharmacies, recruiting a sufficient number of patients, ensuring diversity among patients, and completing IRB approval on a timely manner. **Implications:** This novel project allowed students to understand patient-oriented research processes and importance of health literacy in patients. Students were able to provide important feedback regarding their experience.

**A One-Year Longitudinal Opportunity to Meet APPE Requirements while Serving a Vulnerable Population.** Cameron C. Lindsey, University of Missouri-Kansas City. **Objectives:** To describe a novel, longitudinal APPE that provides students the ability to apply and build patient care skills during a one-year timeframe. Tabulations of the various services provided by the APPE students at the practice site are presented. **Method:** The longitudinal APPE commences between June and May. The practice site serves uninsured, adults with chronic illnesses. Ten student positions are available to accommodate the rotation with one preceptor. Students acquire a total of 160 hours during this timeframe by completing approximately 32, five-hour night shifts. The number of patient visits, device trainings, educational programs, and medications acquired for the patients by student pharmacists was collected during the 2012 fiscal year. Average wholesale price of medications was tabulated using the Red Book 2012. **Results:** A total of 20 student pharmacists have enrolled within this longitudinal rotation since its inception in 2011. During the 2012 fiscal year, student pharmacists conducted 1,945 patient care visits requiring medication reconciliation, drug counseling and drug procurement. Students held 77 in-depth educational trainings comprising glucose meter teaching; injectable medication administration; asthma education and action-plan development; and, blood pressure/glucose log assessment and medication therapy adjustments. Through student pharmacist involvement with patient assistance programs, 2,467 medications were received totaling an average wholesale price of $1.5 million. **Implications:** The longitudinal nature of the APPE serves the site by having continuity of patient care delivery, streamlined medication management and patient education while meeting the requirements for accreditation standards.

**A Prologue to Interprofessional Collaborative Practice.** L. Brian Cross, East Tennessee State University, Reid B. Blackwelder, Michael A. Crouch, East Tennessee State University. **Objectives:** To evaluate the prologue of a new Interprofessional Education Program within the Academic Health Sciences Center (AHSC) at East Tennessee State University (ETSU). **Method:** The AHSC consists of five colleges: Pharmacy, Medicine, Nursing, Public Health, and Clinical and Rehabilitation Health Sciences. In 2012, the AHSC embarked on a two-year, pilot Interprofessional Education Program (iPEP) that includes students from all five colleges completing three separate phases: a prologue, experiences (courses/activities), and capstone event. The prologue (informative learning) entailed an overview of interprofessional (IP) collaborative practice, group activities, and “box of stuff” exercise. Anonymously, students answered pre- and post-activity questions and completed a post-prologue online survey. **Results:** Forty-eight students participated. Pre-activity responses documented students’ support of team-based care (97.9% strongly agreed [SA]/agreed [A]), comfort
A Rapid Diagnostic Test Certificate Program for Community Pharmacists. Donald R. Miller, North Dakota State University, Lynette R. Bradley-Baker, American Association of Colleges of Pharmacy, James Bresette, Learning and Diffusion Group, Center for Medicare and Medicaid Innovation, Hoai-An Truong, University of Maryland Eastern Shore School of Pharmacy, Christian B. Albano, Concordia University Wisconsin. Objectives: The demand for more practitioners in the public health workforce arising from the enactment of the Patient Protection and Affordable Care Act (PPACA) provides an opportunity for pharmacists’ active participation at all levels of the public health system. A review of published literature and stakeholders’ survey responses suggests pharmacists’ current involvement in public health as inadequate. Thus, new public health training options are needed for pharmacists. Method: In 2011, a group of public health advocates around the U.S. began meeting by teleconference to develop a practical professional development strategy for pharmacists and students. After much discussion, a certificate training program with continuing professional development strategy for pharmacists and students. After much discussion, a certificate training program with continuing professional education (CPE) credits was developed by North Dakota State University (NDSU) faculty associated with their Master of Public Health program. Continuing professional development by an online certificate program is flexible, can accommodate pharmacists’ individual workloads and schedules, and has been used in other pharmacy knowledge areas. Results: NDSU faculty, in collaboration with professional staff of the American Association of Colleges of Pharmacy and faculty with public health credentials from Concordia University Wisconsin and University of Maryland Eastern Shore, have developed an online certificate training program consisting of 20 CPE hours and 9 modules. Module topics include overview of public health, epidemiology, disease prevention and health promotion, public health policy, community engagement, environmental and occupational health, cultural perspectives and emergency preparedness and response. Implications: The certificate training program will provide a practical means for pharmacists and pharmacy students to understand basic concepts in public health.

A Virtual Interview Case-Scenario (VICS) to Improve Student Learning about Nonprescription Medication Recommendations. Denise L. Walbrandt Pigarelli, University of Wisconsin-Madison, C. Blaire Bundy, Timmo Dugdale, Alan Barnicle, Joshua H. Morrill, Steven G. Oakes, University of Wisconsin-Madison. Objectives: To develop, implement and evaluate a realistic VICS that will improve student learning and ability to provide nonprescription product recommendations. Method: The School of Pharmacy and the ENGAGE program constructed a VICS for use in the 2012 fall semester for the 2-credit elective Nonprescription Medications course. The individual components of the module (photographs, audio recordings, text and questions) were integrated using the Case Scenario/Critical Reader (CSCR) Builder developed at the University of Wisconsin-Madison.
The VICS was developed using the consultative model and an iterative design process specified by the ENGAGE program. Four sets of four questions requiring selection of the two appropriate inquiries per set focused on the SCHOLAR method. Unsuccessful question selections were re-directed for section repeat. After completion of the online module, students were asked to submit their recommendations from a list of 15 medications. One week later, 90 of 115 students completed an anonymous online survey about the VICS. Results: Students agreed that compared to traditional, non-interactive case scenarios, the online approach was more realistic (88.3%), helped with learning (84.9%), kept student interest (84.9%) and increased student ability to assess nonprescription medication options (91%). Implications: The VICS increased student confidence and understanding in making nonprescription recommendations. Use of the module will provide a valuable bridge between the classroom and DPH-4 rotations with actual patients in the next school year. Additional modules will be added in fall 2013 when the course will be required for all DPH-3 students.

A Practice Redesigned: A Shared Position for Acute Care Clinical Faculty. Sarah Stephens, The University of Utah, Heather Nyman, The University of Utah. Objectives: To describe a novel practice setting for clinical faculty involving an acute care adult internal medicine practice setting. Method: During four years of employment, a co-funded (60% college, 40% practice site) pharmacy faculty member with a clinical practice in acute care medicine spent approximately 80-90% of the time at the practice site, leaving the balance for teaching, service, and scholarship. Reducing hours spent at the practice was not possible due to the negative impact on clinical staff and patient care. The college purposed a second faculty position to share practice site responsibilities. The goal of the new position was to provide support at the clinical site to allow for increased faculty engagement in all areas of college service. Results: A second co-funded full-time faculty member was hired August 2011. Each faculty member covers 1 week of a 2 week pay period at the practice site. Patient care and clinical staff are no longer impacted by faculty absences. College productivity has increased dramatically, especially in the area of scholarship. Student rotation opportunities have doubled. In October 2011 the payment structure of the position changed, resulting in faculty members becoming part time employees of the practice site. Challenges of the shared position include continued refinement of the expectations from the college and practice site, coordinating absences between faculty to maintain continuous coverage for the service, and managing the changes in payment and benefit structure. Implications: Shared clinical practice sites for faculty positions in acute care allow for success of the faculty member and satisfaction of the practice site. Clear expectations from the college and practice site are vitally important. Although this position is unique and successful overall, challenges remain.

A Virtual Curriculum Map for Interprofessional Education (IPE) Competencies. Jennifer Danielson, University of Washington, Colleen A. Catalano, University of Washington, Stanley S. Weber, University of Washington, Michael Casumann, University of Washington. Objectives: To create a virtual map for curricular penetration of core competencies for interprofessional collaborative practice based on pharmacy faculty perceptions and prior curriculum mapping efforts. Method: A subset of faculty with high likelihood of teaching IPE-related content were identified with results of previous curriculum mapping to school ability-based outcomes (ABOs) and ACPE Appendix B topics. Selected faculty then responded to a web-based survey indicating applicability of their course(s) in teaching Interprofessional Education Consortium (IPEC) core competencies using response options “Directly applies” (D), “Foundational” (F), or “Not at all” (N). Analysis was completed using Excel, then a virtual map was developed in a FileMakerPro database showing penetration for IPEC competencies across the curriculum. Results: Greatest curricular penetration was found in the Values/Ethics (33% D, 43% F) and roles/responsibilities (26% D, 42% F) domains. Least curricular penetration was found for communication (24% D, 35% F) and teamwork (12% D, 36% F) domains. The IPEC competency taught most often was VE10, which describes maintaining competence in one’s own profession. Competencies TT1 and TT8, which describe team development and team performance, were found to be taught the least. Implications: An IPE-specific virtual curriculum map allows intuitive interpretation of curricular penetration of IPE content and facilitates sharing trends and benchmarking across schools. Traditional curriculum mapping efforts may not correctly elucidate curricular penetration of IPE. A virtual map specific to IPEC competencies revealed faculty misperceptions about IPE content. Further investigation into learning methods used and professions involved in IPE-related activities is necessary.

Academic Workload at a New College of Pharmacy. Kamila A. Dell, University of South Florida, Erini S. Serag, University of South Florida, Aimon C. Miranda, University of South Florida, Jennifer Pytlarz, University of South Florida, Carol Fox, University of South Florida, Gwendolyn A. Wantuch, University of South Florida, Sheetal P. Dharia, University of South Florida, Shane Jordan, University of South Florida, Kristy M. Shaeer, University of South Florida, Sarah J. Steinhardt, University of South Florida, Jose L. Barboza, University of South Florida, Wendy H. Updike, University of South Florida. Objectives: The purpose of this project is to utilize a previously developed tracking tool to assess faculty workload distribution in a developing college of pharmacy and identify changes in faculty time allocation as the program grows. Method: An Excel-based workload tracking tool was previously developed. Pharmacy practice faculty members at a new college of pharmacy voluntarily used the workload tracking tool since the beginning of 2012. Teaching, practice, service, scholarship, and other activities were tracked to the nearest 15 minute increments for up to 12 months, spanning the spring, summer, and fall semesters. The frequency of documentation was not standardized among faculty. Results: Up to 12 faculty members utilized the tracking tool in any given month. The overall workload distribution was 40% teaching, 20% practice, 19% service, 11% scholarship, and 10% other activities. The workload distribution changed in each semester. Teaching accounted for 23% of the workload in spring, 28% in the summer, and 50% in the fall with corresponding changes in other categories. Implications: The workload tracking tool was developed for time management, resource planning, and career development within the college. Tracking time has assisted faculty in reporting workload required for annual assessment. It will help redistribute time to meet tenure and promotion requirements and identify inefficiencies in time allocation for future quality improvement endeavors. Data collected may serve as a model for new pharmacy programs.

Accuracy of Resident Self-evaluation of Teaching in an Elective Course. Melissa M. Chessen, Mercer University, Nicole L. Metzger, Mercer University, Kathryn M. Momary, Mercer University. Objectives: To analyze the association between residents’ self-assessment of their teaching in an elective course compared with students’ and course faculty’s perception of their teaching. Method: An elective course offered to pharmacy students was designed to provide didactic teaching opportunities for local PGY1 pharmacy residents. Each resident selected a topic and submitted objectives, lesson plan, lecture content, active learning strategies, and quiz questions to course faculty who
provided detailed feedback at each step. Residents provided demographic data and completed two surveys using a 5-point Likert scale: a self-evaluation and an evaluation of their advanced preparation for the lecture. Residents’ self-evaluation scores were compared with faculty and students’ evaluations of their teaching utilizing descriptive statistics and Mann-Whitney tests. Results: All residents (n=13) completed the surveys. Forty-six percent reported prior didactic teaching experience. Evaluations of teaching by residents and faculty had a median score of 4 (meets expectations). No difference was observed between the residents’ overall self-evaluation scores and faculty evaluations of resident teaching (p=0.21). Students scored residents higher than residents scored themselves (p=0.003) but not higher than faculty scored residents (p=0.085). Overall, the residents agreed that advanced preparation was helpful (median score of 4). They strongly agreed that generating objectives and a lesson plan were helpful and that feedback from faculty was constructive. Implications: Residents accurately self-evaluated their teaching, which may be the result of detailed feedback provided by faculty during residents’ preparation for the course. Residents can be used to provide quality didactic instruction when faculty are involved in lecture development.

Adherence and Refill Request Simulation for Doctor of Pharmacy Students. Colleen A. Dula, The Ohio State University, Jacqueline Roesch, The Ohio State University, Anna C. Haas-Gehres, The Ohio State University. Objectives: To assess pharmacy students’ adherence to a chronic medication regimen and determine how refill reminders impact medication adherence. Method: Each student was counseled and received a thirty-day supply of “medication” (empty capsules) to be taken once daily. Students were permitted to use adherence tools to remind them to take their medication. On day 23 of the activity, 50% of the class received an email reminder to refill their prescription; the other 50% received no reminder. Refills were allowed day 23 through day 31. After the activity, participants filled out a survey describing their adherence. Results: 49% of students surveyed responded that staying adherent to their medication was “harder than they thought.” 67% of the participants were adherent (defined as ≥80% of total capsules taken) to their medication. 78.8% of students that received a refill reminder refilled their prescription on time. 59.6% of students that did not receive a refill reminder refilled their prescription on time. Receiving a refill reminder significantly (p=0.03) increased the number of students that refilled their prescription. Implications: Many students cited the fact that they “were not sick” as a reason for not staying adherent to their medication. Students were able to see how difficult it can be to stay adherent to a once daily medication, especially if the medication does not seem to be affecting their health. Understanding barriers to adherence will help students empathize with their patients and work towards overcoming these barriers.

Administration of High-stakes Examinations in an Active-learning Classroom. Anastasia M. Rivkin, Fairleigh Dickinson University, Gail B. Rattinger, Fairleigh Dickinson University, Marysol Diego, Fairleigh Dickinson University, Stacy Hardeo, Fairleigh Dickinson University, Dongmi Kim, Fairleigh Dickinson University, Robin Pucci, Fairleigh Dickinson University, Shawn D. Spencer, Fairleigh Dickinson University, Ligia Westrich, Fairleigh Dickinson University, Barbara A. Rossi, Fairleigh Dickinson University, Michael J. Avalroni, Fairleigh Dickinson University. Objectives: Evaluation of a written examination administration method in classrooms designed for active learning with close student proximity. Method: At Fairleigh Dickinson University SOP, classrooms are designed in accordance with our strategic plan to provide unique classroom experience. Classrooms have round tables seating 6-9 students. For exam administration, physical dividers and technological barriers (using self-paced audience response systems devices (ARS) with 3-9 examination versions) were employed to minimize student distraction and academic misconduct.ARS were exchanged for phones to prevent texting/e-mailing. Exams were proctored in pairs. Students enrolled in fall 2012 P1 courses and faculty proctors were surveyed to collect perceptions of this examination administration method. Results: Seventy-five of 81 students completed the survey. Students were almost evenly split regarding whether using ARS was easier (53%) or took the same amount of time as using scantron forms (48%). The majority of students felt dividers allowed them to concentrate (83%) and increased privacy (87%). A majority felt that ARS and dividers should be used in the future. Of the eight faculty, the majority felt that either ARS (100%) or dividers (87.5%) alone were insufficient to curtail academic misconduct; however, a combination of both was deemed sufficient (87.5%). During examinations, students didn’t feel phone exchange decreased distractions (45%), while faculty felt it was necessary for examination security (75%). Implications: As learning environments transition away from traditional classroom structures, this study offers one approach to administering examinations that minimizes potential for academic misconduct without needing to build an additional classroom for this purpose.

Alternative Treatment Plan Assignments: Increasing Student Knowledge and Skills. Katie S. McClendon, The University of Mississippi, Shirley M. Hogan, The University of Mississippi, Kim G. Adcock, The University of Mississippi, James J. Pitcock, The University of Mississippi, Daniel M. Riche, The University of Mississippi. Objectives: To evaluate alternative assignments used in the 3rd year pharmacotherapy problem-based learning course series. Method: Students are required to complete a written assignment related to a facilitated patient case. The standard assignment (termed a “treatment plan”) includes goals, drug selection, monitoring, counseling, and references. In 2009-2010, an alternative assignment was developed and implemented for the type 2 diabetes case. The focus was on formula selection and rationalization. An IRB-approved 5-question survey was used to evaluate this alternative assignment. Descriptive statistics were used. Results: Forty-five students in the class of 92 students replied to the survey (48.9% response rate). Most students (66.7%) reported spending about the same amount of time on the alternate assignment as they normally do, but 54.5% of students either agreed or strongly agreed that they were better prepared for the next class session than normal after completing the assignment. The majority of students (55.6%) felt they had a greater depth and breadth of knowledge compared to other weeks, and 66% of students preferred the assignment over the traditional assignment, although several commented that they liked having variety in types of assignments. Additionally, unsolicited positive feedback was also provided by several students. Implications: Despite similar time commitment, self-reported preparation was improved with the alternative assignment. The majority of students reported a preference for alternative assignment. Using these results, alternative assignments, such as group plans, SOAP notes, and multi-vignettes, have been successfully implemented.

An Acute Care Medicine Elective Course Using Online Learning and Patient Simulation. Kendrea M. Jones, University of Arkansas for Medical Sciences, Ashley R. Stinnett, University of Arkansas for Medical Sciences, Kathryn K. Neill, University of Arkansas for Medical Sciences. Objectives: To describe a hybrid delivery system incorporating online modules, live case-based application sessions, and high-fidelity patient simulations in an acute care elective. Method: Students completed online modules consisting of Web-based video
presentations and assignments designed to model activities students encounter in acute care APPEs. In-class discussions included patient case and journal club presentations. Students participated in 2 simulation exercises (sepsis and ACLS). Students utilized a Wiki for group communication. An end of semester course evaluation used a 5-point Likert (1 = strongly disagree to 5 = strongly agree) to assess course delivery methods. Mean (.SD) values are reported. Pre- and post-tests to assess baseline knowledge and to assess learning following completion of a sepsis simulation were administered. **Results:** Nine students completed the course. Students indicated the journal club exercise increased their ability to critically evaluate literature (4.33 ± 0.82). Students agreed participation in simulation exercises enhanced knowledge of sepsis (4.67 ± 0.52) and ACLS (4.5 ± 0.55) and their understanding of a pharmacist’s role (4.5 ± 0.55) in a clinical setting. Students agreed simulation exercises improved their confidence communicating recommendations to providers (4.67 ± 0.52). All students perceived they learn better using simulated patient cases compared to online modules or lectures. Students’ rating of the Wiki as easy to use for group work was marginal (3.1 ± 0.67). Average increase for pre- versus post-test scores for the sepsis module was 35.6%. **Implications:** Participation in multiple active-learning techniques including simulation resulted in increased performance on knowledge-based assessments. Students perceived active-learning exercises to be beneficial to their learning and communication skills.

**An Initial Assessment of Pharmacy Practitioners’ Perception of Pharmaceutical Care in Uganda.** Karen Beth H. Bohan, Wilkes University, Robert D.B. Otto, Makerere University School of Health Sciences, Harnisha Patel, Wilkes University, Samuel Opio, Pharmaceutical Society of Uganda. **Objectives:** To identify perceptions regarding Pharmaceutical Care (PC) in Uganda and to develop a Needs Assessment tool to advance pharmacy training and practice in Uganda. **Method:** Collaborating with the Pharmaceutical Society of Uganda (PSU) and Makerere University (MU), two short questionnaires were given to pharmacy stakeholders in Uganda in fall 2012. One, developed by PSU, was administered during Pharmacists Awareness Week; the other, developed by Wilkes University, was administered to a convenience sample of stakeholders at MU and Mulago Hospital. Both surveys were open-ended questions to fully explore the range of perceptions. **Results:** Eighty-three individuals participated including pharmacists, pharmacy students, faculty, and staff. Currently 84% of pharmacists state they practice PC and 86% believe prescribing authority would enhance the effectiveness of PC. The following challenges/barriers to provision of PC were identified: inadequate resources, limited collaboration among healthcare professionals, and lack of support from the management team. When asked about the role of pharmacists in improving patient health care, 69% of students identified PC activities as positively impacting patient care outcomes. Working outside of the traditional community practice setting was of interest to 75% of students. **Implications:** Pharmacy stakeholders in Uganda clearly embrace the philosophy of PC but face many challenges to full implementation. The results of this survey were used to develop a fixed-response Needs Assessment instrument that will be administered later in 2013 in the second phase of this project. This will help prioritize future projects towards the goal of advancing pharmacy practice in Uganda.

**An Interprofessional Education (IPE) Experience Involving Pharmacy and Medical Students.** Shyam Gelot, University of South Florida, Erin S. Serag, University of South Florida, Allesa English, University of South Florida College of Medicine, Dawn M. Schocken, University of South Florida. **Objectives:** Healthcare is undergoing a comprehensive paradigm shift towards Interprofessional team-based practice. The purpose of this IPE experience was to introduce several short cases to pharmacy and medical students that simulate didactic content learned by both groups and provide opportunities to teach each other about their respective fields. **Method:** A class of second year pharmacy (P2) and medical (M2) students were divided into eighteen groups consisting of 2-3 P2s and one M2. Groups were separated into three cohorts of six groups and rotated through three stations. The first station involved a shared standardized patient (SP) interview; since this was the P2’s first live encounter obtaining a patient history, it provided an opportunity for M2s to provide guidance. The second station involved prescription counseling and patient interviews with both a pharmacist and physician. The M2 and P2s reciprocated roles in order to appreciate each other’s perspectives. Lastly, the third station depicted ethical conflict scenarios and involved role plays. Each station culminated in de-brief sessions with students and faculty. **Results:** Course evaluations revealed student enjoyment of the interprofessional encounter and better perception of each other’s roles in healthcare. Constructive feedback suggested that additional time at each station and a more thorough clinical background on the SP case would have been beneficial. **Implications:** The IPE scenarios allowed for robust discussions between health students and simulated activities exposed them to events they will encounter in practice. Also, it instilled concepts of professionalism and communication skills.

**An Interprofessional Education Summit: Differences in Perceptions Between Medicine and Pharmacy Students.** Edward F. Foote, Wilkes University, John Szarek, The Commonwealth Medical College, Karen Arscott, The Commonwealth Medical College, Zachary Vaskalis, The Commonwealth Medical College. **Objectives:** Each year, the Northeastern/central Pennsylvania Interprofessional Education Coalition (NECPA IPEC) hosts an annual Collaborative Care Summit which brings together hundreds of students for interprofessional learning. The summit is held simultaneously at seven different sites in our region. There is some data in the literature that differences in attitudes toward IPE may exist between professions. The objective of this research is to compare the perceptions of pharmacy and medical student’s perceptions of the summit. IRB approval was obtained. **Method:** Using an anonymous questionnaire (SurveyMonkey.com) we survey all participants of the summit regarding their perceptions on the quality of the summit and whether summit objectives were met. Survey questions were Likert-based with 1 being “strongly disagree” and 5 being “strongly agree.” **Results:** 556 students and 122 facilitators participated in the summit, representing 17 professions. Overall 54% of the students responded to the survey compared to 48% (n = 50) medical students and 75% (n = 50) pharmacy students. Pharmacy students were more likely to agree that the summit was overall effective (mean 4.32 vs 3.97, p = 0.019). Pharmacy and medical students gave equal and fairly positive responses to questions regarding summit organization and logistics. However, in three of the five questions directly related to summit objectives, pharmacy students were statistically more likely to agree that objectives were met. **Implications:** Both pharmacy and medicine students agreed that the Summit was effective. Pharmacy students appeared to have had a somewhat “better” experience but it is unclear if this statistical difference is clinically meaningful. More research is needed in this area.

**An Ongoing Longitudinal Comparison of Students’ Readiness for Self-directed Learning.** Therese I. Poirier, Southern Illinois University Edwardsville, Radhika Devraj, Southern Illinois University Edwardsville. **Objectives:** Self-directed learning (SDL) is an important attribute for growth and success in the pharmacy profession. The
purpose of this study is to determine the impact of educational experiences on students’ readiness for SDL as they progress through the pharmacy curriculum. **Method:** A cohort of students from the graduating class of 2014 is being followed yearly for their SDL readiness as they progress through the professional program. A previously validated Fisher’s SDLR scale, a 28 item instrument with 3 subscales is being used at each of the three administrations that have occurred to date. Matched pair data were available from 68 students out of the original cohort of 83 students during the recent third administration. Repeated measures ANOVA was conducted to determine whether significant differences in overall and subscale scores were present over time. **Results:** The mean SDLR score for P3 students was 162.80 (range 124 to 197) in the third administration. Mean SDLR scores in the P1 and P2 years were similar (P1 mean = 166.42, P2 Mean = 165.04). Eighty two percent (82.1%) scored a high readiness (SDLR>150). No significant differences in SDLR and subscale scores were noted over the 3 year time period. No significant differences in scores with the demographics were noted.

**Implications:** Curricular experiences did not impact students’ readiness for SDL. It is possible that high readiness at onset may have led to a ceiling effect. Alternatively, the Fisher’s instrument may not be sensitive enough to detect small differences in SDLR.

An Initial Assessment of a Rural Health Professions Program. Suzanne M. Soliman, *University of Illinois at Chicago*, Martin MacDowell, *University of Illinois at Chicago Rockford*, Allison E. Schriever, *University of Illinois at Chicago*, Michael Glasser, *University of Illinois at Chicago Rockford*. **Objectives:** The University of Illinois at Chicago (UIC) Rockford campus opened a formalized Rural Health Professions Program (RHP) for pharmacy and medical students in 2010. Since that time, rural healthcare instruction research has become a topic of interest in pharmacy education. In contrast, rural student opinions using qualitative research is virtually nonexistent in the literature. **Method:** A study of rural pharmacy and medical students’ initial perceptions of rural healthcare education was performed. A written survey was given to all 49 RHP students at UIC (classes of 2015 and 2016) during summer orientation. Data were analyzed qualitatively using thematic content with constant comparative analysis. Basic demographic information and quantitative opinions regarding community and healthcare teams were also collected. **Results:** All RHP students participated, providing written responses in three areas: becoming a rural health professional, desire to attend UIC and best ways to train students. Predominant content themes were identified and demonstrated that students had similar reasons for wanting to become rural healthcare providers, including “giving back” to a small community and staying in their hometown. Students also had similar recommendations for training including working with established “rural role-models.” Over 90% of students were from rural areas; 94% were Caucasian and 55% female. Nearly 90% agreed that the team approach meets the needs of caregivers and patients. **Implications:** This study serves as an initial assessment of the background/opinions of rural healthcare students. Results can be used to inform the implementation and evaluation of other rural pharmacy education programs.

An Interprofessional Program that Includes Clinical and Community-oriented Health Professions to Address Childhood Obesity. Elizabeth W. Blake, *South Carolina College of Pharmacy*, Brianne L. Dunn, *South Carolina College of Pharmacy*, Tiara N. Rosemond, *University of South Carolina*, Christine E. Blake, *University of South Carolina*, Arnold School of Public Health, Scotty Buff, *Medical University of South Carolina*, Teri Browne, *University of South Carolina, College of Social Work*. **Objectives:** Long-term solutions to the childhood obesity epidemic will require concerted interdisciplin ary efforts that are sensitive to both individual and social determinants. The Junior Doctors of Health® (JDOH) program involves interprofessional education (IPE) with university students from healthcare fields (e.g. medicine, pharmacy, dietetics, social work, public health) who deliver an interactive program in teams to at-risk school-aged youth. The purpose of this study was to assess the impact of participation in the JDOH IPE program on health professional students’ beliefs about childhood obesity. **Method:** Students at two different universities (n=52) enrolled in an IPE elective that incorporated the JDOH curriculum. IRB-approved survey instruments assessed beliefs about importance, causes of, and responsibility for childhood obesity among student participants before and after IPE experiences. Data were analyzed using paired t-tests. **Results:** At pre-test, students ranked individual-level causes of (e.g. fast food/ junk food consumption) and responsibility for (e.g. parents and the child) childhood obesity higher than those classified at the social or environmental level (e.g. crime, lack of places to exercise). Students also ranked childhood obesity as more important relative to other issues (e.g. drug use, violence). At post-test, significant increases were observed in identification of social/environmental level causes of and responsibility for childhood obesity, while the rating of individual-level contributors remained constant. **Implications:** Direct involvement with implementation of the JDOH curriculum increased sensitivity to the complexities of childhood obesity and a greater understanding to the social/environmental contextual factors that influence health behaviors among health professional students.

Are First-Year Health Science Students Ready for Interprofessional Education? Margarita V. DiVall, *Northeastern University*, Lelsie L. Kolbig, *Northeastern University*, Mary Carney, *Northeastern University*, Jennifer Kirwin, *Northeastern University*, Christine Letzzeier, *Northeastern University*, Shan Mohammed, *Northeastern University*. **Objectives:** Our objectives were to 1) develop an interprofessional conference for first year students at a College of Health Sciences; 2) assess readiness and attitudes towards interprofessional learning before and after the conference. **Method:** Alcohol and substance abuse were chosen as topics for their relevance to college freshmen and health professionals. A half-day conference was based upon core competencies for interprofessional education (IPE) based on the IPE Collaborative and included 1) a presentation from the Office of Prevention and Education at Northeastern regarding alcohol and drug abuse; 2) a personal account of drug addiction presented by a pharmacist; 3) a panel discussion representing all health programs framing issues of interprofessional approaches to address substance abuse; 4) small interprofessional group discussions of cases facilitated by faculty and upper level students; and 5) a reflection and debriefing. A validated scale “Readiness for Interprofessional Learning Scale” (RIPLS) was administered a week before the conference (pre) and immediately after the conference (post). **Results:** 277 first-year students (pharmacy, nursing, physical therapy, speech/audio, health sciences) attended the conference (83.9%). RIPLS was completed by 293 students (89%) pre- and 203 students (73.3%) post-conference; 161 students had matched pre and post results. Overall, students were open to IPE before the conference and comparison of pre- and post-data demonstrated further significant improvement for 7 of 19 items (P<0.05), all of which were related to shared learning. **Implications:** Our interprofessional conference was well attended and successfully provided information regarding substance abuse, interprofessional collaboration, and further improved freshmen attitudes towards IPE and shared learning.
Assessing Student Performance on Thinking and Decision Making Outcomes in a Therapeutics Sequence. Alexandria M. Garavaglia Wilson, St. Louis College of Pharmacy, Paul Juang, St. Louis College of Pharmacy, Abigail Yancey, St. Louis College of Pharmacy.

Objectives: St. Louis College of Pharmacy provides ability-based education. Practice opportunities to develop thinking and decision making (TDM) abilities of assess, evaluate, select and recommend, monitor, and educate as related to drug therapy are linked to the four semester therapeutics sequence. Content-based multiple choice questions (MCQs) are linked to an outcome. The study objective was to compare student performance on TDM outcomes within a therapeutics course.

Method: In this single center retrospective study, investigators collected and categorized content-based MCQs for 2 years of students in the 3rd and 4th courses of the sequence. Student performance on these questions was collected and compared. Descriptive statistics, student t-test and chi-square test were utilized.

Results: Student performance by specific TDM outcome differed in both the 3rd and 4th courses in the sequence (p = 0.0248 and p = 0.0001, respectively). When comparing the 2 courses, performance also differed between the 3rd and 4th courses in the sequence (p < 0.001). While the class completing the 4th course in the sequence in 2010 performed similarly to those students enrolled the 3rd course in 2009 and 2010, it appears students enrolled in the 4th course in 2011 performed worse on the outcomes of assess, evaluate, and select and recommend.

Implications: Student performance on the exam content-based MCQs in the therapeutics sequence may need to be tracked and compared throughout the sequence and regularly reported in the course assessment reports.

Assessing the Impact of Pharmacy Student Collected Medication Histories in an Observation Unit. Brian Faley, Rutgers, The State University of New Jersey, Michael A. Wynd, Rutgers, The State University of New Jersey, Gabrielle Procopio, Hackensack University Medical Center, Michelle Kobayashi, Hackensack University Medical Center, Douglas Finefrock, Hackensack University Medical Center, Joseph Feldman, Hackensack University Medical Center.

Objectives: To assess the quality of medication history taking by pharmacy students in the medication reconciliation process compared to the standard of care in patients placed in an observation status.

Method: After evaluation in the Emergency Department, patients are discharged, placed into an inpatient status, or placed into an observation status for a period up to 48 hours. Once patients were in an observation status, pharmacy students obtained medication histories for each patient by interviewing the patient, family member/caregiver, or by contacting the patient’s community pharmacy. Patients were excluded if they were unable to provide a comprehensive history and family, caregiver, or community pharmacy could not be contacted. Data Collected includes: medication name, dose, route, frequency, and allergies. Data was reconciled by a pharmacist with the interdisciplinary team. Data was recorded and maintained, without patient identifiers, in a password-protected database. Comparisons between triage collected and pharmacy student collected medication histories were made to identify discrepancies between medication, dose, frequency, and to identify omissions, and discontinued medications.

Results: Five hundred and one medications histories were collected, accounting for 3213 drug records. There were 1176 identical medication records and 2192 discrepancies identified. Seventy-six (15%) of the profiles were identical. Discrepancies found were: 34 (1.6%) wrong medication, 278 (12.7%) wrong dose, 296 (13.5%) wrong frequency, 808 (36.9%) omissions, 51 (2.3%) discontinued. 725 (33.1%) records were unable to be compared.

Implications: Pharmacy student collected medication histories in an observational unit identify discrepancies that can be reconciled by the interdisciplinary team.

Assessing the Impact of a Drug Abuse/Addiction Awareness Program for Sixth Graders. Jane E. Krause, Purdue University, Val J. Watts, Purdue University.

Objectives: To assess the impact of a drug abuse/addiction awareness program presented by first professional year Doctor of Pharmacy (P1) students to sixth graders. Method: Over a three week period, P1 students deliver a series of five drug abuse/addiction awareness presentations to sixth graders as a component of Drug Abuse/Addiction Education, a one credit elective course offered in the College. Each presentation is 40 minutes in length and the students present in teams of 3-4. The sixth graders complete a 12 item multiple-choice quiz before and after the series of presentations. Each P1 student provides feedback on the experience by completing a seven item questionnaire utilizing a five-point Likert scale [strongly agree (5); strongly disagree (1)].

Results: During the 2012 spring semester, the 33 students enrolled in Drug Abuse/Addiction Education participated in this service learning initiative by presenting to 38 sixth graders. The mean score of the pre-quiz was 5.71 ± 2.3 and the post-quiz was 7.55 ± 2.08 indicating the mean score increased by 15.33%. All P1 students agreed (strongly agreed or agreed) that they enjoyed presenting to the sixth graders, this was a unique experience that contributed positively to their pharmacy education, the sixth graders benefited from the program, and they would enjoy additional opportunities to educate the public on health issues.

Implications: Exposing sixth graders to a drug abuse/addiction awareness program increases their knowledge of the topic. Such initiatives could serve as a template for future community involvement by the pharmacy students.

Assessing the Quality of Database Search Strategies Utilized by Meta-analyses that Evaluate Anti-infective Drug Therapy. Jacob Marler, The University of Tennessee, Kiana Y. Curry, Med Communications, Katie J. Suda, The University of Tennessee.

Objectives: Meta-analyses are increasingly influencing clinical practice. However, meta-analyses have limitations including: publication bias, methods for study selection, and appropriate statistical analysis. It is crucial to evaluate their quality, since significant methodological flaws have been reported. The purpose of this study was to evaluate the quality of search strategies utilized by meta-analyses evaluating anti-infective drug therapy due to the lack of evidence in this area.

Method: Embase and Medline were searched using the term “anti-infective” with limits (meta-analytic design, English, and published from 2007-2012). Meta-analyses evaluating anti-infective drug therapy were selected to collect data on: search strategy, outcomes, journal impact factor, quality assessment, and trial design. Regression analyses were applied; p-value <0.05 was considered significant. Results: 103 of 268 identified citations met inclusion criteria and were evaluated. 80.6% of meta-analyses used search terms and an average of 4.3 databases [Medline (98.1%), Cochrane (93.2%), Embase (76.7%)] to identify relevant articles for inclusion. 97.1% included randomized control trials and 27.2% evaluated multiple study designs. The majority of meta-analyses used a quality assessment tool (84.5%) and reported positive results (59.2%). Average impact factor of journals publishing meta-analyses was 5.7 + 3.4 (median = 5.9) and 73.5% were published in specialty journals. The number of resources searched was correlated to the impact factor (p = 0.0013).

Implications: The majority of anti-infective meta-analyses used rigorous search strategies to identify and increase the quality of studies included for evaluation. This is inconsistent with reports in other therapeutic areas that have questioned the quality of meta-analyses. Therefore, these results may provide increased confidence in anti-infective meta-analyses.
Assessing Thinking and Decision Making Abilities Through Multiple Choice Questions in a Therapeutics Sequence. Alexandrea M. Garavaglia Wilson, St. Louis College of Pharmacy, Paul Juang, St. Louis College of Pharmacy, Abigail Yancey, St. Louis College of Pharmacy, Ryan Moenster, St. Louis College of Pharmacy. Objectives: St. Louis College of Pharmacy provides ability-based education. Practice opportunities to develop the thinking and decision making (TDM) abilities of assess, evaluate, select and recommend, monitor, and educate as related to drug therapy are linked to the four-semester therapeutics sequence. The study objective was to assess the TDM abilities practiced through the exam content-based MCQs in the therapeutics sequence. Method: In this single center retrospective study, investigators collected, categorized, and compared content-based MCQs for 4 years of students progressing through the sequence. Descriptive statistics, student t-test and chi-square test were utilized. Results: Select and recommend was the most frequently (33-46%), while educate was the least frequently (0-2%), linked outcome to the content-based questions on therapeutics exams (p<0.0001). The percentage of questions written at each TDM outcome in each course within the sequence appears similar when compared individually. However, the TDM outcomes of these questions in therapeutics 1 was significantly different than the other courses in the sequence combined (p<0.0001). Implications: Similar to the level of questioning by Bloom’s taxonomy, content-based MCQs on therapeutics exams should provide equal and balanced practice opportunities for students to develop the 5 aspects of the TDM outcomes regarding drug therapy throughout the sequence to achieve the abilities and succeed in the profession. It may be beneficial for therapeutics course coordinators to prospectively assign the TDM outcome to be tested by each exam content-based MCQ in the sequence using the same blueprint.

Assessment of Critical Thinking Skills Progression in a Pre-Pharmacy Curriculum. Melody Hartzler, Cedarville University, Aleda M. Chen, Cedarville University. Objectives: To evaluate critical thinking skills as students progress through a pre-pharmacy course sequence. Method: Rubrics were created to provide objective assessment of critical thinking skills across the undergraduate curriculum from L1 (Freshman) – L 4 (Senior). Each rubric addresses: identifying and considering context, problem-solving, and innovative thinking (4 point Likert-type, 0= not present, 3= mastery). The rubric was designed to show progression, where equivalent or higher scores from year-to-year indicate development in critical thinking skills. Students were given a critical thinking assignment related to ethics in their freshman pre-pharmacy course and the subsequent year in their sophomore pre-pharmacy course; assignments were evaluated using the L1 and L2 rubrics, respectively. Changes in critical thinking from freshman to sophomore were compared using a Wilcoxon Rank-Sum Test, where a non-significant p-value indicated equivalent scores. Results: Students (n=30, 53% female, mean age =20.16±3.22, GPA = 3.37±0.46) progressed from freshman to sophomore year in their critical thinking skills of considering content (L1/L2 medians =2, p=0.083) and innovative thinking (L1/L2 medians =2, p=1.0). Students’ problem-solving skills did not progress and instead declined (L1 median =2, L2 median =1, p=0.008). Implications: To show progression in critical thinking skills, students must consider at least two solutions to a problem (L2) versus one solution (L1). Examination of the results indicated that many students continued to consider a single approach when problem-solving, while progressed in considering multiple contexts (considering content) and creating new ideas rather than restating ideas (innovative thinking). Faculty must promote the development of critical thinking skills by encouraging students to consider multiple viewpoints and solutions to addressing ethical issues.

Assessment of Pharmacy Students’ Baseline Understanding of Biostatistics Concepts. Andrea M. TenBarge, Purdue University, Amy H. Sheehan, Purdue University, Kevin M. Sovinski, Purdue University. Objectives: To evaluate the effect of a newly-required pre-pharmacy statistics course on the baseline biostatistical knowledge of entering pharmacy students. Method: A modified version of the Biostatistical Knowledge Test Survey Instrument (BKTSI) was distributed to all entering pharmacy students during the fall semesters of 2011 (no pre-pharmacy statistics course) and 2012 (required pre-pharmacy statistics course). The previously validated BKTSI is based on the most prevalent statistical methods used in contemporary research. Data was collected using Qualtrics™ Research Suite software. Between class analyses were performed on individual question scores using chi-square tests and mean total test scores using an independent t-test. The project was approved by the Indiana University Health Investigational Review Board. Results: A total of 122 students participated with response rates of 47.3% (71/150) and 33.6% (51/152) for the Classes of 2015 and 2016, respectively. Mean total test scores (36.3% vs 34.4%) were not statistically different between classes [1.9% (95% CI, -2.3%-6.2%); p=0.367]. The most common incorrectly answered questions were similar between classes and included the following concepts for the Classes of 2015 and 2016, respectively: Cox proportional hazard regression (8.5% vs 9.8%), Kaplan-Meier analysis (15.5% vs 7.8%), and multivariable logistic regression (12.7% vs 9.8%). Analyses performed on individual question scores showed no statistically significant differences between classes. Implications: A newly-required pre-pharmacy statistics course did not impact baseline BKTSI scores for entering pharmacy students. Key areas to direct future biostatistics instruction within the pharmacy curriculum include Cox proportional hazard regression, multivariable logistic regression, and Kaplan-Meier analysis.

Assessment of Student Performance and Perceptions for Live versus Asynchronous Video Streaming in Pharmacotherapeutics Lectures. Elizabeth L. Geison, Cora Lynn B. Trewet, The University of Iowa. Objectives: To compare students’ performance and perceptions for a set of pharmacotherapeutics lectures taught live and for the same lectures taught via asynchronous video streaming via the Internet. Method: In fall 2011, therapeutics gynecology, pregnancy, and lactation lectures were taught by means of live lectures. In fall 2012, the same lectures were taught using asynchronous video streaming. The same exam questions were used and compared between years. Additionally, a course evaluation was administered to each group at the end of the courses as well as a survey to fall 2012 students. Results: Students in the asynchronous setting performed poorly compared to the students in the live lectures. There was a significant difference in exam scores favoring when the lectures were offered live (p=0.0006). Of the 20 questions on the exam, 19 questions did not score as high in 2012 compared to 2011. While the majority of fall 2012 students attended other course lectures that were live, 67% of students admitted to not listening to the recorded lectures prior to the exam. When surveyed, most students felt they learned best during live lectures but would like having the option to listen to recorded lectures on their own time. Implications: Students’ performance was better with live lectures compared to asynchronous video streaming. Many students selected not to listen to the recorded lectures. While students felt they learned best from interacting with students and faculty during live lectures, they also felt synchronous recording of the lectures may be beneficial for study and review purposes.
Assessment of Team Based Learning (TBL) in a Required Self Care Course. Katherine K. Orr, The University of Rhode Island, Brett Feret, The University of Rhode Island, Virginia A. Lemon, The University of Rhode Island, Celia P. MacDonnell, The University of Rhode Island, Lisa B. Cohen, The University of Rhode Island, Anne L. Hume, The University of Rhode Island. Objectives: To assess previous course grades and the change in students’ perception of their self care knowledge, communications, professional skills, and teamwork after a transition to a TBL format. Method: Previously, Self Care was a lecture based course with 3 exams and a comprehensive final. TBL was implemented and included individual readiness assurance test (IRAT) electronically during class. TBL teams of 5 members collaborate on group readiness assurance test (GRAT) using Immediate Feedback Assessment Technique (IF – AT). Three exams were also IF-AT based. On the first day, a voluntary 25 question pre-survey was administered to assess students’ confidence in self care knowledge, communication skills, and team learning using a 1 – 5 Likert scale, along with class preparation. At the end of the semester, students participated in a similar survey. Pre and post survey data was analyzed for significance using paired sample t-tests. Average exam grades from previous years to fall 2012 were also compared. Results: One hundred twenty surveys were completed out of 126 students. Measures relating to self care confidence, communication, and professional skills significantly improved (p<0.001). Most measures on group work significantly improved (<0.001). Percentage of time spent preparing for class increased with a mean change of 21.4% (95%CI 15.8 – 27.1; p<0.001). A comparison between the previous year’s exams showed no difference in average grades. Quiz grades averaged 90%, increasing the overall course grades. Implications: TBL provided self reported improvements in teamwork, communication, study habits, and overall perception of self care skills. However, individual exam scores did not improve.

Assessment of a Collaborative Project to Increase Availability and Accessibility of Influenza Immunizations. Maili Nelson, Idaho State University, Catherine A. Cashmore, Idaho State University, Jacob Nestler, Idaho State University, Kevin W. Cleveland, Idaho State University, Kushal Shah, Idaho State University, Kimmie Miller, Idaho State University, Lindsey Reeder, Idaho State University, Benjerman Shay, Idaho State University, Megan Jarmin, Idaho State University, Malysa West, Idaho State University. Objectives: This study assessed participant demographics, satisfaction, and beliefs regarding the increased availability and accessibility of influenza vaccination provided at a unique, collaborative flu shot clinic. Method: Pharmacy students organized a collaborative effort between a community pharmacy and on-campus Operation Immunization events. Eligible participants were faculty and staff, as well as their spouses and dependents. Consent forms and insurance information were filled out and submitted by participants in advance. A local community pharmacy processed all vaccine insurance claims; flu shot events were then organized at each college or division. Student researchers administered questionnaires to participants after they received their vaccination. Results: Two hundred thirty-four participants received a flu shot. The majority of participants (54%) were staff, and 55.8% were between the ages of 40 and 60 years. One third of participants did not get their flu shot last year, and 79.5% reported that this event made it more likely that they received a vaccination this year. Convenience was reported as the most important reason for participation by 62.3%, followed by no out-of-pocket expenditure by 18.8%. Just over one third of participants were unaware that pharmacists in Idaho have prescriptive authority to administer vaccines. Satisfaction with the program was overwhelmingly positive. Implications: Increased convenience and reduced out-of-pocket costs increased the likelihood of patients receiving their annual vaccination. This type of collaboration could be easily replicated at other large organizations to increase overall vaccination rates and minimize the detrimental effects that the influenza virus may have on individuals, college campuses, and large organizations.

Assessment of a Communication Skills Laboratory on Student Perception of Competence and Performance. Catherine Taglieri, Massachusetts College of Pharmacy and Health Sciences-Boston, Steven J. Crosby, Massachusetts College of Pharmacy and Health Sciences-Boston, Joseph Ferullo, Massachusetts College of Pharmacy and Health Sciences-Boston. Objectives: Assess the effectiveness of a Communication Skills Lab, an active learning component of a Pharmacy Practice Laboratory, on improving student knowledge and confidence in communication related to patient care activities specifically, patient counseling, delivery of drug information and writing SOAP notes. Method: Activities of the Communication Laboratory include patient counseling, drug information and written medical documentation. A student survey was developed and administered through Qualtrics® using a 5 item Likert scale and analyzed using SigmaPlot. This survey assessed student perceptions of both their confidence in performing communication tasks as well as how effective the curricula met the NAPLEX blueprint objectives. Student assessment was performed through the use of grading rubrics and scores were tracked over the course of the semester, assessing the degree of change in performance. Results: Data was collected with the administration of a pre- and post-laboratory survey which was completed by 89% and 87% of students, respectively. The students’ mean score in confidence rating regarding nine lab activities increased from 2.83 to 3.75 (p<0.001). The students’ mean score on their ability rating of 15 NAPLEX blueprint competency statements, intended to be addressed in the lab, increased from 3.40 to 3.80 (p<0.001). Student grades for the three main patient care activities of the lab improved significantly (p<0.001, p<0.001, p<0.001). Implications: An active learning Communication Skills Laboratory effectively increased student ability and confidence in providing patient care activities involving communication.

Assessment of Pharmacy Student Attitudes and Perceptions on Team Based Learning in a Spanish Elective Course. Victor Sapochnikov, Jennifer M. George, University of Illinois College of Pharmacy at Rockford, Sandra Cuellar, University of Illinois College of Pharmacy at Chicago, Suzanne M. Soliman, University of Illinois at Chicago. Objectives: Previous studies conducted on team based learning (TBL) have demonstrated favorable student attitudes. The pharmacy education literature is virtually nonexistent on TBL in a foreign language course. The objective was to determine pharmacy student attitudes and perceptions on TBL in a foreign language course. Method: The course was offered during fall 2011 and 2012, where students were assigned into groups of 5-7. Classes had a uniform structure, consisting of: 1) outside preparation, 2) in-class activities, 3) online journal entries, peer assessments and examinations, and 4) mock patient interviews. At the semester’s end, students completed an online 18 question survey composed of quantitative Likert scale, multiple choice and demographic questions, and open reflections via a qualitative design. The results were analyzed using descriptive statistics and a thematic content analysis using constant comparison. Results: The response rate was 100% (n=52): 25% male and 75% female. Approximately 77% of students were between the ages of 21-25. Nearly 85% of the students noted the course will
enhance the care they will provide to Spanish-speaking patients, and 90% of students regarded teamwork and TBL course structure to be beneficial to their learning experience. Four recurrent themes regarding this teaching method for a foreign language course were identified: course flexibility, learning opportunities, group interactivity, and applicability to the overall curriculum. Implications: The findings illustrate students were generally satisfied with the overall TBL approach over traditional classroom experience. This is a viable construct for pharmacy schools embarking on or offering a foreign language course.

Association of Health Sciences Reasoning Test Scores with Academic and Clinical Performance. Wendy C. Cox, University of North Carolina at Chapel Hill, Jacci McLaughlin, University of North Carolina at Chapel Hill. Objectives: To assess the association of scores on the Health Sciences Reasoning Test (HSRT) with academic and clinical performance in the PharmD curriculum. Method: The HSRT was administered to a total of 329 first-year PharmD students enrolled at the UNC Eshelman School of Pharmacy between Fall 2007 to Fall 2009. Performance on the HSRT and its subscales (analysis, inference, evaluation, deductive reasoning, and inductive reasoning) was compared with academic performance in 29 courses throughout the curriculum and with performance in advanced pharmacy practice experiences (APPEs). Results: Statistically significant positive correlations were found between course grades in 8 courses and HSRT total scores; 3 courses and analysis subscale scores; no courses and inference subscale scores; 1 course and evaluation subscale scores; 6 courses and deductive reasoning subscale scores; and 1 course and inductive reasoning subscale scores. All significant correlations were accounted for by the pharmaceutical care lab courses (4), therapeutics courses (3), and the law and ethics course. No statistically significant correlations were found between HSRT total scores or subscale scores and APPE grades. In addition, all correlations were weak (r<0.3). Implications: While in theory the HSRT seems like an attractive tool to predict clinical performance, its use may be limited by the lack of moderate to strong correlation between scores and course performance in years 1-3 and with APPEs in our current curriculum.

Associations in Pharmacy Student Performance Among Standardized Tests and the North American Pharmacist Licensure Examination (NAPLEX). Melissa C. Jones, South University, Andrea L. McKeever, South University, Kenrie B. Ware, South University, Lilia Z. Macias-Moriair, South University. Objectives: To identify trends in student performance on standardized tests utilized by pharmacy schools/colleges and the NAPLEX. Standardized tests including the Pharmacy College Admissions Test (PCAT) and Pharmacy Curriculum Outcomes Assessment (PCOA) exam are used by pharmacy programs as initial and progress indicators, respectively, of student performance within the curricular track. At South University School of Pharmacy, the PCOA exam was administered in January 2012 to graduating students in their final year of professional training, and corresponding NAPLEX scores were later reported. Method: Students’ NAPLEX and PCOA scores were matched, and descriptive statistics were calculated for NAPLEX and all of the PCOA subtopic scores. Odds ratios were calculated to determine the level of association between lower NAPLEX and PCOA scores, with lower scores defined as at or below the 25th percentile. Scores were then dichotomized as 1=low and 0=all other scores. A summative score compiled from subtopic scores was tabulated, and a Pearson correlation coefficient was employed to identify a relationship between the NAPLEX and summative subtopic scores. Statistical significance was defined as a P value at or less than 0.05 based on a 2-tailed test. Results: Students scoring in the lower 25th percentile in the Clinical Preventive and Population Health and Medication Therapy Management subtopics were at greater risk for lower NAPLEX scores than those above the 25th percentile (OR= 5.426; CI=1.755-16.775 and OR= 3.173; CI=1.137-8.850, respectively). Student subtopic summative scores were negatively correlated with NAPLEX scores (-0.449, p<0.00). Implications: PCOA subtopic summative scores identify at-risk students for intervention.

Attitudes and Perceptions of Pharmacy Students on Provision of Drug Information by the Pharmaceutical Industry. Bobby C. Jacob, Mercer University, Annesha W. Lovett, Mercer University, Hannah K. Rogers, Mercer University, Ashish A. Advani, Mercer University. Objectives: To assess incoming pharmacy student confidence in the reliability of drug information disseminated by the pharmaceutical industry. Method: An online, 45-item questionnaire regarding perceptions of the pharmaceutical industry was offered to first year pharmacy students during the first week of fall semester 2012. Responses were analyzed using descriptive statistics, chi square and correlation. Results: A total of 155 students (99%) completed the survey. Findings reveal that 15% of students trust industry to provide reliable information regarding product efficacy, while 31% trust the reliability of product safety information. 71% “somewhat” trust industry to provide reliable information regarding efficacy, while 55% “somewhat” trust product safety information. The remaining students reported little or no trust in the reliability of product information. A relationship was shown between trust and views on regulation (r=-.175), drug development (r=.412), pricing (r=-.250), and confidence regarding informing the public of safety concerns (r=.415) (p<0.05). Chi-square analysis revealed significant associations with trust in the industry and views on adequacy of safety monitoring, patient assistance, and direct to consumer advertising (p<0.05). Implications: Incoming students at our institution have relatively low confidence in the reliability of industry disseminated drug information. Drug information is addressed from a general perspective at most pharmacy schools; however, it is unclear if programs adequately prepare students to understand and evaluate drug information as it relates specifically to the pharmaceutical industry. Further research is warranted to examine student perceptions on the reliability of diverse types of product information and the influence of the pharmacy curriculum on these perceptions over time.

Bridging the Gap: Clinical Application of Genetic Markers Utilizing Case Studies. Nancy H. Goodbar, Presbyterian College, Christopher L. Farrell, Presbyterian College, Katherine G. Moore, Presbyterian College, Kathryn N. Freeland, Presbyterian College, Edward E. Grace, Presbyterian College. Objectives: To evaluate the impact that case studies have on pharmacy students’ understanding of the application of pharmacogenomics to clinical patient scenarios and utilization of online pharmacogenomic resources. Method: Second year pharmacy students enrolled in PHRM 6104 “Principles in Human Genetics and Pharmacogenomics” were included in the study. In order for these students to gain an understanding of the clinical applicability of genetic markers, pharmacy faculty merged basic science concepts of pharmacogenomics with case study scenarios. At the conclusion of the course, students completed a survey to assess their understanding of pharmacogenomic concepts and clinical application, their satisfaction of the pharmacogenomic case study series, as well as the utility of the online pharmacogenomic resources. Results: The survey results yielded positive feedback in regards to case study implementation. On a 5 point scale, the average responses for each question ranged from 3.95 to 4.75. Implications: Implementation of
clinical case studies within a pharmacogenomics course was well received by pharmacy students. The case studies proved to be successful in enhancing their understanding of the clinical applicability of pharmacogenomic concepts. As pharmacogenomics is a topic of evolving interest in the healthcare field, it is crucial to continue to identify successful ways in which this concept can be integrated into the pharmacy curriculum.


Objectives: Health care professionals can enhance quality of care by being conscious of patients’ cultural backgrounds. Although there is agreement that health care professionals need to be culturally competent, how to teach and then measure this competence is evolving. The purpose of this study was to examine cultural knowledge, awareness and skills among nursing and pharmacy students enrolled in an elective course culminating in a two week trip to China.

Method: The study used a mixed methods design, using a quasi-experimental approach with pre- and post-testing. Eleven nursing and nineteen pharmacy students were enrolled in the class and 29 participated. The group had diverse ethnicities (40% Hispanic, 37% Caucasian, 20% Asian); 73% reported previous international travel and 40% reported knowledge of a second language. The measure of cultural competence used the Clinical Cultural Competency Questionnaire (CCCQ) which measures knowledge, awareness and skills. The second instrument used is a researcher-designed demographic questionnaire.

Results: Paired t-test was used for analysis. There was a statistically significant increase from pre-to post-trip in knowledge (pre: M = 17.72, SD = 4.52) (post: M = 33.41, SD = 6.7), t (28), p < .0005 (two-tailed); in skills (pre: M = 10.62, SD = 3.1) (post: M = 19.41, SD = 4.8), t (28), p < .0005; and in cultural awareness (pre: M = 21.57, SD = 2.8) (post: M = 22.89, SD = 1.75), t (27), p < .014. Implications: Students’ increased cultural knowledge, skills and awareness indicates the value of this type of learning activity. More research is needed to determine the best way to teach cultural competency and whether these results can be sustained over time.


Objectives: Case-based learning (CBL) is an effective educational model that improves students’ clinical decision-making, learning motivation, and exam performance. Students benefit from CBL by applying newly acquired therapeutic skills and solving real-life case-based problems. The objective is to describe an innovative CBL-didactic course and evaluate student perceptions of the effectiveness of its format. Method: A 4-week, 3-credit, CBL-format course titled Advanced Ambulatory Care was offered to two class cohorts. The course goal is to increase student understanding of pharmacists’ role in ambulatory-care and increase knowledge of pharmacotherapeutics relevant to its setting. Classes were comprised of a 10-minute quiz based on assigned pre-readings, a one-hour lecture based on new therapeutic materials, immediately followed by individual and team case-based assignments. A business plan development group-project for a new ambulatory-care service was also included as a longitudinal administrative assignment. To evaluate student perceptions of the course format, both cohorts were surveyed weekly and at course completion. Results: Fifteen and nineteen students from cohort 1 and 2, respectively, completed 5 separate course surveys. Upon course completion, significantly more students felt a higher level of comfort with administrative and clinical components of ambulatory-care. The majority of both cohorts found daily quizzes and case-based assignments to benefit their overall education and would recommend the course to students regardless of interest in working in ambulatory-care. Implications: CAPE and ACPE have emphasized the importance of case-based instruction. Although often difficult to implement, CBL is well received by students and is an excellent educational method to integrate into the didactic environment.

Characteristics of Fourth-Year Pharmacy Students who Apply for Residencies. Catherine L. Hatfield, University of Houston, Sora Choi, University of Houston, Mark D. Hatfield, University of Houston, Elizabeth A. Coyle, University of Houston.

Objectives: The objective of this study was to determine if there are differing demographics or characteristics in fourth year pharmacy students who choose to pursue a residency as compared to those who choose not to pursue a residency. Method: A questionnaire was emailed via Qualtrics to the fourth year students at the University of Houston College of Pharmacy. The questionnaire contained basic demographic questions in addition to questions on dependent children, GPA, loan debt, research exposure and availability of mentors. Chi square tests and Fisher’s Exact tests were used to analyze the data in Excel and SAS. This project received IRB approval from the University of Houston.

Results: Ninety-nine fourth year pharmacy students were emailed the survey and 56 responses were returned (56.7% response rate). Of these, 37.5% were applying to residencies. Significant findings were found for those applying to residencies and participation in a clinical research project (p < 0.001) and having mentors that influenced their decision to pursue a residency (p < 0.05). Other trends, but non-significant findings, were that those applying to residencies tended to be younger, have higher GPAs, and have less debt. Differences in regards to gender, marital status, dependents, ethnicity, or exposure to bench research were not found. Implications: Knowing what characteristics influence a student’s decision on whether to pursue a pharmacy residency can be beneficial. In our population, exposure to clinical research and having an influential mentor made a significant difference and increasing opportunities for these to occur may help improve residency application rates at our College.

Closing the Loop: Evaluation of a Community Comprehensive Health Outreach Program. Suzanne M. Galal, University of the Pacific, Sian Carr-Lopez, University of the Pacific, Natalie N. Hajian, University of the Pacific, Josh L. Fu, University of the Pacific, Eilibra G Younan, University of the Pacific, Rajul A. Patel, University of the Pacific, Joseph A. Woelfle, University of the Pacific, Berit Gundersen, University of the Pacific.

Objectives: To assess and report stakeholder feedback regarding community health outreach events targeting Medicare beneficiaries. Method: Twelve outreach events throughout northern/central California were conducted during the 2013 Medicare election period. Beneficiaries were offered Part D plan optimization, vaccine administration, medication therapy management (MTM) and several health screenings at each event. Event feedback was collected from various stakeholders including attendees, pharmacy student leaders, pharmacist preceptors, and site coordinators. Results: In total, 636 attendees received Part D and/or MTM services at the events. Seventy-two attendees returned the follow-up survey with 66 (92%) reporting having a “slightly” or “much better” understanding of their Part D plan, 69 (96%) being “very satisfied” with the overall performance of pharmacy students, and 69 (96%) “likely” or “very likely” to return to a future event. Of the 952 student evaluations preceptors
completed, 852 (89.6%) indicated that they “strongly agreed” that students represented the profession of pharmacy well. Student leaders completed 103 evaluations of 52 preceptors and in 94 (91%) such instances indicated that they “agreed” or “strongly agreed” of having a positive experience with preceptors relating to engagement, accessibility and ability to provide constructive feedback. Sixty-five (63%) students provided narrative feedback as to how preceptors could enhance student learning. Ten of 11 (91%) site coordinators who provided feedback were “extremely satisfied” with students’ professionalism, knowledge, patient interactions, and communication skills. Implications: Comprehensive evaluation of a community outreach model from various perspectives is critical to ensuring continuous quality improvement and sustaining successful program outcomes for stakeholders.

Communication Skills for Student Pharmacist Pre-and Post-Self Assessment. Julie A. Adrian, University of Hawaii at Hilo, Paula Zeszotarski, University of Hawaii at Hilo. Objectives: Objectives: To evaluate a new required communications course based on active learning skills. The course learning objectives define the skills needed to communicate effectively with patients and health care providers. Students practiced various oral communication skills by role playing and written communication skills through writing peer critiques. The course combines formative or practice role play with a summative role play session. Method: Methods. Second-year Pharmacy students completed online pre- and post-self-ratings surveys on the course objectives. Students rated themselves on communication skills on a 5-point scale from Poor to Excellent. Results: Results. Thirty-one (31) of the 46 enrolled students (67%) completed both surveys. Average gain scores from pre- to post-test showed that students felt they had gained in all areas defined by the course objectives. Areas that showed the most gain were related to patient counseling skills and implementing a pharmaceutical care plan. The area that showed the least gain was in using technology to facilitate communication. Implications: Implications. The results demonstrate the impact that the course had on developing key communication skills in pharmacy students. As second year students, they are just beginning to take an active role in their experiential rotations so it may be expected that they would show the greatest gain in this new skill area. Using technology to facilitate communication was not emphasized in the course and may be removed as primary objective. Future studies will address the limitations of a self-assessment by comparing students’ scores on the practice role play with scores on the final role play.

Communication of Clinical Recommendations During Therapeutics Oral Examinations. Lisa M. Lundquist, Mercer University, Angela O. Shogbon, Mercer University, Kathryn M. Momaly, Mercer University, Hannah K. Rogers, Mercer University. Objectives: To compare students’ self-assessment and faculty evaluation of communication of clinical recommendations during therapeutics oral examinations. Method: Methods. For three consecutive years in the Cardiovascular/Renal therapeutics course, one individual and one group patient case-based oral examination were given to all second-year student pharmacists. In addition to evaluation of pharmacotherapy knowledge, faculty evaluated students’ communication skills using a 4-point scoring rubric with 1 = needs significant development and 4 = accomplished. Immediately following each oral examination, students self-assessed their communication skills using the same rubric. This study was approved by the Institutional Review Board and students voluntarily signed informed consent prior to participation. Students’ self-assessments were compared to faculty evaluation of their communication skills using descriptive statistics and student’s t-tests. Results: A total of 401 (97.3%) students completed communication self-assessments following both oral examinations. For the individual oral examination, mean (SD) student self-assessment and faculty’s evaluation of communication were 3.16(0.52) and 3.51(0.42), respectively. For the group oral examination, mean (SD) student self-assessment and faculty’s evaluation of communication were 3.35(0.47) and 3.52(0.34). Faculty evaluations in both oral examinations were statistically significantly higher than the students’ self-assessments (p<0.001). In addition, students’ self-assessment of communication increased from the individual to the group examination (p<0.001). Implications: Student pharmacists’ self-assessment of communication skills was consistently lower than the faculty’s evaluation scores. Students’ lower self-assessment may be due to a lack of practice in the verbal communication of clinical recommendations. Increased utilization of patient case-based oral examinations in therapeutic courses may help to improve students’ confidence and self-assessment of their communication skills.

Comparing Clandestine Lunch Interviews to Structured Behavioral Interviews for Assessing School of Pharmacy Candidates. Robert B. Stanton, Marshall University, Lisa W. Frazier, Marshall University, Christopher Gillette, Marshall University, H. Glenn Anderson Jr., Marshall University. Objectives: To compare the clandestine evaluations of School of Pharmacy candidates during lunch to a structured behavioral interview (SBI) to determine if assessments of the candidates differed between the two types of interview and/or type of interviewer. Method: Methods. The clandestine lunch interviews were performed by external adjunct faculty members and the structured behavioral interviews were conducted by a team consisting of one faculty member and one School of Pharmacy student. The faculty member and student assessed the same candidate independently during the SBI and only one candidate was interviewed at a time. During the clandestine lunch interview, the adjunct faculty interviewed and assessed 2 or 3 candidates simultaneously. Candidates were not told that they were being assessed. Results: Of the 21 candidates evaluated, the adjunct faculty who clandestinely evaluated the candidate over lunch disagreed with the ranking given by the faculty and student during the SBI in nine instances. In seven cases the adjunct faculty rated the candidate lower than the faculty or student. Though there was a trend towards non-agreement between the two interview styles, the differences missed being statistically significant with a p-value of 0.5734. Two candidates over lunch expressed neutral or negative attitudes towards the profession of pharmacy, and two candidates exhibited behavioral that was not polite. Implications: A clandestine interview and observation over lunch by trained interviewers offers important information on whether a candidate would be a good fit for the program.

Comparing Live versus Online Instruction to Teach Health Literacy. Nadine Shickora, Wilkes University, Adam Welch, Wilkes University. Objectives: To compare live versus online instructional methods on students’ ability to create health literate material. Method: Methods. Students in their first professional (P1) year were divided into two sections, S1 and S2, and introduced to the topic of health literacy for the first time. A live classroom PowerPoint lecture was given to S1. Section two was given the same lecture pre-recorded and was told to review it within one week. All students were given the same pre- and post-assignment to describe to a patient how food is digested. Microsoft Word 2010 was used to measure the reading grade level by the Flesch-Kincaid tool. An independent t-test was used to compare differences in reading level before and after the lecture. Research was approved by exemption by University IRB. Results: There were 31 students in S1 and 36 in S2. The mean reading grade level on the
Assignment went from 8.95 to 7.42 in the S1 group, a difference of 1.53 [95% CI (0.92-2.14) p<0.001]. The S2 group’s mean grade level dropped from 8.30 to 6.25, a difference of 2.04 [95% CI (1.40-2.69) p<.001]. The mean percent change was 15.83% in S1 and 22.26% in S2, a difference of 6.43% [95% CI (-1.69-14.54) p=.119]. Implications: Both instructional methods showed a significant lowering in reading grade level. The percent change between the live and online groups was not statistically significant. Either live or online instructional methods may be appropriate in teaching this foundational material.

**Comparison of Clinical Communication Skills to Written and Oral Examination Performance in a Therapeutics Course.** Angela O. Shogbon, Mercer University, Lisa M. Lundquist, Mercer University, Kathryn M. Momary, Mercer University. Objectives: To compare performance on written and oral knowledge-based examinations to faculty evaluation of student communication skills. Method: For three consecutive years, in addition to traditional written examinations, a patient case-based oral examination was given to all second-year pharmacy students enrolled in the cardiovascular therapeutics course. The oral examination incorporated information also tested in written format. In addition to evaluation of pharmacotherapy knowledge on the oral examination, faculty used a grading rubric to assess students’ communication skills in the areas of rapport (confidence, non-verbal, tone of voice, eye contact) and presentation of therapeutic recommendations (concise, pronunciation, well-prepared, patient-focused). Students’ performance on the written and oral examinations were compared to faculty evaluation of their communication skills using descriptive statistics, student’s t-test, and Pearson’s correlation. This study was approved by the IRB. Results: A total of 403 (97.8%) students voluntarily consented for participation. A positive correlation was seen between performance on the oral examination and mean faculty communication evaluation scores (r=0.49, p<0.001). Little correlation was seen between written and oral exam performance (r=0.19, p<0.001) and between written exam performance and mean faculty communication scores (r=0.06, p=0.208). In addition, students scoring 90 or greater on the oral examination had higher mean (SD) faculty communication scores than those scoring less than 90 [3.65(0.36) vs. 3.35(0.43), respectively, p<0.001]. Implications: A positive correlation was seen between students’ performance on oral examinations and communication skills, but not to written examinations. Identification of potential disparities between knowledge and communication skills may lead to a broader curricular focus on oral communication in therapeutics courses.

**Comparison of Faculty Protégés’ Desired Guidance to Guidance Provided.** Jane R. Mort, South Dakota State University, Wendy Jensen Bender, South Dakota State University, Jodi R. Heins, South Dakota State University, Zhu-jiu Jin, South Dakota State University, Kim Messerschmidt, South Dakota State University, Tasha L. Rausch, South Dakota State University, Hongwei Zhang, South Dakota State University. Objectives: Compare protégés’ desired level of guidance, protégés’ perceived level of guidance received, and mentors’ perceived level of guidance provided. Method: The mentoring experience included regular meetings between the faculty protégé and mentor (mean 3.8) utilizing guidance materials. A survey addressed perceived support in four aspects (general information, scholarship, teaching, service) on a 10 point scale (1 least, 10 most). Results: Ten mentors and 10 protégés completed the survey. The largest difference between the protégés’ desired level of guidance (mean 7.2) and guidance received (mean 5.6) was in scholarship. According to the protégés, all of the remaining aspects were perceived to be fairly well matched (<0.2 difference between mean level desired and provided). The largest differences between what the protégés desired and what the mentors perceived they provided were in the areas of scholarship (mean 7.2 and 6.2, respectively) and teaching (mean 5.6 and 6.8, respectively), while perceptions were similar in the areas of general information (mean 7.6 and 7.7) and service (mean 3.8 and 4.1). The protégés’ desired level of guidance and level they perceived receiving were highly correlated in all areas (r=0.90 to 0.97) except scholarship (r = 0.45). No correlation existed between the protégés’ desired level of guidance and what the mentor perceived providing (r = -0.43 to -0.13), except for scholarship (r = 0.59). Implications: Protégés’ perceived mentoring needs and what they received were not consistent with the mentors’ perceptions of what was provided. The mentoring process will benefit from assuring these focuses are aligned.

**Comparison of OSCE Scores Between Two Campuses in a Patient Assessment Course.** Jeremy Thomas, University of Arkansas for Medical Sciences, Schwanda K. Flowers, University of Arkansas for Medical Sciences, Scott Kaufman, University of Arkansas for Medical Sciences. Objectives: Determine if any difference exists between OSCE scores among two campuses. Method: The Patient Assessment Course at the UAMS College of Pharmacy utilizes an OSCE to assess student competency in history taking and physical examination skills. While the main UAMS campus houses a state of the art Center for Clinical Skills Education, the college decided to offer an OSCE to students at the Northwest (NW) satellite campus to decrease travel time for students. The NW campus facilities do not offer equivalent amenities in regards to technology and support staff as the main campus for OSCEs. However, standardized participants were recruited from the local area and trained along with standardized participants from main campus through the distance education technology equipment at each campus. A suitable location was identified on the NW campus that served the needs of the exam. Mid-point and final OSCE scores were compared to determine parody between the two campuses. A t-test was used to determine any statistical difference between scores of the two campuses. Results: The average of the OSCE scores for the Midpoint Exam were 85% for the NW campus and 87% for the main campus (p=0.14). Final examination scores for the main campus and NW campus were 89% and 90% (P=0.14), respectively. Implications: The implementation of a second location for the Patient Assessment OSCE did not result in a significant difference in scores between the two campuses. Training standardized participants at both campuses in a similar fashion is essential to achieving parody between OSCEs offered at multiple locations.

**Comparison of a Traditional and a Revised Lecturer Evaluation Tool Within a Team-taught Pharmacotherapy Course.** Paul Juang, Paul Juang, South Dakota State University, Tasha L. Rausch, South Dakota State University, Thomas L. Rausch, South Dakota State University, Alexandria M. Gravaglia Wilson, South Dakota State University, Alexandria M. Garavaglia Wilson. Objectives: Student feedback on lecturer performance is a vital component in improving lecturer performance as well as course outcomes. The purpose of this study was to examine the quantitative (proportion of students providing feedback) and qualitative feedback with the use of a new simplified web-based lecturer evaluation system compared to the traditional evaluation tool. Method: This single center, case-controlled observational study was conducted through the administration of a lecturer evaluation tool given to students enrolled in a 5th year pharmacy therapeutics course. The students utilized the simplified evaluation tool during the first half of the course and the traditional evaluation tool in the second half. Outcomes examined include quantity as well as quality, measured by the type of free text feedback provided. The free text feedback was evaluated by the study investigator and categorized into one of three groups: positive feedback, constructive criticism and
negative feedback. All data were analyzed in summary form via Student t-test and Chi-square test, where appropriate. **Results:** One hundred and fifty-eight (90.3%) students completed the lecturer evaluation during the first half of the course and one hundred and forty-six (83.4%) during the second half. Significantly more feedback (mean 126 vs. 82.3, \( p < 0.001 \)) was given with the simplified evaluation tool compared to the traditional tool. There were also greater percentages of positive and constructive feedback (32% vs. 30%, \( p = 0.32 \) and 10% and 8%, \( p = 0.13 \)) with the new evaluation tool. **Implications:** The study showed that a simplified lecturer evaluation resulted in greater quantitative and qualitative feedback by students.

**Concerns for Bisphosphonate-Induced Osteonecrosis of the Jaw Affecting Clinical Practice Among Dentists in South Texas.** Veronica S. Young, The University of Texas at Austin, Cara Gonzales, University of Texas Health Science Center San Antonio, Norma Ketchum, University of Texas Health Science Center San Antonio, James Bone, University of Texas Health Science Center San Antonio, Thomas Oates, University of Texas Health Science Center San Antonio, Rahima Mungia, University of Texas Health Science Center San Antonio. **Objectives:** Bisphosphonate-induced osteonecrosis of the jaw (BONJ) represents a growing concern for dental practitioners that may alter clinical care. The South Texas Oral Health Network Dental PBRN conducted this study to assess the effects of these concerns on practice patterns for patients at risk. **Method:** Dental practitioners (\( n = 93 \)) in South Texas completed a survey of BONJ knowledge and perception and their current practices for patients on bisphosphonate. A knowledge score was computed, and associations between level of knowledge and practitioners’ knowledge, perception, and practice were explored. **Results:** Most practitioners (78%) classified as “high knowledge” (50/64) felt they were well-informed compared to 54% classified as “low knowledge” (13/24) (\( P = 0.03 \)). Knowledge score groupings suggest a trend toward differences in the following practice behaviors: (1) asking patients about bisphosphonate use (94% high vs. 71% low; \( P = 0.01 \)); (2) altering treatment options for patients on bisphosphonate (97% high vs. 79% low; \( P = 0.06 \)); and (3) ordering CTX levels during bisphosphonate therapy (30% high vs. 9% low; \( P = 0.05 \)). Regardless of knowledge score, 65% of practitioners perceived their patients are not well-informed about BONJ, and 47% perceived their patients are not concerned about BONJ. **Implications:** Dental practitioners recognize their need for additional information to guide the care of patients taking bisphosphonates. They are concerned by their patients’ lack of awareness of BONJ. Pharmacists can narrow this knowledge gap by counseling patients on BONJ risk and dental procedures, and partnering with dentists to translate and disseminate the evidence on risk and management of BONJ.

**Correlation of Capstone Examination Performance to Cumulative GPAs.** Elizabeth A. Coyle, University of Houston, Catherine L. Hatfield, University of Houston, Jessica M. Cottreau, University of Houston, Gerida Brown, University of Houston, Andrea L. Smesny, University of Houston. **Objectives:** Capstone examinations are a useful tool in the evaluation and assessment of student learning. The University of Houston College of Pharmacy (UHCO) has been utilizing a yearly capstone examination for each of the didactic years in the curriculum (Milemarkers I, II, and III) for over a decade. Milemarkers I and II are formative with usual pass rates of 80%, and failure to meet the minimum competency requires remediation. Milemarker III is summative and usual pass rates are 100% as failure to pass Milemarker III could result in postponement of APPEs. The purpose of this study was to evaluate if there is a correlation of a student’s Milemarker performance to their overall academic performance (GPA). **Method:** Exam scores and pass rates for three didactic capstone exams (Milemarkers I, II and III) were compared to cumulative GPAs for two different pharmacy classes. Analysis of variance (ANOVA) was utilized to determine if there were statistical differences amongst three different GPA benchmarks (< 3.0, 3.0 – 3.49, and > 3.0). **Results:** 199 student were evaluated for both Milemarkers I and II, and 91 scores for Milemarker III. For all Milemarkers, significance was observed (\( p < 0.05 \)) for all three GPA benchmarks. Specifically, students with cumulative GPAs <3.0 were more likely to score poorly on the exams and > 3.5 consistently passed all the evaluated capstone examinations. **Implications:** With more and more emphasis on capstone examinations in pharmacy education, our study illustrated that capstone examinations can reliably capture students with poor academic performance.

**Creation and Utilization of an Online Card Game to Study Infectious Diseases Fundamentals.** Meghan Jeffres, Roseman University of Health Sciences, Sean Barclay, Roseman University of Health Sciences. **Objectives:** BugOut was created to serve as a study tool to help students learn infectious diseases fundamentals. It is an online solitary card game in which a student creates groups of three cards, or melds, consisting of a pathogen, an antibiotic and a third miscellaneous card describing the pathogen, antibiotic or both. The objective of BugOut is to offer an alternative study tool and determine the efficacy. **Method:** BugOut was offered to students during their six week infectious diseases therapeutic block. Lecture days one, two and three are dedicated to learning infectious diseases fundamentals including common bacterial pathogens and antibiotics. At the end of day three of lecture, BugOut was made available to students. Students were formally assessed at day 10. Student demographics, learning preferences and game play data were collected. **Results:** A total of 57 (40%) students chose to play BugOut. Student played an average of 8.9 games for 132 minutes over the 7 day data collection period. Students who self-identified as kinesthetic or active learners were younger, played more games and for a longer duration than self-identified listening, reading and writing learners. Assessment scores for kinesthetic learners were higher (84.1%) than listening (78.3%), writing (80.2%), and reading (82.0%) learners, although not statistically significant. **Implications:** Students are able to study infectious diseases fundamentals without the use of textbooks or notes and receive instant feedback on accuracy or knowledge with this online study tool. Increasing student interaction with fundamental infectious diseases information will hopefully transition this information from short-term memorization to long-term knowledge.

**Crisis Management by the Community Pharmacist—A Simulation-Based Learning Experience.** Allison M. Bell, The University of Mississippi, Anna A. Lerant, The University of Mississippi Medical Center, Jeffery D. Orledge, The University of Mississippi Medical Center, Kristi L. Wilson, The University of Mississippi Medical Center, Joyce Shelby, The University of Mississippi Medical Center, Scott S. Malinowski, The University of Mississippi, Justin J. Sherman, The University of Mississippi. **Objectives:** To provide third year pharmacy students the opportunity to manage crisis situations they may encounter in their community practice setting. **Method:** We designed a 3-hour long simulation experience where groups of 7 students rotated among 4 stations. Learning objectives for each station targeted hands-on and behavioral skills. Students immediately used these learned skills in a crisis management scenario. The learning objectives for the stations were: 1) evaluate an unconscious patient,
call 911, provide CPR; 2) recognize acute coronary syndrome, use of an AED, give a report to arriving paramedics; 3) administer an intramuscular influenza shot, evaluate an unconscious patient, manage a vasovagal reaction; 4) communicate with a sick child’s distressed mother, recognize and treat anaphylactic shock. All scenarios took place in a community pharmacy or public setting with limited resources. Each scenario required a student to emerge as group leader. Faculty assumed an insider role in the scenarios and provided structured debriefing after each scenario. Surveys (IRB 13x-200) were administered post scenario. Results: Opinion survey results indicated that 96.5-98% of students (n=51) agreed or strongly agreed that they achieved the stated learning objectives and their time was used efficiently. We used these students’ comments to improve the modules. The students indicated that they gained confidence through these activities and they appreciated the importance of communication as a key element for delivery of patient care. Implications: Simulation-based education in a safe, controlled environment helps pharmacy students discover their own ability to manage a crisis they may encounter in their practice.

**Delivery Preference and Student Perception of Lecture Capture Impact In A Doctor of Pharmacy Curriculum.** Keith J. Christensen, Creighton University, Michael S. Monaghan, Creighton University, Ryan W. Walters, Creighton University School of Medicine, Tracy Chapman, Creighton University. Objectives: To describe students’ preference of viewing lecture captures for classroom lectures and identify their perceptions toward the enhancement of the learning experience. Method: A nine question survey was offered to 650 pharmacy students enrolled across four academic class years. The four point Likert-scale questions assessed the preference of viewing between a full lecture capture including video of instructor, synchronized slides with audio (vodcast), or listening (audio only) of lecture captures along with the perceived importance to enhancing educational value during the fall 2009 to Spring 2011 semesters. Results: Three hundred fifty-nine students (55.2%) responded to the survey. A total of 54.8% sometimes to the majority of the time use just the audio recording of the lecture and 72.5% use a smartphone as the mp3 player to access those files. Three hundred nine students (86.1%) agreed or strongly agreed that access to the lecture captures was critical to success in the program. The majority agree or strongly agree that the value added benefits include help in reviewing material, preparing for exams, reducing the need to take notes, using time more efficiently, earning higher grades, and improving the overall learning experience. Implications: Lecture capture is becoming commonplace within professional degree programs. Determining the most useful way to deliver the recorded material based on student preference will help schools and colleges determine what technology needs exist. Assessing the value of this technology on student learning is paramount to continued success and comparison with student outcomes in the future.

**Description of Primary Literature Evaluation Opportunities on Advanced Pharmacy Practice Experiences.** Kathryn M. Momaary, Mercer University, Lisa M. Lundquist, Mercer University. Objectives: Describe students’ primary literature evaluation experiences (PLE) during advanced pharmacy practice experiences (APPE). Method: Students were asked to voluntarily complete a survey assessing their PLE during APPEs at the end of their fourth professional year. Two graduating classes of students have been assessed. Students were asked to quantify the number of opportunities to critically evaluate literature, which APPEs provided the opportunity, the grade they received, and the type of direction and feedback provided by their preceptor. These data were assessed using descriptive statistics. Results: One hundred eighty (62%) students consented for participation. Overall, 161 (89.4%) students reported the opportunity for PLE a total of 449 times during APPEs. Of those students who did PLE on APPEs, the mean(SD) number of PLE per student was 1.8(1.9) on 2.4 (1.4) APPEs. The majority of students (75.8%) did three or fewer PLE during APPEs. PLE occurred most frequently on elective and acute care APPEs. Students reported that 9.2% of preceptors did not give a grade for the PLE and 8.7% of preceptors did not provide any feedback regarding the PLE. In addition, students reported 63% of preceptors did not provide them with resources for PLE preparation. Implications: The majority of students did PLE during APPEs; however, most students had three or fewer opportunities to practice this skill. Preceptors routinely provided grades and feedback regarding performance on PLE. Preceptor development focused on PLE may be needed to increase the number of APPEs providing this opportunity to improve students’ ability to critically evaluate literature.

**Designing Pharmacy Mobile Applications: A Collaboration Between Pharmacy and HealthCare Information Technology Students.** Maria Leibfried, St. John’s University, Bonnie MacKellar, St. John’s University. Objectives: To improve pharmacy students understanding of healthcare information technology (HIT) by collaborating with HIT students on the design of a pharmacy-oriented mobile application. Method: Eight APPE students and six HIT students enrolled in a HIT course were divided in 2 groups and worked together to design mobile applications aimed at two pharmacy scenarios: turnaround time for a new prescription in a community pharmacy, or turnaround time for an intravenous medication order in a hospital pharmacy. The pharmacy majors in each group brainstormed and developed a list of tasks and variables in each scenario using the CARD methodology (Collaborative Analysis of Requirements and Design). The pharmacy students then collaborated with the HIT students to create a workflow process suitable for mobile app development. Students were surveyed to determine whether they learned how to communicate with members of the other discipline, and whether they learned about the other profession. Results: 13 surveys were returned. 12/13 students indicated that they gained insight to the way healthcare providers and HIT specialists can work together. The pharmacy students indicated that they had the opportunity to communicate their HIT specialists, while the HIT students felt that they learned about the day-to-day processes in a pharmacy. Implications: As the level of healthcare automation grows, pharmacists will need to effectively collaborate with IT specialists and be able to explain pharmacy terminology and process. This project gave pharmacy students an experience where they could practice these skills.

**Detecting Bias in an Objective Structured Clinical Examination Using Differential Facet Functioning.** Luke D. Stanke, University of Minnesota, Doneka R. Scott, University of Minnesota. Objectives: To identify if exam bias exists in an objective structured clinical examination (OSCE) for gender, ethnicity, and citizenship status using differential facet functioning. Method: From 2009-2013, 798 PDIII students completed a three-station OSCE, in which six different cases have been used. Within each case, questions across cases are bundled into four content groups, or facets, sharing common characteristics: essential knowledge, gathering information, patient education, and monitoring/follow-up. Differential facet functioning (DFF) is a method used to detect bias in facets. For this study, 10 facets were examined; the 6 cases and the 4 content bundles. A multilevel mixed-effects measurement model using item response data, student demographic information and facet-level information was fit to detect potential bias. Results: No DFF was found for citizenship on clinical
skill or content facets. No DFF was found on content facets for any ethnic group, however a negative bias was found for Asian students on the patient education facet (p < .001). Finally, no DFF was found for gender on clinical skills facet, but a negative bias was detected for males on the constellation case (p = .029). **Implications:** The detection and elimination of bias is critical to the validity of an exam. This study extends the literature by showing that bias not only exists on written examinations, but can also exist on skills-based assessments, such as the OSCE. Finally, practitioners should not be so quick to label an OSCE case as validated until it has gone through the process of detecting bias.

**Developing a Pharmacy Practice Skills Lab Based on Repeated Testing: A Five Year Analysis.** Kimberley J. Begley, Creighton University, Michael S. Monaghan, Creighton University. **Objectives:** Evaluate the impact of repeated active-learning laboratory simulations on the skills development of third year pharmacy students. **Method:** A required 15-week pharmacy practice skills learning laboratory was redesigned to reinforce skills development and enhance long-term learning retention. Activities simulating real-world experiences (brown bag reviews, patient counseling, prescription verification, and sterile product verification) were constructed to assess student competence. Timed, repeated learning experiences which increased in complexity throughout the semester tested student knowledge, skills, and abilities. Continuous quality improvements were made to simulated experiences based on feedback and data analysis. **Results:** Over a five year period, 814 third-year pharmacy students completed the laboratory series. Scores from skills-based activities repeated four or more times were analyzed. Results demonstrated that each year (2008 – 2012) the test scores significantly improved with each iteration over the semester. In repeated brown bag reviews and patient counseling, there was a statistically significant improvement in student scores with subsequent assessments despite a crescendo of difficulty and complexity of medication problems. (p <.001) With prescription and sterile product verification, there was a significant improvement in student scores up to and including the third assessment. (p <.001) Student scores then tended to plateau, with less significant improvement in performance with subsequent assessments, suggesting that three iterations suffice. **Implications:** These findings support designing educational experiences that maximize learning opportunities based on educational research that supports multiple testing as a means of improving student’s retention and performance. Such data can provide a learning experience that balances student outcomes with faculty workload.

**Development and Delivery of a Seminar to Prepare Pharmacy Practice Residents to Pursue Academic Careers.** Andrew Traynor, Concordia University Wisconsin, Michael C. Brown, Concordia University Wisconsin. **Objectives:** An academic seminar was developed to improve residents’ knowledge of and confidence in pursuing academic careers. The educational objectives included: 1) Outline and describe roles of pharmacy faculty, 2) Characterize and describe organizational and regulatory structures in colleges of pharmacy, 3) Outline the processes for applying for faculty positions and achieving promotion and tenure. **Method:** Pharmacy residents elected to participate in a day-long seminar. Topics covered included; teaching, scholarship, service and practice as faculty roles; governance and promotion; and applying for faculty positions. Each topic included a presentation and active learning exercises. After seminar completion and returning to practice sites, participants were invited to anonymously complete a 21-question online evaluation. **Results:** Twenty-one residents participated in the seminar. Seventeen evaluations (81%) were submitted. All respondents reported the seminar contributed greatly to their knowledge of all topics. Residents most often reported they “learned a lot” about teaching roles (88%) and applying for a faculty position (88%). All reported the seminar met their learning needs, and feeling more confident they could successfully pursue an academic career. Residents reported they were very likely (35%) or somewhat likely (47%) to pursue a faculty position in their career. Residents reported wanting to begin a faculty position following PGY1 completion (38%), following PGY2 completion (25%) or after practicing a number of years beyond residency (38%). **Implications:** Implementing an academic seminar on academic careers improves resident knowledge of and confidence in pursuing faculty positions. Academic seminars may serve as an effective vehicle for recruitment and preparation of future faculty.

**Development and Evaluation of P2 and P3 Curricular Progress Exam.** Lauren S. Schlesselman, University of Connecticut. **Objectives:** 1) To develop a curricular progress exam, and 2) To determine if passing the exam correlates with pharmacy GPA. **Method:** The curricular progress exam, consisting of case-based multiple-choice questions, was administered to P3 students in 2012 and 2013 and P2 students in 2013. Following administration, questions were reviewed for index of difficulty and index of discrimination. Questions were removed if less than 30% of students were able to answer question or with negative discriminators also removed unless at least 60% of students answered it correctly. The passing score for the exam was set at 75%. **Results:** After questions were removed, in 2012 72% of P3s passed the exam with an average score of 79.6% (SD = 8.5), range 60-98%. Students not passing were required to retake the exam. Thirteen students passed on the 1st retake; 9 on the 2nd retake; 4 students did not pass. In 2013 62% of P3s passed, mean 77.0% (SD = 7.1), range 62.6-93.6%. For the P2 exam, 55% passed the exam with mean 75.4%, scores ranging from 52.2-93.8% In comparison of pharmacy GPA with first administration exam scores, the Pearson’s coefficient was found to be 0.7 in 2012 and 0.7 in 2013 for P3s. In 2013 the correlation was 0.5 for P2s. A comparison of inability to ever pass exam and GPA was not possible due to low failure rate but faculty recognized these 4 students also struggled with coursework. **Implications:** The curricular progress exam allows us to meet ACPE standards, document knowledge retention as related to outcomes.

**Development of an Academic Service-Learning HIV Professional Elective Course for Pharmacy Students.** John M. Conry, St. John’s University, Tina Kamnaz, St. John’s University, Tomasz Z. Jodkowski, St. John’s University. **Objectives:** Develop a capstone elective course within the pharmacy program that facilitates the development of the skills/competencies necessary for the provision of pharmaceutical care to people living with HIV/AIDS (PLWHA) and incorporates academic service-learning (AS-L). **Method:** Faculty developed a three-credit didactic course, “Comprehensive Management of HIV/AIDS”. To enhance the learning experience and create an opportunity for AS-L, faculty developed partnerships with two NYC-based institutions that provide care/services to PLWHA. One AS-L partnership focused on students providing assistance to an organization that operates a medication recycling program for antiretrovirals and transports them overseas to underserved areas. The other AS-L partnership focused on students being paired up with a PLWHA that lived at a residential treatment facility for a longitudinal care experience in which the student visited the patient throughout the semester to review and optimize medication management. Students voluntarily completed an anonymous survey at the end of course for course assessment.
Results: 20 students completed this course, with 16/20 (80%) completing the survey. 100% of surveyed students indicated they were satisfied with this course, with the majority of the students indicating that they had personally achieved course objectives. 100% of students opted to participate in the medication recycling AS-L project, while 30% opted to participate in the longitudinal care AS-L project. The majority of students indicated that the AS-L experiences enhanced their understanding of course objectives and global view of HIV/AIDS. Implications: This HIV elective course provided pharmacy students with an innovative opportunity to enhance their awareness and knowledge of HIV/AIDS.

Development of an Instrument to Measure Classroom Incivility and Identification of Group Differences. Alicia N. Ayodele, University of Minnesota, Luke D. Stanke, University of Minnesota, Doneca R. Scott, University of Minnesota. Objectives: There has been little research on classroom incivility; this line of research would be beneficial in gaining insight as to what students believe are appropriate behaviors and how those beliefs align with instructor expectations. A scale was developed to measure student perceptions of incivility for items that students rate regarding their own classroom behaviors and a parallel scale for students to rate the same items in terms of their peers’ behaviors. Part one of this study examines the validity and reliability of the scale and part two fits a model to investigate if age, gender, marital status, or having children affects expectations. Method: The survey was administered in paper and pencil form to a total of 310 respondents. A dimensionality analysis was conducted by first running an exploratory and then a confirmatory factor analysis. Next, a latent regression analysis was conducted to compare model fit between the groups of interest. Results: Items chosen for the scale had fairly high reliability (0.85 for self items, 0.88 for peer items). Factor analysis results suggest self items and peer items form two distinct scales. There was no effect for gender, however, students who were younger, un-married, or without children had higher tolerance for incivility than did their counterparts. Implications: Findings from this study may help pharmacy programs decide on the importance of setting guidelines regarding classroom expectations and how these expectations translate into professional conduct as a pharmacist. Characteristics of an incoming cohort may inform the amount of resources allocated to implement these guidelines.

Diabetes Experience: Improving Student Competency in a Core Domain of Interprofessional Collaborative Practice. Amy L. Pittenger, University of Minnesota, Sarah M. Westberg, University of Minnesota, Mary M. Rowan, University of Minnesota, Sarah K. Schweiss, University of Minnesota. Objectives: Objective: to evaluate outcomes of adding interprofessional learning objectives in a diabetes experience course offered concurrently to pharmacy and nursing students. Method: Methods: course modifications included adding a social networking space designed for students to apply diabetes management content as an interprofessional team. Pharmacy and nursing students collaboratively created a communication plan to care for diabetes patients as a team in an outpatient setting. Results: Total enrollment was 34 pharmacy and 17 nursing students. Pre-course and post-course RIPLS and IEPS results were not statistically different. Most students (77%) stated their expectations for the interprofessional experience were met. Students were split about whether social networking should be used again (42% agreed or strongly agreed, 58% disagreed or strongly disagreed). In the entrance and exit surveys students commented on the role of the nurse and pharmacist in caring for patients with diabetes. A third of both pharmacy and nursing students were unable to describe the role of the other profession in the entrance survey. Another third characterized the role very superficially and stereotypically. In the exit survey all students were able to characterize the role of the other profession and the phrasing used by all students converged. Over the semester students became aware of the other profession’s role and also adopted a common language to describe it. Implications: Qualitative responses demonstrate that students increased their knowledge of roles and responsibilities with respect to the other profession and developed an understanding of interprofessional communication strategies and its central role in effective teamwork.

Didactic and Experiential Pediatric Curricular Content of ACPE-accredited Colleges of Pharmacy. Timothy J. Todd, Midwestern University/Downers Grove, Manali Shah, Edward Hines Jr. VA Hospital. Objectives: Following the conversion to the all PharmD degree, the Pediatric Practice and Research Network of the American College of Clinical Pharmacy published an opinion paper proposing standards for pediatric pharmacy education. The objective of this project was to evaluate the current status of didactic and experiential pediatric curriculums for ACPE-accredited entry-level pharmacy programs in the United States and Canada. Method: Pediatric-focused faculty or administrators were identified for each accredited college of pharmacy. A seventeen question electronic survey was administered to document the extent of required and elective pediatric content within their didactic curriculums. A separate fourteen question electronic survey solicited information from experiential education departments to determine advanced pharmacy practice experiences (APPE) allocated to pediatrics. Results: The response rate for the didactic-focused survey was 33.6%. The average required curriculum contains 31.4 hours of pediatric-focused topics. Of the responding schools, 58.8% offered a pediatric elective course to their students. A majority of the electives (73.7%) were 2 credit hours with an average enrollment of 26.8 students. The experiential education survey yielded a response rate
of 42.9%. All responding schools offered a pediatric APPE opportunity, however 52% had less than twenty rotation allocations per year. No responding college of pharmacy required a pediatric APPE.

**Implications:** Colleges of pharmacy have typically met the proposed hour requirement of 25-30 hours of pediatrics within the required didactic curriculum. However, a need for significant expansion exists with pediatric electives and experiential education.

**Effect of a Pharmacy Camp on High School Students’ Interest and Understanding of the Profession.** Nancy Culberson Taylor, South Carolina College of Pharmacy, Elizabeth W. Blake, South Carolina College of Pharmacy, Kristen L. Ammay, Laura Jeffcoat, South Carolina College of Pharmacy, Zaina Qureshi, University of South Carolina, Wilma J. Sims, University of South Carolina, Charles Bennett, South Carolina College of Pharmacy. **Objectives:** Many high school students are unaware of the numerous opportunities within the pharmacy profession. It is of great benefit to educate those on the brink of selecting a career pathway about these opportunities. This study was designed to analyze the impact of an educational pharmacy camp on high school students’ interest, understanding, and perception of pharmacy then determine the effect on the likelihood of pursuing a career in pharmacy. **Method:** During a five-day summer camp, high school students were exposed to various areas of pharmacy practice including clinical, nuclear, compounding, hospital, and community via hands-on activities. Students enrolled in the camp in 2011 and 2012 completed an IRB-approved survey instrument to assess interest, knowledge, and perception of pharmacist duties on the first and last days of camp. Informed consent was obtained, and responses were de-identified to maintain participants’ anonymity. Cronbach’s alpha was utilized to assess inter-rater reliability. **Results:** Upon completion of the camp, respondents (n=33) indicated an increased understanding of the pharmacy profession and various areas of practice (58.5% to 100%), as well as an increased confidence in performing job-related tasks of a pharmacist with the largest increases in community (18.2% to 81.8%) and nuclear (9.1% to 63.6%). Additionally, interest in various areas of pharmacy practice increased with a subsequent increase in the likelihood of attending pharmacy school (57.6% to 78.6%). **Implications:** The results of this study indicate that the “Adventures in Pharmacy” camp was effective at increasing high school students’ knowledge and understanding of the pharmacy profession with increased interest in pharmacy.

**Effectively Using Current Real-time Communication Technology to Foster Empathy Development in a Diabetes Experience Course.** Elizabeth A. Musil, Concordia University Wisconsin, Michael C. Brown, Concordia University Wisconsin. **Objectives:** The poster objective is to describe an innovative teaching process utilizing and implementing student pharmacist training. The mean KCES score in the pre-survey group was 84.70 and that in the post-survey. 43 students completed both the pre- and post-survey. The mean KCES score in the pre-survey group was 84.70 and that in post-survey group was 86.19. A paired samples t-test comparing the KCES means between the two groups was non-significant (p=0.138). Majority of the students characterized the training as a positive and educational experience. **Implications:** There was a nonsignificant trend toward an increase in empathy when comparing the pre and post survey results. The results support a direct hands-on approach to implementing student pharmacist training.

**Emergency Contraception: Evaluation of Curricular Content Impact on Student Pharmacists’ Knowledge, Attitudes, and Confidence.** Kristen A. Pate, The University of Louisiana at Monroe, Adam Pate, The University of Louisiana at Monroe, Scott A. Baggarly, The University of Louisiana at Monroe, Jamie M. Terrell, The University of Louisiana at Monroe, Roxie L. Stewart, The University of Louisiana at Monroe. **Objectives:** To determine if the current manner in which emergency contraception (EC) is taught in our curriculum increases student knowledge of EC, improves confidence in providing patient education on EC, and changes students’ attitudes regarding EC. **Method:** All students enrolled in the University of Louisiana at Monroe College of Pharmacy’s Special Populations Course and the corresponding Integrated Laboratory Sequence during the spring 2012 semester were taught about emergency contraception in the following multiple-methods approach: 1) A reading assignment on EC; 2) A lecture covering all contraception; 3) An EC patient counseling activity. Surveys assessing student pharmacists’ knowledge of EC, attitudes toward EC, and confidence in counseling patients on EC were administered before and after curricular coverage of EC. **Results:** Pre- to post-survey knowledge scores increased 11.7% (p<0.0001). Median confidence scores increased from 3.25 to 4 (p<0.0001)
a 5-point Likert scale. The percentage of students who agreed or strongly agreed that pharmacists should have the right to refuse to dispense EC for moral/ethical reasons increased from 81.8% to 90.9%; the number of students who agreed or strongly agreed that EC is a form of abortion decreased from 27.3% to 12.9%; the number of students who disagreed or strongly disagreed that EC should be available over the counter increased from 93.9% to 100%. Implications: The EC curricular content effected attitudes, improved student knowledge, and increased students’ confidence in counseling patients regarding EC. Repeating the survey in future years will help determine if results are consistent across different groups of students.

Establishing Criteria for an Early Assurance Program in a School of Pharmacy. Mark S. Luer, Southern Illinois University Edwardsville, Connie Stamper-Carr, Southern Illinois University Edwardsville, Dana M. Dain, Southern Illinois University Edwardsville, Erin M. Timpe Behnen, Southern Illinois University Edwardsville, Gireesh V. Gupchup, Southern Illinois University Edwardsville. Objectives: To establish academic criteria for an early assurance program that identifies students who likely will be successful in the pharmacy program. Method: A retrospective evaluation of academic records was conducted on all students who attended SIUE for pre-pharmacy studies, had ACT scores on record, and completed at least one year of pharmacy education. Data from composite ACT scores and three pre-professional GPAs (cumulative, pre-pharmacy, pre-pharmacy math & science) were cross-tabulated against composite PCAT scores and the cumulative pharmacy GPA after the first professional year (P1-GPA).

Results: Records from 268 students were included. Using regression analysis, weak positive correlations ($R=0.3$) existed between ACT and each GPA while a moderate positive correlation ($R=0.56$) occurred between ACT and PCAT. Students were also evaluated as ACT and pre-professional GPA cohorts (ACT<27 or ACT≥27; GPA<3.5 or GPAs≥3.5). Eighty-three students in the ACT≥27/GPA≥3.5 cohort were compared to all other students in the data set (N=185). This cohort had a significantly higher average composite PCAT (78.1±11.7 vs 61.3±18.3) and a significantly higher average P1-GPA (3.34±0.40 vs 3.05±0.47), $p<0.05$. Implications: No single criterion (ACT or GPA) alone identified which student would be successful academically in the SOP. However, when combined as a cohort, the combination of criteria did identify those who achieved higher PCAT scores and demonstrated a higher degree of success in the professional program as measured by P1-GPA. Thus, a combination of criteria (ACT≥27, GPA≥3.5) was set as the baseline standards to initiate the early assurance program.

Evaluating Exam Question Writing Practices in a Pharmacotherapeutics Course at a New College of Pharmacy. Gwendolyn A. Wantuch, University of South Florida, Kamila A. Dell, University of South Florida, Aimon C. Miranda, University of South Florida. Objectives: 1. Evaluate pharmacotherapeutics exam questions in relation to our best practice guidelines at a new college of pharmacy. 2. Identify the most common faults in exam question writing in a pharmacotherapeutics course. Method: A literature search was performed regarding exam question writing guidelines. Our search yielded no consensus guidelines that currently exist regarding this topic. Therefore, we utilized recommendations published by individual institutions to establish a list of twenty best practices to assess our faculty’s exam question writing technique. Three pharmacy practice faculty evaluated exam questions independently from four pharmacotherapeutics exams and then met to reach a consensus regarding best practice deviations. Descriptive statistics were performed on collected data. Results: A quantity of 240 multiple choice and true/false questions were analyzed against our twenty best practices. Only 21.7% of questions met all best practices and 78.3% deviated from at least one best practice. The most common deviation was grammar, punctuation, or spelling (45%). Other issues included: answer choices not similar in length (16.3%), inclusion of nonessential information unnecessary to identify the correct answer (12.5%), and utilization of phrases such as “all of the above” or “none of the above” in answer choices (11.7%). Implications: We determined exam question writing technique requires improvement at our new college of pharmacy. Formal training in best practices will be implemented and evaluation of exam questions after the training will occur to benchmark progress.

Evaluating Student-pharmacists’ Perspectives of Medication Adherence Before and After a Pillbox Simulation. Alison Walton, Butler University, Jessica E. Wilhoite, Butler University. Objectives: To evaluate the change in student-pharmacists’ understanding, perception, and awareness of medication adherence following a four week pillbox simulation. Method: An observational study design was used to meet the study objective. Third Professional year student-pharmacists enrolled in an ambulatory care elective were assessed on adherence to medications using a pillbox. Students were provided multi-dose pillbox, one month supply of 15 “medications” (candies), and medication list. Students were required to initially fill the pillbox and take the “medications” as directed then provided “real-life scenarios” to adjust medications. Pillbox accuracy was assessed weekly and students self-assessed missed doses, late doses, and dosing changes in weekly surveys. Students completed pre- and post-simulation surveys to identify perceptions of adherence. Results: Ten students completed the simulation. The students’ ability to identify barriers to medication adherence reported as superior level of understanding increased from 40% to 90% post-survey. Students reported a 50% increase in ability to identify solutions to improve medication adherence. Post-survey responses demonstrated 100% of students expressing a superior level of understanding regarding the importance of decreasing number of medications prescribed and dosing frequency. Seventy percent of students rated ability to routinely provide suggestions to improve medication adherence as excellent compared to 30% pre-survey. Implications: Following the ambulatory care elective pillbox simulation, the students’ responses were positive and demonstrated an increase in understanding, perception, and awareness of medication adherence. This project is being further evaluated with 3rd and 4th professional year student-pharmacists in the elective course and advance pharmacy practice experiences, respectfully.

Evaluating the Effectiveness of a Post-Graduate Training Committee (PGTC) in Preparing Students for Post-Graduate Education. Anne Schweighardt, St. John Fisher College, Ashley Woodruff, St. John Fisher College, Megan Jensen, Buffalo General Medical Center/Wegmans School of Pharmacy. Objectives: To evaluate the effectiveness of the Post-Graduate Training Committee (PGTC) in preparing students for post-graduate education. Method: The PGTC was created in the Fall of 2011 to increase student interest and involvement in post-graduate education opportunities. The PGTC leads several activities to assist our students in preparing for residency application and interviews. These activities have evolved to included CV preparation and review, interview presentation critiques, mock interviewing practice, interview observation, cover letter review and residency program and professional meeting seminars. In order to quantify the role of the PGTC in preparing students for post-graduate education, the number of students that have gone on to post graduate training programs before and after the PGTC creation were compared.

Results: In 2010, 8% (4/53) students applied for residencies. Three
students obtained residencies, a 75% success rate. In 2011, 16% of students applied for residencies (10/61); four of which obtained residencies, a 40% success rate. In 2012, 31% (20/64) students applied for a residency program, 15 of these students were successful in obtaining a position, a success rate of 75%. Implications: The PGTC has been effective in increasing both the number of students applying for residencies and the number of students successfully matching to a program. We anticipate adding additional activities to ensure continued success of our students to compete successfully for residency positions.

Evaluation of Immunization Training in the Curriculum of First and Third Year Pharmacy Students. Brett Feret, The University of Rhode Island, Katherine K. Orr, The University of Rhode Island, Jeffrey P. Bratberg, The University of Rhode Island, Felicia Strom, The University of Rhode Island, Celia P. MacDonnell, The University of Rhode Island. Objectives: To assess student pharmacists’ perspectives of the placement and quality of immunization certificate training, a curriculum requirement. Educators can place the training in the most appropriate professional year by gauging student comfort with the didactic material and administration. Method: First (P1) and third (P3) professional year students were required to complete the APHA Immunization Certification program as integrated into required courses across the curriculum. After completion of the didactic teaching and practicum, an IRB-approved, anonymous, voluntary online survey was sent to all participants (N=228). This 15-question Likert scale survey assessed quality of the program, timing in the curriculum, and student’s confidence in providing immunization services. Results: 168 responses were received, resulting in a 75% response rate. Overall, 75% of students either agreed or strongly agreed (A/SA) that they were comfortable in administering vaccinations and 93% felt it was appropriate to require it as part of the curriculum. Additionally, 71% of P1 students felt that it was appropriately placed in the P1 year compared to 56% of P3 students (p=0.04). However, more P1 students indicated they still needed additional training compared to P3s (39% vs. 25%; p=0.02). Implications: Immunization training was well received by both P1 and P3 students. The majority of both groups found it appropriate to complete immunization training in the 1st professional year. Early placement of immunization training in the curriculum will provide students more opportunities to administer vaccinations during their IPPE rotations and their places of employment as state law permits.

Evaluation of Interprofessional Learning Through a Ventilator Bundle Patient Case Simulation. Kendrea M. Jones, University of Arkansas for Medical Sciences, Michael E. Anders, University of Arkansas for Medical Sciences, Tonya R. Cook, University of Arkansas for Medical Sciences, Theresa A. Gramlich, University of Arkansas for Medical Sciences, Karen Jeans, University of Arkansas for Medical Sciences, Tobias J. Vancil, University of Arkansas for Medical Sciences. Objectives: To describe the impact of an interprofessional educational program on pharmacy, medical, nursing, and respiratory therapy students’ perceptions towards interprofessional learning before and after completion of a simulation exercise. Method: Pharmacy (n=9), medical (n=6), nursing (n=19), and respiratory therapy (n=9) students completed 6 online modules related to implementing a ventilator bundle. Students then participated in a patient case simulation, using a high fidelity simulator, where they formed 9 groups of 5 to 6 students. Pre-test to assess baseline knowledge and post-test to assess learning following completion of online modules were administered. Students completed a survey before and after participating in a patient case simulation. Survey questions examined students’ perceived preparedness towards team-based competencies including roles, interprofessional communication, respect, and teamwork. Questions used a visual analogue scale, anchored by “none” and “completely,” for students to rate their level of agreement to each statement. Descriptive statistics were used to analyze demographic items, participation, and competencies. Paired-samples t-tests were used to compare pre- and post-test results for knowledge and perceptions. Results: Forty five students participated in the educational program. At baseline, combined discipline baseline scores demonstrated moderate agreement with each statement. Statistically significant differences were found for all team-based competencies from baseline to post-simulation (p<0.05). Students’ felt significantly more prepared to evaluate interprofessional team performance (mean change ± SD; 27.57 ± 23.29). The average increase in pre- to post-test scores was 14%. Implications: In this pilot study, implementation of an interprofessional simulation appears to significantly change students’ perceptions towards interdisciplinary learning.

Evaluation of a Simulated Medication Adherence Activity Including Pharmacist Counseling. Rolee Das, Rutgers, The State University of New Jersey, Lucio Volino, Rutgers, The State University of New Jersey, Lisa Degnan, Rutgers, The State University of New Jersey. Objectives: To evaluate the impact of pharmacist counseling in a simulated medication adherence activity. Method: Pharmacy students in a Pharmacy Communications course (P3) were given a prescription vial containing a fictitious medication and associated patient medication monograph. Students were randomized into two groups. The first group, designated patient medication monograph only (PMMO), received the medication and monograph. The second group, designated patient medication monograph with counseling (PMMC), received medication, monograph and individual counseling by a pharmacist regarding a food-drug interaction. Students documented doses and food/beverage consumption over a five day period. A multiple choice, paper-based survey evaluating a food-drug interaction and number of missed doses was then completed. Student perceptions regarding the activity’s value and impact on understanding medication adherence challenges were assessed. Results: A total of 92 students participated in the study PMMC n=45 and PMMO n=47. The average numbers of doses missed were 31.8% in PMMC versus 28.1% in PMMO. Overall, 46.2% of PMCC doses were taken without any food-drug interaction, compared to 41.9% of PMMO. When evaluating food-drug interaction doses there was a higher incidence in PMMO (30%) versus PMMC (22%). Overall, 69.9% found the activity to be valuable and 89.1% believed it helped them better understand challenges associated with medication adherence. Implications: This activity demonstrated the challenges and role of counseling in medication adherence. A disadvantage is that approximately half of the class did not complete the questionnaire, potentially due to lack of interest or documentation. This activity will continue to be utilized for students’ understanding of medication adherence challenges.

Evaluation of an Elective Course Focusing on Application of Clinical Pharmacy Principles. Jessica H. Brady, The University of Louisiana at Monroe, David J. Caldwell, The University of Louisiana at Monroe, Kristen A. Pate, The University of Louisiana at Monroe. Objectives: To determine if an elective therapeutics course that combines problem-based learning and other active learning principles in a traditional lecture-based curriculum improves student pharmacists’ corresponding confidence and knowledge. Method: Problems in Therapeutics requires students to work through patient cases in a problem-based learning format, develop a pharmaceutical care plan and SOAP note evaluation. Results: A total of 87 students completed a pre-test and a post-test in the interprofessional course. The average number of correct responses increased significantly from pre-test 75% to post-test 85% (p<0.05). Students reported increased confidence in their ability to provide medication therapy management and counseling to patients. Implications: This course provides a unique opportunity for students to apply clinical pharmacy principles in a collaborative, interprofessional setting.
as a group, and present it for discussion. Student confidence regarding application of clinical pharmacy principles was evaluated with a voluntary self-efficacy survey administered on the first and last day of class. Improvement in clinical skills were measured by comparing scores between baseline and final standardized cases, between the first and final four group SOAP notes, and between first and final individual case presentations. Results: Nine of fifteen items on the self-efficacy survey demonstrated a significant increase in confidence from baseline. The average number of correctly identified problems on the standardized clinical cases increased from 37.5% to 52.2% (p = 0.12) between baseline and final. Comparisons between group assignment scores on the first four SOAP notes versus the last four demonstrated average scores of 75% and 89% (p = 0.06), respectively. Average case presentation scores were 83% and 93.6% (p = 0.02) between the first and final, respectively. Implications: Successful application of clinical pharmacy principles improved, along with increased confidence, in students enrolled in this course. Students commented that they felt better prepared and more confident for advanced pharmacy practice experiences as a result. Incorporation of similar clinical activities into required courses should be further explored.

Evaluation of Clinical Skills with an Objective Structured Clinical Examination. Elizabeth M. Urteaga, University of the Incarnate Word, Rebecca L. Attridge, University of the Incarnate Word, John Tovar, University of the Incarnate Word, Amy P. Witte, University of the Incarnate Word. Objectives: We used an objective structured clinical examination (OSCE) to evaluate how effectively second-, third-, and fourth-year pharmacy students’ and practicing pharmacists’ communicate and apply knowledge to simulations of commonly encountered patient scenarios. Method: Second-, third-, and fourth- year pharmacy students enrolled at the University of the Incarnate Word, Feik School of Pharmacy completed an OSCE as part of their required courses. Licensed pharmacists were recruited to complete the OSCE and serve as controls. Trained standardized patients graded the interaction based on a rubric that consisted of clinical skill and communication checklists. Results: A total of 275 pharmacy students and 6 licensed pharmacists completed the OSCE and consented to participate in the study. Overall, the licensed pharmacists performed better than the pharmacy students. The fourth-year students performed better than the second-year (p = 0.01) and third-year pharmacy students (p = 0.0001). The pharmacists performed better than the second-year (p = 0.02) and third-year (p = 0.002) pharmacy students; however, there was not a statistically significant difference in performance between the fourth-year pharmacy students and pharmacists (p = 0.07). Implications: The results of this study provide a better understanding of the clinical and communication skills of practicing pharmacists and pharmacy students at different stages of the curriculum. Communication skills were strong in each group; however, clinical skills were proportionate to the level of clinical experience each group possessed. Clinical skills increased significantly in the P4 year, after completion of the students’ APPEs.

Evaluation of Embedding Multiple Interprofessional Educational Activities into a Required Course. Sarah Shrader, The University of Kansas, Caroline Griggs. Objectives: Determine the impact of embedding longitudinal interprofessional educational (IPE) activities on pharmacy students’ perceptions regarding interprofessional collaboration within a required course. Method: Seventy two third-year pharmacy students participated in Clinical Assessment, a required applications-based course. The curricular content included nine IPE sessions over the semester using various active-learning strategies such as human-patient simulation, standardized colleagues, and a senior mentor program. The IPE activities incorporated student participation from other health professions (medicine, nursing, physician assistant). Pharmacy students completed a pre-survey the first day of the course and a post-survey the last day of the course. The survey used was the Interdisciplinary Education Perception Scale, a validated instrument containing 18 items using a five-item Likert scale (1 = strongly disagree to 5 = strongly agree). The pre- and post-surveys were voluntary and anonymous, a code was used to match the results. Data was analyzed by a Wilcoxon signed-rank test. This study was approved by the institutional review board. Results: Sixty three pharmacy students (88 %) completed both surveys assessing their perceptions of interprofessional collaboration before and after the required course. Significant positive changes occurred for 16 out of 18 items (p value < 0.05). After completion of the course, students most strongly agreed that pharmacists are willing to share information and resources with other professionals (post mean score 4.65), pharmacists are trained well (post mean 4.62), and individuals in pharmacy need to cooperate with other professions (post mean 4.71). Implications: Embedding IPE activities longitudinally into a required course positively impacted pharmacy students’ perceptions of interprofessional collaboration.

Evaluation of Student Perspectives of Clinical Controversy Debates for Third Year Student Pharmacists. Anusha Raju, Kristin K. Janke, University of Minnesota, Jeannine M. Conway, University of Minnesota, Sarah K. Schweiss, University of Minnesota. Objectives: To evaluate student perspectives of a clinical controversy debate activity designed to improve their ability to effectively approach and communicate complex therapeutic dilemmas. Method: A Clinical controversy debate activity was implemented in the fall semester of the third year pharmaceutical care laboratory curriculum. Topics were chosen based on controversies encountered in practice. Students were assigned to groups of 5-6 and subdivided to the pro or con of the topic. Each debate lasted 25 minutes. Students completed a self-assessment asking them to rate eight skills (e.g. selecting appropriate references, analysis of literature, defending and predicting arguments, composing and delivering the presentation, and persuading the audience) before and after the activity as: novice, developing, skilled, facilitating/leading, or educating. Results were analyzed descriptively and the pre-post ratings were compared using a Wilcoxon Signed Rank test. Results: 140 (84.8%) students responded to the self-assessment survey. The skill that students rated most highly prior to the debate was the ability to select appropriate resources and primary literature, with only 7.1% rating themselves as novice. After completing the debate, the skill rated with the greatest improvement was the ability to predict opposing arguments with 47.1% rating as developing and 40% rating as skilled. All eight skills had statistically significant improvements pre and post assignment (p < 0.001). Implications: A clinical controversy debate activity resulted in reports of ability improvement on measures of evidence based medicine-related skills. Preparing arguments for and against treatment options is an important clinical skill, which can be exercised through this active learning assignment.

Evaluation of Team Perceptions Regarding Personality Types and Learning Styles. Tracy Frame, Cedarville University, Rebecca J. Gryka, Cedarville University, Mary E. Kiersma, Manchester University College of Pharmacy, Aleda M. Chen, Cedarville University, Lorin Sheppard, Manchester University College of Pharmacy, Stephanie M. Cailor, Cedarville University School of Pharmacy. Objectives: To determine differences in student perceptions of personality types in teams based on personality types and learning styles. Method: Students completed a personality test (Dove, Owl, Peacock, Eagle
Results: One hundred eleven students completed the questionnaire (95.7% response rate). The dove personality type (N=41) was most common at 36.9%. The assimilator learning style (N=67) was most common at 60.3%. Students felt that teams should consist of different personality types as well as learning styles (p<0.0001). As the semester progressed, students agreed or strongly agreed that they connected with their team members on a personal (72%) and intellectual level (75%) and 84% of students agreed or strongly agreed they now know how to work with different personality types. Implications: Personality types and learning styles can be considered as a method to develop a team structure. As future healthcare professionals, students will be required to work with individuals of differing personality types and learning styles. By acknowledging the diversity of personality types and learning styles, students may be able to adapt to different situations in their future careers.

Evidence of Potential Deficiency in Longitudinal Learning: Revisiting Pharmacy Calculations. Keith J. Christensen, Creighton University. Objectives: To describe a potential deficiency in longitudinal learning for second-year pharmacy students enrolled in a pharmacotherapeutics course. Method: A total of 189 second-year pharmacy students enrolled in a pharmacotherapeutics course were given an exam covering pulmonary hypertension. Three questions in the exam asked students to perform calculations for the dispensing and administration of treprostinil. Parameters included in the question were the weight of the patient in kilograms, the prescribed drug infusion rate in ng/kg/min, and the concentration of the drug in mg/mL. Students were asked to calculate the amount administered in mcg/hr, the volume infusion rate in ml/hr and the total milligrams delivered in 72 hours. Results: One hundred sixty-four students (86.8%) were able to perform these calculations correctly. Twenty-five students (13.2%) were unable to perform the calculations. Common errors included incorrect reading or interpretation of the story problem (n=14, 56%), incorrect conversions (n=8, 32%), and incorrect usage of units of measure (n=3, 12%). Implications: The ability of a pharmacist to do simple calculations is a cornerstone for providing pharmaceutical care. Errors with calculations lead to improper dosing and/or dispensing and even patient death. These data were shared with our calculations course instructor of record and admissions committee to highlight the discussion of considering performance in a college algebra course as prerequisite rather than calculus.

Examination of Medication Discrepancy Prevalence After Primary Care Referrals to Outpatient Specialists. Cheryl L. Clarke, Drake University. Objectives: To examine primary care patients transitioning between office-based specialty care and primary care to determine the 1) prevalence of medication discrepancies; 2) need for medication reconciliation; and 3) optimal reconciliation processes. Method: All referral reports for two primary care practitioners were forwarded to the family practice clinic pharmacist for medication reconciliation. The pharmacist reviewed the referral reports and other information in the electronic health record in order to identify and resolve discrepancies. The medication list was updated by the pharmacist as indicated. Data were collected (September 2012 - November 2012) to determine how many medication discrepancies were resolved, the types of discrepancies per ASHP classification, and the type of specialist. Results: 247 discrepancies were resolved from review of 120 referrals. (2.1 discrepancies/referral, range = 0-12) Discrepancies resolved by category were directions clarification 34%; current medication not listed 31%; discontinued medication listed 22%; medication duplication 7% and dose clarification 6%. No discrepancies were noted in 27.5% of referrals. Specialties with a higher incidence of medication discrepancies were cardiology, endocrinology, and pulmonary. Implications: Most medication reconciliation literature focuses on changes in care levels (admission, discharge) or, in the primary care setting, review of the medication list at the office or pharmacy visit. Our examination suggests a need for medication reconciliation during the primary care referral process. Our data also suggests that reserving medication reconciliation for referrals from select specialty types may improve efficiencies. Further research with additional practitioners is needed to confirm these findings.

Facebook as a Method to Promote Continual Professional Development in an Ambulatory Care Elective Course. Ashley H. Vincent, Purdue University, Zachary A. Weber, Purdue University. Objectives: To assess the use of a social networking group via Facebook as a vehicle to promote continual professional development and learning outside of the didactic curriculum as part of an ambulatory care elective Doctor of Pharmacy course. Method: Participation in a social networking group on Facebook was a requirement of an elective course focusing on adult ambulatory care pharmacy. The social networking group was developed as a way to facilitate informal communication among students and instructors about current events or debates in ambulatory care. A survey was developed to evaluate student viewpoints and opinions regarding the use of social networking as an educational tool. The anonymous survey was administered online to students enrolled in the elective during the first week of the semester and again during the last week of the semester. Likert-scale responses were compared from the start of the semester to the end of the semester. Results: Survey results (n = 23) found a statistically significant increase (p ≤ 0.03) in agreement that a social networking group was an effective strategy to expose students to methods of continual learning, as well as it's importance. The majority of students were satisfied with the use of a social networking group on Facebook as an educational tool (mean Likert Score = 3.3), but were less satisfied with discussing pharmacy-related information via this vehicle (mean Likert Score = 3.0). Implications: The results from this survey suggest that the use of Facebook is an effective way to promote the concept of continual professional development and learning among pharmacy students enrolled in an ambulatory care elective course.

Facilitation of Interprofessional Education Among Student Health Professionals Using Human Patient Simulation. Scott Bolesta, Wilkes University, Joyce V. Chmil, Wilkes University. Objectives: To assess student attitudes toward interprofessional education (IPE) facilitated through a human patient simulation (HPS) experience. Method: Groups of two or three third-year pharmacy students were paired with two junior-year nursing students for an IPE clinical lab. A high-fidelity HPS manikin played the part of a patient experiencing new-onset atrial fibrillation and heart failure. The team of students had to work together to diagnose and treat the patient. After completion of the scenario the teams underwent both group and discipline-specific debriefings. Prior to and after the IPE experience students were asked to complete a voluntary anonymous survey regarding IPE and the impact of HPS. The Readiness for Interprofessional Learning Scale (RIPLS) was used to assess student attitudes towards IPE. The Wilcoxon
signed-rank test was used to assess differences in pre- and post-experience survey responses. **Results:** A total of 120 students (69 pharmacy, 51 nursing) participated in the lab and 55 consenting students (48 pharmacy, 7 nursing) completed both the pre- and post-experience survey and had their responses paired. Student attitudes toward IPE showed improvement in 16 of 18 items in the RIPLS after the IPE experience, but only five of these were statistically significant. However, students felt the IPE experience significantly improved their clinical knowledge and skills, and that having another discipline present during an IPE experience using HPS was of significant benefit. **Implications:** Student attitudes towards IPE improve after an IPE experience, but not significantly. Students’ clinical knowledge and skills can improve with IPE and HPS can facilitate this.

**Factors Influencing Pharmacy Students’ Decisions to Pursue Residency Training.** Tiffany L. Kessler, Southern West Missouri State University, Erin D. Callen, Southern Missouri State University, Kristin E. Montarella, Southern West Missouri State University, Kara D. Connelly. **Objectives:** Over the past decade, the number of pharmacy graduates pursuing residencies has dramatically increased. At the same time, the number of students at Southern West Missouri State University College of Pharmacy (SWCOP) applying for residency positions has declined. The objective of this study was to identify motivating factors as well as perceived barriers for post graduate residency training. **Method:** All second, third, fourth, and second semester first year students at SWCOP were given a voluntary electronic survey. The survey consisted of questions designed to examine the stated objectives. The study was approved by the university’s Institutional Review Board. **Results:** A total of 215 students completed the survey (77.6%). Students interested in residencies were more likely to be earlier in the curriculum (p < 0.05) and involved in organizations (p < 0.05). The top reasons identified for pursuing residency training included enhancing knowledge base and experience, the desire for specialized training, and to have a competitive advantage in the job market. The top barriers were school “burnout”, perception that residency is unnecessary for career plans, and lack of information regarding residency training. **Implications:** The study results highlight the need for improved communication about residency programs. To address these issues, earlier exposure and continued emphasis of residency training throughout the curriculum is warranted. An elective course to prepare students for postgraduate training has been implemented. We believe our results and methods to address them will be of interest to colleges of pharmacy with similar concerns regarding student participation in post graduate training.

**Faculty Perceptions after Two Years of a Reflective E-Portfolio Program.** Jennifer Phillips, Midwestern University/Downers Grove, Kathy Komperda, Midwestern University/Downers Grove, Robin M. Zavod, Midwestern University/Downers Grove, Jill S. Borchert, Midwestern University/Downers Grove, Amy Lullo, Midwestern University/Downers Grove, Huzefa Master, Midwestern University/Downers Grove, Ana C. Quinones-Boex, Midwestern University/Downers Grove, Christie Schumacher, Midwestern University/Downers Grove, Susan R. Winkler, Midwestern University/Downers Grove. **Objectives:** In 2010, a reflective e-portfolio program was implemented to promote student reflection, document their longitudinal progression in the achievement of curricular outcomes and reinforce the value of continuous professional development. Faculty members serve as advisors to a group of ten students and are responsible for evaluating their entries. The objective of this study is to evaluate faculty advisors’ perceptions of the e-portfolio program over the first two years. **Method:** Five questionnaires were developed utilizing SurveyMonkey™ to capture faculty advisors’ perceptions of the process after each evaluation period. The questionnaires assessed facets including impact on faculty workload and effect on the faculty-adviser relationship. **Results:** The response rate ranged from 76–91% (N = 16–20) with a total of 89 responses for the five surveys. Faculty reported workload ranged from 11.9–20 hours for each set of entries. PS1 advisors did not feel that the portfolio process helped to strengthen the relationship with advisees overall (58.3%, n = 7) or compared to previous years (66.6% n = 14). PS2 advisors generally thought that entries were easier to evaluate than the prior year (56.3%, n = 9), that students had a better grasp of the understanding of the curricular outcome components (68.8%, n = 11) and demonstrated a greater ability to write reflectively (81.3%, n = 13) and reflect on personal strengths/weaknesses (75.0%, n = 12). **Implications:** Faculty report that a reflective e-portfolio process may assist students in understanding curricular outcomes, but it does not strengthen the relationship with advisors. Based on feedback from faculty advisors, revisions to the reflective e-portfolio process have been made.

**From Idea to Implementation: The Professional Development Convocation Series.** Jennifer L. Ridings-Myhra, The University of Texas at Austin, Rochelle M. Roberts, The University of Texas at Austin, Diane B. Ginsburg, The University of Texas at Austin, William J. McIntyre, The University of Texas at Austin. **Objectives:** The three-year Professional Development Convocation (PDC) course sequence began in fall 2009. The current P4 class, the first to complete the sequence, was surveyed on their perceptions of these courses. **Method:** The PDC courses aim to inculcate students into the college and the profession of pharmacy. The course development committee determined this forum could provide a unique opportunity to longitudinally address student professional development, leadership development, career paths and decision-making, and to hear nationally-renowned speakers address contemporary issues. Current P4 students completed an online survey, indicating the extent to which broad PDC course topics and requirements were helpful for their Advanced Pharmacy Practice Experiences (APPEs) and future employment. Students explained their most important “takeaway” from the entire sequence. **Results:** Survey response rate was 98% (117/119). The majority of students found each of the course topics helpful. Eighty-nine percent indicated Administrative topics were somewhat to very helpful for APPE preparation, and Professional Development topics were the most popular for seeking employment or postgraduate training (86%) and preparing for future practice (85%). Most students found the resume/CV and related components of their e-portfolio helpful for APPE preparation (79%), seeking employment or postgraduate training (85%), and preparing for future practice (79%). “Takeaways” included career options, resume/CV feedback, and importance of professionalism. **Implications:** Students may find value in the overall purpose of the PDC courses, but continued program evaluation, including similar surveys with future students and an alumni survey with the same students, will provide valuable input for course coordinators to further revise and improve the courses.

**Gain of Self-Care Knowledge Associated with Participating in a Race Based Learning Activity.** Elizabeth Skoy, North Dakota State University, Kayla Vigen, North Dakota State University, Erika Haglund, North Dakota State University, Jeanne E. Frenzel, North Dakota State University, Heidi Eukel, North Dakota State University. **Objectives:** Use of a race-based teaching activity to increase pharmacy students' knowledge and confidence in self-care. **Method:** Eighty-seven third year pharmacy students enrolled in a pharmaceutical care lab were placed in groups. Groups received a list of 15 stations referred to as...
their passport. The stations focused on self-care topics including headache, cough and cold, smoking cessation, constipation, pediatric dehydration, lice, pseudoephedrine regulations, nutritional supplementation, pediatric dosing, medication interactions, and vaginal disorders as well as home testing/monitoring devices and kits for glucose monitoring, urinary tract infection, HIV testing, and gastrointestinal bleeding. Each station had a patient case or hands-on activity. Students formulated an answer to the case or activity and presented it to a faculty member. If their answer was correct, their passport was initialed and they were allowed to continue to the next station. If their answer was incorrect, they were directed to a “counseling roadblock” where they were required to counsel their partner on an over-the-counter product. The first group to complete their passport was declared the Amazing Self-Care Race champions. Results: Students voluntarily completed pre-post surveys. Students demonstrated a gain in knowledge with mean scores increasing from 10.4 to 12.1 points (p<0.001). The average number of self-care topics students’ expressed strong confidence in prior to the activity was 3.9 which increased to 8.1 post activity (p<0.001). Overall, students’ perceived confidence increased in 9 different self-care topics. Implications: Use of a race-based teaching activity increased students’ knowledge and perceived confidence in self-care.

Gender-Associated Perceptions of Pharmacy Practice Faculty. Hanna Phan, The University of Arizona, Kathryn R. Matthias, The University of Arizona. Objectives: The primary objective was to evaluate gender-associated perception in selection, recruitment, and retention of pharmacy practice faculty. Perceived differences in resources and barriers for advancement based on gender were also evaluated. Method: This was a survey study of faculty members on the 2012 AACP Section of Pharmacy Practice listserv. This web-based survey was launched nationally after revision based on internal tool validation. Data regarding career selection, recruitment, access to resources, perceived support by department, and demographics were collected. Data were analyzed using descriptive statistics and Wilcoxon Rank-Sum in STATA version 11.2. The null hypotheses were that there are no differences in perceived comfort in recruitment, access to resources, and advancement by gender. Results: A total of 589 of 3,021 section members completed the survey. Of the respondents, 391 (66%) were female and 343 (58%) were 30-49 years of age. Assistant professor (or equivalent) [237 (40%)] was the most common rank, 335 (57%) were non-tenure or clinical track, and 300 (51%) were from state funded institutions. Responses were significantly different by gender regarding comfort in asking about maternal/paternal leave (p=0.02) and work-life balance (p=0.003) during interviews. Significant differences were also found with regard to perceived networking opportunities (p=0.006), mentoring for promotion/tenure (p=0.05), and comfort in seeking advice about stressors as a junior faculty member (p=0.01). Implications: Findings may enhance pharmacy practice faculty and administrators’ awareness of gender-associated factors and encourage programs to address these potential issues to help increase retention and successful advancement of faculty through the academic ranks.

Geriatric Content U.S. Doctor of Pharmacy Degree Curricula. Sherry A. Jimenez, St. John Fisher College. Objectives: The purpose of this study was to describe the current state of geriatric content in U.S. Doctor of Pharmacy Degree (Pharm. D.) curricula. Findings were compared to a 2003 study (Dutta, Daftary, Oke, Mims, Hailmeskel, & Sansgiry, 2005). Data was also obtained to analyze the presence of specific geriatric content areas broadly identified as attitudes and values (Odegard, Breslow, Koronkowski, Williams, & Hudgins, 2007).

Method: A 45-question survey was designed with permission using an existing instrument (Dutta, et al., 2005) to collect information on program demographics, course content, professional practice experiences, and faculty capacity from geriatric pharmacy faculty representatives from the 124 U.S. accredited pharmacy schools. Results: Thirty-one (62%) responding schools (50/124) reported geriatric content offered as an elective; forty-two (84%) reported integrating content within another course. Forty-six schools (N=49, 94%) did not require a stand-alone geriatrics course. Eight (N=41, 20%) schools required a geriatric specific APPE rotation and thirty-six (88%) offered an elective. Five (N=42, 12%) schools reported offering a concentration in geriatrics compared to one school (N=42, 2%) 2003. Ninety-five percent of schools reported teaching compassion and understanding of the problems of older adults, and 90% covered the ability to view each older adult as an individual. Implications: Geriatric content in Pharm. D. curricula has improved. More focus on the extent to which schools are integrating content is needed to address the growing number of people 65 and older needing pharmaceutical and patient care in the U.S.

Guidelines for Faculty Supervision of Student-Conducted Health Fairs. Andrea N. Rosenberg, Don Uden, University of Minnesota, Tom Larson, University of Minnesota. Objectives: There are no collegiate-sanctioned supervisory guidelines for student-conducted health fairs at the University of Minnesota College of Pharmacy. Supervisory guidelines are important, because of potential liability risks associated with these health fairs. Method: To identify how other colleges/schools of pharmacy provide supervision at student-conducted health fairs, a four-question telephone survey was administered to the dean or representative of the dean of the 125 colleges/schools of pharmacy in the United States. Specific questions were asked regarding the supervision of pharmacy students participating in college sponsored student-conducted health fairs, if there were policies or guidelines present and what liability or malpractice insurance is in place. Results: A 36% response rate was obtained from the telephone survey. Of these, 73% of colleges/schools had policies in place that pertained to the supervision of student-conducted health fairs. From the data collected in the survey and internal discussions, three supervisory categories were created: low hazard potential-no supervisor required, (activities involving education), medium hazard-potential-maximum student to supervisor ratio of 10:1 (activities with no needles or body fluid), and high hazard potential-maximum student to supervisor ratio of 5:1 (activities with needles or body fluid). Implications: Based on the perceived degree of hazard potential and level of patient contact, guidelines have been created to ensure adequate student supervision at student-conducted health fairs.

High School Students Gain Knowledge of the Pharmacy Profession. James W. Torr, Lipscomb University, Wendell S. Akers, Lipscomb University, Michael W. Fowler, Lipscomb University, David A. Iacob, Lipscomb University. Objectives: The Lipscomb-HCA/TriStar Health Care Academy introduces rising 10th through 12th grade students to a range of health science professions with experiences related to pharmacy, nursing, nutrition, and exercise science. The primary objectives of the pharmacy module were to identify the professional responsibilities of a pharmacist and explore various career opportunities within the pharmacy profession. Method: Students were exposed to a series of pharmacy related activities throughout the day. Teaching and learning activities included mini-lectures, hands-on lab experiences, and a case study. We utilized aspirin as the model drug to link the various areas of pharmacy. A drug therapy problem was presented utilizing a focused case study related to aspirin. Additional information was
added to the case throughout the day as the students followed aspirin through the drug development and medication use processes. A pre- and post assessment was administered to each student assessing knowledge of pharmacy concepts presented throughout each learning activity. Additional questions were administered to assess the perceived value of the educational activities and the pharmacy module. **Results:** The post-test assessment showed a significant increase (90.3% vs 54.3%) in students’ knowledge of the concepts presented during each pharmacy related activity. In addition, a majority of students indicated a moderate-to-high educational value for the overall pharmacy module. **Implications:** The educational activities promoted interest and increased knowledge in the field of pharmacy for high school students. Activities such as this may foster the interest of high school students in pursuing a career in the profession of pharmacy.

Holistic Interview Predictors of First Semester Performance in the Flipped Classroom Environment. H. Glenn Anderson Jr., Marshall University, John L. Krstenansky, Marshall University, Stephanie L. Anderson, Marshall University, Christopher Gillette, Marshall University, Hasan Koc, Marshall University. **Objectives:** To determine the utility of a holistic admissions process for predicting student classroom performance in the flipped classroom andragogy. **Method:** The school’s holistic admissions process used prerequisite GPA (PGPA), PCAT composite scores (PCATComp), reference letters, group dilemmas, standardized behavioral interviews (SBI), critical thinking tests (CTT), and essays to derive applicant rankings. All admissions process assessments were scaled to a 100-point scale. The admissions process gave bonuses for student residency within the surrounding area and for completion of a college degree. Percentage grades for students for all P1 courses were acquired. Weighted average GPAs were calculated and used as the dependent variable during statistical analyses. Utility of the overall model (all 7 domains plus bonuses entered) and the best predictive model were identified using regression procedures. **Results:** Seventy-eight students comprise the P1 class. Overall mean student classroom performance was 84.59%±5.42%. Mean predictors were 42.70±21.68 (PCATComp), 76.27±10.69 (PGPA), 41.92±24.98 (references), 59.51±15.68 (essay), 78.65±11.86 (SBI), 47.00±22.81 (CTT), and 69.51±18.08 (dilemma). Fifty-six percent of students had completed a college degree prior to admission. More than 70 percent (70.5%) of students resided within the local area. The overall regression model was predictive and moderately correlated with P1 student performance (R=0.74, R2=0.55, p<0.0005). The final reduced model (PGPA, PCATComp, and SBI) was also predictive (p<0.0005) and moderately correlated with student outcomes (R=0.71, R2=0.50). **Implications:** The holistic admissions process was predictive of P1 course outcomes. Future use of these data may facilitate the school’s efforts in identifying those students who are best positioned to excel in a flipped classroom environment.

Identifying Risk for Academic Difficulties in Pharmacy Using Repeat Pre-Pharmacy Coursework Status and Admission Rank. Daniel J. Hansen, South Dakota State University, Jane R. Mort, South Dakota State University, Joel E. Hougplant, South Dakota State University. **Objectives:** Examine the utility of pre-pharmacy repeat course status and admission rank (ADM-Rank) for identifying risk for academic difficulties in a pharmacy program. **Method:** The College requires 66 pre-pharmacy credits. Admissions data for the 2010 and 2011 P1 class (n=160) were compiled regarding repeated pre-pharmacy coursework and ADM-Rank based on GPA, along with each student’s pharmacy grade point average (PHA-GPA) and pharmacy class ranking (PHA-Rank) based on PHA-GPA after the fall semester of their P2 year. **Results:** Of the 160 students admitted, 42 (26.3%) repeated a pre-pharmacy course. Repeated courses included general chemistry I (28.4% of repeated courses), general chemistry II (26.9%), anatomy (14.9%), and calculus (10.4%). Compared to students not repeating a pre-pharmacy course, students repeating a course were more than five times as likely to earn a PHA-GPA of < 2.75 (Risk Ratio (RR) = 5.6, 95% Confidence Interval (CI) = 2.6–12.2, p < 0.0001) and nearly four times as likely to earn a PHA-Rank in the bottom quartile of the class (RR = 3.8, CI = 2.3–6.4, p < 0.0001). Students having an ADM-Rank in the bottom quartile were roughly two and a half times more likely to earn a PHA-GPA of < 2.75 (RR = 2.6, CI = 1.3–5.4, p = 0.0084) and PHA-Rank in the bottom quartile (RR = 2.7, CI = 1.6–4.5, p = 0.002). **Implications:** Repeating pre-pharmacy coursework appears to be a strong indicator of future academic difficulties, while ADM-Rank based on ADM-GPA is useful but a weaker predictor. If admitted, students who repeated pre-pharmacy coursework may be candidates for early intervention and academic support programs.

Impact of Eliminated Assignments on Academic Performance in a Drug Information and Literature Evaluation Course. Whitney V. Elliott, Katie J. Suda, The University of Tennessee, Leslie Hamilton, The University of Tennessee, Kiana Y. Curry, Med Communications, Debbie C. Byrd, The University of Tennessee. **Objectives:** In Fall 2012, select out-of-class assignments were eliminated in a third-year, learning-centered “Drug Information and Literature Evaluation” course. These assignments were designed to enhance learning by allowing students to practice skills outside of the classroom that would be used in recitations, exams, and future practice. The purpose of this study was to determine the effect of eliminated out-of-class assignments on academic performance and course evaluations. **Method:** Students enrolled during Fall 2011 and Fall 2012 were included. Student demographics, course evaluations, exam grades, and course grades were compared. Course evaluations were stratified into student perception of meeting course objectives and course elements. Chi Square and t-tests were used for statistical analysis; p-value ≤ 0.05 was considered significant. **Results:** 273 dual campus student pharmacists (Memphis students = 61.5%) were included in the study (2011 = 53.1%; 2012 = 46.9%). There were no significant differences between classes based on race, gender, or cumulative GPA. The 2012 students (with decreased assignments) had significantly lower final exam scores (p = 0.0171) and course grades (p < 0.0001) than 2011 students. There were no differences in exam scores or course grades by campus. For the Memphis campus, course evaluations were lower in 2012 (p < 0.0001), including lower ratings for achievement of course objectives (p < 0.0001) and course elements (p = 0.0041). There were no differences in course evaluations, objectives, or elements for the Knoxville campus. **Implications:** Decreasing out-of-class assignments, which allow students to practice learning independently, may have a negative impact on students’ academic performance and learning. Additionally, eliminating a learning-centered method decreases overall course satisfaction and student perception of achieving course objectives.

Impact of Pharmacy Skills Lab 3 on Student Perceived Self-efficacy of Core Curricular Topics. Jennifer A. Henriksen, Creighton University, Eric Hoie, Creighton University. **Objectives:** Assess the change in student perceived self-efficacy of core curricular topics reinforced in the Pharmacy Skills Lab (PSL) 3, the third of six semesters of lab curriculum. **Method:** A perceived self-efficacy survey tool, with a scale of 0 – 100, was constructed using input from the P2 fall semester Instructors of Record (IORs) and the current PSL 3 IOR. The survey design was modeled after Dr. Albert Bandura’s self-efficacy survey. The pre-survey was distributed in PSL 3 at the...
beginning of the semester. A brief overview of the survey tool and the purpose of the survey were presented by the survey creator. The post-survey was distributed at the start of a core course lecture at the end of the semester. The students were assigned a number to ensure anonymity. Participation was voluntary, neither rewards nor penalties were assessed. Results: Of the thirty-nine statements on the survey all had an increase in the overall average rating and all but one (“Evaluate the results of an Ankle Brachial Index”) had a standard deviation narrowing. The smallest change was in the perceived self-efficacy to “measure a patient’s temperature” with the pre-survey average of 90 ± 15.74 and a post-survey average of 97 ± 5.50. The largest change was in the perceived self-efficacy to “Perform a Diabetic Foot Exam” with the pre- and post-survey averages of 14 ± 21.48 and 80 ± 18.17 respectively. Implications: The data gathered will help determine what course content needs further reinforcement as the new Pharmacy Skills Lab curriculum continues to evolve.

Impact of Professional Development Series on First-year Student Pharmacists in a Pharmaceutical Care Lab Course. Melissa M. Dinkins, University of North Carolina at Chapel Hill, Megan G. Smith, University of North Carolina at Chapel Hill. Objectives: To study effects of a professional development series on first-year pharmacy students’ perceived importance of professional attitudes. Method: Students enrolled in Pharmaceutical Care Lab participated in a new learning activity centered on development of professional attitudes and behaviors. Eight professional or ethical scenarios, accompanied by the Oath of a Pharmacist and the Code of Ethics, were implemented throughout the semester. Students were allowed 5 minutes to reflect and record their responses. Then, teaching assistants led small group discussions connecting the Oath and the Code to potential courses of action. Students completed a final self-reflection on a scenario and their professional attributes. Impact was assessed via an optional pre- and post-questionnaire. Results: Ninety-three (53%) and 98 (56%) students completed pre- and post-questionnaires, respectively. The number of students who strongly agreed with the following statements significantly increased following the course: “I know how to apply the Oath of a Pharmacist to resolve dilemmas in pharmacy practice” (64% versus 16%, p<0.001) and “I know how to apply the Code of Ethics for Pharmacists to resolve dilemmas in pharmacy practice” (63% versus 17%, p<0.001). Furthermore, more students strongly agreed they were aware of ethical dilemmas in pharmacy practice (70% versus 34%, p=0.01) and were confident in their abilities to handle those dilemmas (47% versus 28%, p=0.11). Implications: Students benefit from participating in activities simulating situational dilemmas in pharmacy practice. While students enter their training with a strong appreciation for professionalism, they feel more confident to handle dilemmas in practice following the simulations.

Impact of a Home Blood Glucose Monitoring Assignment on Student Perceptions and Confidence Over 3 Years. Nathan A. Painter, University of California, San Diego, Candis M. Morello, University of California, San Diego. Objectives: Introduce students to blood glucose monitoring as part of a comprehensive 1st Year Diabetes Self-Care Education Program (DSEP). Evaluate student confidence and technique in training another person to perform glucose monitoring. Method: On the first day of Pharmacy Practice Course, 1st year student pharmacists were oriented to the Self-Monitoring Blood Glucose (SMBG) home project. Faculty demonstrated use of Monogly® lancet device and proper techniques of obtaining a good blood sample. All SMBG supplies were provided to student pharmacists for home use. A 14 question pre-survey, using a 5-point Likert scale, was also administered at this time. During the DSEP workshop, students returned with completed SMBG assignment and monitors. Students demonstrated and educated another student on how to use the monitor and, perform SMBG, and results were documented. A 7 question post-survey, using a 5-point Likert scale, was administered following this workshop. Results: 159 of 173 (92%) students completed the pre-survey and 142 of 173 (82%) completed the post-survey over the past 3 years. Students stated they strongly agreed or agreed that they felt confident in their ability to operate a glucose monitor before (57%) compared to after (99%) the assignment. 60% believed they knew the supplies necessary for home glucose monitor testing before, compared to 99% after the assignment. Only 47% of students stated they strongly agreed or agreed that they believed they had the skills to describe the important criteria to evaluate when selecting a glucose monitor for patient on the pre-survey and 97% on the post-survey. 51% and 52% felt confident they could train another person to perform glucose monitoring, and felt confident in their ability to explain the details needed to maintain a complete glucose log on the pre-survey, respectively; compared to 97% on the post-survey. There was a small difference in the percent of students who strongly agreed or agreed that the SMBG home assignment would help increase empathy for people with diabetes before or after the assignment (96% vs 93%). Implications: A home SMBG assignment, as part of a comprehensive 1st year DSEP, increases student pharmacists’ confidence in performing glucose monitoring and in training another person for all three years the survey was administered. With this model, early in their professional career student pharmacists can use acquired skills to educate diabetes patients on how to use their blood glucose monitors, thereby increasing the number of healthcare professionals who can help meet the needs of the growing diabetes population.

Impact of a Novel Acute Care Pharmacotherapy Elective Course Designed to Simulate APPE Experiences. Jennifer D. Arnoldi, Southern Illinois University Edwardsville, Carrie Vogler, Southern Illinois University Edwardsville. Objectives: To describe the development and implementation of an innovative acute care pharmacotherapy elective and evaluate its impact on students’ perceptions and clinical knowledge. Method: The Acute Care Pharmacotherapy (ACP) elective utilized lectures, self-study cases, and discussions. Student groups were assigned a patient case that was designed to simulate patient progression throughout an inpatient stay. A dynamic electronic medical chart for each patient was created using Excel. The course impact was assessed using a pretest and posttest design. Students ranked interest in post-graduate training and certification, confidence in performance of APPE activities, and overall readiness for APPEs. They also rated confidence in treating disease states and answered clinical questions. The questions pertaining to interest, confidence, and comfort were assessed using a 5-point Likert scale and analyzed by the Mann-Whitney test, and the answers to clinical questions were judged correct or incorrect by course faculty and evaluated using Chi-squared analyses. Results: The nineteen students enrolled demonstrated no significant change in the level of interest in postgraduate training, certification, or desired future practice. Students’ confidence in presenting a patient to a preceptor, providing discharge education, responding to drug information questions, writing SOAP notes, and readiness for APPEs increased significantly. Statistically significant improvements were seen in confidence in treating eight of the ten diseases assessed and in correct answers to eight of nine clinical questions. Implications: The ACP elective course simulated activities students will encounter during APPEs. It was effective in enhancing student readiness for APPEs and clinical knowledge.
Impact of a Postgraduate Residency Training Elective Course on Student Outcomes. Beth Phillips, The University of Georgia, Catherine D. Bourg, The University of Georgia, Michael J. Fulford, The University of Georgia, Bradley G. Phillips, The University of Georgia. Objectives: The purpose of this study was to evaluate the impact of a novel third year doctor of pharmacy residency elective on student preparedness and pursuit of residency training. Method: Graduating students were surveyed prior to and after introduction of the elective course (classes of 2011 and 2012, respectively). Information collected included demographics, residency application information, self-assessment (Likert scale) of residency application preparedness, and time spent preparing for the application process. Results: Overall, 234 students (96%) responded to the survey, including 26 students who completed the elective. Elective students applying for residencies were more confident about their curriculum vitae, ability to research residency programs, application to residency programs, letter of intent, and on-site residency interviews compared to those students who applied to residency programs and did not take the elective (p<0.05 for each). Elective students completed more on-site residency interviews (4.7±2.6 versus 3.7±2.1, p<0.05) and spent more time in their third year and less time in their fourth year preparing to apply for residency training (p<0.05). There were no differences in the number of residency applications submitted between the groups (6.0±2.9 versus 7.2±3.2, p=NS). Implications: Introduction of a third year doctor of pharmacy course elective on residency training was well received by students and increased their confidence in preparing for and applying to residency programs. Elective students prepared earlier and were extended more offers for on-site residency interviews. Didactic instruction on residency education in the third year prepares students for pursuing residencies upon graduation.

Impact of a Student-Driven, Profit-sharing Structure to Fund Pharmacy Student Organization Initiatives. Jami E. Mann, Tamara F. Malm, Charles T. Crawford, Timothy D. Marr, Kelly M. Smith, University of Kentucky. Objectives: Measure the financial impact of a student-developed fundraising collaborative designed to support missions of student professional organizations. Additionally, to determine the knowledge gained by and skills enhanced in project leaders. Method: A college student government subcommittee developed a mechanism to generate operational funds for local student chapters of national pharmacy organizations. Collaborative sales of branded merchandise featured in the institution’s alumni magazine was identified as the target business, yielding shared profits for all 13 student organizations. A business plan was developed, with the key addition of a treasurer position to manage finances from the new business. In addition to profit generation, student knowledge enhancement resulting from the new business was a key outcome measure, and was solicited through student interview. Results: Five students, three of which were dual MBA degree enrollees, created and executed the business plan, which was approved unanimously by the student government and academic leadership. Merchandise sales from the first magazine issue yielded $1922.00 in revenues and $546.80 in profit, a net profit margin of 28%. Students reported learning to assess needs, identify a target market, recognize competitive advantages, distinguish and maximize incentives in a profit-sharing structure, understand cash flows, and form policy. Students also enhanced their soft skills including negotiation, communication, listening, teamwork, observation, decision-making, management, and networking that will benefit them in future business dealings. Implications: This fundraising model, which yielded financial and educational benefits, will be revised to enhance product shipping, catalog space expansion and streamlined price-setting.

Impact of a Virtual Patient Pilot Program on Student Pharmacists’ Learning Outcomes. Mark Douglass, Northeastern University, Jillian P. Casale, Margarita V. DiVall, Northeastern University, J. Andrew Skirvin, Northeastern University. Objectives: To assess the impact of virtual patient (VP) technology implementation on student pharmacists’ medication therapy management (MTM) skills. Method: Student pharmacists’ in their P3 year (N=135) participated in a pilot program involving ten interactive VP cases. Assessments included VP competency achievement and pre/post exam scores mapped to similar class objectives: antibiotics/allergies (AA), heart failure (HF), preventative health (PH), and medication adherence (MA). A paired t-test compared exam results. A survey was administered at the program completion to evaluate students’ attitudes towards the software and its contribution to learning. Results: One hundred nineteen students successfully completed eight or more cases and the average number of competencies achieved was 40 out of 55 (73%). Students’ exam scores significantly improved on three of the four mapped competencies (AA, 40% vs. 57.8%, p<0.001; HF, 89.1% vs. 99%, p<0.001; and AA, 89.6% vs. 99.6%, p<0.001) with non-significant improvements noted on HF (61.1% vs. 70.6%, p=0.06). Eighty and 90% of students thought the pilot improved their chronic disease management skills and was a good summary of the course series, respectively. Commonly reported concerns involved software “glitches”. Implications: Improvements in students’ MTM skills were observed on three of the four mapped competencies, based on significantly higher exam scores and a high competency achievement rate. Software assessment data will be used to identify learning gaps and make curricular improvements. Overall student perceptions of the VP technology were positive, however, the software requires further technical refinement before it can be fully integrated into the school’s curriculum.

Impact of a “Taste of Cultures” Activity on Students’ Cultural Languaging. Lakesha M. Butler, Southern Illinois University Edwardsville. Objectives: The purpose of this study was to assess the impact of a “Taste of Cultures” class activity on students’ 1) cultural knowledge 2) identification on the intercultural learning path and 3) exposure to new cultures through food. Method: During the introduction to the cultural competency cluster in a required 2nd year pharmacy course, “Health Promotion and Literacy” students participated in a “Taste of Cultures” in-class activity. Students sampled ten traditional food items from local ethnic restaurants. Facts and descriptions about each traditional food were displayed during the activity. Similar pre and post-surveys were administered to students before and after the activity containing questions based on the study objectives. Related-samples McNemar tests were used to compare the similar pre and post-surveys. Results: Statistically significant differences were noted on 3 out of the 5 cultural knowledge survey questions in which students performed better on the post-survey following the activity. Additionally, all students tasted at least 1 food item for the first time during the activity. Implications: The “Taste of Cultures” activity was well received by the students. The sampling of foods provided exposure and an introduction to new cultures while also evoking a greater appreciation of cultures. The activity resulted in students moving forward on the intercultural learning path and therefore becoming more culturally aware. The activity will be continued in subsequent course offerings as an introduction to cultural competency.

Impact of an Educational Program on Pharmacy Students’ Long-term Knowledge of Folic Acid. Mary Frances K. Meier, Ohio Northern University, Margarita Bykhovsky, Ohio Northern University, Natalie A. DiPietro, Ohio Northern University. Objectives: To assess knowledge of folic acid (FA) for the prevention of neural tube defects (NTD)
among third-year pharmacy students (0-6 program) 9 months after an educational program. Method: A 30-minute video developed by the March of Dimes (MOD) was used with permission. The video was posted online to the university’s course management software program. Before watching the video, each student completed an online pre-test (adapted with MOD permission). An online post-test was completed after watching the video. The pre/post-tests were not graded; students earned bonus points in a required course by completing all parts of the exercise. Nine months after the educational program, students completed an online longitudinal post-test. The university IRB approved the study. Results: The statistically significant improvements in knowledge from baseline to immediate post-test have been previously presented. Of the 133 students who participated in the educational program, 107 (81%) completed the longitudinal post-test. Ninety-five percent retained the knowledge that FA can prevent some birth defects; 85% indicated FA should be taken by all women of childbearing potential. Eighty-seven percent correctly remembered that most women do not receive enough FA through diet. Eight-five percent recognized FA as a B-vitamin. The increase in knowledge from baseline was statistically significant. Implications: NTD are among the most common birth defects in the U.S., but 50-70% are preventable with FA. Pharmacy students can take active roles in public health and primary prevention through patient education. Programs with online videos are effective means to teach students key information regarding FA for the prevention of NTD.

Impact of an Integrated Case Studies Course on Preparation for Advanced Pharmacy Practice Experiences. Kierstan M. Hanson, Ferris State University. Objectives: To determine if an integrated case studies course better prepares students for Advanced Pharmacy Practice Experiences (APPEs). Method: Fourth year students answered 25 questions about APPE preparedness. A control group completed the traditional curriculum (spring 2011) and the study group completed a curriculum featuring a course focused on student preparation for APPEs (spring 2012). The course, Integrated Case Studies (ICS), prepares students to be interprofessional team members by incorporating written and verbal components of journal club evaluation, persuasive argument delivery, patient regimen assessment, therapeutic plan development and in-service presentation. Survey questions addressed these components. Results were compared between the groups. Results: A total of 231 surveys were completed: 131 in the control group; 100 in the ICS group. Approximately 48% of ICS students strongly agreed they were confident in summarizing a journal article compared with 15% of students who did not complete the course. In the ICS group, 64% strongly agreed they were able to gather information necessary to evaluate a patient case as compared to 37.4% in the control group. The percentage that agreed or strongly agreed they were well prepared for APPEs increased from 74.8% to 92% after implementing the ICS course. Implications: Results indicate the ICS course was effective in improving student preparedness for APPEs. The continuation and revision of this course will benefit students by better preparing them for the demands of patient care, orienting them to the many facets of the pharmacy profession and assisting them in effectively communicating as an interprofessional team member.

Implementation of Active Learning Components into an OTC Course. Sara M. Reece, Philadelphia College of Osteopathic Medicine School of Pharmacy-Georgia Campus. Objectives: 1. Describe the specific active learning components incorporated into the OTC course. 2. Discuss the outcomes of the initial and post student surveys of these active learning components. 3. Explain future plans for active learning components in the OTC course. Method: Active learning tools, minute write and i-clicker audience response system, were utilized during the OTC course as an avenue to engage the students in learning process. The minute writes were incorporated as a transition between topics in the power point presentations. As well, they also assisted in identifying areas of strength and weakness of the students. The i-clicker audience response system was utilized as tool for assessing student learning by use of multiple choice questions to quiz students on topics discussed during class. An initial and post survey regarding active learning tools were completed by the students. The goal of the initial survey was to identify active learning tools that students had been exposed to prior to the OTC course as well as assess their perspective of the value of minute write and i-clicker audience response system. The post survey assessed the students perspective of the value and their satisfaction with the minute write and i-clicker audience response system. Results: Active Learning Tools - Initial Survey (5-point Likert scale) (95% of students enrolled in course completed initial survey) 1. Active learning tools utilized in education prior to pharmacy school: Think-Pair-Share (2%); Group work (7%); Notes Exchange (39%); Audience Response System (40%); Scenario/Vignette (17%); Minute Write (17%) 2. Value of the following active learning tools have in OTC course: a. Minute Write i. Enhance knowledge: Strongly Disagree (0%); Somewhat Disagree (2%); Neutral (23%); Somewhat Agree (39%); Strongly Agree (34%) ii. Increase retention of material: Strongly Disagree (0%); Somewhat Disagree (2%); Neutral (16%); Somewhat Agree (34%); Strongly Agree (47%) iii. Reinforce didactic material: Strongly Disagree (0%); Somewhat Disagree (2%); Neutral (17%); Somewhat Agree (39%); Strongly Agree (41%) b. i-clicker audience response system i. Enhance knowledge: Strongly Disagree (3%); Somewhat Disagree (0%); Neutral (12%); Somewhat Agree (42%); Strongly Agree (42%) ii. Increase retention of material: Strongly Disagree (3%); Somewhat Disagree

Implementation of a Clinical Trial Project to Address ACPE Literature Evaluation Standards. Mona Gandhi, St. John Fisher College, Jane M. Souza, St. John Fisher College. Objectives: Our school is committed to documenting student success in meeting ACPE curriculum standards. We have found it can be challenging to demonstrate proficiency in Literature Evaluation at the synthesis level. The innovative addition of a “Clinical Trial Project” was incorporated into the Literature Evaluation course in order to address this deficiency. Method: All third-year pharmacy students enrolled in the Literature Evaluation course were required to complete a Clinical Trial project. In groups, students designed a trial based on an appropriate hypothesis, implemented the methodology, collected and analyzed data, and presented the results at a poster exhibit session modeled after the AACP sessions. To promote excitement regarding clinical trial development, students were encouraged to test hypotheses which were “fun” or creative in nature. Results: Quantitative and qualitative data were collected over 3 years to assess the effectiveness of this new activity. Average grades improved from 88.5 to 94.7 during year 3. Results were validated externally through a comparison with PCOA scores for the Literature Evaluation and Research Design. In this section, scores have exceeded the national average by an average of 13 percentage points. Qualitative feedback from two student focus groups identified challenges of the project and opportunities for improvement. Based on this feedback, improvements were transitioned into the syllabus for the following year. Implications: Incorporating a Clinical Trial project can address ACPE guidelines, as well as, provide students with experience in key skills necessary for clinical pharmacy practice.

Implementation of a Grading Rubric for a Formulary Monograph Assignment in Campus and Distance Pathways. Amy Friedman Wilson, Creighton University, Zara Risoldi Cochrane, Creighton University, Philip J. Gregory, Creighton University. Objectives: Students in our third year Literature Evaluation course are required to develop a formulary monograph suitable for review by a Pharmacy and Therapeutics Committee. Due to the large number of students in this course (approximately 115 campus and 75 distance), multiple graders are required. In an effort to increase consistency in grading and provide guidance to students completing the assignment, a grading rubric was developed and implemented for all students in Fall 2011. The objective of this project was to compare final assignment grades between and among pathways in Fall 2010 and Fall 2011. Method: Previously, a grading sheet was utilized to assign a monograph score. However, it provided only basic information about point totals for assignment sections, with no leveling of expectations. It also provided minimal guidance for students. The rubric was developed by veteran graders of the assignment, based on practice expectations for a monograph. The rubric was provided to students when the assignment was introduced. Scores were compared using the independent t-test. Results: Data from both pathways for Fall 2010 and 2011 were analyzed. No significant differences were noted in mean score between Campus and Distance 2011. Significant differences were noted between the Distance 2011 cohort compared to Distance 2010 (87.63 vs 91.85; p=0.0250) and Campus 2011 cohort compared to Campus 2010 (90.20 vs 86.43; p=0.0055). Implications: A grading rubric effectively standardized scores among campus and distance students on a monograph assignment when different graders were utilized in the same semester, while providing students with specific expectations for assignment completion.

Implementation of a Grading Rubric to Evaluate Students’ Communication Skills in a Literature Evaluation Course. Zara Risoldi Cochrane, Creighton University, Amy Friedman Wilson, Creighton University, Philip J. Gregory, Creighton University. Objectives: In our experience, and as has been previously described in the literature, pharmacy students frequently do not possess the oral communication skills necessary to excel during their clinical rotations. We found that there were few opportunities in the didactic curriculum for students to give oral presentations, and assessments of such presentations in our course focused primarily on content, rather than students’ communication skills. The objective of this project was to examine the effect of implementing a communication skills grading rubric on average presentation scores in a third-year literature evaluation course for doctor of pharmacy students. Method: Following a systematic search of the literature, a presentation rubric was identified and adapted for use in a literature evaluation course. This grading rubric was used to assess communication skills during students’ oral presentations of evidence-based drug information consultations during the fall semester of 2011. These scores were compared to scores from the preceding spring semester (prior to rubric implementation) using an independent t-test. Results: Data from 112 students was included (56 from each semester). Average presentation scores decreased significantly from 91.1% pre-rubric (SD 5.59) to 88.2% post-rubric (SD 5.46; two-tailed p=0.0059). This change was thought to be directly related to the increased focus
on assessing students’ oral communication skills, rather than presentation content or literature evaluation skills. Implications: A grading rubric was an effective mechanism to accurately assess students’ oral communication skills rather than literature evaluation skills. Use of the rubric also provided students with explicit expectations for the assignment and additional feedback on their performance.

Implementation of an Elective Course Focusing on Application of Clinical Pharmacy Principles and Active Learning, Kristen A. Pate, The University of Louisiana at Monroe, Adam Pate, The University of Louisiana at Monroe, David J. Caldwell, The University of Louisiana at Monroe, Jessica H. Brady, The University of Louisiana at Monroe. Objectives: To describe the implementation and outcomes of an elective course, Problems in Therapeutics, focusing on application of clinical pharmacy principles and active learning. Method: Problems in Therapeutics was offered to third professional year pharmacy students and had three primary components: 1.) The utilization of problem based learning (PBL) to evaluate patient cases with corresponding written pharmaceutical care plans in the form of a SOAP note and case presentations; 2.) Drug information activities in which students formulated answers to drug information questions and formally presented the response; 3.) Reinforcement of literature evaluation concepts through review and presentation of an article in a “journal club” format. Additionally, there was a “speed dating” activity in which students rotated to stations where faculty led discussion regarding various literature evaluation concepts. The course was assessed through a teaching methods evaluation survey, pre- and post-course clinical skills assessment and self-confidence survey, and assignment grade analysis. Results: Course activities were used to meet the following outcomes: provide comprehensive patient-specific pharmaceutical care; communicate effectively; identify, interpret, and evaluate literature needed for the provision of drug information and pharmaceutical care; and think critically. Assessment results (significant increase in confidence on 9 of 15 survey questions, 14.7% (p=0.12) increase in performance on clinical skills assessment, 10.6% (p=0.02) improvement in first vs. last case presentation), along with student comments, indicate that course outcomes were met. Implications: A PBL and active learning elective may enhance the attainment of curricular outcomes. These methods could be used in other courses to enhance learning.

Implementation of an Elective Course in Evidence-based Medicine Using Team-based Learning for Pharmacy Students, Stacy L. Haber, Midwestern University/Glendale, Virginia Boomershine, Midwestern University/Glendale. Objectives: This report describes the implementation of a 1.5-credit elective course in evidence-based medicine (EBM) using team-based learning (TBL) at Midwestern University College of Pharmacy-Glendale. Method: The authors attended the TBL Collaborative Meeting and reviewed articles to learn about the instructional method. In a literature search, no information on TBL within EBM was found. A pilot session was held with 25 students on advanced pharmacy practice experiences and a questionnaire to assess student perceptions of TBL was approved by the Institutional Review Board (7 items addressed individual components of TBL; 4 items addressed TBL in general). Results: The authors felt that the pilot session was successful. The elective course was offered in the last didactic quarter of the curriculum. Thirteen students enrolled. Each week, students evaluated a study prior to class. Class sessions included a 10-question multiple choice quiz on the study, taken individually and then in teams of 3 to 4 students. Subsequently, the teams completed an application activity (e.g., SOAP note, drug information question). Quizzes and application activities were discussed as an entire class and peer evaluations were conducted. The questionnaire was completed by 13 students. The highest agreement was in that required readings enhanced their knowledge (100%) and discussing quizzes as an entire class increased their understanding of the studies (100%); the lowest agreement was in that TBL required more effort than traditional lectures (76.9%). Implications: An elective course in EBM using TBL was received positively by students and may work well in other curricula.

Implementing and Assessing a Blended Learning Model in an Integrated Pharmacotherapeutic Course, Cathy L. Koo, Texas A&M Health Science Center, Elaine L. Demp, Texas A&M Health Science Center, John D. Bowman, Texas A&M Health Science Center, Charlotte A. Farris, Texas A&M Health Science Center, Panahi Ladan, Texas A&M Health Science Center, Paul Boyle, Texas A&M Health Science Center. Objectives: To transform a two-credit hour integrated pharmacotherapeutic course for second-year pharmacy students into a blended learning model and assess students’ performances and perceptions. Method: Four faculty members divided class time into online pre-recorded videos with self-assessment questions and face-to-face sessions. The faculty recorded a total of 59 short videos using Camtasia™, a screen capture tool, to present the fundamental concepts prior to the face-to-face sessions. The face-to-face sessions began with quizzes, followed by discussions of multiple patient cases. Collected data included results from a 20-item pretest and posttest, compared performances on repeated exam questions, a survey about our blended learning model, and the course evaluation. Results: The posttest score significantly increased from the pretest (6.45 ± 1.88 vs. 12.17 ± 2.95, p<0.001). The current class performed significantly better than the previous class on 11 of 27 repeated questions while the previous class performed better on only two questions (all p<0.05). The course was perceived as good or very good by 79% of the students and 88% of them found the pedagogy effective for learning. The students commented that the online videos allowed productive self-paced learning and the face-to-face sessions were valuable for applying their knowledge; however, they stated that the schedule for video viewing, quizzes and exams was difficult to manage. Implications: The students viewed our blended learning model favorably and learning was demonstrated on the posttest and exams. Modifications on the time allotment for the videos and scheduling of the course activities can further improve the learning experience.

Improving Student Learning by Incorporating Preferred Learning Styles into Personalized Study Strategies, Jenny A. Van Amburgh, Northeastern University, Jacqueline M. Kraft, Northeastern University, Nicole M. Wegryn, Northeastern University, Amanda L. Slowinski, Northeastern University. Objectives: Evaluate a tutoring strategy in which the students’ perceived learning styles and study strategies are identified by a validated learning style survey (VARK) and then guide tutoring sessions with a goal to improve academic performance. Method: Students were either self-identified or identified by faculty as high risk (i.e. previous course failures). Identified students completed an online survey assessing perceived/actual learning styles, current studying preferences, and previous tutoring participation. Students met one-on-one with the Assistant Dean for Academic Affairs to discuss pre-survey results and to identify new strategies and techniques and participated in weekly tutoring. To assess actual and perceived benefits of the intervention, students completed a post-survey and their academic performance was reviewed. Results: During academic year 2011-12, 32 students completed the pre-survey and 24 students completed the post-survey. Students self-identified their learning styles as followed: 31% visual, 9% verbal, 18%
read/write, 3% kinesthetic, 27% multimodal, and 12% unsure. VARK-based identification yielded different results: 13% visual, 10% verbal, 19% read/write, 3% kinesthetic, and 55% multimodal. Students implemented new study strategies to supplement their VARK-based preferences. Following the intervention, academic performance improved from a failing grade to a C, C+, B−, or ≥B in 27%, 27%, 33%, and 13% of students, respectively. **Implications:** Based on these results and students’ feedback, the intervention continues for all professional courses. Results for 2012-13 will be analyzed.

**Incoming Students’ Perceptions Regarding the Role of Spirituality in Pharmacy Education.** Bobby C. Jacob, Mercer University, Hannah K. Rogers, Mercer University, Annesha W. Lovett, Mercer University, Angela O. Shogbon, Mercer University, Amy C. Grimsley, Mercer University. **Objectives:** To describe student perceptions of the role of spirituality in pharmacy education. **Method:** An online survey was administered to first year pharmacy students at the beginning of the academic year assessing student perceptions of the role of spirituality in pharmacy education. A Likert scale of strongly agree to strongly disagree was utilized. In addition, measures of spirituality and religiosity were assessed using the Daily Spiritual Experience Scale (DSES) and Duke University Religion Index (DUREL). Responses were analyzed using descriptive statistics and correlation. **Results:** A total of 146 students (93%) completed the survey. Half reported that spirituality had an impact on their decision to pursue a pharmacy degree. Furthermore, 50% anticipated that matters of spirituality would be significant components of academic course work, and 75% believed spirituality would be integrated into their professional practice. A majority of students (85%) believed a general understanding of spirituality’s role in society was useful in order to be fully prepared for a successful pharmacy career, and 79% expected that personal spiritual experiences during the current year would contribute to academic success. Student perceptions regarding the role of spirituality in pharmacy education were significantly correlated to spirituality and religiosity as measured by the DSES and DUREL respectively (p<0.01). **Implications:** Spirituality plays a role in many pharmacy students’ lives and many expect educators to incorporate spirituality into course work. Further research is warranted to evaluate the role of spirituality within required and elective components of the curriculum and the effect of this training on educational outcomes and practice competency.

**Incorporating Social Media into a Required Drug Literature Evaluation Course - Second Year Analysis.** Maria D. Kostka-Rokosz, Massachusetts College of Pharmacy and Health Sciences-Boston, Lana Dvorkin-Camiel, Massachusetts College of Pharmacy and Health Sciences-Boston, William W. McCloskey, Massachusetts College of Pharmacy and Health Sciences-Boston. **Objectives:** To further evaluate social media use in fourth year (PY2) pharmacy students following pharmacy Facebook page. **Method:** In 2011 a Facebook page was developed to provide pharmacy news. Students taking Drug Literature Evaluation were asked to “follow” the page. Results of 2011 survey were presented at 2012 AACP Annual Meeting. Following data analysis additional areas of exploration were identified. In 2012 survey, students were also asked about devices for social media participation included computers, smartphones and tablets. Most common activities included keeping in touch with others, following news, and following/interacting with companies. Most interesting educational categories for students included newly approved drugs/indications/dosing changes, FDA recalls, and diet/nutrition. Sixty-one percent preferred posts that linked to magazine articles, with link opened on average “often” to “sometimes”, and entire article read “sometimes”. On average students liked posts “often” to “sometimes” and commented on posts “rarely”. Majority agreed the project helped them stay current on professional news connecting the class to the real world. **Implications:** This project further exposed students to professional use of social media and engaged them in a less conventional learning environment and encouraged them to develop the characteristics of life-long learners.

**Incorporating Team-Based Learning into Topic Discussions in a Drugs in Pregnancy Elective.** Lea S. Eiland, Auburn University, Kristi W. Kelley, Auburn University. **Objectives:** To introduce team-based learning (TBL) into a Drugs in Pregnancy elective and compare student perceptions of TBL to traditional discussion. **Method:** For the 2012 fall semester, four of eight topic discussions were converted to TBL. The other four topics were taught using a traditional style discussion method (verbal questions for the class to answer, expecting the students to pre-read). The major difference in the two methods was the use of independent readiness assurance tests (IRAT) and team readiness assurance tests (TRAT) for TBL. Students were provided a survey after the TBL weeks and then again after the traditional style discussion weeks. Student perspectives regarding TBL compared to traditional discussion format and IRAT and TRAT scores were compared. **Results:** All students (n=16) completed both surveys. After completing the TBL component, the majority (~75%) of students stated TBL exercises helped them with learning and assessment of the topic. Average TRAT scores were higher than the IRAT scores (3.87 vs. 2.39). After completing discussions without TBL, in re-surveying the students, it was found that fewer students read prior to class. All students still reported they learned from the prior TBL discussions. Comparing the teaching styles, students (81%) preferred the topic discussions with TBL versus without TBL. However, 44% of students did not want their course grade associated with IRATs or TRATs. **Implications:** Student feedback was positive regarding the incorporation of TBL into topic discussions. TBL methods will be included in future course offerings.

**Incorporation of Audience Response Technology and Human Patient Simulation (HPS) into a Pharmacotherapeutics Course.** William Maidhof, St. John’s University, Gregory J. Hughes, St. John’s University, Tran Tran, St. John’s University, Candace Smith, St. John’s University. **Objectives:** To incorporate innovative technology into a second professional year pharmacotherapeutics course for the purpose of enhancing active learning and promoting student engagement. **Method:** Pharmacy faculty teaching a pharmacotherapeutics cardiology course developed simulated cases reviewing atrial fibrillation, advanced cardiac life support (ACLS), and various types of shock (cardiogenic, hypovolemic, and septic). The cases were created using SimMan HPS software (Laerdal Medical), enabling students to view a patient case and treat the patient by selecting from a variety of pre-programmed treatment possibilities. Students selected the treatment they felt was most appropriate using Turning Point Audience Response Technology (Turning Technologies, LLC.). Faculty then reviewed each case demonstrating the beneficial or harmful outcome for every possible treatment option. A discussion followed, exploring the nuances associated with each therapy. Students completed a survey assessing the technology’s effectiveness at the conclusion of
the exercise. **Results:** A total of 138 students completed the exercise, of which 96% responded to the survey (n=133). Approximately 92 percent of students either agreed or strongly agreed that incorporating audience response technology and HPS software into a pharmacotherapeutics course enhanced their understanding of select cardiovascular topics. Ninety-two percent of students also either agreed or strongly agreed that using the technologies improved their ability to analyze information, problem solve, and make appropriate therapeutic decisions. **Implications:** Further inclusion of these two technologies into other pharmacotherapeutic topic areas is currently under discussion within the college.

**Innovative Elective Course to Prepare Third-Year Pharmacy Students for a Postgraduate Pharmacy Residency.** Kathy S. Eroschenko, Idaho State University, Catherine M. Oliphant, Idaho State University, Thomas Wadsworth, Idaho State University, Glenda Carr, Idaho State University. **Objectives:** To develop and evaluate a residency readiness course for third-year pharmacy students interested in a postgraduate pharmacy residency. **Method:** This was a two credit residency readiness elective offered to third-year pharmacy students. Course instruction utilized lectures, forum discussions, and guest lecturers including local pharmacy residency directors. Students were required to prepare a curriculum vitae for faculty review. Students completed a survey to assess the course and its applicability for applying for residency. Results were evaluated for utilization and application. **Results:** Nine students enrolled the fall of 2012. Prior to the course, 3 (33%) students were very certain, 5 (56%) fairly certain and 1 (11%) was somewhat uncertain about applying for a residency. Following the course, 7 (78%) were very certain and 2 (22%) were fairly certain about applying for a residency (p=0.03). Eight students (89%) felt prepared for residency interviews. All students felt prepared to apply for a residency, had a better understanding of the application process, and believe this course will assist them in attaining a residency. Material covered in class was viewed as beneficial. All students would recommend the course to future students. **Implications:** An elective course in residency readiness increased student preparedness and interest in applying for a postgraduate pharmacy residency. All students rated the course as beneficial and would recommend it to future students. As postgraduate training continues to gain momentum, preparing students for these coveted positions is essential.

**Integrating Hand Hygiene Instruction Throughout Required Health Care Delivery Content : Design and Assessment.** Eric Amos, Jill E. Lavigne, St. John Fisher College. **Objectives:** Hand hygiene is the most effective method for preventing healthcare associated infections, a top 10 cause of death in the US. Our objectives were to: (1) Design and implement instructional materials and assessments to integrate World Health Organization standards for hand hygiene into a Health Care Delivery course; and (2) Assess student skill, knowledge and application, as well as changes in attitudes and motivation to perform hand hygiene technique as indicated. **Method:** We integrated hygiene training into course material covering professionalism, interprofessional competencies, historical patterns of burden of disease, public health, and new models of reimbursement for readmissions and health care outcomes. Learning outcomes progressed from knowledge to synthesis. Students demonstrated their knowledge and application of the material through an exam, skills by instructor observation using a rubric, and any changes in attitudes and motivation to perform hand hygiene using a 17-item pre/post survey based on previously published research. **Results:** 78 (100%) students completed all training exercises and the exam. 77 (98.7%) also completed the survey and skills rubric. 78 (100%) passed the skills assessment. All survey items significantly improved after training. Notably, all students confidently stated that hand hygiene training would make them better pharmacists. **Implications:** To our knowledge, we are the first pharmacy school to require formal hand hygiene training of our matriculating P1 class. Neither the Accreditation Council on Pharmaceutical Education (ACPE) nor the Center for Advancement of Pharmacy Education (CAPE) standards include formal hand hygiene instruction. We were unable to identify manuscripts about hand hygiene education in pharmacy education.

**Integrating Oral Health Concepts in a Virology & Antiinfectives Doctor of Pharmacy (PharmD) Course – a Multidisciplinary Approach.** Dorothy E. Rudorf, Massachusetts College of Pharmacy and Health Sciences-Boston, Anela Stanic, Massachusetts College of Pharmacy and Health Sciences-Boston, Stephen G. Kerr, Massachusetts College of Pharmacy and Health Sciences-Boston, Lori Rainchuso, Massachusetts College of Pharmacy and Health Sciences-Boston. **Objectives:** Following a faculty survey to investigate incorporation of oral health (OH) into our Pharmacy curriculum, OH concepts were integrated in the syllabus of a required PharmD course, Virology & Antiinfectives (V&A). Student exposure to and knowledge about OH, its relevance in the V&A course, and effectiveness of this multidisciplinary Pharmacy – Dental Hygiene project was evaluated. **Method:** A case study integrating relevant OH issues with bacterial, viral, and fungal infection topics was developed. Prior to the in-class case discussion led by Pharmacy and Dental Hygiene faculty, students were surveyed about previous exposure to/knowledge of OH issues and relevance to pharmacy education. After the case discussion, students evaluated the effectiveness of the learning experience. **Results:** 207 (69%) of 300 students completed the survey. One third had either prior exposure or knowledge in OH issues. 71% indicated the case discussion improved their OH knowledge and helped integrate course concepts. This perception was not significantly associated with prior knowledge of OH issues. 125 (62%) considered this teaching technique effective, and 110 (55%) stated that it improved their critical thinking. 171 (85%) agreed that OH plays a role in V&A, and 126 (63%) felt OH should be required in all PharmD practice courses. Of 70 students with prior OH knowledge, 53 (79%) agreed the case discussion advanced their knowledge. **Implications:** Incorporation of OH in a V&A course is relevant, and a multidisciplinary case study is an effective teaching and learning tool.

**Interprofessional Education Event Implementation Involving Three Non-affiliated Health-science Programs Located Across an Expanded Region.** Katie E. Ronald, Southern Illinois University Edwardsville, Carrie Vogler, Southern Illinois University Edwardsville, Jennifer D. Arnoldi, Southern Illinois University Edwardsville. **Objectives:** To describe a pilot interprofessional education (IPE) event engaging pharmacy students, nursing students, and respiratory therapy students from three non-affiliated health-science programs in a high-fidelity acute care simulation scenario. **Method:** Faculty from pharmacy, nursing, and respiratory therapy coordinated a thirty minute simulation to enhance interprofessional communication skills and interdisciplinary team dynamics. Each case scenario included three fourth year nursing students, one second year respiratory therapy student, and two third professional year pharmacy students using a high-fidelity simulator. Student pharmacists were assigned a reading to prepare for the event. After completing the three part case, students attended a debriefing session to discuss communication between professions. Pharmacy students completed the Readiness for Interprofessional Learning Scale (RIPLS) before and after the event. A survey to measure student perception of the IPE event and
high-fidelity simulations was also administered after the event. Results: Eight student pharmacists participated in the pilot program. The survey and RIPLS results showed that overall the experience was positive and enhanced interprofessional communication skills. Surprisingly, after the simulation, some pharmacy students became less sure what their professional role would be within an interdisciplinary team. 

Implications: A successful IPE event can be initiated between three non-affiliated health-science programs located across an expanded region. Students agree that an event of this nature should be required in the pharmacy curriculum. Based on this pilot information, incorporation of this event into a required course with expansion to an entire pharmacy class is being explored.

Interprofessional Education: Using Standardized Patients and Providers for Primary Care Simulation. Cherokee Layson-Wolf, University of Maryland, Deanna Tran, University of Maryland, Laura Koo, University of Maryland School of Nursing, Patrick T. Rocafort, University of Maryland, Shannon Idzik, University of Maryland School of Nursing, Margaret Hammersla, University of Maryland School of Nursing, Brenda Windemuth, University of Maryland School of Nursing. Objectives: Interdisciplinary collaboration and interprofessional education (IPE) are essential for transforming healthcare. While standardized patient experiences have been used extensively to facilitate IPE in the acute or inpatient setting, IPE in the primary care or outpatient setting is limited. The purpose of this project is to create, implement, and evaluate a teaching/learning clinical simulation strategy to enhance interprofessional collaboration for advanced-level adult and gerontological primary care nurse practitioner (AGNP) students and student pharmacists. Method: The Schools of Nursing and Pharmacy developed a formative standardized patient experience to give student NPs and student pharmacists the opportunity to synthesize patient assessments, problem-solve, and establish communication with one another and with physicians. Case scenarios depicted two different primary care settings that highlighted interprofessional communication using face to face interactions, video conference, and telephone. After the simulated scenarios, a debriefing activity and a voluntary focus group were conducted. Results: The preparation of faculty and the standardization of patients and providers allowed for an efficient and beneficial clinical learning experience. Faculty-facilitated learning and debriefings promoted student critical thinking, collaborative problem-solving, and effective communication skills. Students provided positive and constructive feedback regarding the IPE experience during the focus groups. Implications: Integration of interprofessional education into existing curricula will require intentional effort by faculty to overcome common barriers. Involving high-level adult and gerontological primary care nurse practitioner (AGNP) students and student pharmacists to provide feedback will assist in the implementation of this type of educational experience into the curriculum. Based on the pilot information, the instructional strategy to enhance interprofessional collaboration for advanced-level adult and gerontological primary care nurse practitioner (AGNP) students and student pharmacists to provide feedback will assist in the implementation of this type of educational experience into the curriculum.

Intradermal Influenza Vaccine Education and Administration in the Second Year Pharmacy Curriculum: An Observational Study. Jennifer M. Jordan, Pacific University Oregon, Jeff Fortner, Pacific University Oregon, Mihaela S. Talianu, Pacific University Oregon. Objectives: The goals of this observational study were two-fold, first evaluate student attitudes regarding intradermal trivalent influenza vaccine (intradermal-TIV) immunization training using peer administration in the classroom setting, and second to measure the training’s value in terms of student confidence with influenza intradermal vaccine counseling and administration. Method: In September 2012, all second year (P2) students were assigned to watch an intradermal-TIV administration training video and complete a worksheet on influenza vaccination patient education. During the pharmacy practice course groups of 6 students, with oversight by a trained pharmacist, discussed immunization options, demonstrated counseling skills, and administered the intradermal vaccine into a practice pad and then into each other if another student was amenable. Intradermal-TIV vaccine and training materials were provided by Sanofi Pasteur. After initial training, an intradermal-TIV vaccination clinic was offered by P2 students to faculty, staff, and students at the School of Pharmacy’s career fair. A voluntary and anonymous survey was then sent to all P2 students. Results: All 102 P2 students completed the training, with a 90% survey response. Approximately 270 vaccines were administered by P2 students. Survey respondents felt prepared in counseling patients and administering intradermal-TIV (87%). Students preferred to administer their first intradermal vaccine to a classmate (86%). Most students were comfortable receiving a vaccine from classmates (77%). Respondents felt that this training should be repeated (93%). Implications: Active demonstration of intradermal-TIV counseling and vaccination using pharmacy student peers increases student comfort level and competency for counseling and administration of the vaccine.

Knowledge, Attitudes, and Beliefs of Geriatric Care Education Among Student Pharmacists. Jill M. Augustine, The University of Arizona, Amit Shah, Nirav Makadia, Ankur Shah, Jeannie K. Lee, The University of Arizona. Objectives: The objective was to assess the knowledge and attitudes of first, second, and third year PharmD students on geriatric care based on completion of a geriatric-focused elective. Method: A 23-question survey was distributed to students...
enrolled in the PharmD curriculum (N=193, response rate=64.3%). Second and third year students were stratified based on their completion of the geriatrics elective. Nine questions assessed student pharmacists’ knowledge of geriatric care. Students’ attitude on geriatric care was assessed by four questions, based on a 6-point Likert-like scale (0=not at all to 5=strongly agree). Data analysis included descriptive statistics and t-tests. Results: Second and third year students who participated in the elective were more likely to be interested in additional geriatric care education compared to their peers who had not taken the elective (p = 0.045 and p = 0.05, respectively). The second and third year students who had taken the elective showed significantly higher knowledge of geriatric care compared to their peers who did not take the elective (p = 0.032 and p = 0.022, respectively). First year students were not able to take the elective at the time of the survey; however, they placed high importance on participating in a geriatrics-focused course in the PharmD curriculum. Implications: Student pharmacists who took the geriatrics-focused elective had more positive attitudes and a stronger knowledge base regarding geriatric care. Schools and colleges of pharmacy should explore having geriatrics-focused course in their curriculum and its impact on clinical confidence in geriatrics care.

Low versus High Fidelity Simulation to Train Pharmacy Students on Proper Injection Technique. Elizabeth Skoy, North Dakota State University, Heidi Eukel, North Dakota State University, Jeanne E. Frenzel, North Dakota State University, Alicia Fitz, North Dakota State University. Objectives: Utilize a cross-over comparison to determine if a high fidelity injection simulator arm is superior to a low fidelity injection pad to train students on proper subcutaneous and intramuscular injection technique. Method: Students were divided into 2 groups. Group 1 first utilized the injection pad, and then utilized an injection simulator arm before administering an injection to a peer. Group 2 first practiced with an injection simulator arm and then an injection pad before administering a peer injection. Using a 3-item survey, students rated themselves on proficiency, confidence and anxiety before, and after utilizing each form of simulation. Results: There was a significant increase in self-ratings of proficiency, confidence and decreased anxiety between pre-simulated practice and after practicing with both forms of simulation (P<0.05) for both groups. An analysis of variance test was employed to determine if there was a statistically significant difference between Groups 1 and 2. The only significant difference between groups was seen in the self-rating of proficiency for Group 1. All students successfully administered an injection to a peer. Implications: Injection simulation improves student self-ratings of proficiency, confidence and decreased anxiety. Since there was little difference between Groups 1 and 2, the physical fidelity of the simulation utilized appears to not influence the end results.

Measuring the Effectiveness of an Analgesia Skills Laboratory. Michael W. Neville, The University of Georgia, Amber Bradley, The University of Georgia, Carolyn S. Hunter, The University of Georgia. Objectives: The primary objective of this study was to evaluate a laboratory exercise about the principles of analgesia and its effects on the knowledge, attitudes and self-perceived skills of P3 pharmacy students. Method: This IRB-approved study evaluated the effects of a two-hour skills laboratory exercise that included three components – compounding a patient controlled analgesia syringe, programming an IV pump, and using equianalgesic dosing tables. A 12-item, on-line, questionnaire was administered to students during the course orientation. The two-hour, hands-on skills laboratory was delivered during the semester and the questionnaire was re-administered at the conclusion of the semester. Pre- and post-questionnaire data were matched and changes in mean scores were analyzed using Paired Samples t-test. Results: One hundred thirty-five students (90%) completed the pre- and post-questionnaires. Significant changes (p<0.05) were observed in 3 of 3 (100%) of the attitude questions, 4 of 4 (100%) of the skills questions, and 2 of 5 (40%) of the knowledge questions. This hands-on, interactive laboratory introduced P3 students to unfamiliar equipment and procedures but also reinforced previously acquired knowledge. Implications: A two-hour skills laboratory can effectively change the attitudes and self-perceived skills level of pharmacy students.

Medical Resident Choices in Drug Information Resources. Gregory J. Hughes, St. John’s University, Priti Patel, St. John’s University, Christopher Mason. Objectives: Many questions persist as to what extent medical residents receive training in drug information. Following medical school, their choices of drug information resources when faced with common questions are also unknown. We sought to determine more about their day-to-day use of drug information resources and how practices differ amongst post-graduate year medical residents. Method: An online survey including simulated drug information questions was administered to 146 medical residents in the Department of General Internal Medicine. Residents were given a wide range of choices in drug information resources to answer these questions and were instructed to select what they would choose in actual practice. A score was assigned to each resource corresponding to a “best”, “intermediate”, or “not good” choice. Results: Seventy-three respondents completed the survey and results were analyzed for statistical significance. Fifty-seven percent of respondents reported receiving no formal training regarding drug information. Statistical analyses revealed there were no significant differences in performance based on post-graduate year (p<0.4314) or extent of prior training (p<0.4496). Individual question responses revealed a generally poor selection of “best” choices. Less than 10% of the respondents chose the “best” answer for drug information questions related to drug-interactions, herbal supplements, adverse events, and medication identification. Implications: Further training in drug information resource selection is warranted in the medical residency program. Educational sessions and a pocket-guide are under development and an assessment of these interventions will take place in the future.

Medical Residents’ Perception of Student Pharmacists. Jocelyn D. Jones, Florida Agricultural and Mechanical University. Objectives: The objective of this study is to explore the perceptions of medical residents regarding the role of student pharmacists during their advance pharmacy practice experience. Method: Prior to commencement, this study was submitted to the Institutional Review Board for approval. The study was conducted over a two month period. Medical residents at four local hospitals will be asked to participate in the study. Data was collected using a survey. Student pharmacists were responsible for ensuring that the medical residents were given the survey. Prior to issuing the survey, the medical residents were informed of the intention of the study. Any medical resident who completed the survey was considered to have given implied consent. The primary endpoint of the study was to determine perceptions of the collaborative relationship between medical residents and student pharmacists in a practical setting. The secondary endpoint was to evaluate the overall acceptance and value of the recommendations made by student pharmacists. Results: Forty medical residents participated in the study. The analysis demonstrated that medical residents have an overall positive perception of student pharmacists. Greater than 91% of residents agree that a positive collaborative relationship exists with student pharmacists. Moreover, 90% of medical residents perceived student pharmacists to be knowledgeable on medication issues including therapy selection and...
Implications: This data supports the idea that student pharmacist play a major role in collaborating with other healthcare providers in the management of patients’ medication therapy. As faculty, we must continue to ensure that our students are equipped to manage patients’ drug therapy. We must also ensure that we afford the students opportunities to collaborate with other healthcare professionals.

Narratives of Care: Integration of the Medical Humanities in a Pharmacy Skills Course. Marion L. Pearson, The University of British Columbia. Objectives: To promote development of caring attitudes, two narrative assignments were added to a reflective portfolio for a pharmacy skills course. The nature of students’ responses and attitudes to these assignments were evaluated through analysis of the submitted assignments and a questionnaire. Method: The assignments were: 1) writing a reflection on a story of care, with a choice of responding to a published case study or to an autobiographical account; and 2) writing a biography of a paper-based patient encountered repeatedly in the course to simulate interactions between a pharmacist and a regular patient. Assignments were analyzed for themes in students’ reflections, and questionnaire responses were analyzed to determine the extent to which students valued writing about care. Results: Assignment 1: The majority reflected on the case study rather than an autobiographical account. For both options, students identified taking initiative, committing time, problem-solving, and being empathic as important elements of caring. Those selecting the case study also noted the importance of being competent, observant, assertive, and respectful of patient autonomy and of interprofessional collaboration. Assignment 2: The majority of students wrote creative biographies, with details of childhood experiences, work, hobbies, etc. that would have been gleaned through conversations with a real-life patient. All respondents to the questionnaire appreciated the value of these types of assignments in promoting a commitment to care in pharmacy practice. Implications: Narrative pedagogy has potential for helping students develop the skills and attitudes needed to care for and about others.

Novel Ideas to Increase Empathy in Second Year Student Pharmacists. Kajua Lor, Touro University California, Julie Truong, Touro University California, Eric Ip, Touro University California, Mitchell Barnett, Touro University California. Objectives: To determine the impact of an active three-day empathy intervention on empathy levels as measured by the Jefferson Scale of Empathy-Health Profession Students version (JSE-HPS), a validated empathy instrument. Method: This study was a randomized, non-blinded prospective study. Forty second-year student pharmacists were recruited. Subjects were randomized to an intervention group (n=20) or control group (n=20) and completed a pre- and post- JSE-HPS. The intervention group consisted of a three-day simulation whereby each day had a designated activity including simulated loss of dominant hand usage, vision loss, and loss of speech; each day ended with debriefings. The empathy simulation occurred during regular didactic class hours. Three months after the study, JSE-HPS were given to all subjects to assess longitudinal effects of the intervention. Results: Forty students completed the pre- and post- JSE-HPS. Students receiving the three-day empathy intervention had higher empathy scores compared to the control group (p<0.001). Debriefings with students revealed 3 major themes: the importance of patience and being open-minded with patients, increased empathy for patients with disabilities, and improved ability to apply the lessons learned to their patient care roles. Implications: A three-day empathy training program resulted in students displaying higher empathy scores on the JSE-HPS compared to students not involved training program. This study highlights the imprtance of empathy training in the early years of the pharmacy curriculum.

Over-The-Counter Aisle as a Method of Student Assessment in Pharmaceutical Care Lab. Fatima M. Ali, Roosevelt University, Cara M. Brock, Roosevelt University. Objectives: Evaluate second-year pharmacy students in Pharmaceutical Care Lab on nonprescription medications using an approach that simulates a community pharmacy setting with over-the-counter (OTC) aisles. Method: Students were assigned a patient case upon entrance to the practical exam and given five minutes to work up the case. Case topics correlated with OTC aisles and included cough/cold/allergy, pain, smoking cessation, and first-aid. Students selected an OTC aisle based on chief complaint and history of present illness and narrowed selection to an OTC product based on the following: past medical history, medications, allergies, drug/drug interactions, and/or other patient related factors utilizing the QuEST method. Faculty members played the patient and only provided information elicited by student. Students then counseled utilizing the SCHOLAR method. Faculty evaluated student on QuEST/SCHOLAR method with rubric provided. Results: About half the COP class of 66 was assigned to counsel on an OTC product. All of the students correctly identified the OTC aisle and majority identified the correct product utilizing the QuEST method. Students who did not successfully complete the practical remediated by counseling on another product using a different patient case. Implications: The OTC aisle approach as a method of student assessment for nonprescription medications was unique as it simulated the community pharmacy setting. The entire counseling session required more time and evaluators to complete than anticipated. In the future, availability of additional faculty members and more time for case workshop and patient interview should allow for comprehensive evaluation of all the students.

PaCT: Development of Patient-centered Communication Tools for Pharmacists. Theresa R. Prosser, St. Louis College of Pharmacy, Gloria Grice, St. Louis College of Pharmacy, Nicole Gattas, St. Louis College of Pharmacy, Jill Sailors, St. Louis College of Pharmacy, Mychal Voorhees, St. Louis College of Pharmacy, Peter D. Hurd, St. Louis College of Pharmacy, Clark Keboeaux, St. Louis College of Pharmacy, Amy M. Tienmeier, St. Louis College of Pharmacy, Tricia M. Berry, St. Louis College of Pharmacy. Objectives: Based on experience using a validated instrument designed for physicians (Four Habits Model-FHM) to evaluate student pharmacists’ communication skills during patient encounters, the goals were to: 1) develop an effective, comprehensive and valid framework with assessment rubric specific to pharmacist-patient communication skills and 2) use that framework and rubric to teach, assess and evaluate student pharmacists’ skills during patient encounters. Method: Literature review identified 8 additional clinician-patient communication instruments. Faculty teaching clinical communication and health literacy compared each to the FHM and a prior self-developed instrument. Unique, important aspects for pharmacists were identified by consensus and included in a new (PaCT) framework and assessment rubric. Feedback was incorporated from two rounds of review by an external, interdisciplinary panel of 10 communication and health literacy experts. Consenting standardized patients critiqued the framework from the patients’ perspective. Framework and rubric were further revised after piloting with P-4 students. Results: The PaCT framework includes 23 skills categorized into 5 general “tools”. The FHM authors determined the PaCT to be significantly different from the FHM. Face and content validity was supported by external review. The PaCT rubric provided formative assessment and final evaluation for 190 P-3 student encounters with standardized patients in a required course. The framework, assessment rubric, and summary materials will be presented. Implications: The PaCT addresses the need...
for a validated framework and rubric specifically designed for student pharmacist clinical communication skills. Further validity testing is in process. The PaCT’s suitability for other health care professionals could be evaluated.

**PaCT: Faculty Validation of Patient-centered Communication Tools.** Gloria Grice, *St. Louis College of Pharmacy*, Theresa R. Prosser, *St. Louis College of Pharmacy*, Nicole Gattas, *St. Louis College of Pharmacy*, Mychal Voorhees, *St. Louis College of Pharmacy*, Jill Sailors, *St. Louis College of Pharmacy*, Peter D. Hurd, *St. Louis College of Pharmacy*, Clark Kebodeaux, *St. Louis College of Pharmacy*, Amy M. Tiemeier, *St. Louis College of Pharmacy*, Tricia M. Berry, *St. Louis College of Pharmacy*. **Objectives:** To determine reliability and validity of the Patient-centered Communication Tools (PaCT). **Method:** Faculty trained in using PaCT assessed student pharmacist video performances of standardized patient interviews. Performances were rated on a 5-point scale for 22 analyzed skills grouped into five tools: (A) Establish a Connection, (B) Explore and Integrate the Patient’s Perspective, (C) Demonstrate Interest and Empathy, (D) Collaborate and Educate, and (E) Communicate with Finesse. Two analyses evaluated reliability: the same faculty member rating and re-rating a video three months later (reliability) and two faculty members rating a video for the first time (inter-rater reliability). To assess predictive validity and tool sensitivity/specificity, performance scores by trained raters of both the PaCT and another validated tool, the Four Habits Model (FHM), were compared. **Results:** For reliability analysis, total scores were well correlated (r=0.75, p<0.001). Correlations were also significant for tools C, D, and E (p<0.01). Tools A and B correlated at a p<0.10, approaching significance. Fifteen of 22 analyzed skills were significantly correlated. Inter-rater reliability results were more limited with significant correlations for 5 of 22 analyzed skills, significant correlations for tools C (p<0.01) and E (p<0.05), and no overall total correlation. The total PaCT and FHM scores were significantly correlated (r=0.71, p<0.05) supporting the validity of the PaCT. **Implications:** The PaCT is now a validated assessment tool indicated for measuring student pharmacist’s communication. Further rater training or editing of individual skills may improve inter-rater reliability.

**PaCT: Use of the Patient-centered Communication Tools to Measure Pharmacy Student Communication Skills.** Nicole M. Gattas, *St. Louis College of Pharmacy*, Peter D. Hurd, *St. Louis College of Pharmacy*, Gloria Grice, *St. Louis College of Pharmacy*, Theresa R. Prosser, *St. Louis College of Pharmacy*, Mychal Voorhees, *St. Louis College of Pharmacy*, Jill Sailors, *St. Louis College of Pharmacy*, Clark Kebodeaux, *St. Louis College of Pharmacy*, Amy M. Tiemeier, *St. Louis College of Pharmacy*, Tricia M. Berry, *St. Louis College of Pharmacy*. **Objectives:** The PaCT is a new rubric specifically designed to assess student pharmacist communication skills during patient encounters. Our objective is to assess the PaCT’s ability to measure communication skills in student pharmacists. **Method:** The PaCT rubric uses a 5-point scale for 23 skills grouped into five tools: (A) Establish a Connection, (B) Explore and Integrate the Patient’s Perspective, (C) Demonstrate Interest and Empathy, (D) Collaborate and Educate, and (E) Communicate with Finesse. The scale includes unsatisfactory, needs improvement, adequate, capable and proficient. Third year student pharmacists (N=190) received instruction about interviewing, reviewed the PaCT rubric, and practiced in lab prior to the first standardized patient interview. Faculty trained in using the PaCT observed student performances via live video-feed and provided formative feedback. Students completed a different standardized patient interview three weeks later. Summative feedback was provided by the same group of faculty. **Results:** Overall scores for each student on the second interview showed a significant improvement (p<0.001). Scores improved for 21 of 22 analyzed skills; significantly improving for 18 skills (p<0.05). Tools A, B, C, and E showed significant improvement (p<0.05). Correlations between first and second interview scores were significant for all five tools and for 16 of 22 analyzed skills (p<0.05). **Implications:** Prior work shows PaCT has face and content validity. These results support the PaCT’s ability to identify improvement in student pharmacist-patient communication skills both overall and in four of the five individual tools. Tool D and certain skills will likely benefit from revision and refinement.

**Paperless Assessment of Drug Information Papers: Using iPads and Other Technologies to Go Green.** Debra J. Reid, Northeastern University, Margarita V. DiVall, Northeastern University, Fletcher K. Tang, Northeastern University, Aekta H. Vasavada, Northeastern University, Kathleen Bungay, Northeastern University. **Objectives:** In conjunction with a department-wide iPad initiative, we aimed to establish and evaluate a paperless workflow in a Drug Literature Evaluation course for a drug information (DI) paper assignment. **Method:** The traditional assessment procedures for a DI paper assignment were modified to include electronic submission via Blackboard of two drafts and all references. Faculty were trained to use iPad annotation applications and Blackboard e-rubric, and encouraged to provide feedback electronically. Students and faculty were asked to complete anonymous voluntary surveys at the end of the course. **Results:** Eighty seven percent of students and 89% of faculty responded to surveys. Among graders, 75% were department faculty with iPads; the rest were adjuncts. Majority (77%) graded five or six papers. Among those with iPads, 39% used iPads for paper annotation, 56% used Word tracked changes, while 1 person printed papers. Three graders overall (12.5%) printed papers. Seventy three percent of faculty agreed that Blackboard e-rubric was user-friendly and 96% preferred it over paper rubrics. Most students found electronic comments easy to retrieve: 88% of those who received annotated PDFs and 90% of those who received tracked changes in Word. Ninety four percent of students agreed that the paperless workflow of the assignment was easy to follow. **Implications:** The incorporation of technology in the pharmacy curriculum can streamline the process of providing and tracking feedback and reduce paper waste. Faculty members, who have diverse backgrounds in technology usage, were slow on average to utilize the available tablet technology.

**Patient Perceived Barriers to Pharmacist Intervention with OTC Medications.** Amy M. McCaffrey, Samford University. Terri M. Wensel, Samford University. **Objectives:** To determine obstacles patients perceive they encounter when seeking a pharmacist’s advice regarding over-the-counter (OTC) medications. **Method:** A 10 question survey was distributed to volunteers ages 20 and older at a church event, as well as through electronic social media. The survey was accessible for completion for 30 days. Questions specific to communication barriers between patients and pharmacists were included. The results were evaluated and interpreted through descriptive statistics. **Results:** A total of 134 people completed the survey. 89.6% of participants reported taking an OTC medication in the past 3 months, and 62.5% of those patients reported taking 2-3 medications within the same 3 month time period. 58.2% of responders either rarely or never consult a pharmacist before purchasing or taking an OTC medication. 66.4% of patients reported rarely or never being counseled by the pharmacist before purchasing an OTC product. The primary reasons for not speaking to a pharmacist were if the patient had already taken...
the medication before (72%), a physician recommended the product (54%), and the patient did not want to bother the pharmacist (45%).

**Implications:** This survey suggests a significant gap in communication exists between patients and their pharmacists when it comes to purchasing OTC medications. Finding ways to overcome barriers can increase patient-pharmacist interaction and decrease potential unnecessary harm to patients.

**Patient-based Pharmacotherapy Notes in a Therapeutics Course: A Structured Approach.** Angela O. Shogbon, Mercer University, Lisa M. Lundquist, Mercer University, Kathryn M. Momary, Mercer University. **Objectives:** To evaluate the effectiveness of utilizing a structured approach to patient-based pharmacotherapy notes, specifically the Subjective Objective Assessment Plan Education (SOAPE) note format, to improve students’ knowledge and confidence in patient-based assessment skills in a cardiovascular therapeutics course.

**Method:** For two consecutive years, five weekly patient-case discussion sessions were incorporated into a cardiovascular therapeutics course for second-year pharmacy students. Students came prepared for small-group discussions on a patient case they completed ahead of time, utilizing the SOAPE note format. Then, students worked-up a second case in class and submitted a SOAPE note for a grade. A pre-test and post-test assessing students level of confidence and knowledge in preparation of SOAPE notes were administered at the beginning and end of the course, respectively. Perception of confidence was ranked on a 4-point Likert scale with 4=strongly agree and 1=strongly disagree. This study was IRB approved and voluntary signed informed consent was obtained. Scores on the pre-tests and post-tests were compared utilizing descriptive statistics and paired student’s-t-test. **Results:** A total of 242 (88.6%) students completed the pre-test and post-test. There was significant improvement in students’ confidence in writing SOAPE notes, with a mean(SD) score of 2.69(0.51) on the pre-test and 3.59(0.36) on the post-test (p<0.001). Students’ mean(SD) performance on the knowledge section of the pre- and post-tests were 93.7%(9.64) and 99.2%(3.99), respectively (p<0.001). **Implications:** Utilization of a structured approach to patient-based pharmacotherapy notes may enhance students’ understanding and confidence to perform this vital task on patient care rotations and in clinical practice.

**PCAT Scores and GPAs as Predictors of Pharmacy Calculations Competency.** Lisa Venuti, The University of Montana, Howard D. Beall, The University of Montana, Curtis Noonan, The University of Montana. **Objectives:** Schools of pharmacy that use quantitative data as admissions criteria are taxed with the job of determining how much emphasis to place on these measures. The objective of this study was to determine if PCAT scores or pre-pharmacy GPAs were reliable indicators of P1 competency in pharmacy calculations. **Method:** The PCAT scores in three categories (quantitative, chemistry, and composite) as well as pre-pharmacy and cumulative GPAs were compared to the scores on the P1 comprehensive calculations competency exam for all students admitted into the program from 2008-2011. Correlation and regression analysis were evaluated against logged calculations exam scores. T-tests were used to compare mean GPA and PCAT scores for students passing (>80%) and failing the calculations exam. **Results:** Between 2009-2012, 259 P1 students took the calculations exam. Scores ranged from 55 to 100%, and 27 students failed (<80%) on their first attempt. Calculations exam scores were consistently correlated with all five pre-pharmacy quantitative measures (r=0.29 to 0.35, p<0.001 for all). Students who passed the exam had 0.15 higher cumulative GPA (p=0.01) and 0.14 higher pre-pharmacy GPA (p=0.003) as well as significantly higher PCAT scores (11, 17, and 11 points for quantitative, chemistry and composite, respectively). In multivariate regression analysis pre-pharmacy GPA, chemistry PCAT and quantitative PCAT accounted for 24% of the variability in P1 calculations exam score. **Implications:** These analyses indicate that quantitative pre-pharmacy measures are associated with performance on a P1 calculations competency exam, however, other unmeasured factors contribute to overall performance on this exam as well.

**Pediatric Medication Safety Training for Doctor of Pharmacy Students.** Michelle E. Condren, The University of Oklahoma, Brooke L. Honey, The University of Oklahoma, Vivian Nguyen, Sean Carson. **Objectives:** A medication safety elective course was created to increase student ability to identify pediatric prescribing errors and determine methods for error resolution and communication. **Method:** In this two credit hour course, students check pediatric prescriptions for medication errors once a week. Students receive de-identified reports with prescriptions written by medical residents from the previous day in a general pediatrics clinic. During the first four weeks of review, students meet with a faculty mentor to review errors and address questions. Weekly, students submit a summary of errors detected and post communication of an error to the medical resident on a discussion board. Weekly class discussions explore medication errors and error prevention and resolution strategies. **Results:** To date, 12 second year pharmacy students and 16 third year pharmacy students have completed the course. Each student has reviewed an average of 272 prescriptions. Students detected 82% of the prescribing errors. Third year students had a higher detection rate of 88% compared to 78% with second year students. Both error detection rates and oral communication skills improved during the course. Student evaluations note that the ability to work on real world scenarios is appreciated and that their approach to pediatric prescriptions has changed as a result of completing the course. **Implications:** The medication safety elective has provided students with opportunities to practice their skills in identifying and resolving actual prescription errors. Allowing students to gain this experience provides a strong foundation for the pharmacist’s role in patient safety.

**Perceptions of a Hybrid Team-Taught Elective Advanced Pharmacy Practice Experience in Academic Pharmacy.** Valerie A. Coppenrath, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Anna K. Morin, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Courtney I. Jarvis, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Maryann Cooper, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Paul P. Belliveau, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester. **Objectives:** The purpose of this project is to compare trends in student and faculty perceptions related to the first two offerings of a hybrid team-taught Advanced Pharmacy Practice Experience (APPE) in Academic Pharmacy. **Method:** This APPE includes weekly theme-based seminars introducing students to the tripartite academic mission and providing application opportunities of seminar content. Online modules and discussion boards were used to supplement seminar topics. After each offering, student and faculty surveys were administered to evaluate course activities and workload perceptions. The 2011 survey included 13 students and 6 faculty; the 2012 survey included 22 students and 7 faculty. Survey results were used to modify the APPE structure after the first offering. **Results:** The two activities added in 2012 were rated favorably by students (90% and 100% rated book clubs and roundtables as very valuable or somewhat valuable to student learning) and faculty (100% and 57% rated book clubs and roundtables as valuable or very valuable to student learning). Fewer students in 2012 identified the workload “too little work”
(23% vs 9%), but a similar proportion rated the degree of difficulty as “just right” (92% vs 91%). More students in 2012 would recommend this rotation to a classmate compared to the first offering (75% vs 91%). A higher proportion of faculty identified the emphasis on service as “too little” compared to the first offering (43% vs 33%).

Implications: The new activities were generally well-received by students and faculty and will be included in future offerings. Strategies to further emphasize service should be identified.

PharmD Employment: Assessment of the Current Job and Post-graduate Training Markets for Pharmacy Students. Suzanne M. Soliman, University of Illinois at Chicago, James D. Bono, University of Illinois at Chicago. Objectives: To determine the number of graduating pharmacy students seeking and securing post-graduate employment in the current market. To compare and contrast differences in employment and job-seeking behaviors between two recent class years. To assess the areas of pharmacy practice and geographies students select. Method: Graduating pharmacy students from classes 2011 and 2012 completed an online exit survey. The survey was administered in the month of August, 3 months post-graduation, for both classes. Survey reminders were sent weekly for one month. Results: Nearly 90% of students for both classes were employed by August. Seventy percent of respondents searched Chicago and the surrounding suburbs for employment or post-graduate opportunities. Approximately 20% of students for both classes applied for greater than 15 employment (non-residency) positions. For students seeking residencies, 90% of students matched their first or second residency choice. Of the 35 respondents who were employed out of state, 50% said it was, “because I couldn’t get a job in Chicago”. Students were more likely to relocate for a residency position than an employment opportunity. Managed care job placements increased by greater than 50% for the class of 2012. Implications: The local job market is tighter than initially perceived. Students should begin searching earlier and increase flexibility about geography or initial part-time placement. Students are seeking job opportunities in varying pharmacy practice areas.

Pharmacist Administered Alcohol Screening, Brief Intervention and Referral: A Customer and Pharmacist Survey. Barbara J. Mason, Idaho State University, Kristin Moore, Rick Tivis, Glenda Carr, Idaho State University, Laura J. Tivis. Objectives: To determine how customers and/or community pharmacists in urban and rural settings view: 1. pharmacists as a source of health information 2. talking with pharmacists about their alcohol use 3. talking with physicians about their alcohol use 4. the influence on customer continued use of the pharmacy should the pharmacist discuss alcohol use with the customer 5. the acceptability of pharmacist delivered alcohol SBI&R by pharmacists 6. concerns by the pharmacists regarding pharmacist delivery of alcohol SBI&R 7. incorporating alcohol SBI&R into pharmacy curriculum. Method: A ten question customer survey consisting of six Likert-type scale questions and four demographic questions that could be completed in less than 5 minutes was administered via Electronic Comment Cards to enhance anonymity. Six locally owned pharmacies (3 rural and 3 urban), administered the voluntary survey to customers age 18 and older. Following the customer survey, an invitation was sent to 1300 alumni pharmacists to participate in an online anonymous 4-question survey. The invitation included information on the customer survey, an explanation of alcohol SBI&R, purpose of the pharmacist survey and an opportunity to enter a drawing. Results: 178 pharmacy customers (86 from rural and 92 from urban pharmacies) participated. 56% were female and 44% male with average age 48 years old. Ninety-nine percent indicated that pharmacists are good sources of health information and 67% would be willing to speak with their pharmacist about their alcohol use. 66% indicated they would be willing to speak with their physician about alcohol use. 71% indicated that they would be unlikely to change pharmacies if alcohol use was discussed. No rural/urban, or gender differences with respect to willingness to discuss alcohol use was found (Mantel-Haenszel 0.84, P = 0.36). 53% of urban pharmacists and 71% of rural pharmacists felt that SBI&R is an appropriate role for the community pharmacist. Workload, privacy and reimbursement concerns were similar for rural and urban pharmacists. 61% indicated that schools of pharmacy should include SBI&R into their curriculum. Implications: Research review shows that alcohol SBI&R is successful in reducing alcohol consumption, yet few physicians are willing to do it, despite Medicare reimbursement for it. The U.S. Preventive Services Task Force guidelines recommend screening all adults for alcohol misuse. Pharmacists could expand preventative measures if training was provided and barriers overcome.

Pharmacy Boot Camp: A Longitudinal Experience to Improve Pharmacy Resident Teaching Skills. Katherine Carey, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Evan R. Horton, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Ryan Attwood, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Jason E. Cross, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester. Objectives: To develop and evaluate Pharmacy Boot Camp (PBC), a longitudinal experience to improve pharmacy resident teaching skills. Method: Pharmacy Boot Camp was evaluated during the 2011/2012 residency year at an academic medical center. Four PGY-1 pharmacy practice residents participated in weekly teaching sessions with approximately 100 advanced pharmacy practice experience students. Each resident led approximately one hour-long PBC each month, utilizing a variety of active learning strategies throughout the year. During each PBC, students assessed the residents using a survey aimed to evaluate teaching using the best practices model. Residents were surveyed at year end to determine the benefits of the experience. Results: Student evaluation results were consistently high (median 4 “agree” to 5 “strongly agree” for all best practices) and did not change significantly from the first to the final teaching session. Resident survey results demonstrated that PBC improved their teaching skills. Responses varied on the importance of demonstrating enthusiasm and expertise in their PBC topics, difficulty in developing learning objectives and creating the lecture session. All agreed that they very often used the feedback obtained from student evaluations when preparing subsequent teaching activities. Implications: We developed a longitudinal experience that residents found valuable for improving teaching skills. Student experience was positive overall and allowed for additional high quality didactic sessions during APPE rotations. Other residency programs could easily implement our longitudinal teaching experience.

Pharmacy Practice Pathway: Results of Implementation of a Research Program in PharmD Courses. Allison M. Bell, The University of Mississippi, Katie S. McClendon, The University of Mississippi, Shirley M. Hogan, The University of Mississippi, Kim G. Adcock, The University of Mississippi, Daniel M. Riche, The University of Mississippi, Ashley W. Ellis, The University of Mississippi. Objectives: To increase students’ knowledge and skills with research methods through hands-on experience. Method: This prospective study compared perceptions of students who completed the Pharmacy Practice Pathway (Class of 2013, Pathway group) versus students who did not participate (Class of 2012, Baseline group). Students were given an
Pharmacy Residency Director Perception of Residency Applicants from Pass/Fail and Grade Point Average Based Curriculum. Sean Barclay, Roseman University of Health Sciences, Meghan Jeffreys, Roseman University of Health Sciences. Objectives: Pharmacy residency opportunities have become increasingly competitive as the number of applicants continues to surpass the available residency positions. Residency directors commonly assess academic preparedness by an applicant’s grade point average but it is unknown how residency directors interpret applicants graduating from a pass/fail grading system. The objective of this study is to identify residency director perception of academic achievement of students graduating from a pass/fail grading system. Method: A survey was created and emailed to ASHP accredited residency program directors. Data was collected on program demographics and director’s perceptions of residency candidates from pass/fail grading systems and grade point average systems. Responses were compared between geographical regions. Results: 359 directors completed the survey (32.7% response rate) in the 4 week collecting period. 284 (79.1%) directors were from ASHP Midyear meeting (n=20 vs. n=5 for the year prior). 12 of these posters were Pathway projects. Implications: The Pharmacy Practice Pathway program has been beneficial to PharmD students at the University of Mississippi. Students reported their Pathway project help them achieve self-set goals. Survey results were very positive and demonstrate benefits of the Pathway program.

Pharmacy Student Attitudes on Promotional Advertising by the Pharmaceutical Industry. Annesha W. Lovett, Mercer University, Bobby C. Jacob, Mercer University, Hannah K. Rogers, Mercer University, Ashish A. Advani, Mercer University. Objectives: To describe pharmacy student perceptions of promotional advertising from the pharmaceutical industry. Method: An online, 45-item questionnaire regarding perceptions of the pharmaceutical industry was offered to incoming first year pharmacy students during the first week of fall semester. Responses were analyzed using descriptive statistics, chi square and correlation. Results: A total of 155 students (99%) completed the survey. The majority believe that direct to consumer (DTC) advertisements are beneficial to society (67%), which significantly correlated to opinions regarding money allocated for advertising (r=.313, p<0.05). Only 34% of students rely on promotional advertisements as an accurate source of drug information. Among those who have seen or heard promotional advertisements, 81% believe they do an excellent or good job of describing benefits, while 43% believe they do an excellent or good job describing safety concerns. According to 56% of students, promotional advertisements encourage patients to seek medical attention for conditions of which they might not be aware. Most students believe DTC advertisements encourage unnecessary medication use (74%). Sixty-four percent of students believe there is not enough regulation to ensure that promotional advertisements are not misleading, which is significantly associated with perceptions on the speed of FDA approval and adequacy of safety monitoring (p<0.05). Implications: Critics worry that DTC advertising encourages patients to seek higher cost prescriptions when more cost-effective options may exist. Pharmacy students must be prepared to assist patients to properly evaluate advertised efficacy, safety, and cost claims. Curricular development opportunities exist to address understanding, misconceptions, and practice implications related to DTC advertising.

Pharmacy Student Career Planning Tool Based Upon the Concept of Continuous Professional Development. Kelly M. Smith, University of Kentucky, Helen Garces, University of Kentucky, Jami E. Mann. Objectives: In response to areas for improvement noted by graduating students, a career planning tool modeled upon continuous professional development (CPD) was piloted in a required third year course. The impact of the tool on student career planning was measured, and opportunities to enhance its use were identified. Method: A tool incorporating the elements of personal reflection, professional achievement documentation, personal attribute analysis, and a customized career plan was built as a Microsoft Excel spreadsheet and assigned for student completion. A 15-item electronic presurvey assessing student approaches to career planning was administered prior to the assignment, followed by a 29-item postsurvey. Each questionnaire measured student beliefs, preferences and approaches to career planning according to a five-point Likert scale. Changes in student approaches to career planning were analyzed using a two-sided t-test, and a thematic analysis of narrative comments was conducted. Results: 96.8% and 96.0% of 126 students responded to the pre- and post-surveys, respectively. Mean agreement with the statement of having a personal system for career development increased from 3.03 to 3.84 (p<0.01) following assignment completion. 74% of students agreed that integrating the career tool in all years of the curriculum would be beneficial; similar narrative comments were noted as areas for improvement. The need for more intentional, student-driven career exploration (e.g., shadowing, student organization involvement, selecting a career mentor) was a frequent narrative theme. Implications: CPD is an effective platform for engaging students in their own career planning; the concept needs to be broadly integrated throughout the curriculum.

Pharmacy Students Perceptions on Team-Based Learning at a Historically Black College. Shalondria Simpson, Texas Southern University, LaKendra Brown, Texas Southern University. Objectives: Lecture-based learning (LBL) is the traditional teaching method in most universities. This form of learning has been described by the teaching profession as a passive form of learning, which can often
result in the students becoming disconnected with the lecturer. Team-based learning (TBL) is designed to encourage students to be more engaged in class by requiring students to work as a team to apply new information learned before and during class. When comparing TBL to the traditional LBL little to no research has been done to evaluate the perception of TBL in minority students. Method: TBL was implemented in the Pharmacy Practice III Laboratory course at Texas Southern University during the Fall Semester. At the conclusion of the course students completed a 25 statement course survey. Students rated the statements on a survey on a five-point Likert-like scale ranging from strongly agree (1) to strongly disagree (5). Results: The majority of the students had positive feedback on the implementation of TBL. Over 70% of the students liked the TBL structure of the lab, 60% of the students enjoyed the TBL style of learning over the traditional LBL style, and an overwhelming 72% of the students agreed that TBL was more engaging than LBL. Implications: The results of this study suggest that TBL is viewed favorably among minority pharmacy students at TSU. TBL should be implemented into other courses at TSU and other HBCU’s to enhance student engagement in the classroom and strengthen their communication, critical thinking, and teamwork skills.

Pharmacy Students’ Attitudes and Beliefs Toward the Use of ExamSoft® in an Integrated Therapeutics Course. Salome B. Weaver, Howard University, Mark Wadley, Howard University, Clarence E. Curry, Howard University. Objectives: This study was initiated to examine how students view the use of computer-based testing via ExamSoft software, the primary form of assessment in an Integrated Therapeutics Course, and how select factors may affect its acceptance and ease of use by students. Computer-based testing became a mandatory part of the College of Pharmacy curriculum policy in spring 2012. Method: A cross-sectional study was done using an online questionnaire based on a modified technology acceptance model (TAM). The questionnaire was sent to the 2nd, 3rd, and 4th year pharmacy students who have used ExamSoft as their primary method of assessment in the integrated therapeutics course series. Results: Sixty-seven students out of 160 (42%) completed the questionnaire. The association between perceived ease of use (PEOU), perceived usefulness (PU), attitude towards usage (ATU), and predicted future use (PFU) was measured using path coefficients. It was found that PEOU had a significant influence on PU (path = 0.44, p<0.001) and that both PEOU and PU significantly affected ATU (path = 0.41 and 0.52 respectively, p<0.001). Moreover, PFU was significantly affected by ATU (path = 0.64, p<0.001). Implications: These findings suggest that with the introduction of new technology in an academic setting, pharmacy students’ attitudes towards the usefulness of such technology can impact the current and future utility within that setting. It is important to recognize the perceived usefulness of a technology when thinking about its long term benefits.

Phase 3: Post-instruction Quiz Effect on Retention of Asthma Management Skills in 3rd-year PharmD Students. Michael J. Peeters, The University of Toledo, Hiba Hasabelnaby, Kimberly A. Schmude, The University of Toledo. Objectives: Literature on test-enhanced learning encompasses how tests are not only an evaluation tool for instructors but also can influence students’ learning. This study was the last of three phases exploring testing methods to improve students’ knowledge retention. The first phase evaluated adding a performance test, the second phase investigated a pre-instruction priming quiz, while this third phase studied the effect of a post-instruction quiz on knowledge retention. Method: Throughout these studies the same 10-multiple choice question quiz was used. This quiz was created to evaluate students’ knowledge of main concepts from a lab experience on asthma management (i.e., asthma action plans & peak flow meters). In this study, 101 third-year PharmD students were randomized into groups A or B. An instructional lab was given to both groups, but only Group A received a quiz at the end of this lab. Five months later, both groups took the same quiz to assess retention. Results: For group A (n=50), the median retention score was 7 with an interquartile range of 3. For group B (n=51), the median score was 6 with an interquartile range of 2. Standard error of measurement was 1.3. The groups were not significantly different (Mann-Whitney U, p=0.228) and this was a small effect size (Cohen’s d, 0.26). Implications: In our sample, this post-instruction quiz demonstrated little benefit and did not appear helpful for this lab. Going forward, the effect of a post-instructional quiz could be investigated with other types of skills and other non-lab learning environments.

Political Pharmacy Advocacy Elective Course. Rodney G. Richmond, Harding University, Lori Klein, Harding University, Loretta Brickman, Temple University, Harold Bobrow, Temple University. Objectives: Political Pharmacy Advocacy is an elective course designed to develop student involvement in policy issues affecting the pharmacy profession. The goal is to actively engage students in current issues to facilitate developing advocacy skills for use on behalf of the profession. Course learning objectives include: outlining the legislative and regulatory policy-making process; demonstrating ways to become an advocate; becoming informed about and facile with current issues affecting the profession; developing communication skills and understanding methods to engage policymakers in discourse; and identifying a pharmacy policy issue, and then developing a plan to advocate for a desired change. Method: This elective was offered to second- and third-year students during the fall and spring semesters. Classroom discussions included an overview of the policy-making process and identifying current pharmacy issues. Guest speakers included a political science professor, representatives from the state pharmacists association, State Board of Pharmacy, and active pharmacist advocates. Group activities included writing a white paper with talking points, participation in drafting pharmacy legislation, delivering a moot presentation to practice talking points, meeting with legislators to gain support for introduced legislation, and attending committee meetings where pharmacy legislation was debated. Results: Nine students completed the course the first year. Class activities and assignments were assessed based on participation, grading rubrics, and peer-evaluation. Additionally, each student was required to lead a group meeting with a legislator. End-of-semester evaluations were completed to assess course effectiveness. Implications: Course participation heightened the importance of pharmacy advocacy and resulted in pharmacy legislation being introduced.

Potentially Inappropriate Medications Dashboard: Real-Time Surveillance for High-Risk Medication Prescribing and Management in Vulnerable Geriatric Inpatients. Marketa Marvanova, Chicago State University, Josh Peterson, Sunil Kripalani, Jonna Danciu, Debbie Harrell, Carmen Rodriguez, James Powers. Objectives: To develop a computerized dashboard integrated into the electronic health record facilitating surveillance and clinical pharmacist interventions among geriatric inpatients administered high-risk medication regimens. Method: The potentially inappropriate medications (PIMS) dashboard identified, in real-time, hospitalized geriatric patients (age ≥ 65 years old) in a 658–bed university hospital who have been prescribed at least one PIM. It displays patients’ age, gender, estimated kidney function, complete list of diagnoses, names of the inpatient and outpatient physicians, and a link to the full EHR. Importantly, it
Predictors of Excellent Graduating GPA and NAPLEX Performance Among PharmD Students at Wayne State University. Emily T. Martin, Wayne State University, Richard L. Slaughter, Wayne State University. Objectives: Student metrics such as admission score, entering GPA, PCAT, and graduating GPA can be used for early identification of students in need of additional support to achieve high performance in the PharmD program and on the NAPLEX exam. We evaluated potential metrics for predicting graduating GPA and NAPLEX score. Method: Pre-Pharmacy GPA, PCAT composite scores, graduating GPA, and NAPLEX scores were collected for 2011 and 2012 PharmD graduates. Admission score was collected for the 2012 class. Analyses were conducted using receiver operating curves, sensitivity, specificity, and linear regression to determine the association between (1) pre-pharmacy factors and graduating GPA and (2) graduating GPA and NAPLEX scores. Results: Total admissions score performed significantly well as a predictor of excellent program performance, defined as a GPA ≥3.5 (AUC: 80%; 95% C.I. 0.69, 0.90). Using a target admissions score cut-off of 75, our score had poor sensitivity (42% 95% CI: 30%, 56%) and moderately good specificity (75%; 95% C.I.: 60%, 86%). This indicates that our highest performing PharmD students entered into their P1 year with a wide range of pre-pharmacy GPA. Students with a high pre-pharmacy GPA consistently performed well; a 1-point increase in pre-pharmacy GPA was associated with a 0.35-point increase in graduating GPA (p=0.001). A 1-point increase in graduating GPA was associated with a 21.8-point increase in NAPLEX score (p<0.001). Implications: Pre-pharmacy GPA and graduating GPA are significantly correlated with future performance. These analyses are a first step in identifying metrics-based characteristics of students in need of additional support.

Residency Readiness Elective with a Focus on Research. Catherine M. Oliphant, Idaho State University; Kathy S. Eroschenko, Idaho State University. Objectives: To prepare students for postgraduate residency training. A residency readiness elective was offered to introduce students to basic research principals and application by requiring an independent research project. Completion of a research project will likely increase competitiveness for residency programs. Method: A residency readiness elective with an emphasis on research was offered to third year pharmacy students. Students were required to complete a modified block curriculum. Students were paired with a faculty member to mentor the project. Upon completion, the project will be submitted and presented at a local, state, or national pharmacy meeting. A survey was completed to assess student attitudes regarding research prior to and following
course completion. Results: Nine students enrolled the fall of 2012. Students participated in weekly discussions on various research topics. Topics included idea generation, types of research, IRB process and proposal writing. Prior to the course, 66% stated they were very or fairly uncomfortable with conducting research. At the conclusion of the course, 66% were comfortable or somewhat comfortable with conducting research (p = 0.02). All students felt course information was sufficient to allow them to proceed with their research project. Implications: Obtaining postgraduate residency training is highly competitive. Currently, candidates seeking a residency outnumber available positions. This course introduced the basic concepts of research as well as application of skills by requiring a research project. Students felt more confident and prepared in conducting research after completion of the course. This innovative elective course will likely enhance student competitiveness.

Residency Director Perception of Applicant Preparedness Graduating from a Three or Four Year Pharmacy Curriculum. Jaclyn Stecki, Henry Kim, Delaram Bahmandar, Anthony Sayegh, Sydney Smith, Sean Barclay, Roseman University of Health Sciences, Meghan Jeffres, Roseman University of Health Sciences. Objectives: There are currently a disproportionate number of residency applicants to residency positions. This competitive marketplace increases the level of scrutiny of residency applicants and a smaller percentage of applicants are granted interviews. The objective of this study is to identify residency director perceptions of applicant preparedness dependent upon graduating from a three year or a four year pharmacy program. Method: A survey link was emailed to all residency directors of ASHP accredited programs in the United States. Residency director and program demographics were collected as well as responses to statements regarding applicant desirability. Results: A total of 359 residency directors completed the survey for a response rate of 32.7%. PGY 1 directors consisted of 79.1% of respondents. The mean number of applicants is 37.6 ± 37.8 for 2.6 ± 2.2 residency positions, a ratio of 14.5 to 1. Less than 50% of applicants are offered an interview (37.6 ± 37.8 applicants and 14.8 ± 11.7 interviews offered). 47.5% of residency directors indicated applicants from a 4 year pharmacy program are given interview preference. 35.7% believe applicants from 3 year programs are less prepared academically. 21.7% acknowledged graduation from a 3 year program negatively affects an applicant’s evaluation. Implications: Graduates of 3 year pharmacy programs appear to be at a disadvantage compared to applicants from 4 year programs when competing for residency positions. However perception of academic preparedness does not seem to account for all of the interview preference as there is a 12% difference between residency directors regarding interview preference and academic preparedness.

Rising Pharmacy Student Debt: Is the Return on Investment Worth It? Heather B. Congdon, University of Maryland, Jeff J. Cain, University of Kentucky, Thomas M. Campbell, Lipscomb University, Kim E. Hancock, Ferris State University, Megan A. Kaun, The University of Toledo, Paul R. Lockman, Texas Tech University Health Sciences Center, R. Lee Evans, Auburn University. Objectives: Describe the current landscape within the profession of pharmacy regarding student tuition, indebtedness, salaries, and job potential. Method: Pharmacy tuition and student debt data was obtained through the AACP Institutional Research website. Tuition was defined as average first year tuition and fees for accredited schools. Debt was defined as the total average amount borrowed. Median salaries and numbers of jobs were obtained from the United States Department of Labor Bureau of Labor Statistics Occupational Outlook Handbook website. Results: Instate tuition at public schools rose an average of $1211 ± 31 ($2 = 0.996), whereas out-of-state tuition at public schools rose significantly faster at $1838 ± 80 per year ($2 = 0.988). The average tuition cost for pharmacy school has increased 54% in the last eight years. The average pharmacist salary has risen from $75,000 to over $112,000 since 2002. The increase in salary has been nearly linear ($2 = 0.988) rising $4409 ± 170 dollars per year. However, average salary in 2011 was $3064 below the predicted value based upon a linear regression of salaries over ten years. The number of pharmacist jobs in the United States has risen from 215,000 jobs in 2003 to 275,000 in 2010. However, there were 3,000 fewer positions in 2012 than in 2011. In 2011, average indebtedness for pharmacy students ($114,422) was greater than the average first year salary ($112,160). Implications: Rising tuition and student indebtedness is a multifaceted problem requiring attention in a number of areas including student, faculty, university, academy, accreditation, and government entities.

Rising to the Challenge: Identifying and Overcoming Perceived Barriers to Interprofessional Education. Kimberley J. Begley, Creighton University, Ann M. Ryan-Haddad, Creighton University. Objectives: To assess faculty attitudes and identify barriers to interprofessional education and explore ways of encouraging interprofessional collaboration. Method: Health science faculty (dentistry, nursing, pharmacy, physical therapy, occupational therapy, medicine, and social work) were invited to complete a modified Readiness for Interprofessional Learning Scale and a 16-question survey on perceived barriers to interprofessional education. Results: Fifty-nine faculty returned both surveys. Sixty-three percent of the 2011 survey. Faculty then worked together to plan, organize, and implement interprofessional educational, service, and scholarly projects. Implications: Interprofessional collaboration is an essential element for improving patient outcomes, promoting teamwork, and enhancing health care students’ education and training. Faculty from all disciplines must develop and support interprofessional programs, practice, and research.

Roundtable Discussions on Injectable Drugs as Active Learning Pedagogy in Pharmaceutical Care Lab. Melissa Hogan, Roosevelt University, Cara M. Brock, Roosevelt University. Objectives: Numerous injectable medications are available for home administration, which require extensive patient education by the pharmacist before use. It is incumbent on pharmacists to understand unique counseling aspects for these agents. Pharmacy students need understand important issues with these agents and be able to utilize available resources prior to teaching patients. We created an activity in which third-year pharmacy students researched a variety of injectables and shared key points of information with each other. Method: Each group of 6 students was assigned two injectable medications. Students created Pharmacist Information Sheets to serve as instructional tools and pharmacist resources. Therapeutic topics and practical aspects of injection technique were addressed for each drug. Students were surveyed to determine if they found the activity beneficial. Results: 92% of students responded to the survey. 100% of respondents believe that it is...
beneficial to learn about practical aspects of injectables and that creating the informational sheets was beneficial. 94% of students found teaching other students beneficial while 90% responded that learning from other students was beneficial. Respondents provided many positive comments. Suggestions for improvement centered on the method of conducting the roundtables. Quantitative and qualitative survey responses indicate that this activity was popular among PS3s. **Implications:** Various active learning modalities are employed by pharmacy colleges. This activity was designed to emulate professional practice through roundtables. Students benefitted from researching their topics, teaching others and learning from each other. We will continue this activity for future classes.

**Second-year Pharmacy Student Confidence with Patient Consultations and the Impact of Reflective Assignments.** Andrea L. Porter, *University of Wisconsin-Madison*, Kristin B. Olson. **Objectives:** To evaluate changes in student confidence with patient consultations before and after a first semester Pharmacotherapy course and to analyze student perceptions on improvements, challenges, and required reflections. **Method:** Second-year pharmacy students enrolled in a first semester Pharmacotherapy course were required to complete patient consultations throughout the semester followed by reflective assignments. Students completed a written survey that used an eleven-point scale before their first consult. Students rated their confidence from zero to ten (0 = not at all, 10 = high) on 30 aspects of a consultation. Students completed the same survey after their last consult of the semester, in addition to seven open-ended questions. The Wilcoxon Signed Rank Test was used to evaluate student confidence and thematic analysis was used to explore student perceptions. **Results:** A total of 117 students completed both surveys in their entirety (92.9%). There was a statistically significant increase in student confidence for all 30 aspects of a patient consultation (p < 0.001). The student’s introduction to the patient had the smallest change in confidence (p = 0.0017). Students noticed improvement in their organization (38.5%) and tailoring the consult to the patient (28.7%). The most common challenges after the semester were pace (47.2%) and organization (27.6%). Students felt written reflection assignments were beneficial (82.3%), especially with identifying what to focus on in the future (56.1%) and nonverbal communication (11.4%). **Implications:** Student confidence with patient consultations significantly improved after only one semester. Students found reflective assignments to be a helpful tool in developing their patient consultation skills.

**Spanish for Pharmacists Elective—Providing an Important Patient Communication Tool for Student Pharmacists.** Joan Everett-Houser, *Texas A&M Health Science Center*. **Objectives:** As the Hispanic/Latino population in the United States continues to increase, the need for Spanish-speaking pharmacists also increases. This is evident in the South Texas region, where the Hispanic population is approximately 81%. The broad objective of this study was to determine that student pharmacists can increase their ability to promote health education by taking a specially-designed course focusing on Spanish for pharmacists. **Method:** To achieve the objective, the course was designed to include students with varying Spanish-speaking abilities. Students were asked to participate in activities that promoted effective communication—a) introducing oneself and identifying oneself as a pharmacist, b) requesting pertinent information, c) reading, writing, and verbalizing terms related to anatomy, disease states, medications, and general health, and d) giving patients basic instructions relating to medications. Pre- and Post- exams were used to measure growth in the Spanish language. Student perceptions were collected through direct interactions and course evaluations. **Results:** All students showed improvement in their skills, although the growth areas varied depending on prior exposure to the Spanish language. Improvement was evident in medical vocabulary, ability to give simple directions, and ability to understand and respond to patient needs. Students expressed an “increased comfort level” when communicating with Spanish-speaking patients in the community. **Implications:** Offering a “Spanish for Pharmacists” elective has been effective in increasing students’ ability to communicate with Spanish-speaking patients. Implementation of a required course in the curriculum may increase the number of pharmacists who can communicate effectively with the Hispanic/Latino population.

**Specialty Tracks in US Pharmacy Schools.** Geneva Chen, *West Coast University*, Rahmat Talukder, *West Coast University*, Mohammed A. Islam, *West Coast University*. **Objectives:** Specialty tracks in US pharmacy schools have been developed to meet the needs of students with an interest in a specific pharmacy practice area. The purpose of this study was to determine the number of US pharmacy schools that have tracks incorporated into their curricula, to determine the types of specialty tracks offered, and to evaluate the impact on students’ career pathways. **Method:** An e-mail survey was distributed to US pharmacy schools via AACPs Curriculum SIG distribution list. We identified schools with specialty tracks, determined the types of specialty tracks offered, and evaluated the tracks in terms of curricula, requirements, and outcomes. **Results:** One hundred and four out of 128 pharmacy schools responded to the survey (80% response rate). Sixteen (13%) schools offer various specialty tracks. The most frequently offered specialty track is clinical/pharmacotherapy/pre-residency (31%), followed by research (25%), management/leadership (25%), ambulatory care (13%), and geriatrics (13%). In each specialty track, programs differ in requirements; however, track-associated clinical rotation or research project is required in all programs. Specialty track training was considered helpful to prepare graduates to be highly competitive for residency positions and to meet the demand for generalist pharmacists with expertise in specialized practice areas. **Implications:** The trend to offer specialty tracks is rising and areas of concentration have widened. New tracks such as nuclear, informatics, and clinical/regulatory affairs are emerging. Hence, evaluation on curricula, requirements, and program outcomes will help with future development and standardization of tracks in pharmacy schools.

**Strength-Based Teams—Investigating the Utility of Strengths in Team-Based Learning.** Nichole M. Rupnow, *University of Minnesota*, Angela K. George, *University of Minnesota*. **Objectives:** To assess students’ perception of the impact on team function when Strength Finders® leadership domains are used for group assignment in a team-based learning course format. **Method:** The University of Minnesota College of Pharmacy requires all students to complete the Strength Finders® assessment. Top five signature themes were requested from all P2 students enrolled in the two-semester pharmacy lab course. Group assignments were created with each team having representation from all leadership domains: strategic thinking, executing, relationship building, and influencing. Surveys evaluating perception of the role of strengths were given at the end of each semester. **Results:** Post semester surveys had 163 (100%) and 145 (89%) students respond. After semester one, 96% agreed or strongly agreed that their signature themes/strongest were an asset to their team and 95.7% agreed or strongly agreed that their teams were well rounded with regard to the leadership domain roles. After semester two, students displayed higher agreement in being aware of teammates’ strengths with 60.7% agreement compared with 43.4%

(p = 0.002) and in their team being able to draw upon each member’s signature themes/strengths with 80.3% agreement compared to 60.7% (p<0.01). No statistical difference in responses was found between campuses. Implications: Incorporating leadership domains/strengths into team assignments appears to have a positive effect on team function. Further, increased benefit is found with greater exposure to working in strength-based teams. Since schools are increasingly using the Strength Finders@ assessment, continued research is needed to determine how strengths concepts are best reinforced in student learning and used in instructional design.

Strengthening College, Board of Pharmacy, and State Pharmacy Association Collaboration: Focus on USP <797>. Miriam A. Mobley Smith, Chicago State University, Scott A. Meyers, Illinois Council of Health-System Pharmacists. Objectives: The United States Pharmacopeial Convention Chapter 797 (USP <797>) focuses on the environment and techniques utilized during sterile preparations compounding. The State of Illinois Pharmacy Practice Act and Administrative Rules include standards for sterile preparations compounding albeit not as comprehensive as USP <797>. In May 2011, a collaborative initiative was undertaken between the Chicago State University College of Pharmacy (CSU-COP), Illinois State Board of Pharmacy (BOP), and Illinois Council of Health-System Pharmacists (ICHP) to identify the benefits and challenges of adopting USP <797> standards into the State of Illinois Pharmacy Practice Act. Method: A college-initiated presentation provided an initial USP <797> overview to the BOP. The College conducted a study, incorporating student pharmacist research, to collect information from 23 states that previously adopted the standards and focused on USP <797> implementation: when; why; how; degree of; impact of; challenges; and, future advice. Simultaneously, ICHP collected information from Illinois hospital pharmacy directors to determine the potential impact of USP <797> adoption and willingness to implement standards. Results: Respondents from both surveys felt that adoption was an important step to help ensure public safety. Major challenges included physical facilities, financial (including personnel), and education requirements. The studies resulted in the convening of a task force to draft language for possible legislative adoption and implementation. Implications: Colleges of pharmacy can provide guidance for and strengthen engagement with Boards of Pharmacy and state professional organizations by forging partnerships focused on professional and practice initiatives. Student research, leadership, and advocacy skills can also be enhanced.

Student Leadership in Action: Organization and Delivery of Community Outreach Events. Suzanne M. Galal, University of the Pacific, Sian Carr-Lopez, University of the Pacific, Elibra G. Younan, University of the Pacific, Natalie N. Hajian, University of the Pacific, Josh L. Fu, University of the Pacific, Rajul A. Patel, University of the Pacific, Joseph A. Woelef, University of the Pacific, Berit Gundersen, University of the Pacific. Objectives: To describe the roles, responsibilities, and resultant outcomes of student committees and organizations in implementing community health outreach events targeting the Medicare population. Method: During the annual Medicare open enrollment, our School of Pharmacy provides community outreach events throughout northern/central California. Events are designed to assist beneficiaries in choosing the most cost-effective Part D plan, minimize medication related problems through the provision of medication therapy management (MTM) services, and improve health-related outcomes through offered screenings/services. Students enrolled in the Medicare elective course serve on one of the following student-led faculty supervised subcommittees: advertising and marketing, outreach logistics, donations and design, education and translation, vaccinations, MTM development and advocacy and follow-up. Health screenings/services are provided by the pharmacy student body at large. Each organization/committee contains co-chairs and project managers who organize and oversee the event offerings including: blood glucose, blood pressure, immunizations, bone mineral density (BMD), cholesterol, memory, falls risk, asthma and anemia. Results: In the fall of 2012, 12 Medicare outreach events were held serving 1,547 patients. In total, 610 Part D and 583 MTM interventions were performed. The number of screening services provided at these events included: blood glucose (616), blood pressure (588) immunizations (563), BMD (555), cholesterol (528), memory (195), falls risk (190), asthma (138) and anemia (76). Implications: Students given the opportunity to organize, develop, and implement health outreach events will build leadership skills while providing the skill set to deliver care and services to the community after graduating.

Student Perceptions During the Implementation of the Flipped Classroom Model in a Modified Block Curriculum. Ian C. Doyle, Pacific University Oregon, Marianne I. Krupicka, Pacific University Oregon, Ty Vo, Pacific University Oregon. Objectives: Student perceptions during the implementation of the flipped classroom model in a modified block curriculum. Method: Courses were delivered in 2011-12 via traditional lecture format with active learning. For 2012-13, these courses were delivered via the “flipped classroom” model. Course materials were available to students prior to the start of the 2-week block. Lecture recordings were posted on YouTube. Students were directed to view prerecorded lectures as self-study before activities and discussion held in the classroom. In-person activities included discussion, progressive case studies, games, and online quizzes. Mandatory course evaluations were administered at the end of each course. Ongoing instructor and student feedback during the sequential progression of these courses guided continuous modifications to improve course structure. Results: Student’s acceptance and perception of the “flipped classroom” was favorable, and appears to be inversely related to the amount of preparation work required for in class discussion. Acceptance rate of this instructional model for renal, endocrine, and infectious diseases 2 were 69.9%, 79.8%, and 54.4%, respectively. Greater emphasis on active learning and self-governance were perceived as positive aspects of “flipped classroom” model. Loss of face-to-face lecture and excessive course activity load negatively influenced students’ perception. Implications: The “flipped classroom” is a viable instructional model in a modified block curriculum. Instructors should observe the amount of students’ outside preparation work required to ensure a balance with in-class activities.

Student Perceptions of the Use of a Video for Learning About Ambulatory Care Pharmacy. Scott S. Malinowski, The University of Mississippi, Michael McGuire, The University of Mississippi, Lauren S. Bloodworth, The University of Mississippi, Justin J. Sherman, The University of Mississippi, Laurie E. Warrington, The University of Mississippi, Meagan A. Minor, The University of Mississippi. Objectives: To determine pharmacy student receptiveness to the use of a video to learn about ambulatory care pharmacy, and the potential for similar videos as a medium for learning about other career opportunities. Method: A short (9 minutes) informational video featuring two ambulatory care pharmacists was shown to all PY1-3 students (n=249). Immediately after viewing the video, students were administered a written survey using a 6 item, 4-point Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree). Results: Two hundred eighteen (87.6%) students completed the
survey. 89% of students indicated agreement that the video increased their understanding of what a clinic is, and what a pharmacist can do in a clinic. 87% and 91% of students agreed that the amount of information and time length of the video were adequate, respectively. 94% of students indicated that they would like to watch videos similar to this that describe other pharmacy career opportunities. 95% of students felt that videos of this style would be beneficial for choosing APPE rotations. Agreement rates were similar amongst classes. Nuclear, oncology, and home infusion pharmacy services were the most common topics for further videos requested by the respondents.

Implications: A majority of students agreed that the video was beneficial in terms of increasing their understanding of ambulatory care pharmacy, and they would like to watch more videos of a similar style to learn about other pharmacy practice opportunities and to choose APPE rotations. Short-length video is a well-received medium for informing students about career opportunities.

Student Performance and Satisfaction with a Performance-Based Pharmaceutical Calculations Review Module. Michael A. Hegener, University of Cincinnati, Shauna M. Buring, University of Cincinnati.

Objectives: To determine student retention of skills learned in a prior pharmaceutical calculations course and student satisfaction with a performance-based review activity. Method: Students who completed a required pharmaceutical calculations course 21 months prior independently participated in a performance-based review activity. The activity consisted of 7 stations with 3 pharmaceutical calculation questions at each station. The stations simulated situations commonly encountered in pharmacy practice and reinforced content covered in the pharmaceutical calculations course. Students were required to utilize stock bottles, package inserts and patient chart information to solve the problems. An average ≥ 70% on the activity was considered a passing grade. Immediately following the activity, each student completed an activity assessment form that consisted of 6 Likert-scale satisfaction questions. Results: Ninety students completed the review activity and 81 students (90%) completed the post-activity assessment form. The overall average on the review activity was 88% ± 6.9% and 3 students (3.3%) failed to achieve ≥ 70%. 96.3% of students agreed the activity reinforced lecture material. 87.7% of students agreed the activity improved their ability to perform in future pharmacy practice and 74% of students indicated they would like additional practice with the content of the activity. Implications: Although students overall retained their ability to apply pharmaceutical calculations skills to simulated pharmacy practice situations, the majority indicated that completing this activity improved their abilities and they would like additional practice. Based on this, integrating additional activities throughout the curriculum that reinforce math skills may be warranted.

Student Performance: Comparison of Abbreviated Lecture with Multiple Interactive Mini-Cases with a Traditional Lecture Format. Leisa L. Marshall, Mercer University, Diane L. Nykamp, Mercer University.

Objectives: To compare student mastery of learning objectives with two different teaching and learning methods in a required pharmacotherapy module in a large classroom setting. Method: Two teaching and learning methods were implemented for 2 years for therapeutics of Osteoarthritis and Gout in an Institutional Review Board approved project. Method #1 - Abbreviated lecture (30%) with guided discussion of multiple interactive mini-cases coupled with in-class graded case questions – was used for Osteoarthritis year 1 and Gout year 2. Method #2 - Traditional lecture format with lecture (70%) and one case based non-graded discussion (30%) – was used for Gout year 1 and Osteoarthritis year 2. Student performance on individual readiness assurance tests (IRATs) pre/post topic and subsequent examination performance on these topics were measured. Results: Post-topic IRATs were significantly higher than pre-topic IRATs using abbreviated lecture/mini-cases for Osteoarthritis year one and Gout year two. There was no significant difference in pre/post-topic IRATs using traditional lecture for Gout year one; there was a negative significance for traditional lecture for Osteoarthritis year two. The post-topic IRATs for Osteoarthritis abbreviated lecture/mini-cases year one were significantly higher (p<0.001) than post-topic IRATs after traditional lecture for Osteoarthritis year two; there was no significant difference for Gout. There was no significant difference on subsequent examination question performance for Osteoarthritis or Gout with abbreviated lecture compared to traditional lecture. Implications: In the large classroom setting, multiple interactive mini-cases improved immediate learning objective mastery compared to traditional lecture, regardless of therapeutic topic, but did not improve performance on subsequent examinations.


Objectives: To assess knowledge of common herbal medications and attitudes of student pharmacists in recommending and counseling patients on herbal medication use. Method: A 31-question survey was distributed to all student pharmacists enrolled in the PharmD curriculum. Fourteen questions were focused on the knowledge of common herbal medications, while seven questions assessed attitudes toward and confidence in educating patients on herbal medications using a 6-point Likert scale. Data analysis included descriptive statistics, t-tests, and chi-square. Results: A total of 270 student pharmacists completed the survey (response rate=69.9%). Among these, 40.7% of students had completed the over-the-counter (OTC)-focused course, where herbal medications are briefly discussed. Students achieved a mean knowledge score of 4.8±3.02 out of 14 questions focusing on commonly used herbal medications. Although students who had completed the OTC course scored significantly higher than those who had not (6.09±2.80 versus 3.92±2.83, 4.81±2.56, respectively; p<0.001), on average, the higher scoring group answered <50% of the questions correctly. Overall, the students reported low confidence recommending and counseling patients on herbal medications (1.36 out of 6 and 1.31 out of 6, respectively). Student pharmacists agreed that an elective course focused on herbal medications would be useful (3.73±1.32 out of 6). Implications: With the rise in herbal medication availability and use, this gap in student pharmacists’ knowledge and lack of confidence in educating patients is a concern. Schools and colleges of pharmacy need to incorporate curriculum content focused on herbal medications to enhance knowledge and impact students’ confidence in educating patients.

Student Pharmacists’ Perceptions and Preferences Regarding the Flipped Classroom. Anne Kugler, Western University of Health Sciences, Hyma P. Gogineni, Western University of Health Sciences, Bik-Wai Tai, Western University of Health Sciences, Anandi V. Law, Western University of Health Sciences, Eunice P. Chung, Western University of Health Sciences.

Objectives: To determine student preferences, perceptions, and usage of pre-recorded lectures in the flipped classroom. Method: All students (n=140) enrolled in an 18-day modular P-2 Therapeutics course in January 2013 were invited to complete a survey on the first and last instruction day. Preferences, perceptions and usage were measured using mixed response scales. Pre-post comparisons were conducted using paired or independent t-test at a 95% significance level. Results: Both surveys were completed by 97 (69%) students (pre n = 102; post n = 109). Reviewing handouts and pre-recorded
Student Pharmacists' Perceptions of Immunization. Sarah M. Lorentz, University of California, San Diego, Kara Kubli, Sarah McBane, University of California, San Diego, Jan D. Hirsch, University of California, San Diego. Objectives: This study describes knowledge level, perceived importance, and personal beliefs and attitudes toward immunizations before and after an immunization course for first-year student pharmacists. Method: Participating students completed a pre and post-course survey with questions regarding perceptions and misconceptions related to immunizations. The course was conducted in October 2012, providing 12 hours of didactic and practical immunization education. Successful completion of the course provides students with knowledge and skills necessary to immunize patients as pharmacy interns. Survey questions, based on current literature and recommendations for immunizations by the Center for Disease Control, included demographics, knowledge, perceptions and beliefs about immunization. Data were summarized using means and frequencies. Results: A total of 35 students (61.4% of the class), 66% female, participated in the survey. The mean pre and post-course knowledge scores (0-100 scale) were 52.7(SD 16.8) and 85.7(SD 12.9), respectively. Prior to the course greater than 80% believed Hepatitis B, Varicella, Tdap, Meningococcal, and HPV were important or very important, compared to only 62.9% for influenza (which increased to 88.6% post course). The percentage of respondents who were apprehensive about administering needle injections changed from 54% pre-course to 37% post-course. Prior to the course almost half (49%) of respondents believed immunizations should be a personal choice, not mandatory; this declined to 37% post-course. Implications: Although the immunization course increased student knowledge of immunization facts and the perceived importance of influenza immunization, a substantial portion of students remained apprehensive about administering needle injections.

Student Pharmacists’ Perspective on Pairing a Live Geriatric Patient Interview with an Evidence Based Medicine Project. Jacob V. Arslanian, Cynthia Jackevicius, Western University of Health Sciences, Olivia J. Phung, Western University of Health Sciences, Janice Hoffman, Western University of Health Sciences. Objectives: In health professional academics, professors search for ways to better prepare their students for their future careers. At our university, P2 student pharmacists are provided an opportunity that involves the pairing of a student pharmacists team with a real geriatric patient for medication regimen review and to practice interview and clinical assessment skills. This live patient interview and assessment is coupled with an Evidence Based Medicine (EBM) assignment, in which student pharmacists search for and critically appraise evidence for one recommendation the team would make to a physician to change or monitor drug therapy. The objective of the study is to obtain feedback from the students on the benefits and practicality of the assignment. Method: An optional, confidential survey was taken by the student pharmacists. The survey included questions regarding comfort with performing and interpreting the assessments, difficulty level, and learning experience with the assignment. Results: Analysis of the survey indicates that the students enjoyed the activity, with 57% saying they learned a lot from performing the interview. Over 60% stated they were very comfortable performing and interpreting five of the six assessments. In terms of difficulty, 55% felt that the assignment was challenging, but appropriate. Also, 72% of the class felt that the EBM component had more value being paired with the live patient interview. Implications: The results indicate that student pharmacists enjoyed the live patient setting. Being able to enhance classroom assignments with a real life situation, such as this interview/assessment and EBM assignment, is a valuable learning tool.

Student Recall of Brand or Generic Medication Names in an IPPE Class. Richard O’Brota, St. John Fisher College, Asim M. Abu-Baker, St. John Fisher College. Objectives: The objective of this study was to determine how well P2 students retained brand-generic names of commonly prescribed medications learned in the P1 year. Method: In October of the P2 year 75 of 79 students completed an impromptu optional 20 question multiple choice quiz. The quiz questions asked students to select the brand or generic name of a commonly prescribed medication when given the other name. The quiz questions were projected on a screen and the students selected the answers using a scantron test form. The scantron test form was hand graded in order to eliminate the need for student identifiers. This study received approval from the St. John Fisher College Institutional Research Board. Results: The average score was 67.3%, standard deviation was 14.4, and there was a range of 35%-95%. Of the 75 students who took the quiz 38 students received a score of 70% or higher, which is considered passing. The results indicate there is a large range of how many brand-generic pairs students can recall on an impromptu basis. Implications: It is important for students to have a good working memory of brand and generic names when caring for patients during rotations. To encourage retention of brand generic information, the IPPE course coordinator will consider introducing a computer based brand-generic exam to be given to students during their first introductory experience in community pharmacy.

Student Perception of a Paramedic Shadowing Experience During a Critical Care Advanced Pharmacy Practice Rotation. Julie Kalabalik, Rutgers, The State University of New Jersey, Nancy Doherty, Somerset Medical Center, Luigi Brunetti, Rutgers, The State University of New Jersey, Fatema Dhanalilawa, Stuart Vigdor. Objectives: A traditional critical care advanced pharmacy practice experience (APPE) does not typically expose pharmacy students to pre-hospital patient care. In an effort to expose pharmacy students to pre-hospital and interdisciplinary patient care and allow students to apply knowledge in a real world setting, a paramedic shadowing experience (PSE) was incorporated into a critical care APPE rotation with student perception assessed through a survey. Method: The opportunity to participate in a single 8-hour shift with 2 paramedics was offered to all pharmacy students. A 10-item survey instrument was developed and distributed to pharmacy students who completed a critical care APPE rotation. Ratings were based on a 5-point Likert scale. The survey assessed 3 areas of interest: perception of PSE impact on awareness of pre-hospital medicine, understanding of interdisciplinary patient
care, and application of knowledge. **Results:** The survey was distributed to 18 students. Thirteen students (72% response rate) completed the survey. Students rated the PSE as an excellent opportunity to be exposed to pre-hospital medicine (mean score 4.46) and as beneficial in enhancing their understanding of interdisciplinary patient care (mean score 4.69). Most students agreed that the PSE encouraged the application of knowledge in a real-world setting (mean score 4.38). The majority of students strongly agreed that the PSE should be offered to future APPE students as part of the critical care rotation (mean score 4.69). **Implications:** The majority of pharmacy students rated the paramedic shadowing experience as beneficial in understanding pre-hospital and interdisciplinary patient care and in applying knowledge in a real world setting.

**Student Perceptions of a Self-Care Course Taught Exclusively by Team-Based Learning and Utilizing Social Media.** Kelly J. Wright, Cedarville University, Tracy Frame, Cedarville University, Melody Hartzler, Cedarville University. **Objectives:** To assess student perceptions of a Self-care course taught exclusively by Team-Based Learning and utilizing social media. **Method:** Fifty-three pharmacy students in the first year of a new pharmacy program enrolled in a required Introduction to Self-Care course were asked to complete an electronic survey assessing the student’s perception of the Team-Based Learning (TBL) and social media (i.e. Twitter) teaching methods employed by the course. The survey focused on student satisfaction with team work, workload, and knowledge gained during the course, as well as perceptions of the integration of social media into the course. Most responses were categorized on a 7 point Likert-type scale. Descriptive statistics were used to analyze the results. **Results:** Fifty-one (96%) students completed the survey at the completion of the course. 53.1% of students preferred TBL over traditional lecture style teaching and 90.2% of students agreed that the course prepared them to navigate the clinical decision making process. 31.4% of students enjoyed using Twitter during the course and 94% of students felt that two credit hours were not enough to adequately cover the material in the course. **Implications:** Overall, TBL and the course were viewed favorably. The survey revealed several areas for improvements that need to be made in the course. These include increasing to three credit hours and reshaping the use of Twitter to better engage students in discussion beyond the classroom.

**Student Perceptions of an On-line Interactive Learning Module in an Elective Course.** Sean M. Mirk, Midwestern University/Downers Grove, Huzefa Master, Midwestern University/Downers Grove, Jennifer Phillips, Midwestern University/Downers Grove. **Objectives:** This IRB-approved study surveyed third-year professional pharmacy students to obtain their perceptions and opinions towards an interactive on-line lecture format. **Method:** Two faculty members used Storyline (Articulate Global, Inc; New York, NY) to create two interactive on-line learning modules (OLMs) for an elective course. The OLMs took the place of a traditional live lecture (TLL). Each OLM focused on a different disease state. After completing each OLM, students completed a survey that assessed their level of satisfaction with the on-line format and their opinions on how the on-line format compared to a TLL. **Results:** Both OLMs were completed by all students enrolled (n = 27). The response rate for the survey following each OLM was 66.7% and 40.7%, respectively. After the first OLM, most students either strongly agreed or agreed that the OLM was effective at achieving the learning objectives (77.8%) and provided a practical application of the subject matter (88.9%). In addition, most strongly agreed or agreed that the OLM helped them to apply the information taught to a patient case (83.3%) and enhanced their understanding of concepts and principles related to the topic (72.2%) better than a TLL. After the second OLM, similar results were seen. A majority of students also felt that the number of on-line lectures, as part of this course, should increase. **Implications:** Student perceptions and opinions toward an interactive on-line lecture format are positive and most felt the number of OLMs should increase. Similar results were seen regardless of subject matter or lecturer.

**Student Perceptions of Debates in a Women’s Health Elective.** Brooke L. Griffin, Midwestern University/Downers Grove, Kathleen Vest, Midwestern University/Downers Grove, Erin C. Raney, Midwestern University/Glendale, Shareen El-Ibiary, Midwestern University/ Glendale. **Objectives:** The objective of this study was to evaluate students’ opinions of a debate technique utilized in women’s health elective courses at two colleges of pharmacy. **Method:** Students (n=53) were assigned into groups and debated three controversial topics in women’s health. The project structure was identical in both electives, including topics, format, and scoring. Size of the student groups varied between colleges due to varying class enrollment. A voluntary, anonymous survey was administered to assess students’ confidence, critical thinking skills, and satisfaction with the debate format. **Results:** Fifty-three students who completed the survey rated the debate method as improving their abilities in public speaking (72%), fielding questions (68%), and in clinical reasoning skills (56%) as compared with other learning techniques. Comparison of student responses revealed statistically similar results between campuses, including demographics and past debate experience. Approximately 95% of students at both colleges either strongly agreed or agreed that the debate exercise was a valuable learning technique. Nearly all students (86%) strongly agreed or agreed that the debate assignment improved their abilities to present a position on a topic that may not be their personal opinions. Students in larger groups (6 - 7 students) were less likely to find group size ideal compared with students in smaller groups (4 - 5 students). **Implications:** Students believed debate participation improved their confidence in many skills and will help them in their future careers. Results of this survey may help other faculty considering the use of this teaching format.

**Student Perceptions Regarding Incorporation of an Immunization Program into an Accelerated Doctor of Pharmacy Curriculum.** Anna K. Morin, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Abir Kanaan, Massachusetts College of Pharmacy and Health Sciences-Worcester, Cheryl A. Abel, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester. **Objectives:** The objectives of this study include assessment of: student opinions of the placement of the American Pharmacists Association (APhA) Pharmacy-Based Immunization Delivery Program in the MCPHS University School of Pharmacy – Worcester/Manchester accelerated curriculum; student perceptions regarding the role pharmacists play in immunization; and student level of confidence in immunization education and administration after completion of the program. **Method:** The APhA Pharmacy-Based Immunization Delivery Program was offered in the 2012 summer semester as part of a core course on Introduction to Advanced Pharmacy Practice. A ten question survey, designed to address the study objectives, was administered electronically in November 2012 to 261 students in the class of 2013 who completed the program. **Results:** A total of 120 students (46%) participated in the survey. Survey results (percentage of students who responded strongly agree or agree) are as follows: 85% were confident in their ability to administer immunizations; 86% were confident in their ability to educate patients on the importance of immunizations; 88% felt that the

---

program was appropriately placed within the curriculum; 95% felt that the program should continue to be offered within the curriculum; and 98% believed that pharmacists play an important role in immunization administration. Overall, the majority of students (95%) found the immunization certificate program to be valuable. **Implications:** The APhA Pharmacy-Based Immunization Delivery Program will continue to be incorporated into the university’s curriculum. Students will be provided with opportunities to practice immunization administration and education skills while on advanced experiential education.

**Student Pharmacists’ Actual versus Perceived Health Using the American Heart Association’s Ideal Cardiovascular Health Definition.** Adam Pate, The University of Louisiana at Monroe, Kristen A. Pate, The University of Louisiana at Monroe, Laurel L. Sampognaro, The University of Louisiana at Monroe, Candace T. Chelette, The University of Louisiana at Monroe. **Objectives:** This study compared students’ perceptions of personal cardiovascular health compared to an objective definition of cardiovascular health as defined by the American Heart Association. **Method:** During the fall semester of the 2012-2013 academic year, consenting first year students completed a survey evaluating personal stress, diet, physical activity, and perception of health and wellness. Additionally, physical assessments (blood pressure, BMI, fasting blood glucose, and fasting cholesterol) were measured by faculty and trained fourth year students. These results were compared to the American Heart Association’s 7 ideal cardiovascular health metrics (BMI < 25 kg/m2, total cholesterol <200 mg/dL, blood pressure <120/80 mmHg, fasting glucose <100 mg/dL, never or quit smoking >12 months, ≥ 150 min/week moderate + vigorous exercise, and 4-5 components of a healthy diet) assessing actual versus perceived cardiovascular health. **Results:** The survey response rate was 96.7% (90/93), and physical assessment completion rate was 95.7% (89/93). The majority of respondents’ perception of health was self-described as “intermediate” in the following categories: physical activity 54% (n=49), diet 59% (n=53), BMI 56% (n=50), and overall health 63% (n=57). Corresponding actual health was considered “ideal” in the following: physical activity 59.0% (n=52), BMI 52.2% (n=46), smoking status 85.6% (n=77), total cholesterol 84.1% (n=74), and fasting glucose 53.4% (n=47). Only 3% and 42% of respondents had an ideal healthy diet score and blood pressure, respectively. **Implications:** This data indicates areas for improvement in student health and inaccurate perception of health by students.

**Students’ Performance and Perceptions of Preparedness to Critically Evaluate Literature: Four Years Experience.** Kathryn M. Momary, Mercer University, Lisa M. Lundquist, Mercer University. **Objectives:** To compare third-year pharmacy students’ performance and perceptions of preparedness (POP) to critically evaluate literature before and after a focused application activity. **Method:** Students providing informed consent voluntarily completed a survey assessing their POP to critically evaluate literature in a third year required course before and after a focused application activity including didactic lecture, active learning, individual review, and classroom discussion of primary literature articles. Students rated their POP using 10 questions on a 4-point Likert scale ranging from extremely unprepared to extremely prepared. Knowledge assessment was completed concurrently with the survey. Data from four years were compared with Pearson’s correlation, paired t-test, and ANOVA. **Results:** A total of 453 (82.3%) students provided informed consent for participation and completed all study elements. The four year overall POP (mean=±SD) improved from 2.43±0.43 to 3.03±0.47 (p<0.001). Initial and follow-up knowledge assessments also improved 51.9±21.2% to 71±19.2% (p<0.001). There was a statistically significant correlation between the initial and follow-up knowledge assessment and POP. There were only minor differences in POP or performance between the four years assessed. **Implications:** Students’ POP and performance improved after the focused application activity and POP correlated well with the knowledge assessment utilized. Repeated incorporation of critical literature evaluation throughout the curriculum may be necessary to improve perception and performance.

**Student’s Perspective on an Interprofessional Educational Activity to Cultivate a Collaborative Approach to Patient Care.** James A. Trovato, University of Maryland School of Pharmacy, Conrad Gordon, University of Maryland School of Nursing, Ellen W. Hakim, University of Delaware/Department of Physical Therapy, Virginia Rowthorn, University of Maryland Francis King Carey School of Law, Melissa H. Bellin, University of Maryland School of Social Work, Jacob B. Blumenthal, University of Maryland School of Medicine. **Objectives:** The objectives of this survey were to identify pharmacy, nursing, social work, physical therapy, and law student’s self-confidence and comfort in their ability to collaborate on an interprofessional educational activity; identify student’s understanding and appreciation of their role and the role of other professional students; and identify student’s level of satisfaction with and perceived value of participating in an interprofessional educational activity with students from other professional schools. **Method:** The interprofessional activity consisted of a simulated patient case (including medical, social, and legal factors) presented to teams of students from diverse disciplines. The teams collaborated on the patient case to prioritize problems, identify medical/legal/social concerns, ascertain therapeutic goals, and develop interventions. Students were surveyed before and following the activity. Questions were designed using a rating scale of Strongly Disagree, Disagree, Neither agree nor disagree, Agree, Strongly Agree. **Results:** A total of 45 students from 5 disciplines participated in the educational activity and completed the pre and post survey. There was an increase in the percentage of students, from 78% (pre-survey) to 95% (post-survey), who agreed or strongly agreed that they felt confident in their ability to collaborate and make recommendations on a patient case with students from other professional schools. The majority of students (> 90%) agreed or strongly agreed that the educational activity was realistic, challenged them, and was a great learning experience. **Implications:** Experiences specifically designed to support and nurture an interprofessional collaborative approach to patient care will improve students’ skills, comfort, and satisfaction with interprofessional management of patients.

**Success of the Development of Faculty Mentor Teams in a Pharmacy Practice Department.** Lea S. Eliland, Auburn University, Karen F. Marlowe, Auburn University, Gordon Sacks, Auburn University. **Objectives:** To describe a three year process for implementation, development, and success of mentor teams for junior pharmacy practice faculty. **Method:** Mentor teams consisting of one junior, two senior faculty members and the junior faculty member’s administrative supervisor were first implemented in 2010. Assignments were made based upon survey results from all department members inquiring about mentoring needs and requests. In 2011, faculty members were surveyed about maintaining or changing their mentor teams and for general feedback regarding the mentor teams. In 2012, faculty members were asked to complete a detailed survey questioning the mentor team process, activities, and outcomes. **Results:** Nineteen mentor teams were created in 2010 and currently 15 teams exist consisting of one junior and two senior faculty members. All junior faculty members stated the program and mentors’ role were clearly explained to them. The majority of teams met twice annually for approximately

94
1 hour to discuss primarily the promotion process or scholarship. Other top areas discussed included research, APPEs, and outreach. Junior faculty stated they had improved in scholarship, promotion and APPEs due to assistance from the mentor teams. Fifteen mentees (94%) stated the teams were helpful and 90% of faculty members requested to stay with the same mentor team. The mentor teams were described as ‘somewhat successful’ or ‘very successful’ by 87% of faculty members. **Implications:** The implementation of multi-member, peer mentor teams was well received by junior and senior faculty members of a pharmacy practice department with impact on multiple career dimensions.

**Successful Remediation Strategies for a Performance-Based Assessment.** Kristin A. Casper, The Ohio State University, Katherine A. Kelley, The Ohio State University, Stuart J. Beatty, The Ohio State University, Carolyn C. Brackett, The Ohio State University, Colleen A. Dula, The Ohio State University, Ruth Emptage, The Ohio State University, Laura E. Hall, The Ohio State University, Julie E. Legg, The Ohio State University, Vinita B. Pai, The Ohio State University.

**Objectives:** Describe and review the effectiveness of two remediation strategies employed to address substandard student competency on a performance-based assessment activity. **Method:** Students at the end of their P2 year (n=123), participated in a performance-based assessment (PBA) and were evaluated based on communication, professionalism, and documentation skills. Scores were categorized into one of three groups: pass (indicating competent to proceed), minimally competent, or not minimally competent. Students who received a minimally competent score (n=15) participated in a group remediation activity. Students who received a not minimally competent score (n=4) were paired with a faculty member for an intense one-on-one remediation experience. Success of the remediation was determined by reviewing students’ grades on a PBA at the end of the P3 year, as well as their grades during the first half of their P4 APPE rotations. **Results:** All 19 students who participated in remediation, successfully passed the communication and professionalism components of the P3 PBA. All students who were identified as not minimally competent successfully completed the documentation portions. In the minimally competent group, 86.7% of students successfully completed the documentation portion for patient case #1, and 93.3% for case #2. In addition, all of the students in the remediation group have successfully completed their first five APPE rotations. **Implications:** Both the individual and group remediation techniques resulted in improved student grades on a subsequent PBA activity, and consistent performance as compared to the entire class.

**Targeted Learning Based on Formative Assessments of SOAP Notes.** Kim G. Adcock, The University of Mississippi, Katie S. McClendon, The University of Mississippi, Shirley M. Hogan, The University of Mississippi, Allison M. Bell, The University of Mississippi, Justin J. Sherman, The University of Mississippi.

**Objectives:** To assess a class-wide intervention to improve pharmacotherapy SOAP-note writing skills in a problem-based learning course. **Method:** Students were required to write a pharmacotherapy SOAP note based on a patient-specific case. Each student was provided a formative assessment on the written assignment. Based on the performance of that assessment, a learning module including pre-reading assignments, class discussions and in-lab activities was incorporated into a skills-based laboratory course in which the students were also enrolled Fall 2012. The class discussions and activities focused on writing SOAP notes for various purposes and settings. Following this additional learning opportunity, students were subsequently assigned to complete another SOAP note on a different patient-specific case Spring 2013. The pre and post intervention scores were analyzed via t-test. **Results:** Students performance on the original SOAP note assignment was less than desirable with a mean score of 68. The class mean for each section of the note was 95 (subjective), 70 (objective), 36 (assessment) and 73 (plan). The students’ performance on the SOAP note post educational intervention was significantly improved with an overall class mean of 87. The class mean for each section was 94 (subjective), 86 (objective), 95 (assessment) and 73 (plan), with significant (p<0.001) differences seen for performance overall, as well as on objective and assessment sections. **Implications:** Faculty responsiveness to formative assessments provides students with learning opportunities that can correct knowledge gaps identified by these assessments. A targeted intervention to improve SOAP note writing skills resulted in improved performance the following semester.

**Teaching Certificates Offered by Residency Programs in Academic Medical Centers.** Jere R. May, The University of Georgia, Kelly M. Smith, University of Kentucky, Holly J. Phillips, University of Colorado Hospital, Patrick D. Fuller, Nebraska Medical Center, William M. King IV, University of Colorado Hospital, Kendall Gross, University of California, San Francisco, Courtney C. Cavalieri, Memorial Sloan Kettering Cancer Center, Stephanie J. Kuhn, University of Colorado Hospital, James R. Beardsley, Wake Forest Baptist Medical Center, Ganesh Kumarachandran, University of Maryland Medical Center.

**Objectives:** Describe the predominance, structure, and impact of teaching certificate programs for pharmacy residents in academic medical centers in order to better direct national guidelines for their content and development. **Method:** A 23-point electronic survey of residency program directors in academic medical centers assessed their inclusion of a teaching certificate program, program features and structures, participants’ perceived program value, and challenges in program design or administration. Descriptive statistics were employed. **Results:** Of the 44 respondents (17.5% response rate), 27 (61%) offered a teaching certificate, while 41% of the remainder planned to establish one. The majority of programs (35%) were offered in conjunction with other residencies, and most were led by residency directors or pharmacy faculty. Program participation was required for 38% of postgraduate year one residents. Participant competency was infrequently assessed either prior to or following program completion. Submission of a teaching portfolio at conclusion was required in 79% of the programs. Common content included developing teaching outcomes and learning objectives, small group facilitation skills, academic pursuits, presentation and lecturing skills, and active learning techniques. Resident participants found value of participation in 91% of programs. Common program challenges included scheduling conflicts, time commitments, inconsistency of evaluations and precepting provided to participants, and identification of suitable teaching experiences. **Implications:** The disparity in the structure, content, and assessment elements of teaching certificate programs offered in academic medical center residency programs should be addressed by the profession in order to promote pharmacy resident teaching skills.

**Teaching and Learning Health Literacy in a Doctor of Pharmacy Program.** Jennifer M. Trujillo, University of Colorado, Trista A. Ross, University of Colorado, Lisa A. Thompson, University of Colorado, Katy E. Trinkle, University of Colorado.

**Objectives:** This study assessed the impact of a new curricular approach on first-year pharmacy students’ abilities, self-efficacy, attitudes, and knowledge related to health literacy. **Method:** Health literacy activities were incorporated into a required first-year, patient-centered communication course and included didactic lectures, small group discussions, simulated patient counseling sessions, group projects and introductory
pharmacy practice experiences (IPPE). Students’ abilities to identify and communicate with patients with low health literacy were evaluated by simulated exams using standardized patients, quizzes, IPPE reflections, and group-patient education projects. A pre- and post-course survey assessed students’ self-efficacy, attitudes, and knowledge regarding health literacy (38 questions; 7 self-efficacy, 13 attitude, 18 knowledge). Results: The simulated evaluation revealed that all students (n = 162) met or exceeded expectations related to health literacy with 150 students (92.6%) providing patient-friendly education in plain language “most of the time” and 12 (7.4%) “some of the time”. The average group project score was 89.9% (range 78-99%). Thirty groups met or exceeded expectations and one group met expectations with limitations. Post-course confidence scores for all 7 self-efficacy questions significantly improved from baseline (p < 0.0001 for all). Student attitudes were generally positive both pre- and post-course. Post-course attitudes were more positive than pre-course attitudes in 6 of the 13 questions (p < 0.05 for all). Scores improved in 6 knowledge questions, with post-course scores already high in most other knowledge questions. Implications: This educational approach to health literacy was effective at improving students’ abilities, self-efficacy, attitudes, and knowledge related to health literacy and is transferable to other pharmacy programs.

Team-based Learning (TBL): A Faculty’s Perspective. Scott M. Vouri, St. Louis College of Pharmacy, Clark Kabedoeux, St. Louis College of Pharmacy, Peter D. Hurd, St. Louis College of Pharmacy. Objectives: The objectives were to determine the perceived impact on faculty of implementing TBL in a self-care course and faculty preference for TBL methods versus traditional lecture. Method: In the fall semester of 2012, TBL was implemented in the self-care course (PP2120) at St. Louis College of Pharmacy. There are limited data evaluating a faculty members’ perspective using team-based learning (TBL) compared to traditional lectures. Previous research indicated that faculty teaching TBL reported an increased design time and interactions with students. While previous articles noted that faculty teaching TBL reported an increased design time and increased interaction with students. While previous articles noted that the faculty enjoyed this teaching style, workload was not measured. An anonymous survey was created to identify perceived workload related to the implementation of TBL in PP2120. The survey was distributed to all 8 faculty members who taught in PP2120. The questionnaire included questions to identify workload, training, and student interaction using TBL. Results: Eight faculty members completed the survey. A majority of respondents (75%) indicated that there was an increase in workload; however, 57% indicated that TBL increased their enjoyment of teaching. While 62.5% indicated the transition to TBL was difficult, the same percentage felt that they will use it in other courses. Faculty members (62.5%) indicated that student participation increased due to TBL. Implications: This is the first study attempting to measure faculty perspective of TBL in a self-care course. This data can assess the implementation of TBL into faculty workload in pharmacy school curricula. Subsequent surveys will determine changes in the faculty’s perspective of TBL after multiple semesters of implementation.

Tertiary Literature Introduction: Preferences of Method and Source. Bernie R. Olin, Auburn University, Erika L. Kleppinger, Auburn University. Objectives: To measure the preferences of PY1 student pharmacists in learning about electronic tertiary literature databases, comparing individual learning versus group learning in a skills laboratory. Method: PY1 student pharmacists are introduced to the medical/drug literature in Drug Literature I. Two class periods (4 hours) are devoted to tertiary literature. Students then complete an independent homework assignment to answer questions that compare four online databases: Clinical Pharmacology, Facts/Comparisons eAnswers, Lexi-Comp, and Micromedex. Later in the semester students participate in a 2-hour skills laboratory session (CAPP Lab II) where they work in small groups to answer a different set of questions, utilizing the same databases. Facilitators are in the lab to provide guidance. An anonymous survey at the end of the semester measured student preferences for instruction method, comments/suggestions, and their preference for individual databases. Results: A total of 139 of 148 students (94%) completed the survey. As stand-alone methods, students indicated a preference for the individual homework assignment (27.5%) over the skills lab experience (15.9%) for learning about tertiary literature drug databases, but clearly felt the combination of the two was preferred (56.5%). A range of 24% to 37% of students were satisfied with the current offering; the most common suggestion was to improve the timing of the class, homework and skills labs activities (28%). Implications: Tertiary literature is a foundation of pharmacy education and practice and an early, strong, understanding is critical to lifelong success. Applying the most effective methods of teaching is beneficial to all.

The Evaluation of Instant vs. Delayed Feedback in Improving Counseling Skills in Pharmacy Students. Alexander DeLucenay, St. John Fisher College, Anthony Corigliano, St. John Fisher College, Brooke Lowry, St. John Fisher College, Jane M. Souza, St. John Fisher College, David J. Hutchinson, St. John Fisher College. Objectives: To evaluate instant vs. delayed feedback methods in improving counseling skills. Method: The study was a retrospective analysis of students’ grades who were randomly assigned sequential, live feedback vs. students who received written, delayed feedback in Concepts of Pharmacy Practice (PHAR 5137). Students were assigned unidentifiable codes when assigning the method of feedback and analyzing grades. A standardized rubric for evaluation was used in both groups of students. Live feedback assessment was accomplished immediately following counseling sessions. Delayed feedback was accomplished using videotaping of the sessions. In addition, a survey was distributed after the completion of the counseling session series. Students were asked to rate and comment on the quality of feedback, preferences with respect to feedback delivery, and impressions of the experience. Results: Results showed that live feedback from the previous week had no significant effect on mean grades compared to the delayed feedback group in the various exercises. One exception was noted with the glucose meters/oral diabetes medications session. (91.4% +/- 0.06 vs. 85% +/- 0.12, p = 0.0071). Survey results showed students preferred live feedback by 50% vs. 22%, while 28% indicated no preference of either. Implications: This pilot study will assist faculty in evaluating the differences in student learning and performance using different methods of feedback. Given the significance of counseling skills in pharmacy practice, this study may help determine which methods of evaluation are more effective and preferred by students.

The Hidden Map in the IDEA™ (Individual Development and Educational Assessment) Student Evaluation Survey Process. Jane R. Mort, South Dakota State University, Brad R. Laible, South Dakota State University, Daniel J. Hansen, South Dakota State University. Objectives: Utilize the Faculty Information Form (FIF) data from the IDEA survey process to map the curriculum. Method: FIF contains 12 objectives, nine teaching methods, and nine course requirements. FIF data for 40 courses (30 required, 10 elective) taught Fall 2011 and Spring 2012 were examined for the purpose of mapping the curriculum. Results: Data from the FIF indicated fewer P3 courses had knowledge as an essential or important objective compared to P1
courses (80% vs 100%) and more P3 courses focused on theory (80 vs 70%), application (90 vs 80%), resource use (30 vs 20%), and evaluation (40 vs 20%) compared to the P1 courses. However, twice as many P2 courses focused on teamwork compared to the P3 courses. More courses had requirements of writing and creative activities in the P1 year (70 and 30%, respectively), but there were more courses focused on critical thinking in the P3 year (90 vs 80%). More P3 electives courses had a wider variety of activities than required P3 courses (70 to 100% of electives courses had writing, oral, group, and critical thinking activities versus 30 to 90% required). Lecturing was the primary teaching method for required courses (100%) but 50% of elective courses used discussion as the primary approach. Implications: Information is available from the IDEA student opinion survey process (via FIF) that can guide curricular evaluation and revision. Based on these results, development activities and curricular direction will be provided in the areas of teamwork and alternative teaching strategies.

The Impact of Pre-matriculation Characteristics Upon Graduation Rates in an Accelerated Doctor of Pharmacy Program. Michael Steinberg, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Anna K. Morin, Massachusetts College of Pharmacy and Health sciences-Worcester/Manchester. Objectives: To identify characteristics that predict student academic success in an accelerated Doctor of Pharmacy program. Method: Selected pre-matriculation characteristics of students entering the graduation class years of 2009-2012 on the Worcester/Manchester campuses of the Massachusetts College of Pharmacy and Health Sciences (MCPHS) were compared with whether or not each student graduated in his/her anticipated year of graduation (ie, on-time graduation). Results: Overall, 852 students matriculating into the selected class years were evaluated, and of these students, 699 (82.0%) graduated on time. Students who were most likely to graduate on time attended a four-year school, previously earned a bachelor’s degree, had an overall pre-matriculation GPA greater than or equal to 3.6, and graduated in the spring just prior to matriculating to MCPHS. Factors that reduced the likelihood of graduating on time included attending multiple schools to earn prerequisite credits, using credits from a community college to satisfy pre-requisite requirements, having previously earned a foreign degree, having previously earned only an Associate’s degree or no degree, and whether students submitted a waiver for pre-requisite credits earned greater than 10 years prior to matriculation. Work experience in a pharmacy prior to matriculation had no impact on graduating on time. Implications: Objective characteristics can be used as a guide during the admission process to identify students most likely to be successful in a Doctor of Pharmacy program.

The Impact of an Educational Intervention on Students’ Abilities to Identify Plagiarism. Carolyn Ford, Wingate University, Kira R. Harris, Wingate University, Cynthia Compton, Wingate University School of Graduate and Adult Education, Michelle R. DeGeeter, Wingate University, Heather A. Kehr, Wingate University, Daniel C. Lane, Wingate University, Donald S. Nuzum, Wingate University, Whitney Gibson, Wingate University. Objectives: The prevalence of plagiarism within the healthcare profession and health-science education appears to be increasing. The primary purpose of this study was to determine if a school-wide educational intervention will increase pharmacy students’ abilities to identify plagiarism. Method: In the fall 2012 semester, pharmacy students in levels one (P-1), two (P-2) and three (P-3) attended an education session which reviewed types of plagiarism and methods for avoiding plagiarism. All students, including fourth year students, took a pre-intervention survey immediately prior to the education session and a post-intervention survey at the beginning of the spring 2013 semester to determine their abilities to identify plagiarism. The survey consisted of case scenarios representing a variety of plagiarism types. Results: A total of 260 students, 103 P-1, 92 P-2 and 65 P-3 students, completed both the pre- and post-intervention surveys. Paired sample t-tests revealed statistically significant differences between pre- and post-intervention survey scores for all three levels of students. The average pre-test score for P-1 students was 78.64 compared to average post-test score of 84.61 (p<0.00). The average pre-test score for P-2 students was 75.90 compared to the average post-test score of 83.11 (p<0.00). The average pre-test score for P-3 students was 78.04 compared to the average post-test score of 84.61 (p<0.002). Implications: An educational intervention about plagiarism can significantly improve students’ abilities to identify plagiarism. The ability to identify plagiarism may encourage students to refrain from committing plagiarism in future educational endeavors.

The Long-Term Benefit Of The Analysis Requirement In Assessing Student Compounded Preparations. Robert P. Shrewsbury, University of North Carolina at Chapel Hill, Heidi N. Ankorsus, University of North Carolina at Chapel Hill. Objectives: To demonstrate the long-term benefit of using chemical analysis to assess the accuracy of student compounded preparations. The analytical results of preparations routinely compounded in the Pharmaceutical Care Laboratory were compared before and multiple years after the analysis requirement was instituted. The analysis requirement determined if the student needed to re-make the preparation. Method: Analysis data of the active principal ingredient (API) content of the compounded preparations were compared before and for five years after instituting the analysis requirement. The API content of the preparation was determined by either spectrophotometric or HPLC methods. Parameters compared were 1) percentage of students who compounded the preparation correctly the first time, and 2) variation in the API content (z-test). Results: The two measured parameters showed improved student performance during the five year period after the analysis requirement was instituted. Asymptotic data was found in some of the preparation data. The improvement in student compounding performance was seen as a benefit of implementing the analysis requirement. Implications: The results suggest that this type of assessment tool would improve student outcomes in compounding pharmaceutical preparations. A recent Task Force on Compounding report found that only eight percent of AACP institutions that have compounding education use this type of assessment.

The Impact of a Pilot Problem Based Learning Elective on Student Confidence in Clinical Practice. Kurt W. Wolfgang, Duquesne University, Autumn L. Stewart, Duquesne University. Objectives: Problem based learning (PBL) is a non-traditional pedagogical method in pharmacy education. Students often report a lack of confidence in their ability to think critically in clinical practice. This study sought to determine the impact of a PBL pilot elective course on self-reported changes in confidence and student satisfaction with and attitude toward this learning method. Method: The study utilized an experimental design using pre and post test survey methods to evaluate the impact of the pilot course. The pre test included items capturing demographic data, confidence, and teaching/learning preferences. Confidence items were 4 point Likert-type questions developed from the school’s existing competencies under Patient Care, Drug Information, and Critical Thinking. Items assessing instructional preferences were adapted from previous studies. Results: 30 students completed all survey materials (100% response rate). Significant changes in self-reported confidence in clinical abilities were observed for most survey items. A
significant improvement in self-reported confidence in problem-solving skills was also observed. Overall, satisfaction with the course was positive. **Implications:** PBL provided students with the opportunity to practice and employ critical thinking skills in a new way that enhanced awareness of their abilities. Confidence in specific skills relating to patient care and drug information were also positively changed, demonstrating that this teaching method appears to give students an opportunity to practice their skills in a manner that is positive and encouraging. The use of PBL allows students to apply their knowledge in a way that bridges didactic teaching with a more experiential type of learning.

**The Impact of Elective Online Quizzes Towards Academic Achievement in a Pharmacotherapeutics Course.** Sheila Wang, Midwestern University/Downers Grove, Justin Schmidt, Midwestern University/Downers Grove, Jeffrey Wieczorkiewicz, Midwestern University/Downers Grove, Carrie A. Sincak, Midwestern University/Downers Grove. **Objectives:** Computer-based learning resources have shown to encourage engagement, support study efforts and improve confidence. The aim of this study is to assess academic achievement with utilization of elective online quizzes. **Method:** Elective online quizzes were offered to 3rd-year pharmacy students (N = 200) enrolled in a pharmacotherapeutics course. Approximately 100 quiz questions were offered for exams 1 and 3; exam 2 served as a control. Unlimited attempts and time for the quizzes were permitted. At the end of the course, a questionnaire was distributed to assess impact and utilization of the quizzes. Exam scores were used to assess academic achievement. **Results:** One hundred thirty students completed the questionnaire (65% response rate). The majority of students utilized the quizzes at least 1-2 times per quarter (73%). Among students who participated in quizzes, mean exam scores were approximately 4% higher for exams with quizzes offered compared to the exam without (p < 0.05 for both comparisons). Mean exam scores improved with greater utilization of the quizzes (p = 0.03). The majority found the quizzes to be a useful study tool (96%), prepared them for exams (86%) and improved their confidence in course material (87%). While 62% felt the quizzes influenced their overall grade, 98% of students would recommend quizzes for other courses in the curriculum. **Implications:** Implementation and utilization of elective online quizzes in a pharmacotherapeutics course may be a valuable study tool, improving confidence in course material and academic achievement.

**The Use of Advanced Screencasting and Embedded Assessment to Create a Hybrid Pharmacokinetic Lecture.** Ashley Woodruff, St. John Fisher College, Megan Jensen, Buffalo General Medical Center/Wegmans School of Pharmacy, William Loeffler, D’Youville College, Lisa Avery, St John Fisher College. **Objectives:** Hybrid classes with online and face-to-face instruction have been shown to be well received by students. The objective of this study was to design and evaluate the use of e-lectures utilizing screencasting technology with embedded assessment in a hybrid Pathophysiology and Therapeutics module on clinical pharmacokinetics. **Method:** Three e-lectures were developed to replace the traditional pre-class reading assignment. In addition to the e-lectures, the module included a traditional face-to-face lecture and a case-based workshop. Student preference and academic achievement regarding the use of the e-lectures were evaluated using data on the e-lecture viewing, student surveys with 5-point Likert scale (5 = strongly agree to 1 = strongly disagree) questions, and test performance. **Results:** The combined duration of all three e-lectures was 76 minutes. The average student viewing time was 188 minutes (range, 80-432 minutes) to complete all three e-lectures. The e-lectures were viewed an average of 13 times (range, 4-37 times). Survey results showed that students thought the e-lectures were easy to use, were preferred over traditional pre-class assignments, enhanced their understanding of the topic, prepared them for class, and should be continued as part of the course. Students performed significantly better in 2013 compared to 2011 and 2012 on test questions related to material taught in the e-lectures. **Implications:** Teaching clinical pharmacokinetics with e-lectures utilizing screencasting technology with embedded assessment was perceived by students to be beneficial and improved academic achievement. The ability to self-pace and view the e-lectures multiple times contributed to student preference.

**Thematic Assessment of Reflective Essays for a Teaching Certificate Program.** Sarah N. Ashby, University of Arkansas for Medical Sciences, Ashley Castleberry, Nalin Payakachat, University of Arkansas for Medical Sciences, Kathryn K. Neill, University of Arkansas for Medical Sciences, Martha H. Carle, University of Arkansas for Medical Sciences, Amanda L. Nolen, University of Arkansas at Little Rock, Amy M. Franks, University of Arkansas for Medical Sciences. **Objectives:** To identify and assess major themes discussed by teaching certificate program (TCP) participants in midpoint and end-program reflective essays. **Method:** TCP participants (n = 117) submitted midpoint and end-program reflective essays on teaching experiences. Prompts encouraged consideration of teaching strengths and weaknesses, ability to assess and provide feedback to students, and progress toward self-identified teaching goals. The major themes encompassed by selected essays (n = 50) were assessed using the constant comparative approach with open coding by 2 coders. Essays were coded independently using QSR NVivo 10® qualitative software. **Results:** Thirty-three independent themes were identified in the essays including: student relations, confidence, learning styles, plans for the future, and teaching methods used. Reflections were more likely to identify areas of potential improvement (95%) rather than areas of accomplishment (90%). Evaluating student learning and distinguishing student performance was included more frequently than discussing performance observations with participants (88% vs. 61%). **Implications:** Major themes discussed by participants in reflective essays convey participants’ perceived benefits and needs within the program. The themes identified in this project may be used to better tailor TCPs to participant needs. Since participants focused more on assessment of students rather than providing feedback, programs should consider emphasis in coupling these essential teaching skills. Further development of understanding various learning styles and correlations to teaching methods and assessment are also crucial features of a TCP. These results allow TCP directors to optimize experiences to create valuable programs that produce quality pharmacist teachers.

**Tracking Content and Process Errors in Pharmacy Calculations.** Michael C. Brown, Concordia University Wisconsin, Elizabeth Laubach, Concordia University Wisconsin. **Objectives:** To determine the common reasons for errors and their frequencies in basic pharmacy calculations and to determine whether these errors were caused by content or process mistakes. **Method:** Students were taught and tested in these pharmacy calculations topics: %v/v, %w/w, and %w/v; abbreviations; English-metric height, volume, and weight conversions; dosing based on mg/kg/day and mg/sq. meter; reducing/enlarging formulas; and body surface area nomogram use. Questions were integrated requiring knowledge of more than one topic area within the question. Answers were scored as correct or wrong. The specific reason(s) for the error(s) for each wrong answer was recorded, along with the category of the error (content or process). Content errors were errors of knowledge (e.g., problem setup wrong, conversions wrong, etc), while process errors were mistakes such as transcription errors, entering numbers...
into the calculator wrong, or error-prone number formats. Results: Eight hundred seventy total questions were answered by 87 students on the exam. Average on the exam was 93.6%. Fifty-six questions (6.4%) were answered incorrectly and 57 independent errors were identified. Fifty-two (91.2%) were categorized as content errors while 5 (8.8%) were process errors. The most common content error was wrong English-metric conversion, which happened 26 times (12 volume, 10 weight, 4 height). Implications: On basic pharmacy calculations, skills, performed well overall, and yet English-metric conversions were the problematic area by far. With the success of this work, subsequent work will focus on tracking errors over a broader array of calculations topics as well as look to strategies to minimize errors.

Tracking Student Self-Confidence to Perform Curricular Outcome Tasks. Stuart T. Haines, University of Maryland, David S. Roffman, University of Maryland, Lisa Lebovitz, University of Maryland, Deborah A. Sturpe, University of Maryland. Objectives: To track and assess student self-confidence to perform curricular terminal performance outcomes over time. Method: We established sixteen terminal performance outcome (TPO) statements describing abilities our graduates should possess related to direct patient care, practice management, and population health. A tool describing three scenarios in community, hospital, and managed care settings was administered to students at school entry and annually thereafter. Each scenario included tasks mapped to TPOs that should be performed to address the patient’s problems present in the case. Students were asked to rate their confidence in their ability to perform the tasks in the context of the scenario. Changes in self-confidence over time and comparisons between tasks and practice settings were analyzed. Results: At baseline, students indicated they could not perform the tasks in any scenario “without substantial supervision” (ranging from 54 to 98% depending on task and scenario). As students progressed through the curriculum, self-confidence substantially improved. The percentage indicating they could perform these tasks without assistance increased from 0 to 12% P1 (range); 1 to 26% P2; 7 to 42% P3 (p < 0.001) and mean scores increased for each task (p < 0.01). Similar increases in self-confidence were seen in all settings. Self-confidence was highest for

Use of Disability Simulation to Enhance Empathy Among Students While Counseling Patients With Disabilities. Sara A. Al-Dahir, Xavier University of Louisiana, LaKeisha G. Williams, Xavier University of Louisiana. Objectives: This study was designed to evaluate the utility of simulating disability in enhancing patient counseling techniques and empathy among 2nd professional year pharmacy students. Method: IRB approval was received. One hundred thirty-five second year pharmacy students participated in a Skills Lab simulation that involved simulating visual impairment, hearing impairment and diminished motor function. Students were then given a lecture on cultural competence in counseling patients with physical disabilities. A 5 point Likert-scale pre-test, post-test and opinion scale were administered which consisted of a Social Distance Scale, The Leeds Attitude to Concordance scale and Attitude to Disabilities Scale. Students were asked general questions on their knowledge of counseling patients with disabilities and the efficacy of the simulation lab. Data was analyzed with a reliability test and student t-test to compare the means of the pre and post-test scores. Results: The reliability of the survey instrument was assessed and yielded a Cronbach alpha score of .82 on the three domains of the survey. A significant difference was found between the pre-test and post-test score in Attitude toward People with Disabilities (pre-test = 3.54, post-test = 3.76, p = .005) and the Social Distance Scale (pre-test = 3.76, post-test = 3.99, p = .000). Implications: Culturally competent care among healthcare professionals will positively influence the therapy management of patients with disabilities. Health care students are receptive to alternate learning strategies to deal with special needs populations. Simulation laboratories enhance the empathy these future care providers have toward diverse patient populations, specifically, patients with disabilities.

Use of Online Evaluation Forms and Quick Response Codes to Aid in Student Assessment. Erin M. Timpe Behnen, Southern Illinois University Edwardsville, Jingyang Fan, Southern Illinois University Edwardsville, Janice R. Frueh, Southern Illinois University Edwardsville. Objectives: To investigate the use of online evaluation forms compared to paper forms during an objective structured clinical exam (OSCE). Method: In 2011, evaluators completed real-time paper evaluations to assess student performance in a three-station OSCE. The evaluations were collected and data manually entered into a spreadsheet. In 2012, we created an online form that input data directly into a spreadsheet. Evaluators used iPads to scan Quick Response (QR) codes that contained the link to the online form in Google Documents to evaluate students in real-time. An evaluator survey was conducted immediately following the exam both years. Additionally, the exam
facilitators were able to comment on the accuracy and ease of data analysis between the years. **Results:** All evaluations (N = 234) were accounted for in 2011, whereas 4 of 243 evaluations (1.6%) were missing in 2012. No difference was found between evaluators’ perception regarding sufficiency of training (14 of 20 strongly agreed in 2011 vs. 13 of 18 in 2012) and comments suggested that evaluators liked the technology overall. Overall time spent creating electronic forms prior to the exam was greater in 2012 (4 hours in 2012 vs. 1 hour in 2011); however, less time was spent on inputting and verifying data (5 hours in 2011 vs. 2 hours in 2012) resulting in quicker feedback to students. **Implications:** Using an online evaluation form saved time and was well received by evaluators. OSCEs require significant time and resources to sustain. Our findings provide insight into using technology for student assessments.

**Use of Twitter as a Personal Learning Network (PLN)/Backchannel Tool In Over-the-Counter Drugs/Self-Care Course.** Lana Dvorkin-Camiel, Massachusetts College of Pharmacy and Health Sciences-Boston, Jennifer Goldman-Levine, Massachusetts College of Pharmacy and Health Sciences-Boston, Maria D. Kostka-Rokosz, Massachusetts College of Pharmacy and Health Science-Boston, William W. McCloskey, Massachusetts College of Pharmacy and Health Sciences-Boston.** Objectives:** To evaluate the use of Twitter as a Personal Learning Network and Backchannel tool for PY3 pharmacy students. **Method:** Students signed up for a Twitter account used outside of this required class as a tool for Personal Learning Network development where they shared weekly health news on the Twitter course list. Twitter was also used in class as a Backchannel - students posted questions or comments in real time via smartphones for class discussion with instructors. **Results:** Two hundred sixty-six students completed the survey. Only 36% were comfortable using Twitter before the project, with 58% surprised that Twitter can deliver health news, and 79% introduced to PLN for the first time. Seventy eight percent felt that professional sources shared high quality information, 67% found that following professional sources enhanced their professional development, 56% enjoyed retweeting information from sources they followed, and 59% felt that reading their classmates’ tweets enhanced their professional development. Students plan to continue: using Twitter as a social networking tool (51%), using Twitter as a PLN (60%), following the same individuals (65%), following the same organizations (71%), following the same lists (67%), following the course list (66%). Fifty five percent appreciated the availability of Backchannel during class. On majority of questions, close to 20% of respondents selected a neutral opinion. **Implications:** This project exposed students to the use of Twitter as a social networking tool and Backchannel tool for PY3 pharmacy students. Method: Students signed up for a Twitter account used outside of this required class as a tool for Personal Learning Network development where they shared weekly health news on the Twitter course list. Twitter was also used in class as a Backchannel - students posted questions or comments in real time via smartphones for class discussion with instructors. Results: Two hundred sixty-six students completed the survey. Only 36% were comfortable using Twitter before the project, with 58% surprised that Twitter can deliver health news, and 79% introduced to PLN for the first time. Seventy eight percent felt that professional sources shared high quality information, 67% found that following professional sources enhanced their professional development, 56% enjoyed retweeting information from sources they followed, and 59% felt that reading their classmates’ tweets enhanced their professional development. Students plan to continue: using Twitter as a social networking tool (51%), using Twitter as a PLN (60%), following the same individuals (65%), following the same organizations (71%), following the same lists (67%), following the course list (66%). Fifty five percent appreciated the availability of Backchannel during class. On majority of questions, close to 20% of respondents selected a neutral opinion. Implications: This project exposed students to the use of Twitter as a social networking tool and Backchannel tool for PY3 pharmacy students.

**Use of a Simulation Exercise to Enhance Students’ Learning in a Pharmacology Course.** Ashley Castleberry, Kathryn K. Neill, University of Arkansas for Medical Sciences, Kendrea M. Jones, University of Arkansas for Medical Sciences, Cindy D. Stowe, University of Arkansas for Medical Sciences, Amy M. Franks, University of Arkansas for Medical Sciences. **Objectives:** To assess the effectiveness of a pharmacology simulation on student learning and to evaluate student perceptions of the experience. **Method:** Second-year pharmacy students in the cardiology section of a pharmacology course participated in a simulation experience, using a high fidelity simulator, centered on a hypertensive crisis due to medication non-adherence. Pre- and post-tests utilizing the same four questions were administered to assess knowledge. Changes in learning were compared using mean values. Students self-reported their previously assessed preferred learning style using VARK (Visual, Aural/Auditory, Read/Write, and Kinesthetic). An evaluation incorporating Likert scale responses (1 = strongly disagree to 5 = strongly agree) assessed students’ perceptions of the experience. Perceptions were evaluated using descriptive statistics (mean, SD). **Results:** All students (n=113) completed the simulation experience, pre- and post-tests, and evaluation. Mean score increased from 51.3% (pre-test) to 84.3% (post-test), p<0.05. Mean increases according to learning style were Visual (33%), Aural/Auditory (36%), Read/Write (31%), and Kinesthetic (38%). According to student perceptions, the exercise: stimulated learning (4.26, 0.84); was stressful (3.05, 1.00); was organized (4.24, 0.79); was challenging (3.77, 0.81); and was useful (4.22, 0.74). The majority (93%) of students agreed simulation should be used again in their pharmacy education. **Implications:** Participation in a simulation exercise resulted in increased performance on knowledge-based assessments. Students perceived the simulation exercise to be useful to learning and recommended it be used in future coursework. Implementation of simulation exercises should be considered in basic pharmaceutical sciences courses to enhance learning of foundation knowledge and facilitate application to therapeutic decision-making.

**Use of a Standardized Patient Experience for Curricular Feedback.** Terri M. Wensel, Sanford University, Jennifer W. Beall, Sanford University. **Objectives:** 1. Assess student interaction with a standardized patient for thoroughness in data collection, therapeutic recommendations, and communication skills. 2. Utilize data from interaction to identify areas for improvement within the Pharm.D. curriculum pertaining to a single topical area **Method:** Third-year pharmacy students attended an off-site, two-station OSCE assessing their skills pertaining to headache evaluation and smoking cessation counseling. Methods and results for headache evaluation are presented here. Cases were slightly modified from existing, validated cases used by a medical school. Interactions could last up to ten minutes in length. Students were not allowed any drug reference material before or during the encounter. Students were assessed by the standardized patient in the areas of history, counseling, and interpersonal/communication skills. Data are reported with descriptive statistics. **Results:** A total of 120 students completed the headache encounter. The average score for the encounter was 78.9% (range = 100-45, mode = 89). The history assessment revealed students satisfactorily determined the patient’s current medications (92%) and that ibuprofen had been used for their headache (99%); however, a disappointing number of students assessed headache severity (28%), PMH (78%), and allergies (40%). For all counseling areas, students scored below 70%. All interpersonal areas assessed were higher than 98%. **Implications:** The results of this interaction indicate that while students communicate well, a large number of students failed to collect a thorough patient history and provide specific recommendations to the patient. This information is included in the didactic curriculum and currently reinforced in skills lab once a year. Future planning for the skills lab sequence will include more simulated patient encounters to reinforce this skill.

**Use of an Assessment Tool to Measure Learning in a Cough, Cold, and Allergy Lab.** Rachael B. Hills, Ann Zweber, Oregon State University. **Objectives:** An assessment tool was used to measure effectiveness of interactive teaching methods for the cough, cold, and allergy (CCA) unit for the first year pharmacy practice class. The CCA objectives included: 1) describe when to refer a patient complaining of cold symptoms to his or her PCP, 2) recommend non-pharmacological and non-prescription therapy, and 3) describe the active ingredients, age appropriate use, effects, and unwanted effects of OTC products. **Method:** The pharmacy practice class consists of 5 groups of 16-20
students that meet in a weekly lab. Before lab activities began, the students completed a pre-assessment test. The pre-assessment asked the student to fill in information concerning CCA medications, side effects, age appropriateness, and warnings/precautions, non-pharmacological methods, and when to follow-up. Students were then divided into small groups of 4 and rotated through 5 patient case stations. The cases were then reviewed as a class. At the end of class students completed the post-assessment test, which was identical to the one given at the beginning of class. All assessments were scored after the Friday lab was completed.

**Results:** The mean difference in overall scores was significant between pre and post testing. Differences in performances of different lab days varied. Score differences for specific sections of the test varied in significance.

**Implications:** The pre- and post-assessment tool helped instructors determine achievement of learning objectives. The interactive case-based learning activity successfully promoted learning for some concepts, but not all.

**Using an Error Disclosure Exercise as an Interprofessional Learning Experience.** Jean M. Nappi, South Carolina College of Pharmacy, Sarah Shadner, The University of Kansas, Donna Kern, Amy Blue, Amy Leaphart. **Objectives:** To involve students working in small interprofessional groups to disclose a medical error to a “standardized family member.” **Method:** Students from Dentistry (n=65), Graduate Studies (n=25), Health Professions (n=81), Medicine (n=159), Nursing (n=56) and Pharmacy (n=78) were required to participate in a half-day interprofessional exercise. Initially the students attended a lecture on steps to consider in error disclosures. They were then divided into 28 small groups to apply their interprofessional collaboration skills. Within these groups, students were further divided into three teams consisting of six team members representing various health professions. Each team was given the same patient case scenario, allowed to discuss the case and plan their approach to disclosing the error to the patient’s family member. The family member responded to the disclosure in a different way for each team, first understanding, then angry and last emotional. Each small group was able to observe and critique the other two teams. After the exercise students were asked to evaluate various aspects of the experience using two scales: 1 = ineffective through 5 = very effective and 1 = strongly disagree through 5 = strongly agree. The evaluation survey asked students their opinion regarding the value of teamwork. **Results:** Overall students rated the exercise as effective (mean 4.14). Graduate students found the experience to be less valuable than other students. All types of students rated the small group exercise as being more valuable than the lecture presentation (4.48 vs 3.65). **Implications:** Students value simulation activities that allow them to practice interprofessional collaboration skills in a safe environment.

**Utilization of Multimedia Design Principles in PowerPoint Redesign to Improve Classroom Dynamics and Student Performance.** Adam Pate, The University of Louisiana at Monroe. **Objectives:** To measure the effects of multimedia design principles in redesigning a PowerPoint presentation on student satisfaction, confidence in mastery of material, and test item performance. **Method:** Two versions of an identical lecture were presented in different formats over subsequent years (2011 & 2012). One with traditional lecture PowerPoint slides and the other redesigned to comply with multimedia design principles as defined by Mayer, et al. At the conclusion of the lecture, students were given an optional survey evaluating the lecture presentation. Student scores on three identical test questions were also compared between the two years. **Results:** The survey response rate was 90% (66 out of 73). Overall, 86% (n=57) of students selected 7 or above on a 10 point scale for presentation satisfaction. Sixty-four percent (n=42) agreed/strongly agreed that they believed they would perform well on an exam covering the material. Sixty percent (n=40) considered: GPA, PCAT, MMI score, age, credit hours, state residence, degree, and admit year. **Results:** Students (n=476) had a median MMI score of 5.7, their mean GPA, PCAT and age were 3.58, 73.15, 22.69, respectively. In our model, students with a GPA < 3.0 (OR=62.2; 95%CI: 6.47-597.32) and PCAT < 40 (OR=13.3; 95%CI: 1.08-163.79) were more likely to experience academic difficulty than those with the highest GPA and PCAT scores. Students with MMI scores in the bottom 5% (MMI <4.3) were also more likely to experience academic difficulty (OR=2.9; 95%CI: 1.30-6.44). The model had good discrimination (c-statistic=0.756). **Implications:** These data show that the MMI can identify those at risk of academic difficulty independent of GPA and PCAT scores. Students with the lowest MMI scores, GPA and PCAT scores were at especially high risk of academic difficulty in our curriculum and these factors should be considered in admissions determinations and to target programs to at risk students.
indicated they would like to see pictures and narration used more often and 75% (n = 50) agreed/strongly agreed pictures and narration kept their attention better than traditional PowerPoint. Students receiving the modified lecture also performed statistically better on three identical test items (p < 0.05) compared to those receiving the traditional PowerPoint. Implications: Student reaction to a multimedia design principle redesigned PowerPoint was positive, indicating that students may prefer this method over traditional PowerPoint. Positive effects on student knowledge retention may be possible with multimedia design adherent PowerPoint slides as evidenced by improved test performance.

Vaccine Administration Experience and Perceptions Among Student Pharmacists at Auburn University Harrison School of Pharmacy. Erik L. Kleppinger, Auburn University, Jason E. Dover, Auburn University, Amber Hutchison, Auburn University. Objectives: Auburn University Harrison School of Pharmacy students receive immunization delivery training in the spring of their PY1 year. We sought to evaluate the immunization experience, attitudes, and perceptions of our student pharmacists after completion of immunization training. Method: An anonymous survey was distributed to students via Qualtrics®, a web-based questionnaire and statistical analysis tool. Questions in the survey included demographic information, opportunity to immunize, volume and scope of immunizations delivered, immunization venue, and attitudes toward pharmacist’s role as an immunizer. Data were collected over a 6-week period and analyzed via descriptive statistical tests. Results: A total of 233 students responded to the survey (52.5%) including 88 PY2 students, 80 PY3 students, and 65 PY4 students. Of all respondents, 61% reported involvement in immunization delivery, primarily at their place of employment as opposed to other venues. The influenza vaccine was the most frequent vaccine administered (93%). Other vaccinations given included: herpes zoster (40%), pneumococcal (29%), Td/Tdap (25%), hepatitis B (4%), meningococcal (2%), HPV and MMR (1%). Most students not involved in immunization activity reported a lack of opportunity. The majority of students reported having the opportunity to recommend vaccinations (78%) and feel that pharmacists play an important or very important role in immunization delivery (97%). Implications: Students most often reported providing immunizations at their place of employment; therefore, immunization training earlier in the curriculum may increase the opportunity student pharmacists have to provide needed immunization services to the community. Other avenues for immunization experiences within the PharmD curriculum need to be explored.

Validation of a Cased-based, Annual Student Assessment and Progression Exam. Rebecca L. Brady, University of the Incarnate Word, Jeffrey T. Copeland, University of the Incarnate Word, Helmut B. Gottlieb, University of the Incarnate Word, Adeola O. Grillo, University of the Incarnate Word, Cheryl Horlen, University of the Incarnate Word, Helen Smith, University of the Incarnate Word, Elizabeth M. Urteaga, University of the Incarnate Word, David F. Maize, University of the Incarnate Word. Objectives: Analyze the criterion validity of the P3 Annual Student Assessment and Progression (ASAP) exam using the well-validated Pharmacy Curriculum Outcomes Assessment (PCOA) exam. Method: Students from the P4 class of 2012 were invited to participate in this prospective, self-controlled study. Participants took the 2012 PCOA exam followed 2 weeks later by the P3 ASAP exam that had been administered to the graduating class of 2011. The P3 ASAP and PCOA raw scores were compared to determine the criterion validity of the P3 ASAP exam using regression and correlation analyses. Results: Forty-seven P4 students participated. The least squares method gave the estimated regression equation, Y = 0.2163X + 16.5, which could predict the ASAP score using the PCOA score. A strong positive correlation between the PCOA and ASAP performance was shown by the linear regression analysis including a Pearson Correlation Coefficient of 0.8106 (p < 0.001) and an r2 of 0.6571 (p < 0.001). Implications: Statistically, the student performance was significantly similar on both the PCOA and ASAP exam supporting the criterion validity of the FSOP P3 ASAP exam. Strengths of this study demonstrate 1) schools can develop internal, curricular-outcome assessment exams that are valid; 2) along with criterion validity, success of the exam depends on having strong content validity, which requires extensive faculty participation and dedicated, continued analysis to ensure quality improvement. Limitations include that only one version of the P3 ASAP exam was compared to the PCOA and the assessment was based on students willing to participate.

Value of a Regional School of Pharmacy Residency/Fellowship Showcase to Program Directors. William W. McCloskey, Massachusetts College of Pharmacy and Health Sciences-Boston, Susan Jacobson, Massachusetts College of Pharmacy and Health Sciences-Boston, Kathy Zaiken, Massachusetts College of Pharmacy and Health Sciences-Boston, Trisha L. LaPointe, Massachusetts College of Pharmacy and Health Sciences-Boston, Caroline S. Zeind, Massachusetts College of Pharmacy and Health Sciences-Boston, Judy W.M. Cheng, Massachusetts College of Pharmacy and Health Sciences-Boston, Anela Stanic, Massachusetts College of Pharmacy and Health Sciences-Boston, Snehal Bhatt, Massachusetts College of Pharmacy and Health Sciences-Boston, Matthew R. Machado, Massachusetts College of Pharmacy and Health Sciences-Boston, Dorothea Rudorf, Massachusetts College of Pharmacy and Health Sciences-Boston, Timothy J. Maher, Massachusetts College of Pharmacy and Health Sciences-Boston. Objectives: To assess the value of a regional residency/fellowship showcase to program directors and to identify important candidate characteristics that programs were seeking. Method: We surveyed 44 pharmacy residency/fellowship directors or their representatives who participated in a regional showcase at MCPHS University. Demographic information, perceived benefits, and satisfaction with the showcase were assessed, along with questions aimed at identifying important candidate characteristics that programs were seeking. The survey instrument used a 5-point scale, with a score of 1 being low and 5 being high. The survey was distributed at the showcase and was collected at the end of the program or completed online. Results: Forty-one (93%) directors or their representatives completed the survey. Most (88%) represented PGY 1 or 2 residencies. Large teaching hospitals (51%), small community hospitals (15%), and pharmaceutical industry (10%) were the most common organizations represented. Benefits identified included: reaching many students from the region (95%), no fee (85%), meeting candidates in person (68%), convenient location (66%), and networking with colleagues (51%). Most respondents rated the communication skills and professionalism of students they met as 3 or 4. Work experience, academic ability, leadership roles and performance on APPE rotations were the main characteristics both residencies and fellowships used for identifying strong candidates. Research experience was also considered highly by fellowships. Most respondents were highly satisfied with the showcase and all would recommend it to others. Participants suggested a larger venue in the future. Implications: A regional School of Pharmacy residency/fellowship showcase is valued by program directors.

We All Have iPads-Now What? Margarita V. DiVall, Northeastern University, Elizabeth Haftel, Northeastern University, Carol Poskay,
Northeastern University, David P. Zgarrick, Northeastern University. 

**Objectives:** Evaluate iPad utilization after a department-wide iPad initiative. 

**Method:** All faculty received iPads and virtual tutorials and group training sessions were provided. An anonymous survey was administered 9 months after iPad distribution. 

**Results:** Twenty-eight faculty (90%) responded to the survey. Of these, 32% were prior iPad users and 82% had external practice sites. Most common iPad uses were connectivity with students (86%), paper/project annotation (68%), assessment (57%), and demonstration of tools used in practice (36%). For teaching, 61% used iPads in seminars/labs, 57% in experiential setting and 43% in the classroom. For those with practice sites, 39% accessed electronic medical record, 39% accessed drug information resources, 22% used them for medical reconciliation, and 17% for documentation. Only 39% of practice sites supported iPad use of for patient care and 68% provided WiFi access. Previous iPad users utilized iPads to a greater extent than new users (P<0.01 for all comparisons). Faculty found iPads overall beneficial: 89% agreed that iPad increased their productivity and decreased paper waste; 69% of those who used iPads for patient care agreed that it improved their efficiency; 73% and 80% agreed that iPad allowed them to try out new teaching strategies/tools in the classroom and experiential setting, respectively. Faculty reported spending an average of 75% of time on iPad for work-related activities and 25% for personal use. 

**Implications:** Faculty were able to integrate tablet technology into daily workflow as it relates to teaching and overall productivity. iPad use for patient care activities depends on site support for tablet technology.

---

**iPad Use by Student Pharmacists on Advanced and Introductory Pharmacy Practice Experiences.** Jeffrey P. Bratberg, The University of Rhode Island, Margaret M. Charpentier, The University of Rhode Island. 

**Objectives:** Assess use of Apple iPad 2 by student pharmacists completing their medicine and infectious diseases experiential rotations at Roger Williams Medical Center (RWMC) in Providence, RI. 

**Method:** At RWMC, iPads were provided to all students for use during their advanced and introductory practice experiences at this site starting in May 2011. Students who completed their rotation at RWMC since May 2011 were invited to complete an IRB-approved, voluntary, anonymous online survey. This survey retrospectively queried the students to assess the perceived benefits and limitations of using the iPad during multidisciplinary rounds and other activities, how the iPad enhanced learning, and its effect on intervention documentation. 

**Results:** A total of 25 responses were received, representing a 53% response rate. Of listed advantages, 68% percent of students found that an advantage of the iPad on rounds was for drug information to answer team questions, 60% for patient information access, and 28% for literature searches. Twenty eight percent of responders reported that the patient information system login process was a limitation, 78% reported that the iPad enhanced their learning through easy access to clinical information, 71% reported that the iPad assisted with intervention documentation. Forty four percent of students requested more application-based patient and drug databases, while 25% felt nothing needed improvement. 

**Implications:** Students surveyed reported that the iPad enhanced their learning and improved intervention documentation. Application-based patient and drug information access may further improve the use of this tool. New technology that provides ready access to evidence and patient information enhances student learning.

---

**Theoretical Models:** 

**Active Learning through a Debate Series in a First Year Pharmacy Self-Care Course.** Michelle Lewis, D’Youville College, Stacie J. Lampkin, D’Youville College, Christine Collins, Amanda Ryan, Aaron Barczak, Janelle Juda, Jacob Northrup, John Jiles, Dimeji Oyetunj. 

**Objectives:** This study is aimed to determine if including formal debates in coordination with classroom lectures aids students in learning Self-Care concepts and improving skills such as critical thinking, communication, public speaking, research methods and teamwork. 

**Method:** Pre- and post-debate surveys were administered to students to assess their opinion on debates and their associated effect on skill development. On debate day, students would take a quiz testing knowledge on the previously provided debate topic. The debate then ensued with opening arguments, rebuttals, the formal debate, and closing remarks. The quiz was then re-administered to determine if there was improvement in understanding of the material, and if their opinion was altered. 

**Results:** Pre and post-class data showed that students believed participating in a debate assisted them in learning material, but observing the debates did not. We found that 92% of students felt preparing for the debate was at least slightly effective in helping them improve skills. Also, students evaluated themselves as more competent in these skills after participating in the class. 

**Implications:** We conclude that active participation is crucial in student’s perception of their ability to retain and comprehend information, and that observation was not effective in facilitating learning. Most students said participating in debates was at least slightly effective in improving crucial skills. We observed that debates facilitate student’s personal perception of competency with regard to these crucial skills, and therefore believe that debates may be a useful classroom tool, in conjunction with didactic learning, to improve overall education.

---

**Adaptations Made in Team Based Learning for Patient Self-Care and Monitoring Course Based on Student Feedback.** Jessica W. Skelley, Samford University, Lindsey K. Elmore, Samford University. 

**Objectives:** To identify significant feedback themes received from a class of 122 third-year pharmacy students after their first semester of Team Based Learning (TBL) within the Patient Self Care and Monitoring course, and describe adaptations made to the course based on this feedback. 

**Method:** Following completion of the first semester of TBL within the Patient Self-Care and Monitoring course, students were surveyed to obtain feedback on their experience with TBL and perceived learning outcomes. Students anonymously completed evaluations electronically, and results were compiled into a composite document and distributed to all instructors teaching within the course. 

**Results:** A total of 98 responses were received. There were several consistent themes of feedback regarding the TBL format of learning. Students frequently complained about a mismatch between their expectations for time spent preparing for the course outside of class time and what was actually required. This feedback was addressed by clarifying in the syllabus to expect an average of 6 hrs/week for a 3 credit hour course to be spent in outside work. Students were also asked to contact the course IOR if they spent more than 6 hours/week preparing for class. Students gave feedback about confusion regarding how to achieve 100% on assignments. To address this concern, the syllabus was adapted to include examples of projects that achieved 100%, and additional assignment guidance and format were given. 

**Implications:** Implementation of any new course design will have challenges, and requires reflection and adaptability from semester to semester. Changes should be guided by feedback received from students.

---

**Closing the Immunization Disparity Gap Through Public-private Partnerships.** Thomas E. Buckley, University of Connecticut. 

**Objectives:** To demonstrate that public-private partnerships can reduce racial and ethnic disparities in adult immunizations. 

**Method:** The state department of public health, the state university pharmacy

Objectives: To develop an electronic medical record (EMR) pain clinic template and evaluate the use of the template by Advanced Pharmacy Practice Experience (APPE) students. Method: The Saint Luke’s Multispecialty Clinic provides multiple services for patients; one of these services includes the Chronic Pain Clinic. The Chronic Pain Clinic was started in 2006 and initially utilized paper charts and a hard copy pain template. The Multispecialty Clinic converted to an EMR system in October 2010. Since that point, the clinic has designed and implemented an innovative electronic pain template to be used for documentation during patient encounters. Nursing staff, pharmacy staff, and/or physicians can document in the template. Records were queried to determine APPE student involvement in patient evaluation and documentation using the template. Results: The electronic pain template was initially implemented in September 2011. Through February 14, 2013, 304 templates have been generated. During that time frame, pharmacy students were present in clinic and able to participate in patient encounters for approximately 7.5 months out of the 16 months that the electronic template has been available. Of those 304 templates generated, pharmacy students participated in patient assessment, data collection and documentation of 89 templates or approximately 30% of all clinic patient encounters. Implications: Utilizing a common template for all chronic pain patient interviews ensures consistency in documentation amongst all healthcare professionals, including pharmacy students. The electronic pain template also allows APPE pharmacy students to become fully integrated in the patient encounter and encourages effective assessment of chronic pain.

Development of a Veterinary Pharmacy Elective Course. Cory R. Theberge, University of New England. Objectives: 1. To ascertain the subject areas in veterinary pharmacy that are essential in most retail and community pharmacy settings. 2. To review the assessment of student pharmacists’ conceptualization of veterinary pharmacy topics. 3. To develop a veterinary compounding laboratory component to a veterinary pharmacy course. 4. To assess the impact of clinical experiences through a required animal health-related volunteer assignment. Method: Students were actively involved in the discussion of the learning outcomes most relevant to a veterinary pharmacy elective course in the PharmD curriculum. Collaborative exercises were utilized to reinforce student comprehension of legal and regulatory issues, available veterinary-labeled products, and companion animal anti-infective therapy. Student and mentor input was collected during a required animal health-related volunteer assignment. Students and local veterinary compounding pharmacists worked together to develop a compounding laboratory component to the elective course. Results: Collaborative discussion of learning objectives was effective in determining the areas of study most relevant to students planning for retail or community pharmacy careers. Group problem solving sessions were effective in reinforcing student pharmacists’ familiarity with legal and regulatory issues, veterinary-labels drug products, and anti-infective therapies for companion animals. Both the required animal-health volunteer experiences and the compounding laboratory sessions were positively evaluated by students, and plans are discussed to expand these course objectives in the next school year. Implications: The information generated provides a perspective on the organization of a veterinary pharmacy elective course in the PharmD curriculum. Progress was made in clarifying the veterinary pharmacy topics that are most relevant to a student pharmacist planning a career in retail or community pharmacy settings. Veterinary pharmacy learning objectives were greatly enhanced by the inclusion of a compounding laboratory session and a required volunteer assignment in an animal-health related practice.

Educational Model in a Community-Based Research/Service Program. Lauren S. Bloodworth, The University of Mississippi, Leigh Ann Ross, The University of Mississippi, Meagan Brown, The University of Mississippi, Courtney S. Davis, The University of Mississippi, Ashley W. Ellis, The University of Mississippi, Kristopher Harrell, The University of Mississippi, James J. Pitcock, The University of Mississippi, Daniel M. Riche, The University of Mississippi, Justin J. Sherman, The University of Mississippi, Laurie E. Worthington, The University of Mississippi. Objectives: To describe an innovative approach to expanding student/resident training through a Community-Based Research Program (CBRP) in an underserved region. Method: As a CBRP was developed to provide medication therapy management (MTM) services in an underserved region, it was determined that student/resident education would be important to build a network of future pharmacy providers to sustain MTM services. Educational objectives were added to involve students in Advanced/Introductory Pharmacy Practice Experiences (APPEs, IPPEs) in this area, increase pharmacist preceptors, create new advanced community APPEs, and implement a Community Pharmacy Residency Program (CPRP). Results: From 2008-2012, 111 students completed APPEs and 179 completed IPPEs related to CBRP work, and 56 students were involved in health screenings/MTM encounters. Participating CBRP pharmacy sites were offered preceptorship and four were developed into advanced community APPE sites. A residency program was implemented in 2009 and received full accreditation in 2011. Through this success, funding was awarded to expand to three residency positions in 2013. Three former residents are in positions providing MTM services and one serves as the School’s Coordinator of Community Pharmacy Development, working throughout the state to implement the CBRP MTM model. Implications: As MTM models are implemented in community settings, it is increasingly important for sustainability that students/residents train in this environment. This program description will provide...
insights from four years’ experience with this educational model and will assist other institutions in development of advanced community APPEs and CPRPs through research and service activities.

**Preliminary Evaluation of an APPE Scholarship Rotation.** Nancy T. Williams, *Southwestern Oklahoma State University*, Christine F. Cox, *Southwestern Oklahoma State University*. **Objectives:** Pharmacy residency programs are becoming increasingly competitive. In an effort to increase our students’ competitiveness, an APPE scholarship rotation was designed. This rotation allows students to work closely with a Pharmacy Practice faculty member to prepare a poster and/or manuscript for publication. The purpose of this project is to (1) determine the type of scholarly output produced as a result of this new rotation, and (2) assess student feedback. **Method:** In summer 2010, guidelines were developed for an APPE scholarship rotation. This rotation would be offered during the student’s first semester of APPEs. An application process would be used to select students and match them with faculty. Most practice faculty expressed interest in participating. This rotation was piloted before full implementation. **Results:** As of February 2013, ten students have completed this rotation. The most common types of scholarly activities included: data collection/analysis, preparation of a review article or poster, and peer review of a manuscript. To date, the status of these projects include three manuscripts in progress, one poster presented at a national meeting, one abstract submitted, three manuscript reviews completed, and one research project terminated. Two of the ten students are completing a residency, and two are applying to residencies. Student feedback has been very positive. Their interest in pursuing future scholarly activities has increased, and several students commented that they felt this rotation strengthened their residency application. **Implications:** This type of rotation enhances scholarship at our College and may help distinguish our students during the residency application process.

**Professional Development Opportunities for Health Care Providers in an Underserved Region.** Lauren S. Bloodworth, *The University of Mississippi*, Leigh Ann Ross, *The University of Mississippi*, J. Randy Pittman, *The University of Mississippi*. **Objectives:** To describe professional development opportunities provided for health care providers in an underserved region through a Community-Based Research Program (CBRP). **Method:** In 2008, a CBRP was created to implement medication therapy management (MTM) services in community pharmacies and clinics in an underserved region. It was determined that education would be important to build a provider network to sustain MTM services in this region. CBRP faculty completed APhA MTM and Diabetes Certificate “Train the Trainer” Programs and then offered these programs for CBRP pharmacists throughout this underserved region. The population of this region is largely African American and many suffer from diabetes and related complications. In addition to certificate programs, providers were offered educational programs focused on cultural competency and diabetes control among multicultural populations. **Results:** Over four years, 14 MTM Certificate Programs were offered with 88 pharmacist participants and five Diabetes Certificate Programs were offered with 42 pharmacist participants. Cultural competency programs were offered in various locations for pharmacists, physicians, nurse practitioners, and other healthcare professionals with 50 participants. **Implications:** Through the CBRP, professional development opportunities were provided for 180 healthcare professionals in a medically underserved region with a large chronic disease burden. This education facilitated the successful implementation of MTM services in this region, increased access to providers with MTM, diabetes, and cultural competency training, and supports the sustainability of services beyond the scope of the CBRP projects.

**Stigma Associated with Mental Illness Among Healthcare Professionals.** Devon A. Sherwood, *University of New England*, Alyssa A. Stiles, *University of New England*. **Objectives:** The purpose of this study is to identify stigma towards mental illness among health professions students and healthcare professionals. **Method:** This is an educational research study conducted with current students in the healthcare professions to measure stigma associated with mental illness. This was done by conducting a literature review using search engines PubMed, EBSCO, and Ovid from January 2000 to October 2012. An analysis of the literature was completed to illustrate stigma among healthcare students and professionals as a comparator to our samples. Students were then surveyed (154 total; 95 pharmacy, 47 nursing, 12 social work) using the Opening Minds Scale for Health Care Providers (OMS-HC). This OMS-HC is a 12-question, 5-point Likert scale ranging from 12 to 60 points, with lower score indicating less stigma. **Results:** The literature analysis identified stigma among healthcare professionals as an area of concern that clearly has negative impact on the care of mentally ill patients. The OMS-HC results from our students surveyed revealed a mean score of 30.6 (30.9 pharmacy, 31 nursing, and 26.3 social work), which did not significantly differ among disciplines. These scores illustrate negative stigma among our students similar to existing research identifying a disparity among all healthcare professions. **Implications:** Extensive research in the literature and our survey suggests views of healthcare providers continue to show negative attitudes towards psychiatric patients and a large deficiency in education provided. Evidence suggests a need for alternative teaching methods to reduce mental health stigma and to correct these barriers in caring for psychiatric patients.

**Use of Standardized Patients in Case-based Scenarios to Meet ACPE Core Domain Competency Requirements.** Justin J. Sherman, *The University of Mississippi*, Scott S. Malinowski, *The University of Mississippi*, Allison M. Bell, *The University of Mississippi*, Meagan A. Minor, *The University of Mississippi*, Joshua W. Fleming, *The University of Mississippi*, Judith Gearhart, *The University of Mississippi*. **Objectives:** To implement patient interaction activities with standardized patients (SPs) using professional actors to promote development of communication, problem-solving, and interpersonal skills for third professional year pharmacy students and to meet ACPE requirements for core domain competency prior to starting APPEs. **Method:** As part of a new Practice Skills Laboratory course, students attended the Clinical Skills Assessment Center (CSAC), operated by the School of Medicine, and interviewed SPs. Activities addressed core competencies and consisted of two different scenarios (asthma and hypertension), and timing within the curriculum coincided with introduction of these disease states in problem-based learning (PBL) classes. Building upon practice skills introduced in previous laboratory courses, students reviewed patient medical records, interviewed the SP, analyzed the clinical situation, and documented their interventions using SOAP notes. Students received immediate individual feedback [METI LearningSpace(r) software] from SPs regarding interpersonal skills, clinical and data gathering skills, and patient satisfaction. The activity and feedback were recorded on video for faculty and student review. **Results:** Combined class averages of student scores were as follows: interpersonal skills, 93%; data gathering skills, 85%; physical exam skills, 81.5%; counseling, 92.5%; patient satisfaction, 100%; and total average scores, 90%. **Implications:** Students achieved high scores in categories assessing performance criteria during two case scenarios. Using SP scenarios to complement PBL in the areas of asthma and hypertension is an effective way to provide third professional year pharmacy students initial training in conducting a limited patient visit. Additionally, this addresses ACPE Accreditation Standards regarding core domain competencies required prior to APPEs.
Utilizing Writing Across the Curriculum as a Tool to Reinforce Learning Goals Across the Curriculum. Glenn Rosenthal, University of New England, Matthew M. Lacroix, University of New England, Wes Zemrak, University of New England, Devon A. Sherwood, University of New England, Edward Li, University of New England. Objectives: Introducing the use of principles of Writing Across the Curriculum (WAC) as a well established teaching tool that helps connect goals to activities within courses and across curricula. Method: We developed a 2 day faculty workshop that focused on WAC. We engaged two experts, one recruited from our English Department faculty, the second from the Teaching and Learning Center, the on-campus tutoring center. The program developed focused on developing overall curricular objectives, then working backwards to coordinate related courses to include similar teaching methods. Developing writing assignments were a key topic of the workshop since writing has been shown to help students develop critical thinking and communication skills necessary for pharmacy students to move beyond rote memorization of course content. Results: Faculty within the Department of Pharmacy Practice took the principles demonstrated and chose one type of writing assignment, SOAP notes, to apply the concepts too. A grading rubric was developed that was adaptable for the different focuses each course used. Implications: Preceptors had reported this as an area where they had spent a larger amount of time with our first year students. With this change we are hoping to demonstrate an increase in preceptor satisfaction.

Social and Administrative Sciences

Completed Research:

A Course to Teach Third-Year Pharmacy Students to Provide Medication Therapy Management in Community Pharmacies. Ahmed M. Alshehri, The University of Texas at Austin, Sharon Rush, The University of Texas at Austin, Jamie C. Barner, The University of Texas at Austin, Carolyn M. Brown, The University of Texas at Austin. Objectives: Several schools/colleges of pharmacy (S/COPs) have curricula focusing on training pharmacy students to provide Medication Therapy Management (MTM). The “Clinical Skills:Community Care” course was introduced at The University of Texas in 2011 to provide students with practical application of MTM provision. It differs from other S/COPs’ MTM courses because it focuses entirely on MTM, is a required course, requires completion of an MTM national certificate program, and the students serve community pharmacy patients. The course objectives are to help students: incorporate basic clinical skills in real practice settings; assess and resolve medication- and health-related problems (MHRPs); develop public health projects to educate patients on health and wellness; perform patient assessments; and administer immunizations. Method: Students receive lectures and training on MTM, as well as how to utilize documentation software. Each student is supervised by a community pharmacy preceptor. Students are required to identify MHRPs, provide recommendations, follow up, and document services performed for five patients. Results: To better understand the impact of the course on patient outcomes, student cases were also evaluated to determine the type of MHRPs identified and resolved. Overall, students identified 1,370 MHRPs (5/patient) and made 1,004 recommendations (3.7/patient). Out of these recommendations, 16.8% were accepted either by patients or their healthcare providers. Implications: Pharmacy students developed a better understanding of the profession of pharmacy from a community pharmacy perspective.

A Modified Peer Evaluation Tool for Team Learning: Evaluating Student Acceptance and Perceived Effectiveness. Veronica S. Young, The University of Texas at Austin, Rochelle M. Roberts, The University of Texas at Austin. Objectives: Conducting peer evaluations is often expected in team learning. While peer evaluations may foster professionalism and teamwork, evidence suggests varying support and perceived effectiveness. The objective of this process improvement initiative is to determine students’ acceptance of a modified peer evaluation tool and their attitudes toward the impact of peer evaluations on teamwork. Method: The evaluation process was modified based on prior student feedback. It aimed to improve efficiency and acceptance without diminishing quality. A 2-item, online tool was developed incorporating criteria from the Fink method. At midpoint and end of semester, students in a required laboratory rated each team member using an internally developed scale and provided qualitative feedback. Students were given the option to complete an end-of-semester survey to evaluate this process. Results: The survey response rate was 91% (106/116). Student acceptance of the process was high. Compared to other peer evaluations, 73% felt this tool was easier to complete, 62% spent less time, 67% preferred the online format, and 39% felt the feedback was better quality. Most students valued the process, with 75% reporting the feedback was constructive and helped gauge contribution, and 63% perceived it improved teamwork. Barriers involved the qualitative section, including discomfort providing constructive feedback and concerns about anonymity and peer reaction. Implications: A 2-item online peer evaluation tool may increase student acceptance without eroding the quality of feedback. Training students to provide and receive quality peer feedback could further improve the experience and their own self-efficacy, and help develop a skill necessary in their professional career.

A Study of Community Service Curriculum Requirements in US Doctor of Pharmacy Programs. Grant M. Stebbins, Western New England University, Erica L. Wegryn, Western New England University, Joshua J. Spooner, Western New England University, Daniel R. Kennedy, Western New England University. Objectives: This study was conducted to find the prevalence of required community service in US Doctor of Pharmacy Programs. The study further distinguished between volunteer community service and service learning. Method: An online survey tool (SurveyMonkey, com, LLC, Palo Alto, CA) was developed and distributed to the Dean of Academic Affairs (or equivalent) at 129 US Doctor of Pharmacy programs and members of the AACP Curriculum list serve. Results: Overall, the response rate was 66% (85/129). Among responders, 72% have incorporated some form of community service into their curriculum; there was no significant difference between private and public programs (76% vs. 67%; p=0.80). Of these programs, 16% require volunteer community service, 51% require service learning, and 33% require both. Of the programs that require volunteer community service, 44% mandate that a portion of those hours be for a healthcare related purpose. Further, 76% of programs that require voluntary community service link the requirement to the curriculum through activities such as reflective journals or a discussion format. Implications: This study indicates that community service is a component of the majority of Pharm.D. programs, primarily through service learning opportunities. As a more formalized experience, service learning may lead to greater student investment and may consequently instill a sense of philanthropy in future practitioners by establishing a greater connection between themselves and the communities they serve.

A Systematic Review of Studies Investigating Pharmacy Professionals’ Behaviors and Intentions Using Social Cognitive Theories. Paul Gavaza, Appalachian College of Pharmacy, Gregory Barton. Objectives: Little is known about the utility and extent of utilization
of social cognitive theories and their effectiveness in explaining pharmacy-related behaviors. This systematic review investigated the utilization of social cognitive theories in predicting pharmacy professionals’ behaviors and intentions. **Method:** A literature search was performed in January 2012 to discover pharmacy-related articles in PUBMED, PsycINFO, MEDLINE, and Google Scholar databases. A data collection form developed for the study was utilized to extract the information from the studies. For all the articles, reviewers were able to agree through discussion on one coded response for each item. **Results:** Thirty articles met our inclusion criteria. The theory of planned behavior was the most utilized social cognitive theory in predicting behaviors and intentions. Twenty studies utilized the theory of reasoned action and its extension the theory of planned behavior (n=20). Twenty – two (N=73.3%) studies reported that the use of theory was effective in predicting pharmacists’ behaviors and intentions. Clinical pharmacy and counseling were the most investigated behaviors (n=17 and n=6 respectively). **Implications:** This study was the first systematic review on this area. The study provide evidence that there are a limited number of studies utilizing theoretical models to understand and predict pharmacy related behaviors. More research utilizing theories is required to better understand the motivational and cognitive processes underpinning pharmacy-related behaviors.

**AAC Abstracts Reflect Interests of Membership—A Longitudinal Study 2010-2012.** Bernard A. Sorofman, *The University of Iowa, Nathan Peterson. Objectives:** The focus of abstracts of posters at the AACP meeting reflects membership interests. The purpose of this project was to analyze abstracts submitted to AACP Annual meetings to determine 1) what educational interests emerged, 2) how interests varied by the types of educational institutions (private v. public; newer v. established) and 3) how interests change over time. **Method:** A content analysis of abstracts submitted to the 2010 through 2012 AACP annual meetings was performed. Coding was initially based on analyses of 2010 and 2011 abstracts and new topics were added for 2012. Each abstract was reviewed and labeled with keywords that identified its topical focus. Keywords were arranged into thematic content areas; frequencies noted. Institution analysis was restricted to the first author. Schools were labeled as private or public and with the year of their program initiation. Thematic contents were then arrayed by school type and year of program initiation. **Results:** Over 250 distinct keywords were identified. The most common categories were Research, Student Perceptions, Assessment, and Curriculum issues. Themes indicated a different set of interests from previous years; Research emerged as the most common code. Poster topics varied slightly based on age and type of institution but not sufficiently to create a distinction between the content of interest at the schools. **Implications:** The analysis of three years of posters indicated that interests shift from year to year. However, there continues to be no clear distinction in interests between newer and older schools, or between public and private schools.

**Academic Progression: Defining Failure in Professional Pharmacy Programs.** Linda S. Garavalia, *University of Missouri-Kansas City; Maquail R. Graham, University of Missouri-Kansas City; Karen L. Hardinger, University of Missouri, Kansas City School of Pharmacy; Patricia A. Marken, University of Missouri-Kansas City; Russell B. Melchert, University of Missouri-Kansas City; Leigh Anne Nelson, University of Missouri-Kansas City; Amanda M. Stahnke, University of Missouri-Kansas City. Objectives:** Investigate how professional degree programs define failure in the context of academic progression and retention. Programs strive to optimize retention while maintaining high quality. Examining professional degree program policies regarding failure and progression is one avenue for understanding and potentially alleviating excess attrition. **Method:** Progression and remediation strategies and academic performance policies were solicited from fully accredited programs. Content analysis was used to define failure and summarize consequences for 23 programs. **Results:** Students fail to progress academically due to insufficient GPA and/or course grades. Twelve programs required a minimum semester and/or cumulative GPA of 2.00. Minimums from other programs ranged from 2.25 to 2.50. Minimum GPA for 3 programs could not be determined. Failing grades in courses were either “less than C” (n=18) or “F or U” (n=5). Some programs differentiated between “required” and “elective” courses when counting failures (e.g. electives were not subject to failure policy). All schools had a probationary option (e.g. contract) within their progression plan. Failure during the probation resulted in dismissal. All but one school allowed reinstatement after a first dismissal and some allowed reinstatement after two dismissals. **Implications:** Programs use a range of progression strategies; however, few studies report the range of possibilities. This study provides foundational information for programs to learn from each other. While all programs in our study were fully accredited, indicating acceptable progression outcomes, these programs varied in their standards for progression with regard to minimum GPA, allowance for failed coursework, and other related academic achievement factors.

**An Analysis of Supplemental Applications to Pharmacy Programs in the United States.** Erika F. Prouty, Michael E. Derkits, Daniel R. Kennedy, *Western New England University, Joshua J. Spooner, Western New England University. Objectives:** Student complaints about the time and costs associated with completing supplemental applications to pharmacy school are commonplace. The objective of this study was to evaluate the utility of supplemental applications required by Doctor of Pharmacy programs that also use the Pharmacy College Application Service (PharmCAS) common application. **Method:** The PharmCAS website was utilized to identify participating programs that require completion of a supplemental application. Supplemental applications (when available) were collected through individual pharmacy program websites. All data requested in each supplemental application was compiled and compared to the data collected in the PharmCAS common application. Statistical tests for significance at the 0.05 level were performed with t-tests and chi-squares for continuous and categorical data, respectively. **Results:** Out of 110 programs that use PharmCAS, 98 (89.1%) require supplemental applications. There were no significant differences between public and private programs regarding supplemental application usage (96.0% vs. 83.3%, p=0.519) or fees ($59.88 + 20.71 vs. $57.27 + 25.18; p=0.558). Thirty-one supplemental applications were obtained (16 public, 15 private); we found that 68.4% of data points collected in supplemental applications were present in the PharmCAS common application. Frequently asked questions unique to supplemental applications focused on first-time applicant status (61.3%), legacy status (41.9%), and current enrollment status (32.2%). Additional essay questions appeared in 51.6% of supplemental applications (mean: 2.18 essays; range: 1-7). **Implications:** While supplemental applications are common, their questions often overlap with the PharmCAS common application. Pharmacy programs utilizing supplemental applications may consider revising their application to specifically address information not garnered on the common application.

**An Examination of Pharmacists’ Emotional Thinking and its Correlates.** John M. Lonie, *Long Island University, Nino Marzella, Long Island University, Richard Perry, Long Island University, Bupendra Singh. Objectives:** Emotions play a significant role in pharmacists’ decision-making and clinical practice. The current study aimed to examine the pharmacists’ emotional thinking and its correlates. **Method:** A survey was conducted with 51 pharmacists from a single university. The survey included questions on demographic information, emotional thinking, and emotional intelligence. **Results:** A total of 51 pharmacists completed the survey. The mean age of the participants was 36.2 years. Emotional thinking was found to be significantly correlated with emotional intelligence (r=0.47, p<0.01). **Implications:** Emotional thinking is an important aspect of pharmacists’ practice. Enhancing emotional intelligence could potentially improve pharmacists’ decision-making and clinical practice. Further research is needed to explore the impact of emotional thinking on pharmacist performance and patient outcomes.
Stress in Pharmacy Faculty: A National Study to Examine the Use of an Emotional Thinking Scale

Shah, Long Island University, Jesal Jariwala, Long Island University.

Objectives: The main objective of this study was to examine pharmacists’ response on the Emotional Thinking Scale, a measure of the tendency of an individual to allow emotions to affect mood and behaviors. Additionally, this study examined correlative relationships between degrees of emotional thinking and various demographic variables.

Method: A convenience sample of pharmacists was recruited to participate in the study. Participants completed the eight item Emotional Thinking Scale (ETS) and a demographic survey. Data were entered in SPSS and ETS scores were categorized on a continuum of very extremely high to very extremely low emotional thinking. Correlations were run to examine relationship between ETS categories and demographics.

Results: One hundred twenty five pharmacists completed the survey. Twenty one percent of the sample scored between “slightly high” and “very extremely high” on the ETS. “Often being incapacitated by strong feelings” correlated negatively with annual income ($r = -0.309$ ($p = .008$)); “Relying on feelings to deal with complex situations” correlated negatively with annual income ($r = -0.253$ ($p = 0.026$)), with the “number of years practicing pharmacy” ($r = -0.317$ ($p = 0.007$)) and “number of hours worked each week” ($r = -0.317$ ($p = 0.007$)); “Focusing on details thus loosing the big picture” was correlated negatively with annual income ($r = 0.215$ ($p = 0.05$)). Results are consistent with previous ETS research.

Implications: Emotional thinking may decrease with practice experience and may be counterproductive for career goals (salary, promotions, etc.). Entry-level pharmacy education and continuing professional education programs may help develop self-awareness to this issue.

An Examination of Stress and Its Dimensions in Pharmacy Faculty.


Objectives: Colleges/Schools of Pharmacy are responsible for understanding the stress experienced by faculty and, as is feasible, implement strategies to decrease the effect of stress on programmatic outcomes and morale. Currently, there are no known pharmacy faculty-specific stress measures nor are there any known national statistics against which comparisons can be made. The purpose of the study was to evaluate the use of a validated faculty stress measure in pharmacy and provide pharmacy faculty stress benchmark data.

Method: Faculty stress was measured using an adapted version of the Faculty Stress Index (Gmelch, et al., 1986) and included the following dimensions: Rewards and Recognition (RR), Time constraints (TC), Departmental Influence (DI), Professional Identity (PI), and Student Interaction (SI). Respondents were asked to report about the stress associated with work life situations using a 7-point response scale where 1 = no pressure and 7 = excessive pressure. Following pretest procedures, an Internet survey was distributed to a national random sample of pharmacy faculty (N= 2514).

Results: A total of 890 usable responses were received. Overall, faculty reported stress just below the midpoint of the scale (3.64). The highest levels of stress overall were reported in the PI (4.25) and TC (4.04) domains. Differences in overall stress were found on the basis of academic rank, gender, and academic discipline.

Implications: The study provides a better understanding of stress in pharmacy faculty nationally and highlights areas of potential concern. Future research should consider the development and implementation of a new stress measure that accurately assesses all dimensions of pharmacy faculty work life.

Assessing Critical Thinking and Written Communication Skills in the Admission Process of PharmD Program.

Tiffanie Ho, Jason Sowa, Gail Kubat, Lisa Erck, Aubrey Luhdorff, Jason McDowell, Paul Nguyen, Xiaodong Feng, California Northstate University.

Objectives: Critical thinking and written communication skills are essential for effective patient-centered pharmacy practice. This study describes and evaluates the writing exercise we designed as a component of our admission process to assess for these skills and their relationship to other admission measures used in prior years. Our data suggests that the onsite writing exercise could be a strong indicator for the matriculated candidates’ academic performance in the PharmD program. Comprehensive follow up study is ongoing.

Assessing the Need to Offer Pharmacy Informatics as Part of the Pharm.D. Curriculum.

Whitney White, Sanford University, Shauna D. Ford.

Objectives: To gauge knowledge and interest of students at the McWhorter School of Pharmacy (MSOP) in a pharmacy informatics career and assess the need to offer pharmacy informatics education as part of the Pharm.D. curriculum.

Method: An anonymous survey instrument consisting of 9 multiple-choice questions was constructed to assess the baseline knowledge and interest of pharmacy students in the field of pharmacy informatics. Current first, second, and third-year students were invited to participate via paper survey. Fourth-year students were invited via email to participate in the survey and data was collected using an online survey tool. After the survey was completed, the results were analyzed and reported using descriptive statistics.

Results: The overall response rate was 63% (315 of 497 students completed the survey). The primary responders were P1 students (35%) while the P2 through P4 classes ranged from 20-24%. Most of the responders (73%) considered themselves to be knowledgeable in utilizing today’s technology such as computers, smart phones, tablets, etc. The majority of the responders (97%) reported that technology is important/very important to the practice of pharmacy. Although currently enrolled in an ACPE-accredited school of pharmacy, 48% of the respondents reported that they had never heard of pharmacy informatics. Forty-six percent would be interested in a career which added in the reduction of medication errors. Forty-percent reported interest in taking a pharmacy informatics course while completing Pharm.D. requirements. A majority of the students who took the survey (59%) reported that there is a need to offer pharmacy informatics education as part of the required Pharm.D. curriculum.

Implications: In order to fully satisfy ACPE requirements, additional education in pharmacy informatics is warranted and should be offered as part of the
Assessment in U.S. Colleges/School of Pharmacy: Organization, Leadership and Communication. Jeanine K. Mount, University of Wisconsin-Madison, Suntharee Watcharadomrungkun, Chulalongkorn University. Objectives: Describe patterns of organization, leadership and communication of assessment-related efforts in U.S. Colleges/Schools of Pharmacy (C/SOPs). Method: A cross-sectional survey was conducted in 121 U.S. C/SOPs. Key informants from 92 C/SOPs (76%) completed an online survey between 10/2011-1/2012. Respondents were Deans or individuals they identified as knowledgeable about assessment and/or accreditation activities (e.g., Associate/Assistant Deans, Assessment or IT Directors, Assessment Committee chairs). Results: Assessment has become a recognized function in C/SOPs. Fully 95% of C/SOPs have a written plan for programmatic evaluation, 80% have a stand-alone Assessment Committee (mean age =6.6 years; range =0–25), 39% have an Assessment Office or Center (mean age =3.7 years; range =1–11), and a mean of 1.4 FTEs dedicated to assessment. These results compare favorably to MacKinnon’s (2008) findings. Assessment activities have broad engagement, with C/SOPs identifying a mean of 3.7 persons who play “key roles” in assessment efforts; they included faculty (34%), senior administrators (32%), staff (22%) and others/ unspecified (12%). Although 69% of Assessment Committees are chaired by a faculty member, leadership in assessment predominately is a responsibility of senior administrators with 74% of C/SOPs identifying a dean (13%), associate dean (40%) or assistant dean (21%) as having primary role. Patterns of dissemination and review of assessment results are described and analyzed. Implications: Assessment continues to evolve and become more formalized, although C/SOPs take different approaches to its organization and oversight. Sharing of information needs to be intentional to promote improvement and development of a learning organization. C/SOP leaders have key roles in conceptualizing and guiding this process.

Assessment of TOEFL and PCAT as Admissions Criteria in a Three Year Accelerated Program. Jayesh R. Parmar, University of Maryland Eastern Shore School of Pharmacy, Frederick R. Tejada, University of Maryland Eastern Shore School of Pharmacy, Miriam C. Purnell, University of Maryland Eastern Shore School of Pharmacy, Lynn Lang, University of Maryland Eastern Shore School of Pharmacy, Lisa A. Acedera, University of Maryland Eastern Shore School of Pharmacy, Ferdinand P. Ngonga, University of Maryland Eastern Shore School of Pharmacy. Objectives: 1) To determine if TOEFL can be excluded from the admissions criteria based on its correlation to PCATs (i.e. Reading, Verbal Composite scores) and interview scores. 2) To determine if TOEFL predicts academic performance in the first year of the program. Method: A sample size of 41 foreign born students was identified for analyses. Statistical analyses were done using Minitab® 16 at 95% confidence intervals. The data were confirmed for normal distribution. Pearson correlation ‘r’ was calculated to determine the following association: (1) between TOEFL scores and PCAT variables, and (2) first-year Grade Point Average (GPA) with TOEFL and PCAT variables. Simple regression was conducted to determine the effect of PCAT variables and Interview Scores on TOEFL scores and GPA. Results: Significant correlations were found between TOEFL scores and Reading (r=0.452, p-value<0.05), Verbal (r=0.390, p-value<0.05) and Composite (r=0.359, p-value<0.05) scores. There was no association between first year GPA with TOEFL or PCAT variables (p-value>0.05). The regression model with GPA as the dependent variable was not significant (p-value>0.05) but the TOEFL scores revealed a significant association with PCAT variables and Interview Scores (p-value=0.019). Implications: TOEFL is used to assess communication skills and potential success in our program. Based on these analyses it was determined that TOEFL scores correlated significantly to PCAT variables and interview scores. We conclude that these admissions criteria can be used instead of TOEFL. We predict that eliminating TOEFL will result in a potential increase in the applicant pool by offering financial and time benefits to applicants.

Assessment of Changes in Cultural Competence and Health Literacy Knowledge in First-year Student Pharmacists. Stephanie M. Cailor, Cedarville University, Aleda M. Chen, Cedarville University, Tracy Frame, Cedarville University. Objectives: To determine the effect of an integrated, semester-long exposure to cultural competency and health literacy concepts on pharmacy student understanding. Method: Adding cultural competence and health literacy into the curriculum is an important factor that will enable pharmacists to be more sensitive and attentive to the needs of their patients. To address this, cultural competency and health literacy concepts were vertically-integrated into three concurrent courses, giving students multiple opportunities throughout the semester to learn, discuss, and practice skills. Student cultural competence was assessed pre- and post-semester using the Inventory for Assessing the Process of Cultural Competence among Healthcare Professionals–Student Version (20 questions, 4-point Likert, Strongly Agree to Strongly Disagree). Student understanding of health literacy and utilization of health literacy skills also were assessed pre-post semester (23 questions, 1–Strongly Disagree, 7–Strongly Agree). Paired t-tests were performed to assess pre-post changes in SPSS. Results: First professional year students (N = 53, 100% response) completed all instruments. Students at the pre-test were culturally aware (mean = 58.05±7.9) and at the post-test were culturally competent (mean = 65.40±6.1). Student cultural competence significantly increased from pre- to post-test (p < 0.001). In the health literacy questionnaire, 20 of 23 questions showed a significant improvement (p < 0.05), such as the improved application of health literacy level-appropriate skills (e.g., teach-back method, avoiding medical terminology). Implications: As faculty incorporate concepts of cultural competency and health literacy within their curricula; inclusion in multiple courses with several opportunities to discuss concepts and practice skills may be effective in improving student understanding as well as overall cultural competence.

Assessment of Student Confidence in Research and Evidence-based Practice. Stephanie M. Cailor, Cedarville University School of Pharmacy, Aleda M. Chen, Cedarville University School of Pharmacy, Mary E. Kiersma, Manchester University College of Pharmacy, Carrie Keib, Cedarville University School of Nursing. Objectives: To evaluate changes in student perceptions and confidence in research and evidence-based practice. Method: Students in a required, three-credit hour research design and methodology course completed an instrument to evaluate confidence in research and evidence-based practice (EBP) pre- and post-course. The instrument was created using Bandura’s Social Cognitive Theory and course objectives (17 items, 5-point Likert, 1 = Not at all confident, 5 = Extremely confident). Paired t-tests were used to assess pre-post changes in SPSS, since the data were normally distributed. Results: A total of 53 first-year student pharmacists completed the pre-post surveys (100% response rate). Most students were ages 21–22 (69.8%, N = 37) and female (60.4%, N = 32). Students indicated a statistically significant improvement in confidence in all 17 items (p < 0.001, e.g. appraise research.
reports and clinical practice guidelines for practice implications in the context of EBP; apply epidemiological research to patient populations and health policy). Students had a significant improvement in their understanding of the usefulness of research (p = 0.005) as well as how research and EBP complement each other (p < 0.001). Students also were more likely to plan to use EBP in the future (p = 0.015).

**Implications:** Research and utilization of an evidence-based approach to solving problems are valuable skills for pharmacy students to acquire. Utilization of this instrument can assist faculty in both professional and graduate-level programs in assessing the benefits of research-related coursework and activities on student confidence. By being previously exposed to research, students could develop critical and analytical-thinking skills that can be used in daily practice.

**Association of Exam Scores and Final Literature Critique Paper Score in a Literature Evaluation Course.** Miki Goldwire, Regis University, Karen Smith, Regis University, Marianne McCollum, Regis University. **Objectives:** To determine if exam scores assessing foundational drug-information, biostatistics and research method knowledge are associated with final paper scores in the Integrated Literature Evaluation (ILE) course. **Method:** ILE 1 and 2, required for second-year students, are each 3-credits, held over 8 weeks. Classes are 2-hours long and held thrice weekly. ILE1 focuses on drug information and introduces statistics; ILE2 continues statistics, introduces research design and critical literature evaluation. ILE1 consists of 3 multiple-choice (MC) exams and ILE2 of 2 MC exams plus a final written paper that counts as an exam score. Throughout block randomization, faculty assigned students (n = 63) a primary article (randomized control trial (RCT), non-inferiority RCT, case-control, cohort, or cross-sectional study design) to evaluate. Faculty (n = 3) graded according to appropriateness, clarity, completeness of the study overview, methods, results, conclusions, and critique. Descriptive statistics characterized student demographics and scores. A generalized linear mixed model determined association of final exam score with previous MC exams and accounted for serial correlation. **Results:** The exam mean scores (SD) were: exam1, 85.9(8.2); exam2, 81.4(7.8); exam3, 82.9(9.9); exam4, 82.5(9.0); exam5, 81.7(9.4), and the final mean, 83.3 (5.5). There was no difference between exam scores and the final score. Variance between subjects was significant (14.5, 95% CI, 12.2-17.4) yet variance within subjects was not significant. **Implications:** Students’ scores on assessment of foundational knowledge predict ability to assimilate concepts into the final paper. Providing students appropriate tools and ensuring student understanding with MC assessments is imperative to scoring highly on the capstone paper.

**Attitude Toward Interprofessional Education Among Healthcare Professional Students Participating in an Interprofessional Health Leadership Summit.** Shih-Ying (Audrey) Hsu, West Coast University, Jeanine K. Mount, University of Wisconsin-Madison. **Objectives:** 1. Describe attitudes of students toward interprofessional education (IPE) attending an Interprofessional Health Leadership Summit. 2. Assess whether their attitudes toward IPE changed subsequently. **Method:** The Summit is a student-developed, day-long workshop for fostering leadership and interprofessional collaboration. Participants included students in medicine, pharmacy, nursing, occupational therapy, physician assistant, public health, physical therapy, veterinary medicine, dietetics and athletic training programs. An online pre-test survey was conducted to elicit students’ attitudes toward IPE using Readiness for Interprofessional Learning Scale (RIPLS) and Interdisciplinary Education Perception Scale (IEPS). The survey was repeated following the Summit. Descriptive analyses were performed to assess the participants’ baseline attitude and potential attitudinal change after the summit. Mean scores could range from 1-5 for RIPLS and 1-6 for IEPS. Higher scores suggest more positive attitudes. **Results:** The pre-test (n = 74) showed Summit participants held more positive attitudes toward IPE than reported in most studies. RIPLS mean score was 4.11 (range: 3.53-4.68) and subscales indicated participants’ high readiness for teamwork and collaboration (mean = 4.51) and clear professional identity (mean = 4.42). IEPS mean score was 4.80 (range: 2.83-5.94) and subscales indicated high competency/autonomy (mean = 4.81) and perception of actual cooperation (mean = 5.05). Fifty-five participants completed the post-test survey. Pre-/post-test comparisons found positive but non-significant changes overall and in all subscales. The limited improvement could be due to positive attitudes at baseline of the self-selected participants. **Implications:** Learner characteristics should be taken into consideration when choosing IPE outcomes for study. When assessing effects of IPE experiences on highly-interested learners, emphasizing skill and/or behavioral outcomes should be considered.

**Benefits to Pharmacy School Faculty of Reviewing Peers’ Teaching.** Lorin Sheppard, Manchester University College of Pharmacy, Mary E. Kiersma, Manchester University College of Pharmacy. **Objectives:** To examine the benefits to faculty reviewers of participating in a peer teaching review process **Method:** Faculty participate in a peer teaching review process each semester. Each faculty member reviews and is reviewed by colleagues from both departments (i.e., Pharmaceutical Science and Pharmacy Practice). Each targeted class is debriefed with the reviewer(s), the reviewed faculty member, and the Director of Instructional Design. Faculty completed a questionnaire at the end of the first semester with five demographic questions and 25 Likert items (5-point scale, 1 = strongly disagree, 5 = strongly agree). Analyses were performed in SPSS using descriptive statistics to assess faculty perceptions regarding the peer review process from the perspective of both reviewed and reviewer. **Results:** Participating in the review process as a reviewer had a positive effect on faculty: faculty observed teaching techniques they could incorporate into their own teaching (mean = 3.88), faculty found it helpful to see how others integrated lesson components (such as motivation and overview) into their teaching (mean = 4.12), faculty had a better understanding of the characteristics of effective instruction (mean = 3.94), and faculty had a better understanding of the education students receive at the College of Pharmacy (mean = 4.00). **Implications:** Faculty benefit from reviewing the classroom teaching of peers. By observing and evaluating the instruction of their peers, faculty may gain a broader understanding of the goals and expectations of the program, in addition to observing instructional strategies that they can incorporate into their own teaching.

**Best Practices in Building Research Teams for Success in Social and Administrative Sciences.** Rajendra Aparasu, University of Houston, Donna S. West-Strum, The University of Mississippi, Richard Hansen, Auburn University, Harshali Patel, Ilene H. Zackerman, University of Maryland, Natalia Shcherbakova, Western New England University, Rafia S. Rasu, University of Missouri-Kansas City, Ozlem H. Ersin, Manchester University College of Pharmacy. **Objectives:** To survey chairs and directors regarding best practices in building research teams for success in Social and Administrative Sciences (SAS) **Method:** A cross-sectional, web-based (Qualtrics) survey was distributed to SAS administrative heads and directors in May 2012 with 2 follow-up reminder emails. The survey instrument consisted of questions relating to unit composition, infrastructure, financials and research funding, and drivers/barriers for research success.
Descriptive analyses were used to report survey findings. **Results:** A response rate of 48% (n = 25) was obtained. The median faculty size in SAS was 6, with a median of 5 tenure track positions. The mean graduate program size was 8 PhD students and 5 Master’s students. The median annual operational budget was $26,000, and the median annual research funding was $300,000. Most (60%) reported informal research mentoring programs for faculty. Nearly half (48%) reported having a research center in SAS. Nearly two-third (65%) of respondents reported financial/salary incentives for obtaining research grants. The drivers that had highest impact on research success (Likert scale: 1 - least important to 10 - most important) were research expectations for promotion/tenure (6.94 ± 2.28), cohesive research teams (6.73 ± 2.35), interdisciplinary research (6.23 ± 2.70), and collaborations with other departments/colleges (6.10 ± 3.15). The factors impeding research success were limited support staff to assist with grants (6.36 ± 2.55) and extensive teaching loads (6.12 ± 2.84). **Implications:** Research capacity building in SAS requires infrastructure, financial support, and several success ingredients. With increasing research expectations, there is a strong need to develop and implement a research development agenda to meet the college/university goals for research.

**Community Pharmacists’ Knowledge of Diabetes Management During Ramadan.** Mohamed E. Amin, Betty A. Chewning, *University of Wisconsin-Madison.* **Objectives:** During Ramadan, Muslims fast from dawn to sunset while abstaining from food and drink. Fasting is nullified by taking oral medications during the day. Although diabetic patients may be aware of their religious exemption from fasting, many still fast and adjust their medication regimen accordingly. This study examines Egyptian pharmacists’ knowledge regarding management of diabetes during Ramadan as an indication of likely knowledge gaps shared by US pharmacists. **Method:** A cross-sectional, self-administered survey was administered to a random sample of 298 community pharmacists in Alexandria. Three questions likely to arise when counseling diabetic patients during Ramadan were constructed after consulting published expert panels’ recommendations. Questions covered timing and dosing for metformin and insulin as well as safe blood glucose range required for diabetic patients to safely continue their fast. Scores ranged from 0-3. **Results:** Ninety three percent of the 298 approached pharmacists agreed to participate. Forty five pharmacists (16.4%) did not know the correct answer to any question, 121 (44.0%) answered one correctly, 86 (31.3%) answered two correctly and 23 (8.4%) answered all three correctly. Scores were not associated with pharmacists’ religion or age. One hundred seventy five (63.6%) pharmacists were willing to attend a one day workshop on the adjustment of medication regimens in Ramadan. Pharmacists offered specific content and communication process suggestions for future training. **Implications:** Given these knowledge gaps for pharmacists in a Muslim-majority country, it is especially important for US Pharmacy schools in areas with Muslim populations to address pharmacotherapeutic interventions during Ramadan in their curricula.

**Comparing Faculty and Student Perceptions of Students’ Involvement in Scholarly and Professional Activities.** Spencer E. Harpe, *Virginia Commonwealth University,* Lisa B. Phipps, *Virginia Commonwealth University.* **Objectives:** To compare faculty and student perceptions of students’ anticipated participation in various scholarly and professional activities within five years of graduation. **Method:** A questionnaire including 41 items representing scholarly and professional activities in areas including teaching, writing, research/evaluation, and professional organization involvement was developed and distributed to all second-year PharmD students and full-time faculty. Student responses were ranked by the percentage in agreement with participating in each activity. Faculty responses were ranked by the percentage of faculty responding that they anticipated at least half of the students would participate in an activity. **Results:** Responses were obtained from 23 faculty (38% response) and 133 students (98% response). The top five student-ranked activities were serving as a pharmacy student preceptor (76%), state organization meeting attendance (70%), state and national organization participation (both 68%), working on pharmacy service evaluations (66%), and national organization meeting attendance (66%). The top five activities where faculty viewed at least half of students would participate were state organization meeting attendance (74%), serving as a pharmacy student preceptor (61%), national organization meeting attendance (61%), state organization participation (56%), and national organization participation (41%). Students rated high levels of agreement with various research/evaluation activities, such as evaluating pharmacy services or conducting quality improvement projects, but these were ranked very low by faculty. **Implications:** Despite some agreement, students reported higher levels of agreement for a number of items that were ranked low by faculty. Further research is needed to understand these differences and implications for improving educational practices.

**Comparison of Course Content Retention With and Without Student Response System (SRS) Technology.** Tara L. Jenkins, Shenandoah University. **Objectives:** To compare the retention rate for course content presented with formative assessment via student response system (SRS) technology versus content with formative assessment without SRS technology. **Method:** This study was conducted in a required pharmacy management course given to third professional year students. Material presented in this course was delivered via lecture with breaks every 15 minutes for a brief formative assessment. Half of these assessments were performed using SRS technology while the other half were done without. On the last day of the course, an unannounced, anonymous assessment consisting of 6 questions addressing an equal number of concepts covered with and without the SRS in the first third of the semester was given to the students. The percentage of students able to correctly answer all questions for each type of formative assessment was tabulated and compared using a z-test of proportions with an a priori alpha of 0.05. **Results:** 69 out of 74 students completed the assessment (93.2%). 88.4% of students (61/69) were able to correctly answer all questions for material presented with SRS formative assessment, while 58 out of 69 students (84.1%) could for material without the SRS. There was not a statistically significant difference between the two proportions (p = 0.4657). **Implications:** An overwhelming majority of students retained content over the semester regardless of the technique used. This suggests that it is not the technology leading to the high retention rate, but perhaps the formative assessment component. Future research comparing retention rates for material presented with and without formative assessment is warranted.

**Comparison of PCAT Scores and First Semester Academic Performance for Underrepresented and White Students.** Krystal L. McCutchen, The University of New Mexico, Donald A. Godwin, The University of New Mexico. **Objectives:** To determine if differences in average PCAT Composite and Chemistry percentile scores were linked to differences in average first semester academic performance (GPA) between underrepresented students and white students in a majority-minority College of Pharmacy. **Method:** PCAT percentile ranks for students matriculating in 2007 and forward were collected from their Pharm.D. application for their highest Composite and associated Chemistry scores. Their prerequisite GPA and first Pharm...
D. semester GPA were added to the data. The students were grouped by ethnicity, Native American, African-American, and Hispanic as underrepresented and White as the comparison group. Regression analysis was completed comparing the underrepresented group to the comparison group on all factors. **Results:** Data analysis reveals a statistically significant difference between the two groups with the white group having a higher average Composite Percentile, a higher average Chemistry Percentile and a higher first semester Pharm.D. GPA when compared to underrepresented students. Both student groups, however, demonstrated strong academic performance with an average first semester GPA of 3.27 for White students and 3.09 for underrepresented students. **Implications:** Preliminary data indicates that students who are considered to be underrepresented have lower scores on the PCAT, but still demonstrated strong academic performance. Most schools require the PCAT as part of the admissions application; however, the results of our analysis show the importance of considering noncognitive aspects during admissions process. In addition, once admitted to pharmacy school, the importance of supporting underrepresented students through the curriculum is important in contributing to their success.

**Comparison of Pharmacy Student and Pharmacist Rankings of Pharmacy Management Areas and Business Skills.** Christopher J. Jadoch, D’Youville College, David A. Gettman, D’Youville College. **Objectives:** The primary objective of the study was to understand the relevance of pharmacy management areas and specific business skills to the contemporary practice of the profession of pharmacy. The secondary objective was to determine if relevance was determined by whether the subject was a student or preceptor, gender, age, and level of experience. **Method:** 54 2nd year pharmacy students taking a pharmacy management course and also 115 pharmacy preceptors comprised the sample frame for this cross-sectional study. Each subject received an e-mail invitation that explained the purpose of the anonymous survey. By clicking on the link in the e-mail invitation to be switched automatically to the online Qualtrics.com, the volunteer acknowledged informed consent. Each subject was asked to rank 6 areas of pharmacy management and 26 business skills by perceived or current relevance to the contemporary practice of the profession of pharmacy. These areas and skills reflected those articulated in the pharmacy management textbook (Desselle, Zgarrick and Alston, 2012). **Results:** The “people” and “money” areas of pharmacy management were ranked highest by both sets of respondents. The Wilcoxon rank-sum test was used as a nonparametric alternative to the two sample t-test to elucidate specific differences between student and preceptor responses. **Implications:** As the result of this study novel information is provided to pharmacy professors who teach management. They may better focus on coursework specific to skills that are ranked higher by the respondents in this study.

**Cultural Competency and Knowledge of Health Disparities in the Pharmacy Curriculum—How Much is Sufficient?** Olile Okoro, University of Florida, Folakemi T. Odedina, University of Florida, W. Thomas Smith, University of Florida. **Objectives:** The study objectives were to [1] assess change in the level of cultural competency and knowledge of health disparities among students in the 3rd year of the Doctor of Pharmacy program at the University of Florida; and [2] explore the demographic correlates of cultural competency and knowledge of health disparities. **Method:** A modified version of the Clinical Cultural Competency Questionnaire was administered to 3rd year students in three consecutive academic years – 2010, 2011, and 2012. Chi-squared tests, analysis of variance and multivariate regression were used for data analysis. **Results:** By the 3rd year of the study, there was increase in knowledge of health disparities (p=0.03); self-awareness of racial/ethnic identity (p=0.03); self-awareness of racial/ethnic stereotypes (p=0.01); and cumulative training in cultural diversity both in and outside the school curriculum (p=0.02). Receiving formal relevant training outside the school curriculum was significantly associated with higher cultural competency skills and knowledge of health disparities. Students from Minority racial/ethnic groups were reportedly more self-aware of their racial/ethnic identity, racial/ethnic stereotypes and biases/prejudices; and placed more importance on health professionals receiving relevant training. **Implications:** There has been marginal but significant increase in the level of cultural competency and knowledge of health disparities among 3rd year students at the University of Florida. Increasingly, cultural competency instruction has been introduced into the curriculum, but students’ self-assessment of relevant skills is as yet moderate. There is need to establish a standard of training that adequately meets outcomes expectations for practice. A forum for sharing of ‘best practices’, is therefore recommended.

**Drug Testing Policies at US Pharmacy Programs.** Punam Tiwana, Briana O. Cashman, Western New England University, Daniel R. Kennedy, Western New England University, Joshua J. Spooner, Western New England University. **Objectives:** Like other health profession programs, pharmacy programs appear to be increasingly conducting drug testing upon admitted and enrolled students. To our knowledge, there has not been a systematic analysis of the nature and frequency of drug testing practices at pharmacy programs in the United States. **Method:** A 20 question survey designed to gather information on drug testing practices was developed and sent to the Assistant/Associate Dean for Student Affairs (or equivalent) at 129 pharmacy programs. All collected data were aggregated and made anonymous. **Results:** A total of 45 programs (34.8%; 24 public / 21 private) completed the survey. Of these, 23 (51.1%) require drug testing, with private programs seemingly more likely to require testing (66.7% vs. 37.5%, p=0.051). The majority of programs conducting testing screen all students (91.3%), with additional testing done randomly, upon reasonable suspicion, or following accidents. Programs conducting testing utilize a variety of testing schedules and screening panels. The mean cost/test was $48.13 (range: $25.00-$119.00); most programs (72.7%) require students to pay for the test directly. Six programs (26.1%) reported a positive result within the past year. Disciplinary actions for a positive result ranged from warning to expulsion; 11 schools (47.8%) forward positive results to their state Board of Pharmacy. Among non-testing programs, 27% are considering implementing testing in the future. **Implications:** Screening admitted and enrolled students for substance abuse has begun at many pharmacy programs, with additional programs considering future implementation. Additional research can identify best practices and may lead to uniformity in drug screening protocols for pharmacy programs.

**Evaluating Ratings for First Round Review of Pharmacy Applicants: Is An Admissions Committee Meeting Necessary?** Jean T. Carter, The University of Montana, Curtis Noonan, The University of Montana. **Objectives:** To determine the predictive value of individual and aggregated faculty members’ initial, pre-deliberation ratings of pharmacy school applicants compared to ratings decisions made by Admissions Committee. **Method:** Faculty members (n=12, 4 per applicant) independently reviewed and rated applications using a three-point scale (+1 = admit, 0 = keep in the application pool, -1 = reject). Aggregate initial ratings were compared to first round, post-deliberation admission decisions. Sensitivity, specificity, and predictive probabilities for admission and rejection were calculated. **Results:** Mean
(SD) individual rater scores varied from a low of 0.029 (0.618) up to 0.647 (0.636) on the -1 to 1 scale. Comparing applicants receiving a cumulative rating score of 3+ to those receiving a cumulative rating score < 0 yielded sensitivity of 100% and specificity of 95% for the admission/rejection decision. Using these cutoffs, the positive predictive value for admission was 98%, and the negative predictive value for rejection was 100%. When comparing applicants receiving a cumulative rating score of 2+ to those receiving a cumulative score < 2, the sensitivity was reduced (95%) but the specificity was similar (96%). Individual raters’ sensitivity and specificity ranged from 71-100% and 25-100%, respectively. Implications: While predictive values for individual raters were variable, the aggregated initial ratings were highly predictive of first round, post-deliberation admission and rejection decisions. Additional data will be collected in the forthcoming admissions process to determine whether these findings remain consistent over time. These data, if consistently observed, would argue for a more efficient first-round admissions process.

Evaluating Students’ Perceptions of the Educational Climate in a Saudi Pharmacy School. Ibrahim A. Aljuifali, King Saud University, Yasser Albobami, Nouf I. Al-Meshal, King Saud University. Objectives: The educational climate in which future pharmacists is educated is an important aspect of pharmacy education and could widely affects the quality of their educational outcomes. The aim of this cross-sectional study is to apply the Dundee Ready Education Environment Measure (DREEM) inventory for the first time in an Arabic-speaking sample of pharmacy students. DREEM is a validated, generic and reliable tool to assess learning environment at health related schools. Method: All pharmacy students at the College of Pharmacy, King Saud University were asked to complete an Arabic version of DREEM in a paper-pencil survey. The survey contains 50 questions related to students’ perception of learning, teachers, atmosphere, and students’ academic and social self-perception. Results: DREEM was completed by 310 undergraduate pharmacy students; 51.6% of which were male and 48.4% were female. Students’ perception of the learning environment was positive (mean=113/200, S.D.=22.8). Students’ perception of subdomains were (mean=25.8/48, S.D.=6.5 for learning), (mean=25/44, S.D.=6.2 for teacher), (mean=18.3/32, S.D.=9.9 for academic self-perception), (mean=26/148, S.D.=6.5 for atmosphere) and (mean=17.2/28, S.D.=5.4 for social self-perception). There was no significant difference between male and female perception about learning environment. No significant difference was found between genders. Implications: Positive student’s perception of learning environment and learning subdomains support the school mission and vision. This study provides useful diagnostic information about the strengths and weaknesses of the educational environments as perceived by the respondents. Future studies are required to explore the underlying cause(s) of the results and to plan for improvement of the learning environment.

Evaluating and Revising PharmD Admissions Tools Based on Sound Measurement Practice. Ken Cor, University of Alberta, Michelle M. Foisy, University of Alberta. Objectives: The primary purpose of this research is to evaluate and revise assessment tools used to rank PharmD applicants for a new post professional PharmD program at the University of Alberta. Method: Data from 19 applicants to the new University of Alberta post-professional PharmD program is used to determine the measurement properties of a suite of 4 assessment tools including: rubrics for assessing the applicant’s CV, cover letter and reference letters, as well as an interview scoring tool. These assessment tools are made up of multiple items that are rated by multiple raters. This process results in up to 81 observations for determining an applicant’s overall rank. Generalizability Theory (Brennan, 2001) is used to determine the reliability of the individual items of each tool. Items with low reliability coefficients are targeted for revision. Finally, a correlation matrix of scores on each tool as well as students’ overall GPA is used to investigate validity. Results: Results identified unreliable items relative to the rest of the items that made up each tool. That is, results showed that raters could not agree on the ranking of applicants on some items. Retrospective reflections of raters supported these findings. Validity coefficients revealed that, with the exception of scores on the reference letter, scores on the other tools were all moderately positively related. Implications: The research has resulted in more fair and valid assessments for ranking PharmD applicants. The research also outlines steps based on sound measurement techniques that can be used to evaluate and revise assessments more generally.

Evaluation of Student Perceptions of Standardized Patient Simulation on Patient Counseling Confidence during IPPE. Yu-Chieh Chen, Manchester University College of Pharmacy, Mary E. Kiersma, Manchester University College of Pharmacy, Ahmed Abdelmageed, Manchester University College of Pharmacy. Objectives: The goal of this research is to investigate student pharmacists’ overall perceptions about how standardized patient (SP) encounters influence students’ confidence during introductory pharmacy practice experiences (IPPE) and patient counseling. Method: A cross-sectional survey was conducted via a self-administered questionnaire. The 35-item, 5-point Likert scale survey comprises two components to measure student pharmacists’ perceptions about (1) the general usefulness of SP simulation on their IPPE performance, and (2) the impact of SP simulation on their patient counseling confidence, focusing on the change of the confidence in skills and techniques before and after the SP encounters. Descriptive statistics and paired t-tests were performed using SPSS v.21.0. Results: Sixty-one first-year student pharmacists completed the survey (95.3% response rate). Overall, 88.5% of students agreed that SP simulation was useful and 73.8% considered that their SP encounters were realistic. In addition, approximately 70% of students agreed that interacting with SPs made them feel more comfortable talking to actual patients during IPPE, and around 80% felt more confident about future evaluation by IPPE preceptor. Comparing patient counseling confidence before and after SP encounters, results indicated that students’ perceptions significantly improved for all counseling skills and techniques (p-value<0.0001). Implications: Students’ perceptions and acceptance of the SP simulation were considerably positive. Their patient counseling confidence also has been greatly increased after practicing with SPs. While many pharmacy schools have placed first-year student pharmacists in experiential education rotations, a prior experience interacting with SPs could improve student’s comfort level and confidence in patient counseling.

Evaluation of a Graduate Seminar on Writing and Publication. Marwa A. Noureldin, Purdue University, Kimberly S. Plake, Purdue University. Objectives: To evaluate the impact of a writing and publication seminar on graduate students’ ability to meet seminar objectives, including: 1) explaining the publication process, 2) explaining factors involved in journal selection, 3) explaining the peer review process, 4) performing a peer review, and 5) writing and submitting a manuscript for publication. Method: Fifteen pharmacy practice graduate students participated in a 16-week structured seminar. Didactic components consisted of lectures on writing plans, journal selection, manuscript structure, peer review, and plagiarism. Students approached faculty mentors and arranged periodic meetings for project and manuscript discussion. Students also developed writing plans.
Evaluation of Interprofessional Communication Skills Confidence Among Pharmacy and Nursing Students. Mary E. Kiersma, Manchester University College of Pharmacy, Aleida M. Chen, Cedarville University School of Pharmacy, Carrie Keib, Cedarville University School of Nursing, Stephanie M. Cailor, Cedarville University School of Pharmacy. Objectives: To evaluate pharmacy and nursing student perceptions of confidence regarding interprofessional communication skills. Method: In order to provide safe and effective patient care, it is beneficial that pharmacists and nurses collaborate. Pharmacy and nursing students were taught about interprofessional communication delivered in an interprofessional manner before participating in a combined research poster session. Students completed a self-evaluation, measuring their confidence regarding interprofessional communication (4 questions, Likert-type, $1 = $Not at all, 5 = Extremely Confident). Students and faculty also completed evaluations, rating their level of agreement of how well students presented to an interprofessional audience (4 questions, Likert-type, $1 = $Strongly disagree, 5 = Strongly agree). Analysis was performed using independent t-tests in SPSS. Results: Students (N = 140) and faculty (N = 16) participated. Most students were very or extremely self-confident regarding interprofessional communication (4 questions, $\geq 85\%$). Nursing students had more self-confidence in their ability to explain the relationship between their topic and their field and speaking in language appropriate for all healthcare professionals than pharmacy students (p < 0.05). Most students and faculty agreed or strongly agreed that students presented well to an interdisciplinary audience (4 questions, $\geq 96\%$ for students, $\geq 90\%$ faculty). On peer evaluations, there was a significantly higher level of agreement that pharmacy students were able to explain the relationship between their topic and field and answer questions (p < 0.05). Implications: After graduation, health professionals are often involved in interdisciplinary teams; however, many are not educated in a collaborative learning environment. Integrating interprofessional education with structured activities offers opportunities to improve communication between healthcare practitioners and modify attitudes and perceptions.

Faculty Mentor Responses to Results of a Student Experiences in Formal Mentoring Survey. Matthew Witry, The University of Iowa, Elaine Nguyen, The University of Iowa, Brandon J. Patterson, The University of Iowa, William R. Doucette, The University of Iowa, Bernard A. Sorofman, The University of Iowa. Objectives: To describe affective and cognitive responses, behavioral changes, and feedback preferences of faculty mentors after providing them results of a formal mentoring program survey administered to students. Method: Ten mentors participated in 45-60 minute semi-structured interviews which were recorded and transcribed verbatim. The investigators independently coded the first three transcripts to propose codes, then agreed on a consensus list. Transcripts were divided and coded. Spot checking verified the coding between investigators. Contact summary forms were used to identify themes. Data also were sorted based on the codes to describe themes and identify representative quotes. Results: Half of mentors expressed it was their responsibility to foster relationships with students (proactive mentoring) and half wanted students to take the initiative (reactive mentoring). This variation appears to underpin their overall approach. Proactive mentors had a more pronounced affective response, had more ideas for behavior change, and were more comfortable in being evaluated. While the need for more administrative support was echoed across participants, proactive mentors were more likely to propose creative approaches to mentoring and relationship development. Most faculty mentors contemplated increasing email communication frequency and providing more targeted content; however, this may partly be an artifact of the interview guide. Implications: Faculty mentors appear to have variation in their proactivity for engaging with students. Administrators of formal mentoring programs can shape their program to acknowledge and support both proactive and reactive mentors. Options may include matching and sharing best practices. More research is needed in this area.

Health-System Pharmacy as Taught by U.S. Schools and Colleges of Pharmacy. Sarah M. Barden, David A. Holdford, Virginia Commonwealth University. Objectives: To explore how U.S. schools and colleges of pharmacy teach entry-level competencies for health-system pharmacy practice. Method: Curricula and course descriptions were obtained from 102 fully accredited schools of pharmacy’s websites. A content analysis of the curricula and descriptions was conducted searching for key words: hospital, health-system, institutional and inpatient. A taxonomy of curricular models was developed based on website information, and each school was matched to a model. Descriptive statistics were used to present the results. Results: Six models were identified that represented the variety of course offerings at different schools. Fifty-six percent of schools fit Model A, the baseline model, which assumes adherence to the minimum hospital IPPE and APPE accreditation standards. Another 24% of schools fit Model B, which includes a health-system elective course offering in addition to the baseline model. Only nine percent of schools required a health-system specific didactic course for all students. When available, most didactic courses were offered in the curriculum after hospital-specific IPPEs. Implications: A variety of curricular models are used to train students to become entry-level institutional pharmacy practitioners, although most schools rely on experiential training. Didactic education about institutional topics is typically interspersed throughout the curriculum. The most effective educational methods for achieving health-system pharmacy practice competency have not been clearly defined. As the distinctions between the roles of pharmacists in different patient-centered care settings blur, it is imperative that all students receive a solid, competency-based education that spans a variety of practice settings, specifically including health-system pharmacy.

Information Technology to Support Assessment and Accreditation: Survey Results from U.S. Colleges/Schools of Pharmacy. Jeanine K. Mount, University of Wisconsin-Madison, Suntaree Watcharanarongkun, Chulalongkorn University; Michael E. Pitterle, University of Wisconsin-Madison. Objectives: 1. Describe organization and management of information technology (IT) services used in U.S. colleges/schools of pharmacy (C/SOPs) to support assessment and accreditation.
Internet Analysis of Reasons For Alternative Child Immunization Schedules. Erin L. Beattie, Emily T. Martin, Wayne State University.

Objectives: Parents are increasingly choosing to use alternative immunization schedules for their children. An alternative immunization schedule is one recommending delay or omission of immunizations compared to the Centers for Disease Control (CDC) child immunization schedule. Little research has been conducted to characterize internet sources of vaccine information, particularly those promoting alternative schedules. This internet analysis was designed to identify reasons for and against using immunization schedules alternative to the CDC recommended schedule.

Method: An internet search was done using the following search terms (Google®): “Alternative immunization schedule”, “alternative vaccine schedule”, “delayed immunization schedule”, and “delayed vaccine schedule”. The first two pages of results for each search term were examined for information about suggested alternative schedules and whether the content was “pro-alternative”, “anti-alternative”, or neutral. Reasons for and against alternative immunization schedules were evaluated.

Results: Eleven results were classified as pro-alternative immunization sites, eleven as anti-alternative and three as neutral. The eleven sites advocating for use of alternative schedules included nine possible alternative schedules. The reasons discussed for the suggested deviations from the CDC schedule include safety concerns (toxic additives, links to autism and immune disorders, excessively early administration, general adverse reactions), excessive immunizations during a single visit, absence of disease, superiority of natural immunity, and distrust of the CDC. Implications: Many sources contradict CDC recommendations and were not evidence-based. More research is needed to analyze the information caregivers encounter when searching the internet about childhood immunization recommendations. Pharmacists should be prepared to counsel parents about reliability of internet sources.

Interprofessional Spiritual Care Elective: A Pilot Experience. Miki Goldwire, Regis University, Karen Pennington, Judy Crewell, Alice Davis, Maureen McGuire, Daniel Roysden.

Objectives: To describe student perceptions of an interprofessional spiritual elective that was developed to deliver a foundation for spiritual care with emphasis on answering, “What do I say?” to patients. Method: The importance of religion and spirituality with health is well recognized. The Joint Commission requires assessment of patients’ spiritual needs. However, pharmacists are often not aware of such needs. Faculty from Health Care Administration, Nursing, Physical Therapy, Pharmacy, and Ethics met to design a 3-hour elective course. The blended course was divided into two parts, theory (classroom based) and field experience with a hospital-based spiritual care provider. Specific activities included exploring personal feelings and assumptions about spirituality and religion, examining roles of spiritual care team members, observing and participating in a field experience, and presenting a verbatim of one patient encounter. The 16-week course consisted of a weekly online discussion posts and exercises as well as four 4-hour classroom sessions held on Saturday. Results: The pilot class, held spring 2012, included one nursing student and six third-year pharmacy students. All agreed or strongly agreed that the course was intellectually challenging and stimulating and rated the course as good to very good. Students stated their field experience helped to personalize pharmacotherapy topics taught and provided tools necessary to be more aware and comfortable with the role of spirituality in health care. Implications: Although the class size was small, the course helped to shed light on the importance of spiritual care for pharmacy students and future pharmacists.

Interprofessional and Interpersonal Communication: Self-Efficacy Beliefs of Academic Health Science Center Students. Richard A. Hess, Jr., East Tennessee State University, Nicholas E. Hagemeier, East Tennessee State University, Kyle S. Hagen, East Tennessee State University, Emily L. Sorah, East Tennessee State University.

Objectives: To assess and compare interprofessional and interpersonal communication self-efficacy beliefs of medical, nursing and pharmacy students before and after participation in a communication skills course. Method: Using self-efficacy as a theoretical framework, a 37-item survey instrument was developed based on Interprofessional Education Collaborative (IPEC) Core Competencies and course learning objectives. Medical, nursing, and pharmacy students voluntarily completed the survey instrument before and after the required course. Nonparametric tests were employed to examine matched pre- and post-assessments within colleges and to explore differences in self-efficacy beliefs across college. Results: A response rate of 87% (168/193) was achieved. Overall, nursing students entered the course with higher self-efficacy beliefs as compared to medical and pharmacy students. Pharmacy students indicated particularly low self-efficacy beliefs regarding their ability to communicate with other health professionals (p = 0.009) and contribute to healthcare teams (p = 0.002). Matched pre/post analyses indicated statically significant increases in student self-efficacy beliefs across all colleges. After the course, pharmacy students continued to perceive a relative lack of confidence in their ability to develop positive relationships with other health care providers as compared to medical and nursing students (p = 0.02). Implications: Our findings suggest that completion of an interprofessional communications course was associated with a positive effect on self-efficacy beliefs aligned with IPEC competencies across all colleges. Pharmacy students, in particular, noted significant improvements in self-efficacy beliefs across multiple domains. Research is being conducted to examine relationships between validated observational assessments and student self-perceptions.
**Introducing Pharmacy to Freshmen via “Current Issues in Medication Use and Pharmacy.”** Sally A. Huston, *The University of Georgia, Catherine A. White, The University of Georgia. Objectives:* First-Year Odyssey seminars (FYOS) are designed to introduce freshman to the academic life of the University. These seminars allow freshman to engage with faculty and other first-year students in small class environments to learn about research/teaching of faculty. We developed a FYOS on Current Issues in Medication Usage and Pharmacy to provide an opportunity for freshman interested in pharmacy to learn more about professional pharmacy practice issues. **Method:** This FYOS has been offered twice (2011, 2012) and has enrolled 28 freshman. Topics covered include complementary and alternative medicine (CAM), foods in the management of chronic diseases, direct-to-consumer advertising (DTCA), emergency contraception (EC), expanded access to OTC (3rd class of behind the counter drugs), etc. Assignments included debates, opinion papers, presentations, and in-class assignments. Students completed an anonymous survey with objective and open ended questions regarding course content/delivery. **Results:** Highest rated topics in 2011 were DTCA, expanded access OTC, and EC, and in 2012 were CAM, foods as drugs and expanded access OTC. The 2011 highest rated assignments were DTCA group brainstorming/analysis, and debate preparation; in 2012 they were CAM presentations, EC opinion paper and DTCA brainstorming/analysis. Students rated class discussion (3.9-4.3/5) as an important indicator of their understanding of discussed topics discussed. Student comments on improving the class included more active learning, more opportunities to get to know classmates and more information about the pharmacy profession. **Implications:** This course has been well received by the freshman students and can be adapted as an elective in the PharmD program.

**JIT Teaching: A Tool to Create Greater Student Engagement in a Pharmacy Administration Course.** David M. Kile, *Albany College of Pharmacy and Health Sciences, Angela C. Dominelli, Albany College of Pharmacy and Health Sciences. Objectives:** Three credit hours is devoted to pharmacy administration, a small component of the typical pharmacy curriculum. The NAPLEX exam does not include questions related to pharmacy administration. Pharmacy administration topics are not similar to the clinical and pharmaceutical science courses. The above may create a situation where students are not engaged in the course or may not retain the subject matter. **Method:** Just-In-Time (JIT) methodology is used to prepare students by helping them to focus on a new topic and organize their thoughts before the topic is introduced. Students complete exercises, which are related to a new topic, online the day before the topic is introduced in class. In class, faculty review the exercise, misconceptions are cleared and students are prepared to connect the exercise with class material. Students were given one point of extra credit for each exercise completed. **Results:** Students agreed or strongly agreed that JIT exercises helped to prepare them for class (73.9%), stay focused on the lecture (64.5%), feel like an active participant in the classroom (77.65%), and made the class time useful (74.85%). Students commented that exercises reinforced concepts, included beneficial ‘real world’ examples, and helped them with preparation for examinations. Participation in JIT exercises decreased approximately one month into the semester. Students commented that one point of bonus credit was an insufficient incentive. **Implications:** JIT exercises increase student interest and comprehension of topics related to pharmacy administration. If used as an incentive for bonus credit, the amount of credit given should be sufficient to spur student motivation.

**Leadership Perceptions and Commitment to Leadership: What Do Incoming Student Pharmacists Think?** Kristin K. Janke, *University of Minnesota, Benjamin D. Aronson, University of Minnesota, Reid C. Smith, University of Minnesota-Duluth. Objectives:** To understand student pharmacists’ perceptions of leadership and commitment to leadership development, in order to tailor leadership education in PharmD. curricula. **Method:** A 49-item survey was developed and administered to assess students’ perceptions of leadership, perceptions of self as a leader, and views of leadership development. In Fall 2012, surveys were administered to incoming first-year students. Descriptive and comparative statistics (Mann-Whitney U) were used to analyze the data. **Results:** 136 students responded for a response rate of 84.5%. The majority agreed or strongly agreed that leadership: can be learned (94.9%), is important to the profession of pharmacy (99.2%), and is important for all student pharmacists to develop (95.6%). Fewer reported being able to describe their strengths (30.2%) or weaknesses (28%) as a leader. Respondents reported having the capabilities to lead (94.1%), yet fewer had the confidence to lead (72.1%), and even fewer felt prepared to lead (67.6%). And while most agree that they are interested in developing their leadership skills (91.9%), fewer have invested (64.7%) or have a plan (44.9%) for their leadership development. Significant differences existed between male and female respondents for the question “I have the confidence to lead,” with 84% of males agreeing and only 54.9% of females agreeing (p=0.021). **Implications:** This study indicates potential areas where education could improve deficits, such as strengths training and developing the confidence to lead. Differences between age and gender groups require further investigation. Through this research an instrument evaluating student pharmacist perceptions of leadership was created and improved.

**Learn It, See It, Do It! A Leading Adaptive Change Experience for Student Pharmacists.** Kristin K. Janke, *University of Minnesota, Reid C. Smith, University of Minnesota-Duluth, Benjamin D. Aronson, University of Minnesota, Todd D. Sorensen, University of Minnesota. **Objectives:** Deliver and evaluate a course providing an experience in leading change. **Method:** This 2-credit elective is offered to students in a structured curricular track focused on leadership development. Students apply lessons learned from previous leadership courses by identifying an issue from pharmacy practice or education that requires adaptive change, creating a vision for this change, and taking the necessary steps to implement their vision. The course also provides opportunities to use and evaluate leadership skills and to build confidence in leading adaptive change. Success in achieving these outcomes was assessed using course satisfaction surveys, student self-assessment surveys and self, peer and instructor evaluations of student final project presentations. **Results:** Twenty-three students (classes of 2011 and 2012) completed surveys (82% response). All students agreed (21.7%) or strongly agreed (78.3%) that they were able to identify an area that would benefit from change. Most students agreed or strongly agreed that they applied: 1) strengths concepts (96%); 2) self-reflection (96%); 3) practices of exemplary leaders (70%); 4) team concepts (65%); and 5) a defined change process (91%). For the class of 2012, ratings from instructors indicated that Project Leadership (vs. Project Management; 17% needs improvement) and Recognition of the Role of Team (8% needs improvement) were among the more difficult variables. Nearly all students (96%) agreed or strongly agreed the experience increased confidence in their leading change ability. **Implications:** Experiences leading adaptive change are important to engendering student confidence prior to entering practice. A focused experience can prompt leading change skill development.
Longitudinal Assessment of Critical Thinking Among Pharmacy Students. Olayide Shodunke, Chicago State University, Samuel Mends, Chicago State University, Kumar Mukherjee, Chicago State University, Dolores Nobles-Knight, Chicago State University. Objectives: The Health Science Reasoning Test (HSRT) is a validated instrument used to measure the critical thinking ability of students in health sciences. The HSRT evaluates critical thinking through five domains: analysis and interpretation, inference, evaluation and explanation, inductive reasoning, and deductive reasoning. Purpose: To determine the change in critical thinking ability overall and in specific domains using the HSRT among a cohort of pharmacy students. Method: The HSRT was administered four times between 2008 and 2012 to 72 students enrolled in the Chicago State University College of Pharmacy. Students took the test at the beginning of the first year and at the end of the first, second, and third professional years. Descriptive analysis and repeated measure ANOVA with post-hoc comparisons were used to compare the mean scores of students across the four testing occasions. Results: The mean overall score was significantly different (F (3, 213) = 3.979, p = 0.009) across four occasions. The average score across all domains was highest at the third testing occasion. There is a significant difference in average score on inductive reasoning (p = 0.005), inference (p = 0.001), evaluation and explanation (p = 0.003). Implications: Students showed overall improvement in three out of five domains. Students had the highest scores during the third testing occasion. Curricular interventions may be required to enhance critical thinking ability in the domains of analysis & interpretation and deductive reasoning. Further research is required to understand the factors enhancing critical thinking ability among pharmacy students.

Making Cross-linkages Work Between Clinical and Management Classes in the College of Pharmacy. Leigh Ann Bynum, Belmont University, Hope Campbell, Belmont University, Lindsay Hahn, Belmont University. Objectives: To explore the possible benefits of the theoretical and practical linkages between clinical and management classes for second year pharmacy students by providing assignments that cross course boundaries. Improvement in the quality of group peer evaluations was also evaluated. Method: One of the objectives of the required Managing Personnel course for second year pharmacy students is to provide them with overview of the major topics in Human Resource Management (HRM) including employee performance reviews. Students were provided the theoretical underpinnings of employee performance evaluation and were made aware of the biases that may occur when evaluating employee performance. In order to simulate real world circumstances surrounding the performance evaluation, these same students were asked to evaluate their peers on their performance as a group member within the required Pathophysiology and Therapeutics course. They were graded on the quality of their evaluation in the Managing Personnel class. While, the results of the peer evaluations were used in calculations related to a portion of the group performance grade in the Pathophysiology and Therapeutics course. Results: Qualitative results indicate that, after initial apprehension, students appreciated the opportunity to practice in a real world settings and the quality of their peer reviews was improved from previous years of peer evaluations. Significant administrative hurdles were identified throughout this process. Implications: There is value to both students and instructors in cross-linking courses using mutually beneficial assignments. Administrative improvements will be made in future iterations of this project.

PAT Assessment of Professional Behaviors in Pharmacy Students and Applicants. Thomas A. Robertson, Palm Beach Atlantic University, Jamie L. Fairclough, Palm Beach Atlantic University, Jim Bruce, Palm Beach Atlantic University. Objectives: 1. To assess professional behaviors of pharmacy applicants using the Professionalism Assessment Tool (PAT). 2. Compare and contrast data as measured by PAT between current pharmacy students and applicants. Method: 1. Administered PAT to the current P1 and P2 classes in fall 2012. 2. Administered PAT during 2012-2013 on-campus candidate interviews. 3. Analyzed data using SPSS/PASW v20. Instrument: The 40-item PAT measures behavioral aspects of professionalism in pharmacy students using a scale that minimizes ceiling effects. PAT assesses five domains of professionalism: 1. Reliability, Responsibility, and Accountability (RRA) 2. Life-long Learning and Adaptability (LLA) 3. Relationships with Others (RWO) 4. Upholding Principles of Integrity and Respect (UPIR) 5. Citizenship and Professional Engagement (CPE) Each item is rated on five levels of competency based on a modified Miller’s Taxonomy (Knows, Knows How, Shows, Shows How and Does, and Teaches). Results: PAT was shown to be a highly reliable instrument (Cronbach’s alpha = 0.962) with good construct validity in the sample population (n = 138). A nonparametric Kruskal Wallis analysis yielded significant differences between pharmacy students (P1 and P2) and applicants across all five domains of PAT (RRA: p < 0.001; LLA: p = 0.050, RWO: p = 0.004; UPIR: p = 0.001; CPE: p = 0.008), with pharmacy applicants reporting higher levels of competency than current pharmacy students. Implications: Validation of PAT as a feasible instrument to be utilized in the admissions process while assessing specific behavioral aspects of professionalism in pharmacy candidates will enhance the selection process. In addition longitudinally tracking of the professional development of current students can be assessed.

Pharmacy Student Attitudes and Willingness to Engage in Care with People Living with HIV/AIDS. Kari J. Furek, Northeastern University, Nathaniel M. Rickles, Northeastern University, Ruthvik Malladi, Northeastern University, Eric G. Ng, Northeastern University, Maria Zhou, Northeastern University. Objectives: We sought to describe the extent to which pharmacy students may currently hold stigmatizing beliefs and aimed to determine whether background variables, HIV knowledge, and attitudes toward persons living with HIV/AIDS (PLWHA) may affect their willingness to engage in care. Method: Based on previously published and validated tools, we developed a novel online survey containing 4 domains: background variables, attitudes, knowledge and willingness to engage in care with PLWHA. Using a cross-sectional design, the survey was administered to 150 pharmacy students in their third professional year during a required pharmacotherapy module. Descriptive, bivariate, and stepwise multivariate regressions was performed to examine relationships between selected study variables. Results: The majority of the sample was female and Caucasian. Regressions controlling for background variables showed: (1) being a minority (p < 0.001) and more socially liberal (p < 0.05) predicted greater knowledge of HIV; (2) being Caucasian (p < 0.05) and socially conservative (p < 0.01) predicted professional and social discomfort in working with HIV patients; (3) being a minority (p < 0.05), more socially liberal (p < 0.05), having greater professional empathy (p < 0.001), having less professional and social discomfort (p < 0.001), and greater HIV knowledge (p < 0.05) predicted pharmacist willingness to provide services to those with HIV. Implications: The present research indicates the need for interventions to improve HIV knowledge and change beliefs (reduce stigma) towards PLWHA, especially targeting socially conservative Caucasians, and thus impact students’ willingness to care with PLWHA. The current work provides a new model of relationships between HIV knowledge, attitudes/stigma, and likelihood to engage in HIV care.
Pharmacy Students Conceptualization of Professionalism: Identifying Groups with Similar Conceptualization. Tatjana Petrova, Chicago State University, Harshal Pandya, Mumbai University, Nunnoula Mazhari, Chicago State University. Objectives: To identify groups of students with unique conceptualization of professionalism and see if groups could be described according to demographic and other variables. Method: A questionnaire examining students’ perception of the importance of professionalism traits and aspects of professionalism was developed. Demographic data was also collected. Questionnaire items were developed based on extensive literature review and informal brief interviews with students at Chicago State University (CSU). Validity was assured by inclusion of content from extensive literature review, expert panel review, and formal feedback from student members of the professionalism committee at CSU. Students from the College of Pharmacy (P1, P2, P3 and P4) were participants. Cluster analysis was used to identify groups of students with similar conceptualization of professionalism. Results: Of 266 participants in the study, 79 were P1; 52 were P2, 71 were P3 and 64 were P4. Analysis of the data revealed an underlying sub-structure in the data indicating four clusters of students with unique conceptualization to professionalism. The number of cases in each cluster was: Cluster 1 – 16; Cluster 2 – 61; Cluster 3 – 83 and Cluster 4 – 2. Clusters were then described using the differences in how participants responded to the demographic items and also using participants’ responses on the other survey items. Implications: A nuanced description of the concept of professionalism among students is helpful in providing a comprehensive understanding of professionalism to students, educators and practitioners. Grouping of students according to common conceptualizations of professionalism could help educators identify strategies to promote positive professional socialization for each group.

Pharmacy Students’ Use of Social Media Sites & Perception Toward Facebook Use. Fadi M. Alkhateeb, Texas A&M Health Science Center, David A. Latif, University of Charleston, Rachel Adkins, Shawn Osolin, Nile M. Khanfar, Nova Southeastern University. Objectives: To describe how common is the use of social media tools and applications among pharmacy students, the Facebook applications that are used by pharmacy students for personal, professional and/or educational purposes, and the attitudes of pharmacy students toward the usage of Facebook? Method: A 33-item questionnaire was sent to 188 pharmacy students at one pharmacy school via a web-based survey tool. The survey items inquired about the frequency, and extent to which students visited the most popular social media websites. Additional items included their purpose for using social media, number of friends (including their faculty), their favorite activities while visiting Facebook, and demographics. Results: One hundred eighty-eight pharmacy students answered the survey with a response rate of (100%). The three social media websites with the most frequent usage were Facebook, Wikipedia, and YouTube. The majority of students have Facebook account (94%) and two thirds (65%) are using Facebook multiple times in the day and they indicated the main purposes for using Facebook were for chatting and keeping touch with friends (90%) rather than for professional and educational purposes. Nearly half (45.1%) add faculty to their friend list and Watching TV was the most popular place where students used Facebook. Implications: Pharmacy students are open to “friend” the outside world, while they are somehow reluctant to “friend” faculty members at their school of pharmacy. Most students choose to use Facebook for “social purposes” instead of “for educational use”. Knowing the volume of students that participate in this type of communication, it may prove beneficial for educators to utilize popular social media in disseminating information and group discussions.

Pharmacy Students’ Personal Financial Literacy and Money Management Behavior. Earle W. Lingle, South University. Objectives: The purpose of this study was to assess the knowledge base and the behavior of pharmacy students regarding personal finance. Method: An online survey of second year pharmacy students on two campuses was conducted. A total of 135 of a possible 148 students completed the survey. The survey included questions testing knowledge of personal finance topics, evaluating students’ current financial behavior, and requesting demographic/background information. Results: The composite average score for the knowledge questions was 61%. Regarding personal finance behavior, 24% of students were late or missed making a credit card payment during the past year. 31% of students report they are spending less this year than last year as a result of the current economic climate. Students reported an average of $1,308 in past due balances on their credit card and they expect to owe an average of $173,310 in student loans upon graduation. 25% of the students also have auto loans and 14% have mortgages. 42% percent responded they worry “nearly all the time” or “often” about their debt and 32% believe that their debt has a negative effect on their academic studies. Implications: These results indicate that pharmacy students appear to have a greater knowledge of personal finance than other college students. This is likely due to pharmacy students being older (mean age=26) and having more experiences in this area. However, pharmacy students’ knowledge of personal finance is lacking in several areas including investing and insurance. It is apparent that pharmacy students’ debt will be a significant factor in their future personal life.

Physician and Pharmacist Perceptions About Use of Comparative Effectiveness Research in Health Care Decision-Making. Derek Tang, The University of Arizona, Terri L. Warholak, The University of Arizona, Lisa E. Hines, Jason Hurwitz, The University of Arizona, Mary Brown, The University of Arizona, Ann M. Taylor, The University of Arizona, Daniel C. Malone, The University of Arizona. Objectives: To assess physician and pharmacist perceptions on comparative effectiveness research (CER) prior to and after attending a four-hour educational program on comparative effectiveness research. Method: Participants were invited via email from specific healthcare organizations. Study eligibility criteria included: 1) participation in the P&T process within managed care, health-systems, or institutional care organizations; and 2) a willingness to attend a 4-hour, interactive educational program on CER. Participants completed a questionnaire before and after the educational program to determine whether the program was effective in improving their self-perceived CER knowledge and in positively altering their attitudes regarding CER. Logistic regression analysis were used to identify factors associated with self-perceived changes of CER ability. Results: One hundred and forty out of 199 participants responded to both the pre- and post-CER session questionnaires (70.4% response rate). Fifty percent of the respondents demonstrated a statistically significant improvement in self-perceived CER ability, whereas only 6.9 percent had a significantly more positive opinion on CER after attending the session. Younger age and hospital-affiliated participants were associated with greater self-perceived CER ability. Implications: The educational sessions appeared to increase the participants’ CER knowledge but not their attitudes toward CER.

Promoting Post-doctoral Pharm.D Program Awareness- A Retrospective Analysis of Educational Outreach Initiatives. Thomas Lehman, Demetre Stamatis, Rutgers, The State University of New Jersey, Justin J. Balint, Caroline Nguyen, Rutgers, The State University of New Jersey, Cristina DiRamio, Rutgers, The State University of
New Jersey, Michael Toscani, Rutgers, The State University of New Jersey, Joseph A. Barone, Rutgers, The State University of New Jersey. 

Objectives: To identify opportunities to promote awareness of post-doctoral Pharm.D. programs using various methods of educational outreach programming. Method: The Rutgers Institute for Pharmaceutical Industry Fellowships (RIPIF) conducted nationwide educational outreach programs at universities, organization meetings, and online webinars. A retrospective pooled-analysis of this data evaluated trends in student attendance by graduation year and type of program attended. Results: Students and recent graduates (n = 1,299) attended educational outreach initiatives over a 4 month period in Fall 2012. Expected 2013 graduates accounted for 42% of all students reached by university visits (n = 61), 28% by organization meetings (n = 18), and 30% by online webinars (n = 2). 2014 graduates, however, attended university visits more frequently (59%) compared to organization visits (32%) and online webinars (9%). Educational outreach attendance at universities and organization events accounted for 87% of all students reached compared to 13% for online webinars. The average graduating student attendance per event was 61 attendees per webinar (n = 89 total attendees per webinar), 6 attendees per organization event (n = 25), and 3 attendees per university visit (n = 12). Implications: Programs attempting to reach expected graduates may be equally effective through any of the outreach methods studied. Reaching students prior to their final year of school, however, may increase program visibility and be more effective through university visits and organization meetings compared to online webinars. Webinars may be a viable option for all programs including those who do not have the resources to attend universities and organization meetings.

Relationships Between Five Factors of Professionalism and Three Stages of Ethical Development Among First-Year Pharmacy Students. David A. Gettman, D Youville College. Objectives: The primary objective of this study was to evaluate the relationships between five factors of professionalism and three stages of ethical development. The secondary objective was to determine whether gender and or age made a difference in the strength of these relationships. Method: Professionalism among pharmacy students was assessed using items from an instrument developed by Hall (1969). Using Likert scaling, the 50-item professionalism scale measures student responses on five factors of professionalism: use of professional occupation as a major referent, belief in public service, belief in self-regulation, sense of calling to the field, and feeling of autonomy. Stage of ethical development was assessed using the Professional Ethics in Pharmacy (PEP) test that was developed by Charr (2009). The three stages of the PEP are patients’ rights (Stage 5), rules and regulations (Stage 4), and business orientation (Stage 3). Results: 54 out of 72 Pharm.D. students (23 female, 31 male) taking a first year communications resources to attend universities and organization meetings. A total of 446 students (response rate = 70.6%) completed the questionnaire. Students agreed (strongly agreed and agreed) that drug addiction is a disease (62.1%), drug addiction indicates a lack of willpower (28%), some people are more predisposed to addiction than others (91%), and drug addiction and substance abuse are the same thing (46%). Associations were primarily found with year in the academic program (i.e., 12 items). Implications: Drug addiction is a major public health concern. As colleges and schools of pharmacy address addiction as a component of the curricula, understanding students’ perceptions can guide faculty to strengthen teaching and learning activities associated with the disease of addiction.

Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education (SPICE): Instrument Development and Validation. David S. Fike, University of the Incarnate Word, Joseph A. Zorek, Texas Tech University Health Sciences Center, Eric J. MacLaughlin, Texas Tech University Health Sciences Center, Anitra A. MacLaughlin, Signa LLC, Mohammed Samiuddin, Texas Tech University Health Sciences Center, Rodney B. Young, Texas Tech University Health Sciences Center. Objectives: Describe the development and validation of the Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education (SPICE) instrument. Method: A 20-item, Likert-type instrument was created to assess changing perceptions of medical and pharmacy students (MPs) exposed to an interprofessional collaborative practice clinic (IPCPC). Items were derived from existing instruments or developed independently by the researchers. A pilot of the 20-item instrument was performed at the IPCPC to identify possible scales (N = 27). The instrument was then administered to a larger, more representative sample of MPs (N = 154) and confirmatory factor analysis (CFA) was performed on the entire data set (N = 181) for the 20-item model. Using theoretical and statistical principles, a refined model was specified. Psychometric properties of the more parsimonious, 10-item model structure were subsequently evaluated. Results: The refined 10-item SPICE instrument assesses students’ perceptions in three domains (Interprofessional Teamwork and Team-Based Practice, Roles/Responsibilities for Collaborative Practice, Patient Outcomes from Collaborative Practice). CFA for the refined model achieved goodness-of-fit (χ²/df = 1.220, CFI = 0.987, RMSEA = 0.036). All standardized regression weights were statistically significant, with only one < 0.60. Factor loadings and correlations provided support for construct validity (convergent and discriminant validity, respectively). Internal consistency reliability for the instrument was 0.837 (Cronbach’s alpha). Content validity was established by subject matter experts. Implications: SPICE is an effective tool for evaluating changing perceptions among MPs exposed to interprofessional collaborative practice. The validated, simple-to-administer, 10-item instrument offers an alternative to assessment tools that have not been comprehensively evaluated or that are less streamlined.

Student Perceptions of a Peer Evaluation System in Clinical Therapeutics Courses. Lisa B. Phipps, Virginia Commonwealth University, Veronica P. Shuford, Virginia Commonwealth University,
Brigitte L. Sicat, Virginia Commonwealth University, Cynthia K. Kirkwood, Virginia Commonwealth University. Objectives: To evaluate student perceptions of a modified peer evaluation system implemented in therapeutics modules. Method: To overcome challenges faced with the peer evaluation system used as part of Team-Based LearningTM (TBL), the process was modified. The classes of 2014 (P3s) and 2015 (P2s) were introduced to the modified system at the beginning of the fall semester. Unlike the P3s, the P2s were using peer evaluation for the first time. Students were asked to complete a 4-item survey about the modified peer evaluation system. Percent in agreement with the statements was analyzed for differences. Results: Chi-square analysis revealed the P2s (n=33) had significantly higher agreement than P3s (n=68) on all four questions. P2 respondents agreed 75.8% the feedback they gave to their peers was useful, compared with 45.2% of P3 respondents (p = 0.013). While 63.6% of P2 respondents agreed the feedback they received from peers was useful, 35.3% of P3 respondents agreed (p = 0.014). Agreement with faculty feedback being useful was 72.7% for P2s and 24.6% for P3s (p < 0.001). P2 respondents agreed 60.6% their ability to write constructive feedback improved as a result of faculty feedback, compared with 31.9% of P3 respondents (p = 0.011). Implications: Peer evaluation, an essential component of TBL, remains a challenging aspect for pharmacy education. Faculty should be aware of how changes affect students. Continuous evaluation is important for improving student guidance and helping students understand the benefits of peer evaluation.

Student-led Screenings at Korean Health Fairs. Lourdes G. Planas, The University of Oklahoma College of Pharmacy, Bumsoo Kim, The University of Oklahoma, Kathryn M.L. Konrad, The University of Oklahoma College of Nursing, Grace Kim, The University of Oklahoma College of Nursing. Objectives: Many Korean immigrants have low access to health care services. This poster describes the development, implementation, and evaluation of three student-led health fairs held in 2010, 2011, and 2012 for Korean Americans in the Oklahoma City area. Method: A student pharmacist planned the initial health fair while enrolled in an independent study course that focused on Korean American health, community-based influenza immunization programs, and interprofessional health fairs. A partnership with a local church was formed. Students and faculty from pharmacy, nursing, dentistry, and medicine served as volunteers. Faculty provided mentoring and assistance for services and screenings, such as influenza vaccination, blood pressure, and body mass index (BMI). Results: Since 2010, three annual health fairs have been held at a Korean American church community center. Influenza vaccinations were administered to 164, 120, and 80 participants in 2010, 2011, and 2012, respectively. During the three health fairs, prehypertensive blood pressure levels were found among 30.23% to 55.74% of participants; levels greater than or equal to 140/90 mmHg were found among 24.59% to 51.16% of participants. Approximately 33% and 7% of participants who received BMI screening were overweight and obese, respectively. Implications: Student volunteers identified individuals within the Korean American community with health needs. Insights gained upon reflection included the importance of persistence, building relationships, clear communication, documenting outcomes, and obtaining feedback from participants for future health fair improvement.

Students Evaluating Students: Using Online Peer Review to Assess Student Pharmacists’ Public Health Projects. Olayinka O. Shiyanbola, South Dakota State University, Jane R. Mort, South Dakota State University. Objectives: Examine the utility of an online peer review presentation format to evaluate student Public Health Projects. Method: Third year pharmacy students in a public health course worked together in groups of 7-8 to develop Public Health and Wellness project proposals. Previously, students presented their group projects in-class which yielded minimal peer feedback. In 2012, students were required to post their paper and a PowerPoint project summary on the online course management system. Each group’s documents were reviewed by all members of another group and students provided non-graded feedback based on the project rubric. All comments were reviewed by the faculty for fairness and appropriateness. Results: There were 10 projects and 79 student critiques. Students gave feedback on the Problem Evaluation (n = 28), Past Programs (n = 13), Community/Target Population (n = 28), Intervention (n = 69), Budget/Income Statement (n = 32), Paper Style (n = 30) and Presentation Style/Content (n = 20). The students' comments were fair and appropriate. Students seemed to enjoy the peer review and presentation format. Comments included: “It was really interesting to read about another group’s take on a public health project after working on our own”; “It was fun to see how another group’s project came together”; “I enjoyed reading through this public health project proposal - especially because it was completely different than the one I have been working on with my group!” Implications: The online peer review format yielded a great deal of constructive feedback. This approach saves class time and facilitates student participation and accountability for peer reviews.

Students’ Confidence and Perceptions of Pharmacists’ Roles in Public Health Interventions After Case Study Exercises. Dennis W. Raisch, The University of New Mexico, Bernadette Johnson, The University of New Mexico, Xian Shen, University of Maryland, Sarrah Babb, University of New Mexico, Melanie A. Dodd, The University of New Mexico. Objectives: In 2011, student feedback regarding the public health (PH) course at the University of New Mexico College of Pharmacy indicated a need to develop skills in applying PH concepts for individual patients. Our purpose was to increase student understanding and confidence in their role in PH. Method: Third-year pharmacy students in the PH course for Spring 2012 were given case studies that presented potential patient PH problems in community settings. The students applied PH concepts to each case using PH resources. Students were included if they participated in the case-based learning session and voluntarily completed pre- and post-surveys, consisting of 22 statements with Likert scale responses, strongly disagree (-2) to strongly agree (+2). Survey questions were grouped into domains of: perceptions of pharmacist roles (PPR) in PH, confidence in ability to identify and address PH problems (CONF), self-efficacy on improving PH outcomes (SEO), and pharmacists as PH role models (PRM). Within each domain, paired t-tests were performed on summed scores (pre- versus post, alpha = 0.05). Results: Both surveys were completed by 73 of 89 students (82%). Significant improvement (P < 0.001) in scores were found for all domains (PPR = +1.42, CONF = +3.21, SEO = +2.2, PRM = +2.0). Reliability of each domain was tested using Cronbach’s alpha and ranged from 0.70 to 0.78. Implications: Patients rely on pharmacists as a source for public health information. A public health case-based learning session increased students’ scores on PPR, CONF, SEO, and PRM. The session improved students’ abilities and confidence in providing PH interventions.

Survey of Vaccine-Preventable Disease Knowledge, Attitudes, Behaviors, and Practices Among Adults in Monroe County, Michigan. Paul E. Kilgore, Wayne State University, Jessica Traster, Carolyn Archer. Objectives: In Michigan, rates for adult immunizations remain below national goals. While several potential barriers
limit adult immunizations, there is relatively limited data on the state of current knowledge about vaccines and vaccine-preventable diseases among older residents in Michigan. This survey was conducted to assess current knowledge, attitudes and practices regarding adult vaccine-preventable diseases and vaccines among older adults. Method: Participants, aged 60 years and older living in Monroe County, were surveyed for their knowledge, perceptions and experience with vaccines and vaccine-preventable diseases including hepatitis B, herpes zoster, influenza, pneumonia, and pertussis. One-on-one surveys were conducted in community facilities using a standardized questionnaire. Statistical data analyses was performed to describe variations in participant responses by demographic characteristics including age and socioeconomic variables. Results: Among 73 participants interviewed to date, 60 (82.1%) were female. Sixty-five (89.0%) were ≥65 years of age and 67 (91.8%) were non-Hispanic Whites. Overall, 84.9% of participants felt that vaccines were important. Participants felt most often at risk for influenza (61.6%), pneumonia (43.8%) and zoster (38.4%). Only 46.6% felt that TdaP (pertussis) vaccine was important to their health. Among the seniors surveyed, 86.3% had received flu vaccine in previous years and 48 (61.6%) had received a pneumococcal vaccine. A substantially lower percentage of participants had received either the TdaP (31.5%) or zoster vaccine (27.4%). Implications: Our survey suggests that there are significant gaps in knowledge among older residents in Monroe County, Michigan. Results of this survey will be used to develop targeted community education, outreach and advocacy for adult vaccines and vaccine-preventable diseases.

Teaching Professional-Degree Students to Read Critically. Whitney Jane A. Caudill, Manchester University College of Pharmacy, Lorin Sheppard, Manchester University College of Pharmacy. Objectives: Many students enter college and even professional school unprepared to extract personal and professional meaning from informationally dense texts. The goal of this study was to assess students’ self-reported implementation of reading strategies that would enable them to comprehend complex texts. Method: Students received instruction on critical reading of complex passages involving pharmacy law. The professor explained and demonstrated strategies associated with critical reading, including identifying the main ideas of the passage, taking notes, and connecting the reading to one’s existing knowledge base. Students had the opportunity to practice these skills and receive feedback. Due to the possibility of response-shift bias, a retrospective pretest-posttest design was used to identify how student behavior had changed as a result of instruction. Nine question pairs had students rate their understanding of the text, and identify the main ideas (p < 0.001 for each pair of questions). Furthermore, 83 percent of students reported that they were applying these comprehension skills to other courses. Implications: A one-hour instructional segment that offers explanation, demonstration, practice, and feedback on critical reading of professional texts improves students’ self-reported reading comprehension strategies and may increase student understanding of complex texts.

The Great Debate: Leading Questions versus Open-Ended Questions—Which Gets the Most? David M. Baker, Western New England University, Eric C. Nemec, Western New England University, Chris Hakala, Western New England University College of Arts & Sciences, Kam Capoccia, Western New England University. Objectives: The objective was to determine whether on a course evaluation form learners would provide more formative feedback in response to leading questions versus a traditional open-ended comments box. Method: A double-blind, randomized, controlled, cross-over study was performed to determine which question set, i.e., two leading questions or an open-ended comment box, provided the most useful feedback. Using a random number generator, seventy-five learners were randomized into two groups and provided a mid-point course evaluation in six separate courses (N = 450). The evaluation surveys were identical except for the comments section. In the control survey, an open-ended comment box was provided, whereas in the experimental survey two specific leading questions were asked, i.e., a plus/delta analysis. In each course, a non-instructor distributed the surveys electronically to the learners. Survey results were blinded and provided to our Center for Teaching and Learning for analysis. At the Center, two independent reviewers assessed the data; scoring responses on a 1 to 3 point scale, with 1 being formative, 2 being neutral, and 3 being summative. Results: Of the 295 completed evaluations, we received an 82% response rate (n = 242) to the comment section. A trend showing more formative responses to the leading questions (n = 94) versus the open-ended comments section (n = 66) was noted; however, the difference was not significant (chi-square p = 0.340). Implications: The study showed that both leading questions and open-ended comment requests on a course evaluation result in similar formative feedback. Further study with more diverse and larger learner populations may show the trend found to be of significance.

The Impact of Professionalism Instruction on Attitudes and Behaviors of First-Year Pharmacy Students. Nathaniel M. Rickles, Northeastern University, Jennifer A. Platt, Quinnipiac University, Anita Young, Northeastern University, Samuel J. Matthews, Northeastern University. Objectives: To determine if: (1) an introductory pharmacy course produces changes in professionalism among first-year pharmacy students and (2) students perceive themselves as having different professional attitudes than their classmates. Method: During Spring 2012, we administered identical surveys to pharmacy students at the beginning and end of an introductory pharmacy course. The novel survey included 13 background questions, and 20 Likert items related to professional attitudes/behaviors. The attitudes/behaviors were measured across 5 domains of professionalism: (1) reliability/responsibility/accountability; (2) lifelong learning and adaptability; (3) relationship with others; (4) upholding principles of integrity and respect; and (5) citizenship and professional engagement. Descriptive statistics and paired T-tests were used to describe and compare the pre/post survey results. Results: The sample of 159 students was largely female (66%), Asian or Caucasian (84%), had no prior pharmacy experience (70%), and held a prior leadership position (79%). Professional attitudes were significantly more positive at the end of the course (p < 0.001). Positive change was noted in the Domain 2 (p < 0.05). Significant changes in professional behaviors were noted in Domains 2, 3, and 5 (p < 0.01). Across both surveys, students indicated their own attitudes as significantly more professional than the attitudes of their classmates except Domain 5, where classmates were rated higher (p < 0.001). Implications: Professionalism instruction had a significant and positive impact on specific domains of professional attitudes/behaviors. These results highlight the value of educational interventions to improve professionalism among freshmen pharmacy students. Future research will explore if the impact of professionalism instruction is sustainable over the curriculum.

The Influence of Source Credibility on Trust and Belief Strength of Health Care Information. Jennifer Lacie Hatcher, Union University,

Sean R. King, Union University, Laura Ladymon, Union University, Erica R. Rogers, Methodist LeBouheur Healthcare-Germantown. Objectives: Using a model of practical reasoning, the purpose of this investigation was to assess the influence of source credibility on trustworthiness of the provider and belief strength of health information provided by various health care professionals. Method: This study used a three-factor experimental design in which 179 undergraduates were randomly assigned to receive information about an influenza vaccination from one of three sources: pharmacist, physician or nurse practitioner. After measuring beliefs about the vaccination, credibility and trustworthiness of the source were assessed. Next, the participants were provided an addendum that contradicted the initial information they received and beliefs and trustworthiness were reassessed. Three 10-point Likert-type scales were used to assess all variables. Results: There were no significant differences observed concerning the credibility of the three sources of health information (p > 0.05). The magnitude of the beliefs formed and the belief change that resulted after the contradictory information was presented did not differ across information sources (p > 0.05). The trustworthiness of the source providing the information was also found to be similar across the groups and did not differ significantly even after contradictory information was provided (p > 0.05). Implications: These findings indicate pharmacists are viewed as credible as physicians and nurse practitioners when providing information regarding influenza vaccinations. The source delivering the information will not influence beliefs and the trustworthiness of each provider decreases similarly when contradictory outcomes are present. As one of the most accessible health care professionals, pharmacists can be instrumental in providing patients with the information required to make informed choices concerning immunizations.

The Knowledge Levels and Attitudes of Pharmacy Students Regarding Immunizations. Alexis Bonnema, Midwestern University/Downers Grove, Courtney Linhart, Midwestern University/Downers Grove, Thomas J. Reutzel, Midwestern University/Downers Grove, Ana C. Quinones-Boex, Midwestern University/Downers Grove. Objectives: To assess the knowledge levels and opinions of pharmacy students regarding immunizations, including views of the value of immunizations and willingness and confidence to administer immunizations. Method: Questionnaires were administered to all students enrolled in the College of Pharmacy. They included demographic variables, a 17-item knowledge test, and ten opinion statements. P was set a priori at ≤ 0.05. The research was approved by the University’s Institutional Review Board. Results: 608 of 837 students (73%) returned useable surveys. The mean score on the 17-item knowledge test was 52%. Over 95% of these students believe that the benefits of immunization outweigh the risks. Over 85% would be comfortable administering immunizations, and 72% think pharmacists should be able to give immunizations without a standing order or prescription. Upperclassmen scored higher on the knowledge test than underclassmen (65% versus 45%). Those with pharmacy work experience were more knowledgeable than those without (53% versus 46%). Those that received immunization training from the College scored higher than those that did not (66% versus 45%). Upperclassmen are more comfortable administering immunizations. Implications: Future pharmacists have somewhat low levels of knowledge regarding immunizations. Positively, those that underwent training scored 20% higher than those that did not. These students felt positive about the value of immunizations and confident in their ability to administer them. College administrators should consider requiring a comprehensive immunization program for their students, including both classroom and hands-on components. Policy makers at the professional and organizational levels could seek to expand the role of pharmacists in providing immunizations.

The Role and Responsibilities of Pharmacy Student Government Associations in US Pharmacy Programs. Nathan J. Harnois, Western New England University, Daniel R. Kennedy, Western New England University. Objectives: Our goal was to explore the structure and composition of pharmacy student governments (PSG) in pharmacy programs, and understand their role and responsibilities as representatives of their pharmacy student body. Currently, there is no available information or standards regarding the organization of PSGs. Method: An online survey tool was developed and distributed to the pharmacy school Deans requesting them to forward the survey to their respective student leaders. A follow-up request was sent one week after a non-response. Results: A total of 67 completed surveys were received (52.4% response rate). Of the responding programs, 64 (95.5%) have PSG representation. Most PSGs included a president (85.7%), vice-president (79.3%), secretary (82.5%), and treasurer (71.4%), with historian (12.0%) fifth most common. In general, PSGs do not impose term limits upon officers (77.4%), nor prohibit officers from serving as officers in other organizations (82.3%). The majority of PSGs served to oversee pharmacy student/organizational activities. Specific functions of the PSG included oversight of fundraisers (73.3%), on-campus events (68.9%), social events (60.0%), organizational meetings (57.8%) and off-campus events (55.6%). The majority (93.5%) of respondent schools are part of a larger university. Only 46.6% of these PSGs participated in the university-wide student government. 88.9% felt this interaction was beneficial, while only 21.9% of PSGs that did not participate felt a relationship would be beneficial. Implications: These results provide a tool for Pharm.D. programs to assess their PSG’s structure and functions with other US pharmacy programs, which could be especially useful for new and recently founded programs.

The Impact of Part-time Employment and Leadership Involvement on Academic Success. Emily Chan, Patty F. Havard, University at Buffalo, The State University of New York, Jennifer M. Hess, University at Buffalo, The State University of New York, Mark M. Sauberan, University at Buffalo, The State University of New York, Clinton Thompson, Mei-Jen Ho, University of South Florida. Objectives: To assess current student profile on their involvement in professional organizations and part-time employment; and determine if there is an overall relationship with part-time employment and leadership involvement affecting academic success. Method: All pharmacy students at the University at Buffalo School of Pharmacy and Pharmaceutical Sciences were invited to complete a 14-item online survey. The survey questions focused on their employment status outside of school and their involvement in professional organizations. Responses were linked to their GPA using their university identification number to identify possible association. Two multiple linear regression models were conducted to define the relationship between academic success and part-time employment and professional involvement while adjusting for preadmission criteria. Results: Devoting more hours to part-time employment and leadership involvement significantly correlated with a negative impact on GPA, even in the presence of other covariates. Pre-admission GPA was the only covariate that was significantly associated with an increase in GPA. There was a consistent decrease in GPA from the first-professional year to the second-professional year, and then an increase in the third-professional year. Implications: With changes in the economy, many pharmacy students look to become involved in part-time employment and/or leadership roles for job security. Knowing these activities are strongly correlated with having a negative impact on GPA, faculty and staff mentors can now better guide pharmacy students achieve
Implications:

A belief that the respondent was at low risk for the disease in question.

From pharmacies. Physicians were the primary source of information.

The majority of respondents had received vaccines from their primary care offices. Providing direction in managing the opportunities offered allow for students to have a diverse pharmacy education experience while preparing them to become assets in the health care profession.

Tobacco and Alcohol Sales in Community Pharmacies: Policy Statements from U.S. Professional Pharmacy Associations. Robin L. Corelli, University of California at San Francisco, Karen S. Hudmon, Purdue University. Objectives: Although there is a growing movement toward eliminating the sale of tobacco and alcohol in community pharmacies, the extent to which state and national associations support such efforts has not been characterized. This study summarizes the stance of professional pharmacy associations on the sale of tobacco and alcohol in community pharmacies and quantifies the proportion of associations that have implemented formal, written policies on these issues.

Method: National pharmacy professional associations (n=10) and state-level APhA- and ASHP-affiliated pharmacy associations (n=86) were contacted via telephone and/or email and a search of the association website was conducted to identify official written policies regarding the sale of tobacco or alcohol products in community pharmacies.

Results: A total of 96 organizations were contacted, for which a final determination was made for 95. Of these, 14% have a formal policy opposing the sale of tobacco in pharmacies [3 national associations (AACP, APhA, ASHP) and 10 state-level associations], and 5% have a formal policy against the sale of alcohol in pharmacies [2 national associations (APhA, ASHP) and 3 state-level associations]. Of the 10 associations representing the major tobacco-producing states (GA, KY, NC, SC, TN, VA), 4 (40%) have a policy against tobacco sales in pharmacies compared with 8% of 75 non-tobacco state associations (p < 0.01). Implications: Among national professional pharmacy associations, only APhA and ASHP have official policy statements opposing the sale of both tobacco and alcohol in pharmacies. AACP has a policy statement against tobacco sales, but not alcohol sales. Most state professional pharmacy associations (ASHP-, APhA-affiliates) have no official policy statement or position against the sale of tobacco or alcohol in community pharmacies.

Vaccine-Preventable Disease Knowledge and Practices Among Hajj Pilgrims: Application of Community Survey Methods in Detroit. Paul E. Kilgore, Wayne State University, Matthew Duprey, Adnan Hammad, Carolyn Archer, Madhia Tariq, ACCESS Community Health & Research Center, Zainab Alsamarae, Wayne State University. Objectives: Annually, over 2,000,000 Muslims complete the Hajj pilgrimage to Saudi Arabia. During Hajj, the potential for spread of vaccine-preventable diseases may place pilgrims at risk for travel-related illnesses. Method: We surveyed Metropolitan Detroiters intending to travel for the Hajj to ascertain their knowledge, attitude, beliefs, and practices with regard to vaccine preventable diseases among.

Results: Among 327 survey participants, 57.8% were female and 48.6% were aged 46–64 years. The most commonly reported country of origin was Lebanon (57.9%). Vaccine awareness ranged from a low of 46% for typhoid fever to a high of 93% for influenza vaccine. Ninety-six percent (96%) of 2011 and 2012 students showed an inverse relationship between critical dialogue and inter-group contact and prejudice. Implications: By using concepts or specific examples from the case, multiple choice questions that test concept skills and application of knowledge can be developed. Use of a case example new to students assures that answers cannot be memorized and use of coordinate concepts as response options assures that all response options are viable choices.

Theoretical Models:

A Critical Intergroup Dialogue Course as a Pedagogical Model for Teaching Pharmacy Students Cultural Awareness. Clara Awe, University of Illinois at Chicago, Shraddha Shinde, Jason A. Rebello, University of Illinois at Chicago. Objectives: To determine whether pharmacy students’ intergroup and critical dialogue contact and interactions with peers have significant impact on students’ affective knowledge and skills related to practicing in a pluralistic healthcare system during and after graduation. Method: A three-part survey developed and validated from the University of Michigan was administered to a total of 16 students in spring of 2011 and to 17 students in 2012 enrolled in PMAD 387 elective course. Pre and post-test and post-post longitudinal measures of students’ knowledge and perceptions and attitudes on race/ethnicity, gender, social group identities and conflicts, social justice and political issues and behavioral change as a result of taking PMAD 387. Analysis of variance (ANOVA) was conducted to measure the differences across various domains. Results: Results revealed that there were statistically significant changes in the overall levels of students’ cultural awareness and sensitivity, ability to think pluralistically and heightened awareness of social justice learning. There were no significant differences based on gender and social class on the impact of course on students’ behavior change. However, there were significant differences based on race/ethnicity (p<0.03). Ninety-six percent (96%) of 2011 and 2012 students showed an inverse relationship between critical dialogue and inter-group contact and prejudice.

Implications: Colleges of pharmacy may want to incorporate this innovative pedagogical model across the curriculum in teaching and learning as a new approach so that students will gain the ability to working effectively with empathy and compassion with patients, families and communities from diverse cultures and health belief systems.
An Innovative Cultural Competence Pharmacy Assignment Utilizing Learning Management System Tools. Christian B. Albano, Concordia University Wisconsin, Elizabeth A. Musil, Concordia University Wisconsin, Loren Cooper, Concordia University Wisconsin, Scott Hordesky, Concordia University Wisconsin. Objectives: To teach cultural competence and integrate student learning outcomes between courses in Applied Patient Care and Healthcare Delivery Systems, an innovative pharmacy assignment and its associated grading rubric were developed utilizing the assignment and grading tools in a learning management system (LMS) software. Method: The team-based assignment was designed to meet pharmacy student learning outcomes related to communicating with the patient and/or family and to research the culturally relevant questions of the patient and/or family. Students were provided with a pre-determined family type with certain cultural aspects, such as race and religion, in which they had to answer questions on a LMS discussion board and were evaluated by a rubric embedded in the LMS. The unique rubric consisted of criterion in content, content organization, resources (used), and spelling and grammar. The ratings of the criteria ranged from needs improvement, acceptable, and outstanding/exceptional. Results: The primary outcomes of the project are the development of the pharmacy assignment and its associated LMS grading rubric. The average team grades for the assignment were 98%. Implications: According to ACPE accreditation standards, guideline 9.1, “the college or school must ensure that the curriculum addresses patient safety, cultural competence, health literacy, health care disparities, and competencies needed to work as a member of or on an interprofessional team.” The unique cultural competence assignment enhanced faculty collaborations and fostered team learning while the development of an innovative grading rubric improvement student assessment. Moreover, the use of LMS assessment tools can enhance student learning and improve course management.

Building Bridges to Health Equity and Disparities: Inter-Professional Health Equity (IHEI) Institute. Clara Awe, University of Illinois at Chicago, Princess Currence, Tiffany J. Scott-Horton, University of Illinois at Chicago, Darryl Pendelton. Objectives: To evaluate whether a seven-week intensive Inter-Professional Health Equity Pilot program enhanced students’ leadership and understanding in the area of health disparities, and their likelihood of cultivating culturally responsive approaches to patient care as part of an interdisciplinary team; to determine whether students had demonstrated understanding of health equity and the contextual factors that affect patients’ adherence to healthcare plan. Method: In spring of 2012, a focus interview was conducted with eight students from the colleges of pharmacy, medicine and dentistry on inter-professional health equity program. As a result, in fall of 2012, UIC Colleges of Pharmacy, Medicine and Dentistry, piloted the IHEI for seven weeks. A total of 30 students participated in the program. A pre-test self-assessment on communication styles, values and attitudes was administered on the first day of program and a post-test at the end of the program. Pedagogical approaches utilized were case studies, role playing, inquiry-based and experiential learning, active learning, perspectives from clinical faculty members from each school Results: Pre-test showed that 78% of the medical students rated their cross-cultural communication styles, and values and attitudes as high; 68% of pharmacy students rated themselves high and 50% of dental students rated themselves high. Post-test showed that, 90% of both pharmacy and medical students rated themselves high while 55% of dental students rated themselves high. Implications: IHEI model should be further explored by health professions curriculum committees on how to incorporate early in the curriculum the opportunity for students can begin to work with patients in an inter-professional collaborative healthcare team.

Creation of an Active Learning, Experiential Healthcare Communications Course Relevant to Pharmacy Practice. David M. Baker, Western New England University, Izabela A. Collier, Western New England University. Objectives: The objective was to design a 3-credit communications course that would provide healthcare communications education in an active learning environment, allowing each learner to develop, expand, and explore his/her personal skills through actual communication experiences. Method: Two contact hours per week were used to provide the basic communication education through didactic lecture. The third contact hour provided the active, experiential learning and was accomplished by breaking the class into separate sections, each consisting of 8-10 students and 1 instructor. Each week, 4 sections were devoted to counseling role plays - half in the role of pharmacists and half as patients; and 4 sections to hour-long professional group presentations – half in the presenting group and half as audience-observers. By the end of the semester, each learner had performed 4 one-on-one consultations, been counseled 4 times, presented 3 professional group topics, and observed 3 group presentations. At the end of each consultation or presentation, self, peer, and instructor evaluations were performed. All consultations and presentations were video-recorded. Results: Providing realistic role plays and cooperative group presentations provided the learners with actual experience utilizing their communication skills. Using peer, self and instructor assessments, the learners gained an appreciation of what constitutes effective communication skills. The self and peer assessments allowed learners to develop critical analysis skills which honed their communication education and skills. Implications: To properly prepare pharmacy learners for future practice, communications courses need to provide basic communication education, as well as experiential communication opportunities, so learners can test and fine-tune their newly-acquired skills.

Pharmacists’ Attitudes toward the Homeless Inventory (PATHI) Survey Creation and Pilot. Erin Johanson, Roseman University of Health Sciences. Objectives: 1) Explain the purpose and process of creating and validating a new survey, the Pharmacists’ Attitudes Toward the Homeless Inventory (PATHI), to a) assess attitudes toward homeless patients and b) measure levels of interest and empathy in working with this population. 2) Discuss future implementation and potential for use of the survey. Method: The creation and validation of the Pharmacists’ Attitudes Toward the Homeless Inventory (PATHI) took place in three different phases. 1) The new PATHI survey instrument was designed based on two validated survey instruments, the Health Professionals’ Attitudes Toward the Homeless Inventory (HPATHI) and the Attitudes Toward Homeless Inventory (ATHI), to alter some items to be applicable for pharmacist-specific assessment. 2) Once drafted, the survey was reviewed by education experts and edits made. 3) Following Roseman University Institutional Review Board approval, the 46-item PATHI survey was piloted to Roseman University, College of Pharmacy students. Consent was granted prior to voluntary participation. Results: Results were compared to assess validity. Data was reported as descriptive statistics. Items in the survey were answered using a 6-point Likert scale. Demographic variables were also included. Implications: Potential areas for future study include piloting this instrument to other Doctor of Pharmacy students and pharmacists. Results gained from this study and future studies have the potential to impact didactic and experiential curricula as well as aid in education and training outreach to provide...
SCHOOL POSTERS

“Hybrid” Approach to Curriculum Design for P1 Students. Kathleen H. Besinque, University of Southern California, Edith Mirzaian, University of Southern California, Curtis Okamoto, University of Southern California, Ian Haworth, University of Southern California. After attending the AACP Curriculum Summit in 2009, the first year (P1) course coordinators developed an innovative approach to the design and delivery of the curriculum. First implemented for Fall 2010, the faculty worked collaboratively to design a “hybrid” model for delivery of the Fall courses. The model was expanded to the Spring for 2013. With the new design, course schedules were developed over the summer based on pedagogical needs for each course. For example, the P1 Pharmacy Practice & Experience course needed a large block of time to provide immunization, BLS, and disease screening education and skills training prior to health fairs in early Fall. The Pharmaceutics course wanted two series of daily lectures followed by 2 weeks of small group instruction for case studies. The Compounding and Calculations course wanted to integrate with the pharmacetics course to blend practice with theory. The faculty wanted to schedule exams in a block, but the number of exams varied between courses. The P1 schedule is now a “shared” schedule and differs from the traditional silo (MWF 10-12) approach and block design (3 weeks, all one course). The curriculum is a “hybrid” design incorporating the flexibility found within blocks and allowing students the time for reflection and deeper learning found with traditional schedules. However, the new design requires more faculty time for scheduling and course management. Selecting the P1 class for the curriculum delivery change made the process easier. Results of student surveys and course performance were evaluated.

A Pathway to a Principled Pharmacist: Using Reflection Throughout the Curriculum to Guide the Way. Jeffrey Lalama, Regis University, Marianne McCollum, Regis University, Michael H. Nelson, Regis University, Allana J. Sucher, Regis University, Brandon J. Sucher, Regis University, Rodney A. Carter, Regis University. The School of Pharmacy (SOP) at Regis University, a Jesuit Institution, strives to produce graduates who are knowledgeable, skillful, and principled. While traditional educational methods teach and assess, the Jesuit educational philosophy incorporates context, experience, reflection, action, and evaluation. The reflective component of this learning cycle distinguishes Jesuit education from non-Jesuit education. Reflective practices are threaded throughout all four years of the SOP curriculum. Examples include the service learning educational sequence, IPPEs, classroom courses (Ethics and Advocacy in Pharmacy, Faith Traditions in Health Care, Leadership and Management), and a fourth-year curricular capstone course. Additionally, peer evaluations from Team-Based Learning™ courses are used for guided reflections with each student’s faculty advisor. An online portfolio system is used to coordinate, archive, and evaluate student reflections throughout all four years of the curriculum. This online system allows for individual student evaluation by the faculty advisor as well as longitudinal programmatic assessment. The SOP reflection experience culminates in a self-reflective presentation on how the student has matured personally and professionally and how their experiences have guided them on the pathway to becoming a principled graduate.

A Progressive, Collaborative Process to Improve a Curriculum and Define an Assessment Program. Nancy A. Letassy, The University of Oklahoma, Melissa S. Medina, The University of Oklahoma, Mark L. Britton, The University of Oklahoma, JoLaine R. Draugalis, The University of Oklahoma. Objective: Capitalizing upon eight years of collaborative work conducting peer reviews of all professional courses, mapping the curriculum, and then identifying curricular streams of knowledge, skills, and attitudes (KSAs), the University of Oklahoma College of Pharmacy revised definitions of its professional program outcomes and created an assessment map. Design: The Assessment Committee charged an ad hoc Outcomes and Assessment Committee (OAC) of faculty and practitioners in the field to review and, if needed, redefine the professional program’s terminal outcomes, propose measurable performance standards for each, and outline an assessment plan evaluating students’ achievement of these standards. OAC accomplished its charges using a three-step process over two years. Assessment: First, OAC consolidated the original 15 CAPE-based program outcomes into 9 more precisely worded outcome statements. Then, OAC defined the KSAs for each. These outcomes and KSA’s were approved by the faculty during a retreat. Finally, OAC detailed measurable program expectations upon graduation for each outcome and created an assessment map identifying where KSAs were taught, how they were to be assessed, and the expected ability level (novice, competent, proficient) for each across the curriculum. Conclusions: The work of OAC identified deficits, inconsistencies, and disproportionalities in professional program assessment; recommended assessments to capture student achievement of each outcome; identified performance levels and criteria to measure outcomes progressively in each professional year; and outlined a process to provide students periodic reports on their progress in achieving each outcome. This work establishes a firm foundation for ongoing efforts to measure effectiveness of the professional program.

A Reflective Teaching Challenge to Motivate Educational Innovation and Improve Teaching and Learning. Michael Goneau, Northeastern University, Jennifer Kirwin, Northeastern University, Roger A. Edwards, Northeastern University, Samuel J. Matthews, Northeastern University, Margarita V. DiVall, Northeastern University, David P. Zgarrick, Northeastern University. Objective: To challenge faculty to incorporate an unfamiliar teaching methodology in a didactic or experiential setting during 2013. Methods: Faculty endorsed and accepted the challenge. Faculty can meet the challenge via integration of any strategy that is new to them including use of technology, active learning or other teaching techniques or deliberate linking of educational principles into a redesigned educational experience. A survey was sent to all faculty to assess use of technology and various teaching methods and to identify how faculty planned to meet the challenge. Faculty development and experience sharing discussions are planned. Faculty will be asked to self-report if they met the challenge criteria via year-end merit reports. Results: Sixteen (59%) faculty responded at baseline. The majority reported sometimes or frequently using the following in the didactic setting: traditional lecture (93.7%), clickers (68.8%), board discussion board (68.8%), cooperative cases (66.6%), peer teaching (64.3%), think/pair/share (60%) and recorded lectures/slides assigned for pre-class preparation (56.3%). Commonly used strategies in experiential education included: case discussion outside of patient-care activities (84.6%), cooperative cases (66.7%), peer teaching (92.8%), problem-based learning (83.3%) and team-based learning (66.7%). Faculty described
A Regional Model of Interprofessional Education: The NECPA IPEC Experience. Edward F. Foote, Wilkes University. Northeastern and north central Pennsylvania is home to several excellent healthcare education programs. Unfortunately, these programs are somewhat smaller and isolated, with most institutions housing just a few disciplines. In addition, there is no large academic health center in the region. Therefore, interprofessional education (IPE) requires collaboration across institutions, disciplines, and county lines. To address the need for IPE in the region, in 2008, a group of educators in the region created the Northeast/central Pennsylvania Interprofessional Education Coalition (NECPA IPEC). The mission of the NECPA IPEC is to “provide vision and leadership to foster and support IPE in health care”. Wilkes University School of Pharmacy has been a leader in the NECPA IPEC since its inception. Members of the NECPA IPEC meet bi-monthly. These meetings are intended to foster collaboration among members and to further specific initiatives. There are eleven participating institutions in the NECPA IPEC. Each contributes a small amount of money to support programming. Efforts have focused on an annual Interprofessional Care Summit, the fourth of which was held on March 20th, 2013 when over 800 students and facilitators came together for an afternoon of interprofessional learning. More recently, other IPE programming using simulation and IPE activities during clinical labs and experiential learning was introduced. Obstacles to further development of IPE include resources and logistics. It is possible to develop a strong IPE program when faculty members work collaboratively across disciplines and geographical boundaries.

Advancing Pharmacists’ Practice Through Innovative Education Initiatives: The University of Alberta Experience. Ken Cor, University of Alberta, James P. Kehrer, University of Alberta, Terri J. Schindel, University of Alberta, Rene Breault, University of Alberta, Michelle M. Foisy, University of Alberta, Lisa Guirguis, University of Alberta, Christine Hughes, University of Alberta, Mark Makowsky, University of Alberta, Cheryl Sadowski, University of Alberta, Scot Simpson, University of Alberta, Nese Yuksel, University of Alberta. Pharmacy practice has evolved dramatically over the last decade to embrace a proactive, patient-centred approach to care. As a result, a pharmacist’s scope of practice in the province of Alberta has evolved to be one of the most progressive in the world including authorization to adapt prescriptions, initiate prescription drug therapy, administer drugs by injection, as well as order and interpret lab tests. The Faculty of Pharmacy and Pharmaceutical Sciences program at University of Alberta employs innovative education initiatives that prepare our graduates to meet the demands of the new practice landscape. Our pharmacy programs include the undergraduate professional pharmacy degree (BScPharm), a new post-professional clinical doctor of pharmacy degree (PharmD), graduate degrees (MSc, PhD), and professional development for practicing pharmacists. The University of Alberta is located in Edmonton - a vibrant, cosmopolitan city of one million and the provincial capital. There are 512 undergraduate pharmacy students and 48 graduate students. Our School Poster outlines some of the initiatives underway to support the expanded scope of pharmacy practice in Alberta and beyond through collaborations in education and research.

Advancing Pharmacy Education Through a Series of Innovative Curricular and Co-Curricular Strategies. Michael J. Avaltroni, Fairleigh Dickinson University, Anastasia M. Rivkin, Fairleigh Dickinson University, Barbara A. Rossi, Fairleigh Dickinson University, Chadwin Sandifer, Fairleigh Dickinson University. The Fairleigh Dickinson University School of Pharmacy was created with a vision focused on the incorporation of innovative strategies across the school’s curricular and co-curricular programs. Within the program curriculum, the School has built a series of eight pathways for students to simultaneously pursue the Doctor of Pharmacy course work alongside a concurrent master’s degree. The use of an integrated curriculum, iPads within the classroom and an active learning environment each provides students an opportunity to learn in a variety of different environments and using a number of different methods and experiences. Introductory and Advanced Practice Experience (IPPE and APPE) courses align with the diversity of opportunities within the New Jersey area, providing students experiences within a number of non-traditional settings. Such settings provide exposure to different and unique professional opportunities for pharmacists across the health care continuum, while also providing students opportunities to gain an understanding and appreciation for the role of the pharmacist within an inter-professional team. Co-curricular activities have been integrated into the program to provide students an opportunity to learn from each other and from their experiences within a host of service learning and community engagement activities. Faculty, staff and students are focused on using innovative methods to prepare future pharmacists who are equipped to think, communicate, advocate,
implement and lead as future health practitioners and members of a patient-centered health care team.

An Innovative, Student-centered Approach to Educational Assessment. Jeffrey A. Gray, East Tennessee State University, Ralph A. Lugo, East Tennessee State University, Michael A. Crouch, East Tennessee State University. Objective: To describe and evaluate a new strategy designed to improve students’ assessment of instruction (SAI). Methods: Fourth-year students are required to complete SAIs. Conversely, formative and summative evaluations are optional for first-, second-, and third-year students. The college has observed low response rates on summative evaluations (means for previous six semesters: 65, 52, 53, 37, 46, and 55%). In 2012, the college embarked on a new student-centered process that actively involves the Dean’s Student Advisory Committee (DSAC). After endorsement by the assessment committee and DSAC, student leaders became more involved in SAIs. For formative evaluations (mid-semester), student leaders led their peers through a standard evaluation process addressing three items for each course: 1) what is working well, 2) what is not working well, and 3) suggestions for improvement. Additionally, course coordinators were allowed to submit up to three audience response questions (Likert scale). Upon completion, student leaders composed de-identified written reports for distribution to course coordinators. For end-of-course summative evaluations, student leaders discussed their value with peers and advocated for their completion. Results: Students provided high-quality, written formative reports. Students and faculty members expressed a high level of satisfaction with the process. For summative evaluations (20 courses), the College observed an improved completion rate (mean 77%, range 59% to 99%) that was significantly higher than previous semesters (mean 51%, p<0.05). Implications: Purposeful student involvement can improve the quality and quantity of SAIs. Student involvement and advocacy of the assessment process is an important component of a healthy assessment program.

An Integrated Examination for a Non-Integrated Curriculum. Shannon W. Finks, The University of Tennessee, Sharon McDonough, The University of Tennessee, Robert B. Parker, The University of Tennessee, Jennifer Stewart-Outten, The University of Tennessee, Stephanie J. Phelps, The University of Tennessee. To improve test quality and overcome logistical problems in scheduling computer laboratories, the University of Tennessee College of Pharmacy developed and implemented an integrated examination (IE) in the first 2.5 years of the curriculum. Implementation began with the Class of 2015 and continued as the class progressed in the curriculum. IE will be fully implemented by Fall 2013. The IE is constructed and administered using ExamSoft™. IEs are given in the computer laboratories on two campuses every two weeks and consist of multiple-choice questions, including embedded images (e.g., chemical structures) from required courses. There is no cumulative final. Each course receives 3-4 questions per contact hour on each exam and maintains its identity in the catalog and on student transcripts. Course coordinators may assess learning in additional ways (e.g., quizzes, projects, clinical performance). Questions are reviewed and edited by an IE review committee composed of faculty trained in question writing. The college is assessing effectiveness of this initiative using focus groups and surveys of students and faculty, item analyses, and performance outcomes. Preliminary data suggest the process may have changed time management and student priority for course study. Advantages include efficient use of technology that enables course directors to focus on other areas, and opportunities to support faculty in writing higher quality test items. Challenges include appropriate balance of IE content that satisfies all faculty; determining optimal exam time, especially when high-level mathematical calculations are required; and faculty and staff resources required to develop and administer the IE.

An Interprofessional Cultural Competence Activity for All First Professional Year Pharmacy and Physician Assistant Students. Cheryl A. Abel, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Kaelen C. Dunica, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester, Scott D. Richards, Massachusetts College of Pharmacy and Health Sciences-Worcester/Manchester. Cultural awareness and sensitivity are essential skills when communicating with and caring for patients. Applicability of concepts pertaining to cultural awareness and sensitivity is not adequately provided when using traditional instructional design. MCPHS University utilizes an innovative, interdisciplinary approach to teach these skills amongst first year pharmacy and physician assistant (PA) students. The activity involves 2 components; a simulation exercise and a book discussion. The exercise starts with a cross cultural simulation utilizing the training tool, Bafa Bafa. Students are required to take on the characteristics of one of two simulated cultures. Students then visit and interact with the opposite unfamiliar culture. The activity ends with a large group debriefing session. Topics discussed include: challenges faced when visiting the other culture, perceptions of the other culture, and how these lessons can be applied to their respective disciplines. The second component of this activity is a project surrounding the book The Spirit Catches You and You Fall Down: A Hmong Child, Her American Doctors and the Collision of Two Cultures. All students (n=456) are assigned to interdisciplinary groups (5 students per group) consisting of pharmacy and PA students. Each group creates a video that describes one scenario from the text that exemplifies an absence of cultural competency. They then develop a revised vignette with an improved interaction. The vignette incorporates cultural competency training from their respective courses. Students are assessed and peer evaluated. These innovative activities provide opportunities for collaboration among students of different healthcare professions while enhancing cultural competence.

An Interprofessional Rounding Simulation with Students of Medicine, Nursing, and Pharmacy. Lena M. Maynor, West Virginia University, Jon P. Wietholter, West Virginia University, John (Jay) L. Martello, West Virginia University, Charles D. Ponte, West Virginia University, David Wilks, West Virginia University School of Medicine, Daniel Summers, West Virginia University, Gail VanVoorhis, West Virginia University School of Nursing, Lee Ann Miller, West Virginia University. Interprofessional education (IPE) is important in the development of pharmacy practitioners in various practice settings. For example, pharmacists have specific responsibilities and expertise to provide during inpatient activities. However, when pharmacy students first encounter acute care rounds during advanced pharmacy practice experiences, they often have difficulty communicating with other healthcare professionals. Opportunities to enhance communication skills early in the curriculum via IPE may allow pharmacy students to be better prepared to interact with other disciplines in acute care environments. Faculty members from Schools of Pharmacy, Nursing, and Medicine constructed a rounding experience in a small group setting. Students were divided into working groups consisting of one third year medical student, 2-3 senior nursing students, and 2-3 third year pharmacy students. Two cases, involving one standardized patient (SP) and one human patient simulator, were developed by pharmacy school faculty. Students were provided with
preliminary patient data prior to the IPE experience for pre-rounding purposes. During the IPE experience, student groups rounded on each patient and developed collaborative care plans. This experience emphasized interprofessional communication and fostered a better understanding of the role of each healthcare provider during inpatient rounds. This experience was required as part the introductory pharmacy practice experience curriculum. Students were clinically assessed using a pre and post experience exam. Verbal and written feedback regarding communication skills and interprofessional collaboration were provided by the SP and a faculty facilitator from one of the participating disciplines. Additionally, students completed a required self-evaluation of their interprofessional communication skills.

An Innovative, Integrated Design for Introductory Pharmacy Practice Experiences at a New College of Pharmacy. Herb J. Halley, Manchester University, Ahmed Abdelmageed, Manchester University, Michael E. DeBisschop, Manchester University. OBJECTIVE: Design and implement Introductory Pharmacy Practice Experiences (IPPEs) that integrate didactic and laboratory courses and enable students to immediately apply learned knowledge and skills. METHODS: IPPEs in each of the first two professional years (community and institutional) are structured to have a focused, two-week, 80 hour experience in between fall and spring semesters, followed by a longitudinal, weekly 4-hour experience during the spring semester. Simulation-based IPPEs occur in all three didactic years. To ensure continuity of learning and to provide students the opportunity to immediately apply knowledge gained didactically, all IPPE assignments are designed to parallel the objectives of didactic and skills laboratory courses. RESULTS: This structure allows for consistent integration of didactic and experiential learning. In preparation for the upcoming IPPE, fall semester didactic classes and practice laboratories incorporate basic knowledge and skills students will need while on rotation. During the weekly spring semester IPPE, students progressively apply knowledge and skills recently acquired in the classroom. In the spring semester of the first professional year, the nonprescription therapeutics course, pharmacy practice laboratory, and IPPE I are closely linked. Students learn concepts in class, practice simulated situations in laboratory and then practice under direct preceptor supervision. This co-ordination of objectives allows students to learn in various ways, and promotes their gradual progression towards mastery of important concepts and skills. CONCLUSIONS: Strategic integration of IPPEs within the academic year provides relevance and motivation for didactic learning and prepares students well for meaningful experiential learning.

Applied Pharmaceutical Sciences: An Innovative, Interdisciplinary Approach to Educating Both Students and Faculty. Lisa Lebovitz, University of Maryland, Andrew Coop, University of Maryland, Magaly Rodriguez de Bittner, University of Maryland, Ilene H. Zuckerman, University of Maryland. All pharmacy practitioners must integrate their vision and values of the institution. Each unit of the College (19) agrees that “As a result of my participation in APS, I am better able to teach with other pharmacy disciplines to explore science/therapeutic issues that are commonly encountered in the management of therapeutic issues in patient care,” and 58% agree that “as a result of my participation in APS, I am better able to tolerate differences, misunderstandings and shortcomings in other pharmacy disciplines.” Faculty identified areas for improvement, including requesting more interdisciplinary interaction to prepare for class discussions. The evaluation data suggest that both students and faculty desire more interdisciplinary interactions to better understand its benefit to their careers. The APS approach serves as a novel way to introduce interdisciplinary pharmacy practice and science topics into the PharmD curriculum.

Approaches to Promote Faculty Scholarship at a New Pharmacy School. Sarah Sweitzer, Presbyterian College, C. Scott Asbill, Presbyterian College, Alfonso Romero-Sandoval, Presbyterian College, L. Clifton Fuhrman, Presbyterian College. There is growing recognition of the need for educational approaches that promote innovation in the academic sciences both inside and outside the classroom. Here at Presbyterian College School of Pharmacy we are committed to our faculty being active pharmacist-researchers that focus on health care and disease in rural, indigent, and under-served populations of South Carolina. In a conscious effort to provide research mentorship and infrastructure, we have implemented three major approaches. First, an office of research has been developed and is headed by a Director and Assistant Director of Research, who have strong records of federally funded research and administrative time so that they can mentor junior pharmacy faculty from idea generation to project development through grant submission. Second, an internal grant program entitled “Small Pharmacy Awards for Research and Collaboration (SPARC)” has been implemented to provide financial resources for pilot projects. Third, a summer fellows research program is being launched to provide faculty with research assistants in the form of pre-pharmacy undergraduates or pharmacy student interns for a full time 8-week research intensive experience. These initiatives have additionally brought to our educational efforts, first, the opportunity for our students to be exposed to cutting edge scientific research, and second the ability for our faculty to use innovative tools through scientific research to deliver academic content. Therefore, our efforts have positively impacted both our scientific and educational/academic endeavors here at the Presbyterian College School of Pharmacy.

Building an Evidence-Based Culture through College-Wide Assessment & Effectiveness Plans. Rodrick D. Jones, Texas Southern University, Shirlette G. Milton, Texas Southern University. Pharmacy educators are not unique in their struggles to institutionalize assessment and move from assessment being viewed as a necessary activity associated with an upcoming accreditation visit to it becoming part of the institution’s culture (AJPE; 2006). All accrediting agencies have recognized the worth of accreditation, and now have standards that outline the need for the development of an institution-wide assessment program and the use of assessment data in making decisions. The overall objective of multiple Assessment and Effectiveness (A&E) plans is to establish an on-going scheme, which will ensure that all areas of the College of Pharmacy & Health Sciences are fully equipped to generate, capture and disseminate information, through “increased attention”, as a means of strengthening the impact and effectiveness of our programs. It establishes and articulates the criterion by which the College uses to measure the effectiveness of academic and administrative units while ensuring that all programs support the mission, vision and values of the institution. Each unit of the College (19)
was required to attend a one-on-one “preliminary advisory review session”, where ‘plan’ components and methods of developing a concise yet all-inclusive proposal were introduced by assessment facilitators. It was also recommended that each unit complete an area-specific electronic data sheet; to identify prior collection, storage and dissemination practices for development of a comprehensive college-wide “data integration plan”. The “A&E Plans” now serve as central evaluative tools relative to each unit, and represents a consistent approach to demonstrating how we meet our college-wide strategic initiatives.

Calculations Across the Curriculum: An Innovative Approach to Improve Student’s Ability to Perform Pharmaceutical Calculations. Vera C. Campbell, Hampton University, Ayman M. Noreddin, Hampton University, David Ombengi, Hampton University, Wayne T. Harris, Hampton University, Ebony Andrews, Hampton University, Francis Ndemo, Hampton University, Neelam Azad, Hampton University, Anand Iyer, Hampton University, Corinne Ramaley, Hampton University, Johnson Deandre, Hampton University, Patricia L. Richards-Spruill, Hampton University, Marilyn Saulsbury, Hampton University.

Objective: In an effort to improve learning in Area 2 of the North American Pharmacist Licensure Examination (NAPLEX), the School of Pharmacy at Hampton University implemented a Calculations Across the Curriculum (CAC) program. Our objective is to evaluate the impact of the CAC program on student competency in Area 2 and to determine if CAC can be used as a predictor for future Area 2 scores for our pharmacy graduates. Methods: CAC incorporates pharmaceutical calculations problems and exercises in courses throughout the didactic curriculum based on a monthly calculations theme, such as alligation, aliquot, isotonicity or percentage. Students were administered a pharmaceutical calculations pre-test at the start of the semester. This was followed by a monthly review session on a relevant topic and a calculations assessment posted on Blackboard. A remediation session was offered to students who did not pass the calculations assessment. In addition, faculty administered calculation questions based on the monthly theme to the students in various forms of assessment, such as quizzes, exams, and class exercises. A post-test was then given at the end of the semester. Results were measured using descriptive statistics and comparative (T-test) analysis. Results: Feedback from students concerning the CAC program has been positive. Preliminary results indicate that 60% of the students who participated in CAC showed an improvement between their pre- and post-test scores. Implications: Utilizing a Calculations Across the Curriculum program ensures continuous reinforcement and reiteration of calculation concepts each semester, and is expected to enhance student performance on the NAPLEX.

Career Mentoring and Academic Advising in a Professional Development Network. Jordana Berry, Mercer University, James W. Bartling, Mercer University. As part of the students’ professional development process at Mercer University College of Pharmacy, students have opportunities to participate in seminars, activities, group and individual meetings that promote their career awareness and academic success. The academic advising/career mentoring program was piloted with the incoming class and volunteer faculty in August 2011 and further expanded to include the incoming class and volunteer alumni in August 2012 and given the name Professional Development Network (PDN). Each subsequent entering class along with additional volunteer faculty and alumni will be added in future years so that by 2014-2015 all Pharmacy students are included. Each incoming pharmacy student is assigned to a PDN sub-group that includes 5-6 of their classmates, 5-6 from each of the professional year classes above them, faculty, and alumni. The students meet face-to-face with their sub-groups at Orientation and throughout each semester. The College’s online learning management systems (Moodle and E*Value) incorporate electronic communication, document/resource sharing, and video that can be used by PDN group members to augment face-to-face communication. PDN activities include the creation of professional development portfolio artifacts such as the personal creed written by students during Orientation, and the students’ sharing of their curricular vitae with alumni who then offer their feedback to the students. Additional participant accountability in the form of required attendance at select events has been identified through informal observation and feedback from participants. Formal Assessment of the PDN will take place in April 2013 via administration of a survey to all participants.

Center of Teaching Excellence Programming to Foster Innovation. Timothy J. Todd, Midwestern University/Downers Grove, Annette Gilchrist, Midwestern University/Downers Grove, Jacob P. Gettig, Midwestern University/Downers Grove. For many years academics have debated a central pedagogical question: How do we foster innovation in teaching? At Midwestern University Chicago College of Pharmacy (MWU CCP) we have responded to this need by establishing the Center for Teaching Excellence (CTE) whose mission is to promote, enhance, and assess the scholarship of teaching and learning within the University. For many residents and new faculty, their first exposure to CTE is through the Teaching and Learning Curriculum. This program provides foundational knowledge in pharmacy pedagogy, and establishes the core principles for use of novel techniques for educational purposes. The Advancing Excellence in Teaching and Learning newsletter provides an opportunity for faculty to share original and thought provoking methods that have proven successful in daily practice. Finally, in an effort to foster innovative approaches by the faculty, the CTE initiated a grand program in 2009 providing intramural funding to enable the investigator to complete educational research projects. Projects must be consistent with CCP missions, and undergo extensive peer review for their significance, approach and feasibility. The overarching goal for the completed research is submission of the work as a manuscript thus providing knowledge to a larger audience. While the grants have nurtured creativity as evidenced by the spectrum of submitted applications as well as completed projects, the CTE is hoping to expand its investment in educational innovations. Options being investigated to achieve this charge include training seminars in education-focused research methods, research advisory clinics, and the creation of research networks within the faculty.

Click, Capture, Test: Innovative Technology in the Classroom. Bradi L. Frei, University of the Incarnate Word, Cheryl Horlen, University of the Incarnate Word, Tina C. Lopez, University of the Incarnate Word, David F. Maize, University of the Incarnate Word, Alejandra Zertuche, University of Incarnate Word, Arcelia M. Johnson-Fannin, University of the Incarnate Word. Innovative technology used throughout the FSOP curriculum includes lecture capture (LC), electronic polling (clicker technology), and computer-based testing. A recent survey revealed some of the most common reasons students use LC: revisiting misunderstood concepts (95%), preparing for exams (85%), learning at their own pace (85%), reviewing statements by faculty who often speak fast or unclear (75%), and studying more efficiently (70%). Almost 75% of students attribute LC to earning higher grades. Faculty state LC is useful for documenting classroom discussion, but express concern that LC could decrease student engagement and attendance, which is mandatory. To help keep students actively engaged in class, clicker technology was implemented four years ago. More than 75% of students agree that clicker technology
enhances their learning. Faculty use clicker technology for tracking attendance, active learning in the classroom, and formative assessment. The school recently implemented new clicker technology that is easier to use. Clicker technology helped build a path to electronic testing. In Spring 2012, four courses were chosen to pilot computer-based testing. Seventy percent of students found the quality of computer-based testing to be excellent, good, or average. In Fall 2012, computer-based testing was implemented in all courses. Faculty have created over 4,875 questions and more than 215 exams in only 1.5 semesters. Advantages of computer-based testing include cloud-based design, outcome mapping, secure testing, and individual student performance reports. Innovative technology is infused throughout our curriculum. It is well accepted by faculty and students. Students agree it enhances their learning.

Combining Technologic and Collaborative Methodologies to Promote Faculty and Student Development. Theresa R. Prosser, St. Louis College of Pharmacy, Patrick M. Finnegan, St. Louis College of Pharmacy, Brian Walter, St. Louis College of Pharmacy, Gloria Grice, St. Louis College of Pharmacy, Erika L. Michalski, St. Louis College of Pharmacy, Chaya Gopalan, St. Louis College of Pharmacy, Ryan Browning, St. Louis College of Pharmacy, Zachary Mussig, St. Louis College of Pharmacy. St. Louis College of Pharmacy’s (STLCOP) Instructional Design Academy (IDA) offers instructors the opportunity to use academic/learning technologies to design robust online course environments that encourage collaborative learning. IDA courses can be either hybrids that combine traditional classroom approaches with innovative technological tools or as “online only” offerings. The goals of IDA are to foster faculty development, use collaborative and instructional media to innovate and enhance the instructor’s pedagogical strategies, and ultimately help students better achieve the course-specific learning outcomes and college-wide abilities. The STLCOP Summer Readers Program (SSRP) also uses academic technology to broaden and enrich the common reading experience. All incoming first-year students compile journals about a book chosen to introduce them to the broader social and humane contexts of health care. Students log on to course management software and respond to prompts devised by STLCOP faculty for each chapter; the online resources may include short videos recorded by faculty to provide further context for the topics covered in the chapters. During orientation activities at the beginning of the fall semester, the students meet in small groups facilitated by faculty, staff, and upper-class students to discuss and edit together composite versions of their responses. The common reading experience then culminates with a talk by the author (or a similar authority) on the book’s lessons for humane health care.

Coordinated Approach to Increase Participation of PharmD Students in Basic and Clinical Research Projects. Joseph A. Barone, Rutgers, The State University of New Jersey, Carol S. Goldin, Rutgers, The State University of New Jersey. Objective: The objective of this project was to increase participation of PharmD students in basic and clinical research studies. Method: A three-fold approach was developed to improve the access and quality of research opportunities for PharmD students, including 1) development of two new research electives, 2) improvement of the Honors Research program, and 3) expansion of the summer fellowship program. Results: Two didactic electives focused on hypothesis generation, literature review, and proposal writing were created. The Honors Research Program was improved with a more flexible timeline, an internal website, customized plans of study, presentation opportunities (Pharmacy Research Day), and two directors (clinical and basic research). These changes increased student participation by 380% over 4 semesters. The summer fellowship program was also expanded to include additional career workshops and a field trip to a pharmaceutical company. Funding for the summer program was initially provided by the school’s administration. This investment was used to compete for grant funding from NIH (R25ES020721) and professional societies (ASPET and SOT). This strategy increased the number of fellowship positions from 11 to 22 over a 2-year period. Additional outcomes included the acceptance of 4 students from the summer fellowship and Honors programs into the dual degree PharmD/PhD program as well as travel awards for students to attend national meetings. Implications: Collectively, these data demonstrate a remarkable increase in student participation in research as well as the development of a PharmD/PhD program using a coordinated strategy aimed at coursework, fellowships, and advanced research experiences.

Creating a P1 Capstone: The Integrated Laboratory Experience. H. Glenn Anderson Jr., Marshall University, Nicole Rockich Winston, Marshall University, Stephanie L. Anderson, Marshall University, Kimberly A. Broedel-Zaugg, Marshall University, Christopher Gillette, Marshall University, Lisa W. Frazier, Marshall University, Hasan Koc, Marshall University, Janet Wolcott, Marshall University, Eric Blough, Marshall University, Robert B. Stanton, Marshall University. Horizontal integration of key components is a desirable outcome for curricular development. Though difficult to identify, such opportunities can reemphasize and extend foundational knowledge learned previously, or being learned concurrently, within the curriculum. This process of introduction, reemphasis, and extension is important to students retaining desired knowledge, skills, and behaviors. The P1 Integrated Laboratory course has evolved to become a nexus for student learning where concepts for seven P1 courses are applied in simulated practice settings. Simulated practice settings contained within the school’s practice laboratory include a 797 compliant IV room, a community pharmacy, a compounding pharmacy, and an ambulatory care setting. The Integrated Laboratory course was developed with broad input from the faculty. The Integrated Laboratory teaching team began the curricular development processes by holding a series of open faculty discussions. Instructors from all P1 courses participated in the discussions. These discussions allowed the Integrated Laboratory instructors to identify key concepts to be carried forward from individual courses and to sequence learning events with Spring P1 courses. Key concepts emphasized within the Integrated Laboratory course include basic immunology, immunization administration, basic pharmaceutics knowledge, pharmacy calculations, personal management, patient counseling, medication administration techniques, and IV medication preparation. Students rotate through the laboratory’s 4 practice settings whereby learned concepts are emphasized and extended through planned student experiences. This school poster will describe the horizontal integration process, summarize faculty experiences with course delivery and summarize assessments of student outcomes.

Creative Changes in Structure and Activities within a New Curriculum. Cynthia P. Koh-Knox, Purdue University, Patricia L. Darbishire, Purdue University, Missy L. Blue, Purdue University. The Purdue University College of Pharmacy is undergoing a major curriculum change. The goal of the College in the new curriculum is to provide comprehensive and professionally relevant learning opportunities to enhance the training of future pharmacists. The Professional Program Laboratories (PLL) and the Purdue University Pharmacy-IPPE (PUP-IPPE) courses incorporate the use of technology to assess student performance. Intensive Elective (IE) courses will be developed.
and offered over a three-week period during each semester. This poster illustrates these innovative courses designed to uphold the College’s mission. The PPL Tobacco Cessation Workshop engages students in technology-aided learning activities. These include counseling both peers and standardized patients. Simulations are performed without the physical presence of faculty, who observe via FaceTime and provide immediate feedback after each simulation. The PUP-IPPE course is a required, active-learning Introductory Pharmacy Practice Experience (IPPE) for first professional year students. Students fill prescriptions, counsel real patients, and are observed and videotaped for self-, peer-, and instructor feedback. PharmD candidates (for Advanced Pharmacy Practice Experience) evaluate student performance and enter assessments in real time on iPads. Purdue follows a two-semester academic year. Core didactic courses and IPPEs in the second and third professional years are being offered in 12-week and 4-week sessions, respectively. Students will enroll in IPPEs in the first four weeks of either the fall or spring semester, or take an IE course, such as Dietary Supplements or Street Drugs, if not on experiential rotations. These electives were developed in practice-based continuing education program fashion.

**Design and Implementation of a Scholarship Sequence in a PharmD Curriculum.** Lisa B. Phipps, Virginia Commonwealth University, Spencer E. Harpe, Virginia Commonwealth University, Patricia W. Slattum, Virginia Commonwealth University, Leticia R. Moczygemba, Virginia Commonwealth University, Glen E. Kellogg, Virginia Commonwealth University, Jean-Venable R. Goode, Virginia Commonwealth University. In response to evolving Pharmacy practice, VCU implemented a new curriculum in Fall 2008. The 2005-2006 Argus Commission Report recommended: “Pharmacy education should serve as a catalyst...and prepare students to incorporate a research culture in their future practices.” To create a culture of scholarship in the new PharmD curriculum, VCU faculty incorporated a longitudinal course sequence focused on scholarship. Each department coordinated one year of the three-year sequence, focused on developing research questions (Year 1), systematically approaching questions (Year 2), and applying them to practice (Year 3). Capstone projects required a needs assessment and mentored proposals for research and quality improvement. To support the overarching theme, assignments from other courses were embedded in Scholarship. Activities included journal clubs, debates, jigsaw activities, peer review, panel discussions, and formal presentations. Faculty and student feedback was ongoing. Students liked the overall philosophy and purpose of the course and appreciated learning about opportunities to participate in research. Students did not like assignments from other courses being dual-purposed in the grade for Scholarship. The second and third year capstone projects were found to be redundant, and the associated student presentations consumed considerable class time. The sequence was decreased from three years to two. Project proposals were decreased from two to one. Assignments from other courses serve as examples of scholarly works and are used for exploring the peer review process, but original grades from those assignments no longer contribute to the Scholarship course grade. Future directions include assessment of students’ openness to research.

**Design of Organ-based Therapeutics Modules Using Mixed Pedagogies with a TBL/PBL Foundation.** Marty Eng, Cedarville University, Tracy Frame, Cedarville University. The School of Pharmacy values the principle that students should become independent, lifelong learners. We believe integrated teaching to be the best vehicle for producing professionals who are servant-leaders with high standards. The Systems and Disease State Modules pedagogy includes multiple teaching and learning strategies. A primary strategy to ensure breadth and application of content is team-based learning (TBL). In addition, problem-based learning (PBL) strategies will be implemented to provide an environment for student pharmacists to develop self-directed learning skills to obtain new knowledge while solving a series of problems. Each week will have an active learning based Integrated Sciences environment that will ask the student pharmacist to explore the connection and application between foundational sciences content and the patient care innovations or research. Skills lab will reinforce and build upon the patient assessment skills developed in Patient Care and Safety. Simulation experiences such as pre-recorded scenarios may be used as part of skills development in the modules. Finally, each module will end in the presentation of Grand Rounds by teams of student pharmacists. Each presentation should focus on critical thinking and exploring of a focused medication issue. These issues could be foundational science in nature or a clinical controversy. A rubric was used to assess the pedagogy and vertical integration of each module.

**Developing Pharmacy Student Empathy Using Mock HIV Anti-Retroviral Therapy Regimens: A Learning Activity.** Doreen Soldato, University of Saint Joseph, Ola Ghoneim, University of Saint Joseph, Ivan Edafiogho, University of Saint Joseph, Joseph R. Ofosu, University of Saint Joseph. Although anti-retroviral research is promising, roughly 40,000 HIV cases are reported in the U.S. annually. Poor adherence increases the likelihood of the development of drug-resistant HIV strains, and affects utility of available treatment modalities. To make students aware of the complexity of the HIV adherence treatment therapy, an innovative class activity was created to bring awareness of the problem to the pharmacy students. During the anti-infective pharmacology course, mock antiretroviral regimens (colored Tic Tacs®) were given to students to take as an HIV patient might. Students were divided into three groups: group 1 was given three mock therapies to take twice daily; group 2 was given three mock therapies to take once daily; and group 3 was given one mock therapy to take once daily. Students recorded their medication adherence over five days. In their learning teams, students then recorded their combined percent adherence, discussed difficulties taking the various regimens, and reviewed the pharmacology as well as the medicinal chemistry of the antiretroviral drugs. Students who took the regimen with the lowest pill burden (group 3) had the highest adherence (78%) as compared to group 1 who had the highest pill burden (67%). Additionally, students who used electronic reminders reported higher adherence rates. Student feedback indicated this activity was valuable for learning the common antiretroviral drugs and provided insight into the adherence issues HIV patients face. This activity created an opportunity to demonstrate empathy in a classroom setting and provided an early experience in patient advocacy.

**Development and Implementation of Elective Longitudinal Introductory Pharmacy Practice Experiences.** Melissa L. Theesfeld, Concordia University Wisconsin, Sarah R. Peppard, Concordia University Wisconsin, Michael C. Brown, Concordia University Wisconsin. Objective: To provide students with an elective, longitudinal Introductory Pharmacy Practice Experience (IPPE) in their third professional year that provides continued experiential learning and prepares students for Advanced Pharmacy Practice Experiences (APPEs). Methods: Concordia University Wisconsin School of Pharmacy students complete all required IPPE hours during their first two professional years. Elective, longitudinal IPPE rotations were developed for each semester of the third professional year. Each student spent one 8-hour day per week at his/her practice site for the entire semester. At
the practice site, students were required to complete a practice-based project, a journal article discussion, and a portfolio of their activities. On-campus discussions occurred six times during each semester. Results: In its first offering during the 2012-2013 academic year, 60 rotation options (199 rotation slots) were available to students, including both inpatient and outpatient pharmacy practice settings. Of the 71 students eligible for the elective, 27 (38%) participated. Students’ top reasons for taking the elective were 1) to gain additional knowledge/skills (100%), 2) to further practice and apply their knowledge/skills (87.5%), and 3) to gain exposure to a specialty pharmacy practice area (87.5%). The Spring semester elective is in session and evaluation is in progress. Implications: The opportunity for students to continue their experiential learning in their third professional year was created. Students were exposed to a specialty area of pharmacy practice and gained experience in maintaining a portfolio. Future work will explore the elective’s success in improving students’ preparedness for APPEs.

**Early Academic Intervention for P1 Students.** Aimee F. Strang, Albany College of Pharmacy and Health Sciences, Luke Schminsky, Albany College of Pharmacy and Health Sciences. An early intervention program was piloted to identify P1 students in academic difficulty to decrease their chances for academic probation. Course coordinators identified students in late September that had exam, quiz or assignment grades of D or less. The names of these students were sent to the Office of Student Affairs (OSA). Students who had multiple referrals were targeted for the intervention. They received an email asking them to meet with OSA or their faculty advisor and create a plan of action to address their deficits. Seventy-six students were identified by course coordinators. Twenty-six students were targeted for the intervention group. Ten students met with an advisor and created an action plan. Seven successfully met their GPA requirement at the end of the semester and avoided probation. Sixteen students did not respond to OSA; 6 successfully completed the semester, and 10 either went on probation or were dismissed. At the end of the semester, 78% of the students who ended up on probation or were dismissed had been in the original group identified by their course coordinators. Only 48% of these students had been targeted for the intervention program. Course coordinators were able to identify students early in the semester that ended up on academic probation. Students who meet with an advisor were more likely to succeed than those who did not. Targeting students who had difficulty in multiple courses was effective; however it did not capture the majority of the population who ended up on academic probation.

**Embracing Educational Evolution: Transitioning from an Instructional to a Learning Paradigm.** Mary Wurm-Schaar, University at Buffalo, The State University of New York, Nicole Paolini-Albanese, University at Buffalo, The State University of New York, Fred Doloresco, University at Buffalo, The State University of New York. Higher education has been restructured to reflect an “instructional paradigm”, delivering educational programming within a system that is driven by traditional structures (e.g., the credit hour and typical class schedules), concepts of curriculum coverage, and indicators of success (e.g., program completion). However, emerging challenges to that paradigm have fostered movement towards a learning paradigm in which educational purpose, specifically student challenges to that paradigm have fostered movement towards a learning paradigm in which educational purpose, specifically student engagement, in the classroom, lab and community setting. A novel approach to team-based learning, clinical reasoning, and practice-based improvements is described. The format for ethics discussions in the core curriculum design, development, and implementation; the advancement of empirically-sound teaching and learning methods rather than popular ones; a modification of the indicators used to determine academic success; and, the triangulation of information regarding learning outcomes to include feedback from the cadre of stakeholders, including employers. Challenges encountered during this transition have promoted a critical evaluation of some commonly accepted educational dogma and modifications to some of our structures and processes, particularly those related to teaching, learning, and assessment applications.

**Evaluating the Curricular Impact of Shifting from Written to Verbal Assessments.** Gina DeSevo, Thomas Jefferson University, Bhavik M. Shah, Thomas Jefferson University, Cynthia A. Sanoski, Thomas Jefferson University, Elena M. Umland, Thomas Jefferson University. Objective: To evaluate student and preceptor perceptions of verbal assessments in place of written assessments in the pharmacy curriculum. Methods: The Jefferson School of Pharmacy shifted practice-based course assessment focus from written to verbal communication skills. Data was collected from: 1) Pharmacy Practice Labs I, II, and III and Integrated Practice Applications (IPA) course evaluations and 2) pre-Advanced Pharmacy Practice Experience (APPE) student and preceptor surveys. Results: Course evaluations from the Class of 2012 (n=62), 2013 (n=56), and 2014 (n=85) were analyzed. Changing from written to verbal IPA course assessments was associated with an increased percentage of students agreeing or strongly agreeing that the course contributes to verbal communication skills [73.4% (2012) to 89.3% (2013)], with a corresponding decrease in the course’s contribution to their written communication skills (86% to 69.6%, respectively). The percentage of students identifying that the Pharmacy Practice Lab I course contributes to their written and verbal communications skills increased over three years; a greater increase was associated with verbal skills [58.6% (2012) to 80.4% (2014) and 51.7% (2012) to 90.8% (2014) for written and verbal, respectively]. For Pharmacy Practice Labs II and III course evaluations, no pattern was detected relative to student perceptions of their communication skills. On pre-APPE surveys, at least 75% of students (n=118) and preceptors (n=62) agreed or strongly agreed with statements regarding effective communication skills competency. Implications: As verbal assessments are implemented, it is necessary to evaluate if they have a meaningful impact on verbal communication skills without negatively impacting written communication skills.

**Faculty Development Seminar Catalyzes Educational Innovations.** Thomas Hazlet, University of Washington, Nanci L. Murphy, University of Washington, Teresa A. O’Sullivan, University of Washington. The Faculty Development Seminar Series at the University of Washington has catalyzed educational innovations that promote active learning and engagement, in the classroom, lab and community setting. A novel approach to team-based learning, clinical reasoning, and practice-based improvements is described. The format for ethics discussions in the core law and ethics course was changed following the team-based learning seminar. Previously, student groups were provided with a selection of cases on a particular topic (reproductive health, professional ethics, end-of-life, etc.) and a group was selected by lottery to present a case of the group’s choosing. Incorporating the team-based approach, each group assigned its members responsibility for specific ethics principles or attributes. The team-based approach fostered student participation in the discussions. In an applied skills lab, students worked in small teams...
in a simulated community pharmacy setting to triage a series of cases with skin/eye conditions in a timely manner. This was designed following faculty seminars on flipping the classroom, incorporating cases into lecture, and team-based learning. The students remained engaged throughout the exercise and 84% agreed that the exercise was useful and relevant to practice. Through the independent study courses at the UWSOP, student pharmacists collaborate with faculty to lead initiatives involving practice improvement, advocacy, community health, and research. These courses, which can be taken throughout all four years of the PharmD program empower students to actively respond to emerging health care and community needs. Redesigning these learning experiences has been challenging and worthwhile for both faculty and students.

Fulfilling Health Care’s Expectations of Pharmacy Graduates through Curriculum Innovations. Bradley G. Phillips, The University of Georgia, George E. Francisco, The University of Georgia, Michael J. Fulford, The University of Georgia, Deanna W. McEwen, The University of Georgia, Beth Phillips, The University of Georgia, Kay L. Brooks, The University of Georgia, Brian D. Buck, The University of Georgia. Background: As patient care providers, changing expectations of society and healthcare require that pharmacy graduates “do more” with patients and caregivers rather than to merely “know more.” This change in philosophy of teaching and learning is being reflected in how we teach, assess student competences and prepare students for post graduate training. Objective: The University of Georgia College of Pharmacy is modifying its professional curriculum to prepare and cultivate patient care provider skills. Initial innovations included, 1) transforming the core pharmacotherapy series to all active learning to develop knowledge and critical thinking, 2) introducing rubrics to assess competencies during student patient encounters for experiential experiences, and 3) developing a residency elective so students can be competitive for post-graduate education that further advances their patient care provider skills to manage complex patients. Results: To date, 65% of students said the transformed pharmacotherapy course increased their level of enthusiasm for being a patient care provider and 53% said it provided an above average or significantly improved ability to apply knowledge. Student assessments during IPPEs were standardized using rubrics and mobile technology to provide students formative and summative feedback on patient encounters. The number of students entering residency programs has increased by 20% and after the first year of implementation of the residency elective, students completed 27% more residency interviews and were 14% more likely to get a residency position. Curricular innovation is ongoing. Conclusion: Initial teaching innovations to cultivate patient care provider skills during pharmacy school and beyond appear to be successful.

Grand Rounds as a Longitudinal Course for Synthesis and Integration of Didactic and Experiential Education. Keith Veltri, Touro College of Pharmacy-New York, Nataliya Shinkazh, Touro College of Pharmacy-New York, Shreya Patel, Touro College of Pharmacy-New York, Haregewein W. Assefa, Touro College of Pharmacy-New York, Nima Akhavein, Touro College of Pharmacy-New York, Ronnie J. Moore, Touro College of Pharmacy-New York, Georgeta Vaidean, Touro College of Pharmacy-New York. Objective: Touro College of Pharmacy’s 4-year doctoral program is uniquely designed to offer an educational experience that prepares students to be both knowledgeable in the foundations of pharmacy practice and proficient in communication and critical thinking. The first two years of the curriculum are primarily didactic and integrate traditional classroom lectures with active blended learning techniques. Laboratory coursework incorporates conventional pharmaceutical compounding and development of patient-specific pharmacotherapy plans. The final two years of the curriculum focus on the experiential phase of pharmacy education. The increased number of practice experiences ensures that students are better prepared as independent decision makers and proficient in providing quality patient care. Methods: To improve the transition from didactic to experiential learning environments, the college incorporated a grand rounds program into these last two formative years of the curriculum. This program will utilize case-based pedagogy to integrate and reemphasize clinical, biomedical and public health concepts. Students will prepare for each session by reviewing pre-assigned materials with specified learning objectives. Each grand round session will begin with a brief overview and question and answer discussion of pre-assigned materials. Students will be assessed through individual pre-quizzes based on the pre-reading and discussed materials. Case-based group assignments and a post-quiz incorporating all related information will allow students to synthesize, integrate and apply knowledge they gained from both didactic and experiential courses within the curriculum. Conclusion: These intellectually rewarding instructional activities will promote self-directed lifelong learning and ultimately allow students to successfully practice as future practitioners.

IPPE Institutional Pilot at Eastern Maine Medical Center (EMMC) During J-Term 2013. Frank McGrady, Husson University, Conrad Dhing, Husson University, Hyeryeon Noh, Husson University. A pilot institutional IPPE rotation was initiated at Eastern Maine Medical Center (EMMC) during the J-Term of 2013. Five second year pharmacy students were selected to participate in the three-week rotation between December 2012 and January 2013. The rotation utilized a Husson University School of Pharmacy (HUSOP) faculty who was not assigned to the institution to act as the preceptor at EMMC to guide the students through their institutional IPPE rotation. The preceptor coordinated with hospital and pharmacy staff and administration to schedule activities that would provide students the opportunity to observe, learn and understand the various components of hospital pharmacy practice, including but not limited to medication orders and medication use monitoring, pharmacy management and leadership, practice standards and guidelines, and drug information. The responses from the students were mostly positive with a reported overall score of 3.72/4 for the site and 3.98/4 for the preceptor. One student suggested that more time be allotted to the observation of day-to-day operations in medication distribution and less time on clinical practice. This pilot rotation was developed to address three critical issues: the lack of institutional sites for IPPE students, the shortage of institutional preceptors during the holiday season, and to provide the institutional pharmacists a break from precepting students.

Implementation of Comprehensive, Capstone Objective Strucured Clinical Exams in a Professional Skills Development Course Sequence. Tara Storjohann, Midwestern University/Glendale, Mitchell R. Emerson, Midwestern University/Glendale, Stephanie J. Counts, Midwestern University/Glendale. The three calendar year accelerated program at Midwestern University College of Pharmacy-Glendale incorporates an eight quarter Professional Skills Development (PSD) course sequence throughout the didactic curriculum. PSD builds upon and reinforces the knowledge, skills, and abilities obtained in the core curriculum and engages students to master the skills needed to provide patient-centered care. Furthermore, the skills obtained during the PS-1 year are intentionally folded into the PS-2 year to consistently reinforce previously attained skills as the level of difficulty in the clinical encounters increases with each subsequent quarter. In quarters four and eight
Implementation of a Pharmacist Regional Coordinator Model to Improve APPE Quality. Stacey Curtis, University of Florida, Kerry A. Stiegler, University of Florida, Patrizia Taddei-Allen, University of Florida, Kristin W. Weitzel, University of Florida, Randell E. Doty, University of Florida, Diane E. Beck, University of Florida. The University of Florida College of Pharmacy has campuses in Gainesville, Jacksonville, Orlando, and St. Petersburg, with advanced pharmacy practice experiences (APPEs) offered at various sites throughout the state. In an effort to improve APPE quality and standardize learning activities, the Office of Experiential Programs (OEP) implemented a novel Regional Coordinator model in Fall 2011, with ten part-time pharmacists throughout the state serving as liaisons between the OEP, preceptors, and students for six regions within the state (Jacksonville, Gainesville, Panhandle, Tampa, Orlando, and South Florida). Each Coordinator is employed for four to sixteen hours weekly and is assigned to sites within their region to monitor preceptor, site, and student needs longitudinally. Regional Coordinator responsibilities include, but are not limited to: a) conducting and documenting site visits biennially or more often as needed; b) providing ongoing support and information to preceptors and students; c) identifying and developing new APPE sites; d) providing monthly feedback data to OEP to assist with site prioritization and quality assurance; and e) participating in twice-monthly OEP Regional Coordinator virtual meetings. Since implementation of this model, quality-related feedback from Regional Coordinator interactions with sites, preceptors, and students has been applied to site prioritization and scheduling for the 2013-2014 APPE cycle. This poster will fully describe the UF COP Regional Coordinator model, explain OEP quality assurance procedures and assessment strategies, and summarize APPE quality-related issues identified and addressed through this model.

Implementation, Assessment, and Refinement of a Problem-Based Learning Model at the University of Mississippi. Kim G. Adcock, The University of Mississippi, Kristopher Harrell, The University of Mississippi, Shirley M. Hogan, The University of Mississippi, Daniel M. Riche, The University of Mississippi, Kayla R. Stover, The University of Mississippi, Gary D. Theilman, The University of Mississippi, Leigh Ann Ross, The University of Mississippi, Marvin C. Wilson, The University of Mississippi, David D. Allen, The University of Mississippi. Objective: The University of Mississippi School of Pharmacy (UM SOP) incorporated a Problem-Based Learning (PBL) model in the third professional year (PY3) curriculum. The goals of PBL are to promote self-directed learning, develop effective problem solving skills, and foster collaboration skills and intrinsic motivation. Since implementation in 1995, the PBL program has been assessed and refined with novel components. The implementation, assessment, refinement, and processes leading to continued innovations will be described. Methods: Implementation of the PBL model reoriented the PY3 curriculum from a didactic, traditional classroom-based approach to a small group, student-centered format. Students work through progressive disclosure patient cases with a faculty facilitator. At the end of each PBL “block,” students are assessed in three courses Group (participation/activities), Knowledge & Comprehension (disease/drug content knowledge), and Problem Solving (critical thinking). Results: The Group course components to be described include electronic case presentation and utilization of mind mapping in case discussions, weekly writing assignments, facilitator rotation scheduling, and Group performance evaluation tool. The Problem Solving and Knowledge & Comprehension courses incorporated social media strategies and electronic examinations, respectively, which will be presented. Implications: Annual assessments of various program components lead to quality improvement initiatives and continued innovations. From these assessments, it became evident that earlier active learning strategies would provide familiarity with PBL processes and promote longitudinal skill development. Efforts are underway to integrate similar components in targeted second professional year courses.

Innovation in Pharmacy Education: Conduct of Research as a Graduation Requirement. Rosalyn Padiyara Vellurattil, Chicago State University, Elmer J. Gentry, Chicago State University, Yolanda M. Hardy, Chicago State University, Melany Puglisi-Weening, Chicago State University, Joseph Slonek, Chicago State University, Charisse L. Johnson, Chicago State University. Objective/intent: In 2011, Chicago State University College of Pharmacy (CSU-COP) implemented a Capstone research program requiring fourth professional year students to complete a research project. This program aligns with the college’s mission to develop faculty and student scholars. Study objectives are to describe development and assessment of the program. Methods/process: A program structure was adopted based on literature review of existing Capstone program structures. Core components included identification of a research project and mentor, development of a manuscript and poster, and formal poster presentation. A focus group session and 18-item survey was used for program assessment in May 2012. Descriptive statistics and qualitative analysis were utilized. Results/outcomes: Seventy-seven students and 21 mentors participated; 43 manuscripts and posters were developed and presented. Approximately 26% (n = 17) of students presented at local/national meetings; five received poster awards. The focus groups (n = 71 students, n = 7 moderators) found students “enjoyed the poster presentation experience,” and felt the experience would “help in obtaining post-graduate training.” Areas for improvement included better communication/instructions for the students. The survey (n = 65) found the majority of students felt they were able to present a poster at a professional meeting and write a research manuscript in the future (69.2% and 72.3%, respectively) after completing the program. Implications: The CSU-COP Capstone research program implementation included successes and challenges. One identified challenge has resulted in expansion of the experience to include all four years of the professional curriculum to increase readiness for conducting research. Program assessment will be conducted yearly for continuous improvement.

Innovations in Communication Techniques in Preparation for Practice. Elizabeth W. Blake, South Carolina College of Pharmacy, Kelly R. Ragucci, South Carolina College of Pharmacy, Wayne E.
Innovations in Education: Design and Implementation of a Laboratory-Based Drug Design and Synthesis APPE. Blake Watkins, Union University, Ashok E. Philip, Union University, Mark A. Stephens, Union University, Sheila Mitchell, Union University. The mission of the Union University School of Pharmacy (UUSOP) is to develop comprehensively-trained practitioners, equipped to meet the immediate and future demands of pharmaceutical science and patient care. To fulfill this mission, we implemented a research APPE, in the area of drug design and synthesis, into the Doctor of Pharmacy curriculum. Prior to starting the one or two month research APPE, students complete a lab-based elective course that includes training in chemical synthesis techniques and basic molecular modeling. Students then utilize molecular modeling tools to perform structure-based, de novo design of ligands. These compounds are then synthesized and purified utilizing solution-phase, parallel synthesis protocols and an automated purification system. Students characterize each synthesized compound using NMR, UV, IR, and mass spectrometry. During the APPE months, students invest a minimum of 40 hours weekly working toward research goals. Student participation in these APPEs has resulted in molecular modeling of an anti-infective target protein, library synthesis of novel carbamate ligands, numerous poster presentations at university research symposia, and a keynote presentation at a local scientific meeting. This research APPE is now an integral part of the UUSOP experiential curriculum and offers students the opportunity to participate in drug discovery efforts and to learn the valuable skills of problem solving, research planning, execution, organization, and dissemination of data. This APPE provides students with a view of pharmacy not routinely available in a traditional pharmacy curriculum.

Innovations in the First Two Years of an Accelerated Doctor of Pharmacy Curriculum. Eric G. Boyce, University of the Pacific, Mark P. Walberg, University of the Pacific, Sian Carr-Lopez, University of the Pacific, Rajul A. Patel, University of the Pacific, Veronica T. Bandy, University of the Pacific, Jenana H. Maker, University of the Pacific, Linda L. Norton, University of the Pacific, Joseph A. Woelfel, University of the Pacific, Adam Kaye, University of the Pacific, Jeneva M. Watkins, University of the Pacific, Blake A. Blake, University of the Pacific. Pharmacy faculty at the University of the Pacific continue to use innovative teaching and learning methods within the first two years of the pharmacy curriculum. First semester students are assigned to teams and a Healthy People 2020 topic for creation and presentation of educational materials targeting health care professionals and patients. The comprehensive vaccination program includes didactic and experiential practice components that incorporate tiered responsibilities where second year students train first year students in the delivery of vaccinations. The informatics, research design and statistics course is taught in a blended format, utilizing in-class presentations followed by submission and review of assignments online, and finally by discussions in class and online. Student-created patient case videos are used in laboratories in a physiology and pathophysiology course. Therapeutic course innovations include the use of concept maps as summative assessments of common disorders, team video projects on landmark clinical trials and patient education, and an assessment of student understanding through open-ended electronic polls. The healthcare outreach introductory pharmacy practice experience (IPPE) utilizes student organizations and faculty to plan and manage events. Medicare
Part D and medication optimization abilities are developed didactically, followed by direct interactions of students with patients to optimize Medicare Part D benefits and provide medication therapy management. In other IPPEs, online learning modules are used for pharmacy law, dispensing controlled substances, and geriatric core curriculum elements. These innovations have been found to be beneficial to student learning based on formative and summative student course evaluations and student performance.

Innovative Instruction and Assessment Strategies at the University of New England College of Pharmacy. Cory R. Theberge, University of New England, Cory R. Theberge, University of New England, M. Lisa Pagnucco, University of New England, Emily K. Dornblaser, University of New England, Erin R. Koepf, University of New England, Curt Cyr, University of New England, Ron Hills, University of New England. Instructors at the University of New England College of Pharmacy are utilizing a variety of innovative techniques for teaching and assessment in the pharmaceutical science and pharmacy practice areas. This school year marks the beginning of an interactive Process Oriented Guided Inquiry Learning (POGIL) environment applied to the P1 Biochemistry core course. This instructional motif, both innovative and disruptive, has proven to be appropriate for the conceptualization of biochemical scientific content. Advanced instructional technology has been incorporated in the didactic setting. Technologies such as tablet PCs and ShowMe® videography have been integrated into Medicinal Chemistry and Clinical PK exercises to offer clarity on structure- and calculations-based learning objectives. The use of the Quizlet® online flashcard application has proven to be very well received by students in three courses: Introduction to Pharmacy Practice, Self-Care Therapeutics, and Pathophysiology. The self-assessment process using online flashcards in each of these subjects has led to a more reflective, self-regulated approach to information review in these challenging subject areas.

Integrating Team-Based Learning and High-Fidelity Simulation for Interprofessional Education. William Ofshtad, California Northstate University, Debra Brady, Sacramento State University School of Nursing, Heather Schumann, California Northstate University, Jimmy Munteanu, California Northstate University, Perri Ann Allen, California Northstate University, Rebecca Keel, California Northstate University, Lane Brunner, California Northstate University. Background: Interprofessional education (IPE) prepares health professionals to work in multidisciplinary teams, improves communication, reduces healthcare related errors, and improves patient centered care. AACP and AACN are among the Interprofessional Education Collaborative sponsors establishing four core interprofessional competencies: values/ethics for practice, roles/responsibilities, communication, and teamwork. Team-based learning (TBL) is a small group learning pedagogy focused on student readiness, teamwork, and classroom applications in place of lecture. Simulation replicates the essential aspects of clinical situations preparing learners to examine, assess, and manage events in practice, involving standardized patients or programmable mannequins to mimic clinical scenarios. CNUCOP and Sac State Nursing have partnered to propose a novel model to integrate TBL and simulation in the delivery of IPE. Methods: In this IPE delivery model, TBL pedagogy serves as the framework, applying principles of team formation, readiness assurance, team applications, and peer feedback. Nursing and pharmacy students are assigned to permanent interprofessional teams to develop understanding of roles and trust through learning activities focused on clinical care, safety, and ethics. Simulation serves as an application modality, with post-simulation guided debriefing enabling teams to reflect and provide peer feedback on learning to improve practice and patient outcomes. Assessments: The four core competencies will be assessed with standardized surveys. Topic readiness, team performance, and attendance will be evaluated with readiness scores and application rubrics. Preliminary IPE data and a previous experiential simulation suggest simulation framed in a TBL pedagogy enhances student learning and we anticipate similar benefit with this model.

Integration of a Simulated Electronic Healthcare Record into Didactic Coursework. Kristin E. Montarella, Southernwestern Oklahoma State University, Krista G. Brooks, Southernwestern Oklahoma State University, Tiffany L. Kessler, Southernwestern Oklahoma State University, Erin D. Callen, Southernwestern Oklahoma State University, Nina C. Morris, Southernwestern Oklahoma State University, Laura A. Randolph, Southernwestern Oklahoma State University. The increased use of electronic health records (EHR) in routine clinical practice makes introducing the EHR to the curriculum an integral part of the educational process. The Southernwestern Oklahoma State University (SWOSU) College of Pharmacy (COP), School of Nursing and School of Allied Health, collaboratively decided to implement the use of NeehrPerfect® as our simulated EHR platform. This platform permits user anywhere internet access is available. Integration into various didactic courses of the COP began in the fall 2012 semester. A scavenger hunt is utilized when students begin to use the program as a means of orienting them to the capabilities of the system. Current activities in the EHR begin with introductory skills such as locating and analyzing data like medications, laboratory values, and vital signs. As students’ progress through the curriculum they build on these skills to develop problem lists and construct care plans and SOAP notes. Students are now more familiar with the advantages and disadvantages of EHR use prior to encountering these programs in APPE experiences. Future implementation plans include use in dispensing labs and other didactic coursework. In addition, faculty from both the COP and School of Nursing are exploring possibilities of completing group projects among students in both programs to help foster interprofessional education on our campus. There are plans to eventually include other allied health disciplines including health information management (HIM).

Integration, Innovation, and Collaboration at Belmont University College of Pharmacy. Eliza M. Greene, Belmont University, Ashton Beggs, Belmont University, Alisa Spinelli, Belmont University, Kristina Wood, Belmont University, Mark Chirico, Belmont University, Condit F. Steil, Belmont University, Philip E. Johnston, Belmont University. Belmont University College of Pharmacy (BUCOP) has implemented innovative educational strategies across the curriculum in core courses, electives, and experiential education. As part of BUCOP’s effort to provide students with a complete vision of the entire patient care process, three core courses in the second year curriculum coordinated interactive practical assessments where students interviewed standardized patients, applied therapeutic knowledge, documented the patient interview and plan, and practiced communicating recommendations to other providers. This experience was designed to showcase curricular linkages and reflect the need for integration of skills to provide patient care. In maintaining BUCOP’s focus on progressive use of technology to enhance the learning experience, two elective courses incorporated non-traditional presentation modalities. These tools were utilized throughout each course as an effort to better engage students in the learning process and develop increased opportunities for active learning within the course. As part of BUCOP’s efforts to foster interprofessional education, BUCOP has partnered with local professional programs in the Vanderbilt Program for Interprofessional Learning.
Integrative Public Health Curriculum Innovations Utilizing Community Health Screenings and Cross Disciplinary Education. Glenda Carr, Idaho State University, Barbara J. Mason, Idaho State University. Idaho State University-Meridian Division of Health Sciences, in collaboration with, and based on needs identified through local government partners, developed and implemented Community Health Screening (CHS) events for the ISU College of Pharmacy regional site campus. These events provide an innovative educational opportunity for curriculum integration, by targeting specific public health goals such as: depression, alcohol use, HIV screening and nutritional assessment. One of the goals of the CHS is to introduce curricular integrative experiences across disciplines, and provide relevant, engaging education through service provision to the medically underserved community. Students and faculty CHS participants function within their scope of practice, but rotate through activities not conventional for their disciplines. A pre and post test student knowledge based questionnaire assessment strategy is being utilized for initial assessment purposes. Teaching public health goals through participation in community health screening events provides an opportunity for students and faculty to work across discipline lines, engage with the community, assist medically underserved, and introduce an integrative curriculum approach.

Interprofessional Education (IPE) Innovations at Southern Illinois University Edwardsville. Miranda J. Wilhelm, Southern Illinois University Edwardsville, Therese I. Poirier, Southern Illinois University Edwardsville, Lakesha M. Butler, Southern Illinois University Edwardsville. An interprofessional team from the Schools of Pharmacy, Dental Medicine, Medicine and Nursing attended the first Interprofessional Education Collaborative (IPEC) Institute in 2012. As a result of the strategic planning process at the Institute various IPE initiatives were conceptualized. The first IPE initiative was the implementation of two, 2-hour ethical case-based learning seminars between P3 pharmacy and D1 dental students. The endeavor was assessed using the Readiness for Interprofessional Learning Scale (RIPLS), ethics knowledge quiz and a student perception survey. The second IPE initiative was the implementation of two, 2-hour cross-cultural communication seminars between P2 pharmacy and sophomore nursing students. This endeavor was assessed using the RIPLS, cultural competency knowledge quiz, the Clinical Cultural Competency questionnaire and a student perception survey. A third initiative was the implementation of an interprofessional faculty retreat for the Schools of Pharmacy, Dental Medicine, Medicine and Nursing, using active learning strategies to explore opportunities for IPE. A pharmacy led interprofessional team has also received a National Institutes of Health Center of Excellence pain education grant and is currently designing interprofessional learning modules for palliative care. Other initiatives in the planning stages include the design of an online IPE global health course and an IPE Spanish language and culture course.

Introductory Collaborative Learning Bridge (ICLB): A Curricular Innovation. Lisa M. Michener, Rosalind Franklin University of Medicine and Science, Gloria E. Meredith, Rosalind Franklin University of Medicine and Science, Marc S. Abel, Rosalind Franklin University of Medicine and Science, Pamela Eder, Rosalind Franklin University of Medicine and Science. Sarah S. Garber, Rosalind Franklin University of Medicine and Science. OBJECTIVE: To design and assess the effectiveness of a longitudinal experiential project to learn the top 200 drugs. DESIGN: The ICLB was implemented by placing P1 students in teams, which remain intact through the P3 year. Each project centers on a specific drug or therapeutic class, and assignments increase in depth and complexity during the P1-P3 years. Primary goal is to bridge didactic to experiential coursework, promoting collaboration through Team-Based Learning, student-initiated curricular mapping to facilitate integration, and assure progression of IPPE student entry into APPEs. Students map the occurrence of their assigned drug or class to basic science courses and clinical experiences. Group projects are presented at a yearly virtual poster session. METHODS: Peer assessments, student reflections and scores on Top 200 Drug assessments. Performance scores are compared pre- and post-ICLB presentation. RESULTS: (Assessments to date include only data from the P1 year) Students were assessed in Pharmacy Skills Lab to a greater degree on ICLB-related drugs. Students knowledge of ICLB-related drugs was greater than non-ICLB-related drugs. Peer assessments demonstrated satisfaction with team dynamics and efforts. Knowledge after the P1 year was significantly greater than at the start of the year. Performance in simulations was better for ICLB-related drugs. Qualitative reflections demonstrate overall satisfaction with the ICLB project. CONCLUSION: This innovative longitudinal project is effective as a learning methodology. Data from subsequent years will provide substantive information regarding this technique.

Learning Communities Improving Program Outcomes. Francine D. Saliniti, Wayne State University, Helen D. Berlie, Wayne State University, Richard L. Slaughter, Wayne State University, Lynette R. Moser, Wayne State University. Objectives: To evaluate the impact of a learning community (LC) on academic success and student perceptions of peer mentoring and group learning among second year (P2) pharmacy students. Methods: Since 2009, each year the Wayne State University Pharmacy Program has maintained a P2 LC which includes an orientation to the year, eight small group sessions facilitated by a peer mentor (PM), and individual tutoring. Sessions were designed to enhance study skills and create a culture of community learning. P2s were divided into 6 groups with each assigned a third year PM. PMs worked with course coordinators to develop LC sessions. Successful completion of P2 courses and surveys of P2 students and PMs were used to assess the outcomes of the LC. Success in courses was compared to historical data. Results: Over 3 years, 246 P2 students and 18 PMs participated in the LC. Successful course completion was significantly improved compared to the 3 years prior to the LC (231/246 vs. 210/260, p < 0.001). From the first year to the third year of the LC, significantly more P2 students agreed that the LC improved academic success and positively impacted professional development (33% vs. 71%, p < 0.001; 30% vs. 66%, p < 0.002, respectively). The overall experience was rated by 89% of PMs as “Great” or “Exceptional”. Conclusion: Implementation of a LC in the second year pharmacy curriculum resulted in improved progression in the program. Student perceptions over time demonstrate increasing support for innovative programs.

Lights, Camera, Action: Assessing Video-Recordings of Introductory Pharmacy Practice Experience Presentations to Improve Patient-Provider Communication. G. Lawrence Hogue, University of Maryland Eastern Shore, Mark Freebery, University of Maryland Eastern Shore. Objective: To improve students’ communication skills by video-recording presentations and critiquing videos with the
students during Introductory Pharmacy Practice Experiences (IPPE)
Methods: In assessing students’ abilities to conduct professional
presentations prior to Advanced Pharmacy Practice Experiences
(APPEs), faculty discovered presentation skills needed improvement.
Experiential education faculty worked with 116 students from the SP-1
and SP-2 classes in the three-year accelerated program to improve
skills during IPPEs which occur every other Tuesday over two pro-
fessional years and in blocks between semesters. For the IPPE Seminar
series, students submitted topics and outlines prior to video-recording
five minute presentations. Students evaluated peer presentations using
a standard form and viewed their own presentations with the faculty
using a standard rubric. For sub-standard performance, students re-
presented. All students were surveyed about overall educational
activity and experiences. Results: Student deficiencies included pre-
sentation management, anxiety, and professional attire. Students who
re-presented showed a marked improvement. The majority of stu-
dents’ survey responses showed improved confidence. Many noted
that they had never previously seen themselves on video, and all stu-
dents had no previous constructive critique of their presentation style.
Implications: Based on the positive outcomes attained from this skills-
based assessment and critique of student presentations, video-recording
and feedback will continue. In the future preceptors may be asked to
provide feedback on rotations using the standard evaluation. By improving
skills and self-awareness, students should enhance their patient-
provider communications in IPPEs, APPEs, and beyond.

Multi-Campus Patient Care Management Laboratory Designed to
Enhance Student Competence and Promote Practice Model
Change. Jaime W. Riskin, Nova Southeastern University, William
R. Wolowich, Nova Southeastern University, Elizabeth F. Shephard,
Nova Southeastern University, Matthew Seamon, Nova Southeastern
University. Objective. Nova Southeastern University College of Phar-
macy’s patient care management (PCM) laboratory was revised to
reflect the expanding scope of pharmacy practice. The intent was to
strengthen student readiness for advanced practice pharmacy experi-
ences (APPEs) and promote practice model change. Design. The lab
was lengthened from two to three semesters. A task force created the
lab, drawing input from community, ambulatory and institutional
pharmacists. Current APPE students participated in a “mock lab” and
provided significant feedback. Each three-hour lab includes phys-
ical assessment, cases and various activities. Groups of five to six
students are assigned instructors (faculty, pharmacy residents or out-
side pharmacists). Groups engage in scripted patient-pharmacist in-
teractions and review simulated medical charts. Each group constructs
a SOAPE note, for assessment. Activities include pharmacokinetic
workshops, stimulating dialogue, trivia games and drug information.
Two one-hour didactic sessions accompany each lab, providing case
reviews, demonstrative lectures and patient encounters. These ses-
ions are designed to complement and build upon lab experiences.
Uniformity across multiple campuses is maintained via constant com-
munication between course coordinators at the main site and facilita-
tors at distant sites. Assessment. The impact of the lab on student
readiness for APPEs as well as performance in the Pharmacotherapy
course series will be assessed in the future. Current students have
shown progress in various skills, demonstrated by a 30% improvement
in graded assignments. These students will be surveyed to identify
other areas of improvement. Conclusion. Establishment of a solid
foundation promotes student competence and readiness for APPEs,
and perpetuates pharmacy practice model change.

Outcomes and Faculty Perception of a Continuous Quality
Improvement Approach to Curricular Review. Karen F. Marlowe,
Purposeful Alignment and Integration of Experiential Activities with the University of Colorado Curriculum. Kari L. Franson, University of Colorado, Wesley A. Nuffer, University of Colorado, Laura M. Borgelt, University of Colorado, Katy E. Trinkley, University of Colorado, Jennifer M. Trujillo, University of Colorado. For twelve years the University of Colorado has incorporated early experiential opportunities (IPPEs) for pharmacy students in the curriculum. Historically, the experiential office matched students with faculty, community, hospital and non-pharmacist preceptors for longitudinal mentorships. Student feedback reflected little correlation between these experiences and what was being taught at the time in the curriculum. IPPEs were viewed as running concurrently to other curricular activities and were largely perceived as “doing time”. A curricular renewal effort brought these limitations to light and it was widely thought that the purpose of IPPEs should allow the students to demonstrate competencies by applying recently acquired knowledge and skills. This resulted in a paradigm shift away from acquiring hours to focused application and assessment. The existing IPPE program was reexamined to optimize application of recent skills and knowledge within a variety of settings. One application includes requiring P1 students to demonstrate inhaler techniques to patients in the community pharmacy setting within two weeks of learning about asthma and practicing communication & inhaler skills in academic environments which reinforces lessons learned in class. In order to facilitate the shift away from hours to application, we proposed a full time, six-week, “advanced” IPPE at the start of the P3 spring semester. This not only provides 240/300 hours of required IPPE experiences, but also an opportunity to assess the students’ ability to meet the pre-rotation core competencies. Finally, it should provide students with strong patient-care experiences prior to our clinical capstone course.

Rapid Development and Longitudinal Incorporation of Interprofessional Education Simulations into the Pharmacy Curriculum. Donald K. Blumenthal, The University of Utah, Sarah S. Stephens, The University of Utah, Heather A. Nyman, The University of Utah, Brandon T. Jennings, The University of Utah, James A. Ruble, The University of Utah, Abrii Atherton, George E. Wahlen Department of Veterans Affairs Medical Center, David Denio, George E. Wahlen Department of Veterans Affairs Medical Center, Holly Gurgle, The University of Utah, Krystal Mooman, The University of Utah, David D. Stenehjem, The University of Utah, Mark A. Munger, The University of Utah, Chris M. Ireland, The University of Utah. Objectives: To develop and incorporate interprofessional education (IPE) simulations across the P1-P4 years, and the curricula of medicine, nursing, physician’s assistant, nutrition, physical and occupational therapy at the University of Utah Health Sciences Center. Methods: In 2011, teams of Health Sciences faculty were formed to develop IPE simulation scenarios, train faculty as facilitators/debriefers, and coordinate the logistics of student registration, scheduling, and assessment. Simulations were developed for inpatient and outpatient settings. For assessment, students complete a pre-IPE on-line assignment that includes a standardized IP attitude survey (the Readiness for Interprofessional Learning Scale; RIPLS). After the IPE simulation, students complete the RIPLS and provide feedback aimed to improve the quality of the IPE experience. Results: Development of IPE scenarios was initiated in the summer of 2011, piloted in fall 2011, and implemented in fall 2012 with 275 students and 30-40 faculty. Students and faculty from all Health Sciences programs will have participated by summer 2013. Scenarios will have included counseling of a non-adherent diabetes patient, discharge instructions following knee replacement, and medical error disclosure, and will cover the four IPE domain competencies of Values/Ethics, Teams/Teamwork, Roles/Responsibilities, and Communication. Feedback from students and faculty debriefers has been very positive, post-IPE RIPLS results show improved IP attitudes, and post-IPE feedback has been used to modify and improve the experience. Implications: With adequate resources and infrastructure, IPE experiences can be developed and rapidly implemented across an existing P1-P4 curriculum. Leadership and cooperation are key to development and implementation of a successful campus-wide IPE program.

Refining Higher Order Learning Assessment in a Case-based Course Stream. Ingrid Price, The University of British Columbia, Arun K. Verma, The University of British Columbia, Janice L. Moshenko, The University of British Columbia, Marion L. Pearson, The University of British Columbia. While higher order learning (problem solving, clinical reasoning) is recognized as important in pharmacy curricula, assessment of these skills is time consuming and requires clinical expertise. These challenges compound as class size increases. We highlight two strategies to refine higher order learning assessment practices in a stream of integrative case-based courses. Our objectives were to develop more reliable, valid and efficient assessment strategies that can be implemented regularly to provide individual students with ongoing, formative feedback on their success within these courses. Research has shown that reliable assessment must involve several samples of a student’s skill. Further, specific assessment methods have been shown to be less important than what we assess (content, skills). Therefore, this work resulted in two major changes in the assessment practices in these courses: 1) Development of multiple-choice questions to test application of knowledge regarding key clinical concepts. This type of multiple-choice question has been shown to assess higher order thinking skills in students. 2) Adapting the “modified essay question” (MEQ) technique to include key features for problem resolution. The MEQ is a written assessment of decision-making skills employing focused questions that can be marked by trained lay
Revision of an Introductory Pharmacy Practice Experience to Enhance Interactions Between Student-Pharmacists and Patients. Donna M. Adkins, Appalachian College of Pharmacy, Sharon C. Deel, Appalachian College of Pharmacy, Joseph A. Farmer, Appalachian College of Pharmacy. The Appalachian College of Pharmacy (ACP) is an accelerated three-year doctorate of pharmacy program located in rural Appalachia. Recently, ACP redesigned the Introductory Pharmacy Practice Experience (IPPE) during the first professional year (P1) to provide students more patient assessment skills and hands-on experiences through the use of a high fidelity mannequin patient simulator and live patient encounters in the college’s community-based wellness program. During the first three days of the P1 year, the redesigned IPPE course provides students instruction and training in CPR, OSHA, HIPAA, self-care devices like glucometers, and patient assessment skills such as obtaining and interpreting vital signs. During the second semester of the P1 year, students are exposed to a variety of practice settings to gain experience communicating with patients, enhance critical thinking skills, and gain an understanding of how medications are dispensed and pharmacies operate. As part of this course, students are integrated into the college’s wellness program where they provide health screenings and patient education to members of the rural and underserved community surrounding the college. ACP emphasizes community outreach and requires each student to achieve a minimum of 150 community service hours prior to graduation. The revised IPPE course provides students with an expanded skill set earlier in the P1 year allowing them to engage in outreach endeavors earlier and in a more meaningful manner. Additionally, the redesigned IPPE course provides an avenue for students to strengthen self-confidence in knowledge and abilities as they transition to the next phase of the experiential curriculum.

Sex and Gender Based Medicine in a Doctor of Pharmacy Curriculum. Rebecca Sleeper, Texas Tech University Health Sciences Center School of Pharmacy, Kristen A. Hesch, Texas Tech University Health Sciences Center School of Pharmacy, Nishil Desai, Texas Tech University Health Sciences Center School of Pharmacy, Marjorie R. Jenkins, Texas Tech University Health Sciences Center School of Medicine, Nidhu Baby, Texas Tech University Health Sciences Center School of Pharmacy, Jackie Chen, Texas Tech University Health Sciences Center School of Pharmacy, Chris Hobart, Texas Tech University Health Sciences Center School of Pharmacy, Jacy Hodges, Texas Tech University Health Sciences Center School of Pharmacy, Ann H. Huynh, Texas Tech University Health Sciences Center School of Pharmacy, Nicolle M. Nicholson, Texas Tech University Health Sciences Center School of Pharmacy, Diane Pham, Texas Tech University Health Sciences Center School of Pharmacy, Chad E. Samuelson, Texas Tech University Health Sciences Center School of Pharmacy, Sana Sankari, Texas Tech University Health Sciences Center School of Pharmacy. Background – Sex and Gender based medicine (SGBM) includes not only the specific areas of Men’s or Women’s Health (“sex-exclusive” focus), but also the evaluation of sex and gender based differences influencing disease / outcomes in illnesses men and women share (sex-inclusive). Despite known disparities in literature and patient care, and recommendations to implement SGBM in health professionals’ curricula, many programs do not map this content. Objectives – To report data describing occurrences of sex-inclusive content in a PharmD curriculum. Methods – Nine student scholars served as curricular auditors and captured content using standardized data forms from the first three class years. Content was categorized as “none”, “minor”, “moderate”, or “major” based on volume or time dedicated to the material. Focus was categorized as “epidemiology”, “pathology/physiology” or “drug therapy”. Each category assignment was peer reviewed. Syllabi review also captured course objectives related to SGBM. Results – Six hundred lectures were audited capturing 143 occurrences of SGBM content (23.8%). Content categorized as “Minor” and “Moderate” accounted for 97.9% and 2.1% of occurrences, respectively. Focus categorized as “epidemiology”, “pathology/physiology”, or “drug therapy” accounted for 55.2%, 23.1%, and 21.7%, respectively. Two SGBM-related course objectives were identified, both in the P1 year relating to pathology/physiology. Conclusions – Results suggest the majority of SGBM focus relates to epidemiology. Patient-centered care is the wave of the future and applying SGBM considerations to drug selection, use, and monitoring should be part of that. However, SGBM clinical instruction can be enhanced. This audit lays groundwork for developing targeted SGBM-inclusive content.

SimMan Cardiac Simulation Activities in a Capstone Lab. Donna G. Beall, The University of Montana, Lisa Venuti, The University of Montana, Mark Raschkow, The University of Montana, Jean T. Carter, The University of Montana. In the spring semester, third-year pharmacy students are required to take a capstone lab where they are exposed to complex cases and scenarios designed to enhance student preparation for the APPE year while providing another opportunity for faculty to assess readiness. The SimMan Cardiac Lab is an example of one of the innovative instructional approaches incorporated into the lab. A key element of the cardiac lab is the use of the SimMan 3G mannequin which provides a real time simulation of acute myocardial infarction symptoms as well as response to administered medications. Although this advanced, high-fidelity patient simulator came with some pre-programmed patient scenarios, they were not complex enough to meet the needs and goals of the capstone experience. A student in his fourth professional year developed and programmed the mannequin for an acute ST-elevation myocardial infarction simulation. In order to minimize students’ sharing of information or providing advice between lab groups, eight distinctive versions of the case were developed, achieved by varying the contraindications for and/or allergies to certain therapies. The lab required two weeks to complete. The first week focused on reading the telemetry monitor, practicing CPR technique, reviewing a STEMI treatment protocol and medications used to treat it. In the second week students had to work in teams of four to provide care for a STEMI patient (SimMan) and interact with a concerned family member. Students were evaluated for their individual and team clinical reasoning and actions. Students completing the lab rated it as an excellent experience.

Simulation Across the Curriculum for Training and Assessment. Katherine A. Kelley, The Ohio State University, Stuart J. Beatty, The Ohio State University, James D. Coyle, The Ohio State University, Colleen A. Dula, The Ohio State University, Julie E. Legg, The Ohio State University, Tiffany Shin, The Ohio State University. The Ohio State University College of Pharmacy has incorporated simulated patient care training scenarios across the PharmD curriculum. Students are involved in a variety of hands on learning environments throughout the curriculum that generate both formative and summative assessment data. In the P2, year students learn physical assessment and counseling skills during a series of interactions with standardized patients. Specially trained standardized patients provide real-time
Students conduct a brown bag mediation therapy management review with standardized patients who also provide formative feedback. A performance based assessment at the end of the year assesses student competencies and fitness to progress in the curriculum. In the P3 IPPE hospital experiences, there are required and elective simulation experiences. The required simulation familiarizes students with a common inpatient room. The two elective simulations are interprofessional: one is an acute cardiac crisis simulation with nursing students, and the other is a multi-patient rounding simulation with medicine, nursing, respiratory therapy, physical therapy, and medical dietetics students. In pharmacology and therapeutics, P3s interview and evaluate standardized patients. Students gather medication-related problems and write a SOAP note based on the encounter. Students are evaluated on their ability to identify drug related problems and provide good therapeutic recommendations. At the end of the P3 year, standardized patients are used for two program level simulation assessments. Students are required to complete a full medical history of patient #1 and a SOAP note based on the encounter. Students are evaluated on their ability to identify drug related problems and provide good therapeutic recommendations. At the end of the P3 year, standardized patients are used for two program level simulation assessments. Students are required to complete a full medical history of patient #1 and complete a simulated medication therapy management session with patient #2.

Simulation Activity to Improve Medication Adherence in Patients with Visual Impairment. Debra K. Farver, South Dakota State University, James C. R. Clem, South Dakota State University, Brittney A. Meyer, South Dakota State University, Teresa M. Seefeldt, South Dakota State University, Jodi R. Heins, South Dakota State University, Joe D. Strain, South Dakota State University, Dennis D. Hedge, South Dakota State University. An interprofessional simulation activity was developed for first year pharmacy students and second semester nursing students to work as a team utilizing good communication skills while interviewing a visually impaired patient. As an assignment in the Pharmacy Practice Laboratory (PHA 367L), the simulation activity meets curricular outcomes of interprofessional education, patient centered medication therapy management, and ethical principles, values and professionalism. Students prepared by reviewing a patient medical record, information on diabetic retinopathy and American Foundation for the Blind recommendations for a pharmacist to consider for a visually impaired patient. The student teams met to develop questions for the interview. Upon interviewing the visually impaired patient, the student teams assessed the patient for difficulties in taking their insulin and oral medications. A fourth year pharmacy student then demonstrated tools and techniques to improve medication adherence including insulin syringe magnifiers, insulin pens, talking glucometers, and automatic pill dispensers. The student teams developed a plan to present the patient to improve medication adherence after the interview and demonstration. Pharmacy and nursing faculty role-played the patient and also debriefed the student teams in the areas of communication, professionalism and teamwork. Assessment included a pre-and post-activity survey concerning attitudes towards health care teams and a reflective paper discussing developing strategies as a team to meet specific medication needs of visually impaired patients. Students gained insight and understanding of the role of other disciplines on the health care team and learned the importance of effective communication and teamwork.

Student Perceptions of Live Internet Based Student Journal Clubs Presented Synchronously to Multiple Distance Locations. Eric A. Wombwell, University of Missouri-Kansas City, Frank Caligiuri, University of Missouri-Kansas City. The purpose of this study was to evaluate the effectiveness, convenience and utility of the novel practice of an internet based journal club which connects students and faculty from different campuses and clinical sites to facilitate discussion of journal articles. Journal clubs were presented to live local and distance audiences via Wimba ClassroomTM technology. After formal presentations, there was discussion period where questions were posed via different modalities. The presentation was recorded for participants to view at their convenience if unable to attend live presentation. After each session participants were invited by email to complete an anonymous, voluntary, online questionnaire to evaluate their perceptions of the experience. A total of 47 student surveys were completed. A majority of participants (89.4%) agreed that internet based journal club provided enhanced discussion and 74.5% of respondents indicated internet based journal club should be incorporated at all rotation sites. Overwhelmingly, 82.1% of participants agreed their interactions with students from other campuses were increased. Finally, 61.7% of participants found their internet based experience superior to conventional journal clubs. Most commonly identified barrier was the use of technology and the benefit identified was a diverse audience generating broader discussion. Internet based journal club demonstrated the advantages of increased accessibility and perceived improved breadth and depth of discussion. The innovative use of a synchronous internet based journal club demonstrated its effectiveness, convenience and utility as an alternative, and possibly a replacement, to conventional journal clubs in pharmacy school curriculum.

Teaching Durable Medical Equipment to Student Pharmacists: An Inter-Professional Approach Utilizing Student Physical Therapists. Karl M. Hess, Western University of Health Sciences, Mary Hudson-McKinney, Western University of Health Sciences. OBJECTIVES: In previous years, the subject of durable medical equipment (DME) was taught as a didactic lecture in PHRM 5112: Self Care Therapeutics II at this institution. This year, a more hands-on workshop was instituted that encompassed inter-professional interactions with the Department of Physical Therapy as an active learning strategy. In order to assess the feasibility and effectiveness of this strategy, we plan to assess: 1) student pharmacist’s overall knowledge of selected medical equipment, 2) student pharmacist knowledge of the importance DME adjustment and safety concerns, and 3) student pharmacist’s attitudes and beliefs regarding DME. METHODS: Teams of student pharmacists rotated through nine different stations with each station facilitated by a team of student physical therapists. A study guide was also made available to student pharmacists in order to help direct their learning. Individual student pharmacists were also required to write a reflection piece on their impressions from this workshop and will be subsequently assessed on their knowledge of DME in a written exam. Examination questions from previous classes that taught DME in a didactic format will be compared to examination questions from this current model to address study objectives. RESULTS: Results (to be presented) will evaluate changes in student pharmacist responses to DME examination questions by course year. A summary of the student pharmacist’s reflection pieces will also be presented. CONCLUSIONS: An inter-professional DME workshop may help to improve knowledge, understanding, and foster appreciation of DME.

Teaching Innovation: A 60-Hour Physical Assessment Course for Pharmacy Students and Practicing Pharmacists. Rucha S. Bond, The University of New Mexico, Joe R. Anderson, The University of New Mexico. In Spring 2012, the UNM COP piloted an intensive capstone physical assessment course. The New Mexico Board of Pharmacy offers a pharmacist clinician license for pharmacists working clinically in a collaborative practice setting. One requirement prior to obtaining the license is completion and passing of a 60-hour physical assessment course. The capstone course was the summative BOP
training and evaluation program for both graduating students and practicing pharmacists interested in obtaining a pharmacist clinician’s license. The intensive short course occurred over seven days. The physical assessment exams covered during the course include neurologic, abdominal, musculoskeletal, cardiovascular, pulmonary, genital, mental status, and the special groups of geriatrics and pediatrics. In addition to organ system physical assessment, the curriculum included an introduction to physical assessment, patient interviewing and history taking, documentation, and a session on “putting it all together”. Both formative and summative Objective Structured Clinical Exams (OSCE’s) were administered to participants throughout the week. A score of > 80% on the summative OSCE was required to obtain the physical assessment certification. Four pharmacists and sixteen graduating pharmacy students completed the spring 2012 course. The UNM College of Pharmacy clinical faculty was integral in the delivery of the instruction and assessments associated with the course. Practicing pharmacists who completed the course received 60 hours of live continuing education credit. Participant feedback in the areas of course quality, expertise of faculty, and usefulness was positive. The course will be offered again in April 2013 and currently has 35 participants enrolled.

Teaching Residents to Teach: Preparing Faculty and Clinical Educators. Sarah Nisy, Butler University, Tracy Sprunger, Butler University, Alison Walton, Butler University, Tracy Costello, Butler University, Jane M. Gervasio, Butler University, Mary H. Andritz, Butler University. Butler University College of Pharmacy and Health Sciences (BU COPHS) is committed to furthering pharmacy resident education, providing a longitudinal academic experiential program (LAEP) for six university sponsored residency programs. In addition, components of this LAEP are offered to residents throughout Indianapolis and surrounding areas. Approximately 40 residents participate in the LAEP each year. Residents participating in these programs gain experience as student educators during experiential education, small group facilitation, and didactic lectures. Assigned faculty preceptors provide formative and summative feedback through verbal and written evaluations during each experience. In addition to student education, residents may also elect to complete an academic or academic administration focused rotation paired with clinical faculty or academic administrators. Regardless of the focus, each LAEP includes accreditation program goals and objectives for successful completion. Prior to participation in the LAEP, residents are encouraged to complete the Indiana Pharmacy Teaching Certificate Program, a collaborative program offered jointly by Purdue University College of Pharmacy and BU COPHS. This program provides the necessary foundation for the academic experience. With the continued growth in colleges of pharmacy, it is imperative that resident training include exposure to student teaching. BU COPHS continues to incorporate resident training into campus-based and experiential instruction and provides a strong academic background prior to completion of the residency program.

The Amazing Race: An Adventure in Infectious Diseases (ID) Pharmacotherapy in an Elective Course. Jony M. George, University of the Sciences Philadelphia College of Pharmacy, Trent G. Towne, Manchester University College of Pharmacy. Objective: To determine the impact of a self-guided, competitive, problem based online learning system on students’ approaches to utilizing ID resources; comprehension of content; and attitude towards the learning activity. Methods: Each team (3-4 students) was provided a patient case that was uploaded to a team file utilizing the learning management system. Teams “traveled” to different places in the world encountering a variety of infectious diseases. The object of the “race” was to correctly identify the infection described by the case endemic to the region and recommend the appropriate therapy. Once this was completed, the students could move onto the next leg of the race. The first team to finish all of the cases won the race. All students participated in a pre- and post-assessment consisting of knowledge-based questions and a questionnaire surveying attitudes based on a Likert scale (1-strongly disagree; 6-strongly agree) Results: For the knowledge based assessments, students had a mean score of 6/15 points versus 9/15 points for the pre and post assessments, respectively. On the Likert scale, when asked if the activity improved their ability to find and utilize ID resources pertinent to diagnosis and pharmacotherapy, students rated an average of 4.54. When asked if working as a team provided an effective method of completing this activity, students rated an average of 5.46. Implications: A positive impact on comprehension of content and knowledge retention was observed. Students generally felt they improved on their understanding of ID pharmacotherapy and ability to utilize resources.

The Complete MTM Experience-Taking Students Through the Process Using Outcomes MTM. Carmela Avena-Woods, St. John’s University, Maria M. Mantione, St. John’s University. Objective: The objective of this innovative teaching project is to provide PY4 students in an elective course, Contemporary Community Pharmacy Practice, the entire Medication Therapy Management (MTM) experience using OutcomesMTM™. Methods: In conjunction with an academic license agreement with OutcomesMTM™, students completed online training modules and created patient profiles within a mock pharmacy. Volunteer faculty were provided comprehensive patient cases developed by the course instructors and played the role of the patients. Students contacted their assigned “patient” to propose a comprehensive medication review (CMR) and schedule an in-person or telephone appointment. Students documented interventions, prepared Medication Action Plans and Personal Medication Records for their patients within the OutcomesMTM™ platform. Students submitted billable claims based on their interventions. Results: Thirty-nine students and fourteen faculty participated in the assignment. The volunteer faculty assessed students on their interview and counseling skills, professionalism, and ability to identify drug therapy problems and potential interventions. Student performance, assessed by the volunteer faculty, will be correlated to student demographics and self-assessment surveys. Instructors will compare student interventions to expected interventions and correlate them to overall performance. Implications: Preparing students for contemporary community pharmacy practice must include an exposure to the MTM process. This project provided the students an opportunity to experience the MTM experience from beginning to end; including the marketing, scheduling, patient interview, documentation, follow-up, and billing process. Performance indicators will be identified through assessment so the assignment can be refined for future use and expansion.

The Flipped Pharmacy Classroom: Integrating Active and Distance Learning with Macro and Micro Video Conferencing. Megan R. Undeberg, University of Minnesota, Timothy P. Stratton, University of Minnesota, Angela K. George, University of Minnesota, Sean Hall, University of Minnesota. Since 2003, the University of Minnesota College of Pharmacy has employed video conferencing to provide quality education experiences using a “one college, two campus” model. Current U of MN research has demonstrated that the use of purpose-designed active learning classrooms improves both student engagement in the learning process and student attainment of
learning objectives. Combining the strengths of conferencing and the active learning classroom, in 2012 the College of Pharmacy partnered with IT and Facilities Services on both campuses to create the first cooperative learning environment in the nation. Active learning pods of nine students utilize user interfaces to share local, pod-specific student media with team members, across the room and to distant learning sites. State-of-the-art automated cameras, including voice-activated video switching and tracking, allow for student-driven discussions and interchange of learning concepts. Each small group pod is equipped with standard and USB power for each student as well as video conferencing options with Cisco ITV, Google Hangout, UMConnect, and Skype. An instructor’s station in the center allows for the instructor to interface with an individual group or focus the entire dual-campus classroom on the product of a particular group. In the first semester of use faculty report increasing their use of active learning strategies, and students and faculty report increased student involvement in classroom activities, discussions and lectures due to improved access, acoustics, and electronic sharing. Future applications include expansion into curriculum modification to accommodate inverted teaching/learning styles.

The IRD Model of Curricular Structure: Evidence of Effectiveness. Amy Friedman Wilson, Creighton University, Michael S. Monaghan, Creighton University, Aimee L. Limpach, Creighton University, Kimberley J. Begley, Creighton University, Mark V. Siracuse, Creighton University. Introduction: In 2005, performance-based assessments to measure students’ ability to accomplish the program’s educational outcomes (EOs) were developed. Students scored roughly 50% on these assessments, which was disappointing to the program. Therefore, a redesigned curriculum that provided increased knowledge in use as a means of reinforcing skills embedded in our EOs was developed. The revised curriculum was based on the Introduce, Reinforce, and Demonstrate (IRD) model that builds in practice and multiple learning trials for students. The purpose of this project was to test the effectiveness of the IRD model on student skill performance. Methods: A skills-based learning environment designed to support the didactic portion of the curriculum was implemented to allow application of concurrent didactic information. This course permits reinforcement of EOs through knowledge in use activities that provide feedback on student performance in order to meet the IRD curricular goals. It also provides a curricular structure for the use of embedded assessments. Timed, repeated learning experiences which increase in complexity throughout the semester tested knowledge, skills, and abilities. Results: Over a five year period, scores from skills-based activities repeated four or more times were analyzed. Examples include prescription and sterile product verification. These activities showed significant improvement in scores up to and including the third assessment. (p < 0.001) Student scores then leveled off in both time to accomplish task and scores. Implications: Designing an IRD curriculum that provides student practice of EO skills with multiple assessments provides a learning environment that improves student retention and performance.

The Pharmacy and Wellness (PAW) Review: An Innovative Approach to Enhancing Professional Skills. Anne F. Gentry, Lipscomb University, Roger L. Davis, Lipscomb University, Susan Morley, Lipscomb University, Benjamin N. Gross, Lipscomb University. With Nashville highlighted in the HBO documentary series, The Weight of the Nation™, the College of Pharmacy and Health Sciences utilized the films as a foundation for an interprofessional program for 165 students and 57 faculty from nutrition, pharmacy, nursing, and exercise science to examine the contributing factors, economic implications, and health outcomes surrounding the obesity epidemic. Students progressed through the film series utilizing case-based learning, didactic lectures, and group activities focused on team building skills, scope of practice, communication strategies, and socioeconomic factors impacting health and wellness. The faculty development program also utilized the films to create discussions on interprofessional collaboration opportunities, scope of practice, and change management. Students and faculty united for a 2-hour panel discussion featuring representatives from the local Department of Health and various nonprofit organizations dedicated to obesity prevention and the elimination of food deserts. Student assessment has focused on quizzes and informal feedback during the program and will include a final course evaluation survey and student focus groups. The implications of this program are that students will have a greater appreciation for the value and services each discipline contributes to a team-based healthcare system while understanding the significance of environmental factors on the health of their patients. Future course plans include the active involvement of cohorts of interprofessional students for concept design, utilization of a patient simulation lab, and possible inclusion of experiential opportunities for students with local organizations actively involved in the processes of food access and obesity prevention.

The Utilization of Active-learning Methods to Teach Psychopharmacotherapy to Third-year Doctor of Pharmacy (PharmD) Students. Andrew J. Muzyk, Campbell University. Background: As advances in neuroscience afford a more detailed understanding of the pathophysiology of psychiatric disorders, a strong familiarity and facility with the pharmacology and therapeutic uses of psychotropic medications

143
remains absolutely essential for competent practice. Therefore, pharmacy students, throughout their education, must not only learn basic pharmacology and therapeutic strategies pertinent to psychotropics, they must also develop the skills necessary to be life-long learners as the fields of neuroscience and psychopharmacology. In order to achieve this goal, pharmacy schools must emphasize the “how” faculty teach as much as the “what” they teach; creating a culture of learning as dynamic current as evidence-based medicine taught in therapeutics lectures. Purpose: Adhering to the principles “andragogy” and practicing the methods of active-learning, we developed a psychopharmacotherapeutic module with a strong focus on student-led educational exercises. The goal of this module is to develop in students an understanding of the pharmacology and therapeutic uses of psychotropics, but also the rudimentary skills to be independent life-long learners. Methods: The module was created for third-year pharmacy students enrolled in pharmacotherapeutics at Campbell University College of Pharmacy and Health Science (CPHS). The module consisted of five class sessions held consecutively over a two-week period. Each session covered a different psychiatric disorder. A number of different active-learning strategies were implemented by the faculty lecturers including muddiest point, individual and group reflection time, repeated testing with open-ended quiz questions, Socratic questioning, cooperative cases (team-based learning), and simultaneous reporting with debate. Results: Pending.

Theater Without Popcorn—An Innovative Approach for Information Review in an Accelerated PharmD Program. Rebecca M. Wise, Lake Erie College of Osteopathic Medicine, Hershey S. Bell, Lake Erie College of Osteopathic Medicine, Sachin S. Devi, Lake Erie College of Osteopathic Medicine, Rachel R. Ogden, Lake Erie College of Osteopathic Medicine. -Several studies have looked at the correlation between admissions criteria or student academic performance and NAPLEX scores. However, there is little information about ongoing review of pharmacy information during students’ didactic coursework and NAPLEX Performance. Also, the challenge of reviewing medication-related information is especially trying for PharmD Candidates in an accelerated program. Students at Lake Erie College of Osteopathic Medicine School of Pharmacy, have year-round classes, and only short breaks between terms. All necessary coursework and clinical experiences are fit into a three-year program of study, limiting curricular time for formal review. 

Theater Without Popcorn presents slides in the format of a movie theater experience to students in the lecture halls before, during, and after didactic sessions. These slides are arranged in three compilations which are shown randomly throughout the day: drug information, flipcharts, study hints, and pearls of information. In a pilot study, a student survey showed that they feel this method of active engagement is helping in their didactic coursework; flipcharts are the preferred compilation; and they would like to see the program expanded and continued. If the students benefit in didactic work from such a theater, it is hypothesized that they are more likely to have better retention of information and earn higher scores on their NAPLEX exams.

Transforming Interprofessional Education at the University of Arizona. John E. Murphy, The University of Arizona, Andreas A. Theodorou, The University of Arizona, Cathleen L. Michaels, The University of Arizona College of Nursing, Lynne Tomasa, The University of Arizona, Yvonne Price, The University of Arizona. Objective: Transform multiple single event interprofessional education (IPE) activities to longitudinal experiences. Methods: Four large-scale IPE events are held annually on the Arizona Health Sciences Center (AHSC) campus in Tucson and the Phoenix campus. Professions involved in all four events include nursing, medicine, and pharmacy. Other professions included when appropriate include public health, law, and social work. Event themes are 1) interprofessionalism for patient safety, 2) pandemic influenza (as a mass casualties model), 3) impact of disability on access to healthcare, and 4) CPR. All events focus on effective teamwork rather than diagnosis, treatment, or direct patient care. The IPE and Practice leadership at the AHSC wanted to transform these activities from single day events where students show up, interact, and then leave, to a more long lasting learning experience. As part of a process designed to create a longitudinal curriculum, leaders decided that the events should be supplemented with readings, discussion blogs, and other assignments before and evaluation and discussion blogs following the events. As these activities are not “required” for all the colleges, a certificate of completion is provided if all pre and post work is done. Results: Assignments posted on the D2L course management system must be done prior to final registration for the course and these are uniformly completed. Students seek the certificates and interact to a greater degree on blogs each year. Attitudinal responses are positive. Implications: Though single day IPE events provide value, the use of pre and post work can enhance the experiences.

Transforming the Culture of Medical Error Disclosure in Kentucky Through Interprofessional Education. Shelley M. Jones, University of Kentucky, Andrea L. Pfeife, University of Kentucky, Margaret Pisciano, University of Kentucky College of Law, Curtis Cary, University of Kentucky College of Medicine, Cathy Catlett, University of Kentucky College of Nursing, David Rudy, University of Kentucky, Joseph L. Fink, University of Kentucky, Douglas Carr, Indiana University School of Medicine, Lee Wilbur, Indiana University School of Medicine. Objective: Evaluate the impact of interprofessional (IP) error disclosure training. Methods: As part of the Core IP Curriculum at the University of Kentucky, an IP error disclosure curriculum will be developed and instructed within the colleges of medicine, nursing, and pharmacy. The curriculum will be adapted into a professional development workshop and deployed within UKHealthCare and to healthcare institutions throughout Kentucky. The curriculum will be based on transformative learning theory in that error disclosure will provide the basis for the disorienting dilemma, in which learners are challenged to change their frames of reference by critically reflecting on their beliefs and consciously making plans that shape new behaviors. Content will be based on the “Five R’s of Apology” which are endorsed by the Joint Commission. Training methodologies will use multi-modal approaches from medical literature, which include background pre-readings, interactive discussions, demonstrative videos, simulation, guided facilitation, and debriefing. Results: Changes in TeamSTEPPS™ skill domains, knowledge, attitudes, and confidence in providing error disclosure will be measured pre and post simulation. Impact on institutional policy and apology law reform in Kentucky will be tracked by monitoring policy development at trained institutions and by monitoring advocacy efforts within the state. Implications: Interprofessional error disclosure training serves as a platform for health professions students and practitioners to learn with, from, and about each other to improve collaboration and healthcare quality. Through transformative learning, knowledge and behavior can be altered, leading to global culture change that informs health policy and medical liability legislation within Kentucky.

University of Wyoming School of Pharmacy Innovations in Education: Preparation for Successful Careers. Jaime R. Bobinmyer-Hornecker, University of Wyoming, Michelle L. Hilaire, University of Wyoming, Suzanne Clark, University of Wyoming, Linda G. Martin,

University of Wyoming, Lauren R. Biehle, University of Wyoming, Jessica Burch, University of Wyoming, Jodi R. Schilz, University of Wyoming. University of Wyoming School of Pharmacy (UWSOP) faculty members take an active role in student career planning. With the increasingly competitive nature of obtaining a residency position or quality job in pharmacy practice, ensuring that our students can present the skill set and qualifications necessary to compete is a critical component of our role as faculty advisors. The UWSOP has developed innovative approaches throughout the curriculum to assist students in determining a career path. As P1s, students are assigned both an academic advisor and a clinical advisor. The academic advisor ensures that the academic requirements for courses are met; the clinical advisor helps with IPPE and APPE rotation selection and provides additional input from the clinical perspective. During the P2 and P3 years, students have the opportunity to select from several electives in specialty areas of pharmacy practice. Examples include a seminar in postgraduate opportunities and teaching assistantships for those pursuing academia. In addition to traditional APPEs, faculty offer elective rotations in pre-residency, academics, and research. Pre-residency rotations focus on advanced patient care experiences, exploration of small-scale research projects with abstract publication and poster presentation, and improvements in self-marketing through mock interviewing and curriculum vitae review. Integrating the curriculum with various active learning opportunities from the P1 to P4 years further builds students’ skill sets. Unique methods of providing feedback and assessing these career planning strategies are underway.

Use of PharmD Students as Teaching Assistants in a 3-Year Longitudinal Professional Practice Development Course Series. Laurie S. Mauro, The University of Toledo, Gayle L. Kamm, The University of Toledo, Steven J. Martin, The University of Toledo. The changing environment of higher education requires innovation in teaching methods and resource use. Full-time pharmacist faculty members are leveraged in multiple directions, including clinical practice, classroom instruction, skills lab instruction, research, service, and often, administrative responsibilities. Skills labs deliver significant practice-focused competency instruction. The Professional Practice Development course sequence delivers practice-related skills and includes assessment of curricular competencies. Student pharmacist teaching assistants (TA’s) act as faculty-extenders to provide practice-based instruction and assessment of skills and competencies. Twenty P3 students provide supervision and instruction in P1 and P2 laboratories including pharmaceutical compounding and calculations, medication counseling and verbal communication skills, drug information, literature searching and written communication skills. Five P4 TA’s assess P3 students in the lab course series on patient assessment, and pharmacy care plan skills through SOAP exercises. TA’s work closely with faculty course coordinators and assist with the development of lab exercises and assessments. Each course includes a practical examination to assess and document competency achievement by individual students. TA’s provide skills practice sessions, and remedial instruction when necessary. TA’s are selected from a highly competitive pool of applicants and receive tuition support and a modest stipend. TA’s benefit from the instructional experience, and improve their competitiveness for residency training, as well as faculty positions. TA’s effectively serve as faculty extenders in a Professional Practice Development course series by directly contributing to the achievement of pharmacy practice competencies by PharmD students.

Using Team-Based Learning in Large Classrooms as a Foundation for Professional Practice. Keturah R. Robinson, Xavier University of Louisiana, Ashley M. Taylor, Xavier University of Louisiana, Janel B. Wheeler, Xavier University of Louisiana, Jessica L. Johnson, Xavier University of Louisiana, John Okogbua, Xavier University of Louisiana, Kristi I. Rapp, Xavier University of Louisiana, Oluwatoyin A. Arike, Xavier University of Louisiana, Lonzie Beamon, Xavier University of Louisiana. Objective: To compare student performance, engagement, class participation and communication, clinical application understanding, and confidence in the first of a three series disease state management course before and after the implementation of team-based learning. Study Design: After the traditional lecture format for teaching a disease state management course was changed to a team-based learning format, students were expected to come to class able to successfully complete individual quizzes, group quizzes, and group application exercises after completing assigned readings prior to class for each unit. Topics covered in the course were fluids and electrolytes, acid-base, anemia, nephrology, pulmonary, diabetes, gastroenterology, and hepatology. Assessment: Student learning was assessed using the performance on individual and team assessments, perceived class participation, clinical application performance, and students’ perception of their confidence in knowledge at the end of the disease state management course. Conclusion: Changing to a team-based learning format from a traditional lecture format encouraged students to prepare for class, increased student participation and communication skills, improved clinical application performance, and student confidence.

Using Virtual Patients to Replace Lecture and Promote Self-directed Learning. Neal J. Benedict, University of Pittsburgh School of Pharmacy, Kristine S. Schonder, University of Pittsburgh School of Pharmacy, James B. McGee, University of Pittsburgh School of Medicine. Objective: To assess the effectiveness of replacing lecture with virtual patient (VP) casework to promote self-directed learning (SDL) in a required advanced therapeutics course Design VPsim (Decision Simulation LLC), a VP program utilizing a branched-narrative decision-making model, was employed to create complex patient case simulations used to replace lecture-based instruction. Within each simulation, students utilized SDL principles to learn course objectives, apply their knowledge through clinical recommendations, and assess their progress through patient outcomes and faculty feedback linked to their individual decisions. Group discussions followed each VP case to provide further interpretation, clarification and clinical perspective. Assessments Students found the simulations to be organized (90%), enjoyable (82%), intellectually challenging (97%), and contributed to their understanding of course content (91%). Students further indicated that completion of the VP prior to class permitted better use of class time (78%), and promoted SDL (84%). A 5-item pre- and post-test around the post-operative nausea and vomiting (PONV) lecture in 2011 (control group) and VP case in 2012 (intervention group) was administered to assess learning. Students improved significantly (p<0.0001) from each pre-test to post-test question in both academic years. Identical final examination questions regarding PONV for both academic years were used to assess knowledge and skill retention. No statistical difference was found when comparing scores from academic year 2011 to 2012. Conclusion Virtual patients, designed to replace lecture and promote SDL, were overwhelmingly supported by students and proved to be as effective as traditional teaching methods.

Utilizing Group-Based Exams as an Assessment Modality in PharmD Education. Kirk E. Dineley, Roosevelt University, Meghana Aruru, Roosevelt University. Objectives: Group-Based Learning (GBL) pedagogy is based on two theoretical perspectives: co-operative learning and collaborative learning. Pharmacy programs often emphasize GBL as a means of promoting and enhancing student learning while fostering critical thinking and problem-solving skills. It is equally
important to utilize effective assessment tools to maintain a sound curriculum and to achieve intended objectives. As such, we intended to study group-based exams as a direct assessment of the GBL modality. Methods: Our curriculum is centered around eleven courses that integrate basic science with clinical decision making. These “Integrated Sequences” often use group-based exams. Typically, students first complete a standard multiple-choice exam independently. After a short break, they return to the classroom to complete a group-based assessment. During the group-based exam, students may discuss, debate and collaborate, thereby reaching consensus about the correct response. This often forces reconsideration of previously submitted responses to the same or similar question(s). Results: Assessment of student performance across the Integrated Sequences suggests greater autonomy, innovation and cooperative learning among student groups to effectively solve problems and, in doing so, learn from their group members. Anecdotal evidence further suggests that students find this modality enjoyable and flexible and, most importantly, useful toward developing self-learning skills in an accelerated curriculum. Implications: Group-based exams may be an important assessment tool in pharmacy programs toward better understanding students’ self-learning as well as facilitating problem solving and critical thinking skills as a group. Pharmacy programs employing GBL might consider adding group-based exams to their assessment toolkit.

**WSOP Prescription for Innovation—Use as Needed (PRN).**

Melinda E. Lull, St. John Fisher College, Christine R. Birnie, St. John Fisher College, Lipika Chabiani, St. John Fisher College, Kathryn A. Connor, St. John Fisher College, Anthony T. Corigliano, St. John Fisher College, Vivek S. Dave, St. John Fisher College, Mona Gandhi, St. John Fisher College, Angela Nagel, St. John Fisher College, Richard O’Brocta, St. John Fisher College, Amy L. Parkhill, St. John Fisher College, Ramlal Sapinoro, St. John Fisher College, Jane M. Souza, St. John Fisher College, Ashley Woodruff, St. John Fisher College, Jennifer L. Mathews, St. John Fisher College, Sridhar Anand, St. John Fisher College. Objectives: The objective of this collaborative project is to showcase the educational innovations being conducted at the Wegmans School of Pharmacy. Methods: During the 2012-2013 school year, the Wegmans School of Pharmacy designed, implemented, and assessed a number of innovations in the areas of 1) didactic curriculum, 2) service learning, and 3) assessment. Examples of innovations include incorporation of service learning activities into didactic courses and experiential rotations, completion of a clinical trial, use of electronic rubrics, using pop culture to illustrate course objectives, peer teaching, blended learning, online flashcards, electronic review modules, electronic testing, and updates to classic active learning strategies like Turning Point, think/pair/share, and muddiest points. These innovations were assessed in a variety of ways, including the use of surveys, reflections, personal feedback, and exam scores. Results: Quantitative and qualitative analyses of educational innovations have revealed benefits to student learning, leadership ability, and experiences. Specifically, these innovations have been linked to improvements in student scores in courses and on national exams. They have also allowed for real-time improvements in faculty teaching. Overall, a majority of the innovations designed were well-received by students, and were seen as a positive addition to the educational experience. Implications: The continued improvement of pharmacy education requires response to the needs of learners, and innovations that push the achievements of our students. The innovations implemented in the 2012-2013 school year at Wegmans School of Pharmacy have been successful and beneficial to student learning and will be continued and expanded in future years.

**Why Pay Tuition When You Can Get the MOOC for Free? Educational Innovations at UCSF.**

Tina Brock, University of California, San Francisco, B. Joseph Guglielmo, University of California, San Francisco, Thomas E. Kearney, University of California, San Francisco, Lisa Kroon, University of California, San Francisco, Conan MacDougall, University of California, San Francisco. Objective: Massively Open Online Courses (MOOCs), with their goal to offer free, world class education to anyone with Internet access have been recognized as a potential disruptive innovation in educational systems. Universities worldwide are scrambling to consider whether to embrace this model and if so, how to manage such nontraditional methods in traditional systems. The implication of MOOC-based learning elicits even more questions in health professions education and for this reason, study is warranted. The objective of this project is to describe the development process and preliminary results of UCSF’s MOOC pilot. Methods: UCSF has entered into a three-year partnership with Coursera to offer 35 courses (15 new and 20 repeat) using their platform. The SOD, SON, SOM and SOP have committed to contributing faculty time and content, supported by an interprofessional guidance infrastructure. SAA and LCKM with support from the Chancellor’s office have contributed initial start-up funding for instructional design, video production, and faculty and teaching assistant stipends. Results: Three courses (i.e., Contraception, Nutrition and Clinical Decision-making) launched in winter 2013, with enrollment of approximately 60,000 participants from 160 countries. The interdisciplinary UCSF Coursera advisory committee has approved four additional courses (i.e., Dental Caries Management, Light Microscopy, Diabetes, and Clinical Toxicology) for development in 2013-2014. Although currently the courses do not offer university credit, CME is offered for some and University Senate-based committees are being kept informed of the processes so as to better inform campus-based instructional systems going forward.

**iPads as a Compulsory Learning Tool for Doctor of Pharmacy Students: KU’s First Year Experience.**

Brian J. Barnes, The University of Kansas, Millinda Fowles, The University of Kansas, Cheryl A. Holcomb, The University of Kansas. Tablet devices merge the features of a laptop computer and a smartphone. When combined with various applications, large screens and rich gesture-based interfaces, tablets become a portable and personalized learning environment that satisfies the computing needs of our students. Commencing in the Fall 2012 semester, all first year students enrolled in the Doctor of Pharmacy program at the University of Kansas School of Pharmacy are required to purchase an Apple iPad2 (Cupertino, CA) or newer generation. In addition to the iPad, students are also required to purchase a wireless keyboard, stylus, an AppleCare protection plan, and install an application suite. Required apps were chosen by members of our curriculum committee and included apps necessary to access our university’s learning management system and those needed for drug and laboratory information, PDF annotation for note taking, audience response/polling, video chatting, and podcasting. Free access to several web-based textbooks are provided by the school. At the end of the Spring 2013 semester, our Assessment Committee will survey our first year students and their faculty to explore the following topics: 1) Characterize the type and frequency of use of the iPads and required or subsequently adopted applications; 2) Evaluate the financial impact of the devices from a student and school perspective; and 3) Explore and develop recommendations for future use, such as computerized testing, student-specific obtainment of curricular objectives, faculty-authored iBooks, School specific application development, and access to our medical center’s electronic medical records. The results of this survey data will be presented.
Storage via Activation of PPAR

Bisphenol A, MEHP, genistein and daidzein were examined using differentiation and upregulate genes involved in lipid metabolism.

Results:

via their ability to effect recruitment of transcriptional coactivators and corepressors to the receptor in a mammalian two-hybrid assay. The objective of this study was to test the hypothesis that EDCs display pro-obesity activities by enhancing PPAR

Implications:

This suggests a possible mechanistic explanation for epidemiological findings showing an increase incidence of obesity in populations in highly polluted industrial areas.

Cannabinergic Mechanism of Action of Alkamides from Lepidium meyenii (Maca). Alejandro Pino-Figueroa, Massachusetts College of Pharmacy and Health Sciences-Boston, Haifa Almukadi, Massachusetts College of Pharmacy and Health Sciences-Boston, Ahmed Alani, Massachusetts College of Pharmacy and Health Sciences-Boston, Mark Böhlike, Massachusetts College of Pharmacy and Health Sciences-Boston, Timothy J. Maher, Massachusetts College of Pharmacy and Health Sciences-Boston. Objectives: The pentane extract of the Peruvian plant Lepidium meyenii (Maca) has been shown to possess neuroprotective activity in vitro and in vivo. The involvement of the endocannabinoid system has been hypothesized to be a possible mechanism of action. The aim of this study was to determine and characterize the indirect cannabinergic activity of natural alkamides and one synthetic derivative in an in vitro model using human recombinant enzymes responsible for the endogenous degradation of endocannabinoids. Methods: Twelve natural alkamides and one derivative were assayed for inhibitory activity using fatty acid amide hydrolase (FAAH) and monooacyl glycerol lipase (MAGL) activity assay methods. Different enzyme-inhibitor pre-incubation times and Lineweaver-Burk plots were used to determine the mechanism of inhibition. Results: The 12 alkamides tested showed significant (p<0.05) concentration- and structure-dependent inhibitory properties on FAAH at concentrations from 1 to 100 μM. The four most active inhibitory alkamides were the N-benzylamide of linoleic acid and the N-(3-methoxybenzyl) alkamides of oleic, linoleic and linolenic acids. Replacement of the 3-methoxybenzyl group with a more strongly H-bond accepting N-(3-pyridylmethyl) group significantly increased the inhibitory activity (p<0.05). Not all compounds tested demonstrated significant MAGL inhibitory activity at the assayed concentrations. The assays were validated with standard FAAH and MAGL inhibitors. Implications: These results suggest the potential application of alkamides present in Lepidium meyenii (Maca) or new synthetic alkamide derivatives as FAAH inhibitors. FAAH inhibitors have been suggested to be a therapeutic approach for the treatment of pain, neurodegeneration, depression and anxiety, acting through local activation of the endocannabinoid system.

Combining Bcl-2 Inhibition with miR-34a Treatment to Improve Bladder Cancer Outcomes. Ruth Vinall, California Northstate University. Dan Pham, California Northstate University. Kathy Phan, California Northstate University, Paramita Ghosh, University of California Davis Medical Center, Vietnam. Ralph de Vere White, U C Davis Medical Center. Objectives: We previously demonstrated that treatment of bladder cancer cell lines with pre-miR-34a decreased clongenic potential and induced cellular senescence when combined with cisplatin, the standard of care treatment for muscle invasive bladder cancer (MI-BC). An increase in apoptosis was not observed, however, and expression levels of Bcl-2, a pro-survival molecule, actually increased. The primary objective of this study was to determine whether combining Bcl-2 inhibition with pre-miR-34a and cisplatin treatment would increase bladder cancer cell apoptosis. Method: Two Bcl-2 inhibitors were used for these studies; Obatoclax and Navitoclax. The impact of these inhibitors, in combination with pre-miR-34a and cisplatin, on clongenic potential and apoptosis was tested in three MI-BC cell lines (T24, TCCSUP, 5637) using clongenic assay and annexin V flow cytometry respectively. The impact of treatments on apoptosis/survival pathways was assessed via Western blot. Results: Obatoclax and Navitoclax mediated a dose-dependent increase in
apoptosis in all MI-BC cell lines. Treatment with Obatoclax in combination with cisplatin and pre-miR-34a caused a 2-fold increase in apoptosis compared to treatment with cisplatin or pre-miR-34a as single agents. Western blot confirmed Obatoclax inhibited Bcl-2 and Bcl-xl expression, and caused increased PARP and caspase 3 cleavage. Implications: Our data indicate that in vivo testing of Bcl-2 inhibitors in combination with cisplatin is warranted. The current 5-year survival rate for is 35%. Clearly new and improved treatment options are needed for this disease. Our long-term goal is to translate our findings into a clinical setting and improve outcomes for MI-BC patients.

Chemistry

Harvesting Transthyretin to Inhibit Extracellular Receptor-Ligand Interactions. Mamoun M. Alhamadsheh, University of the Pacific. Objectives: The importance of protein-protein interactions (PPIs) as a key regulatory mechanism for a number of physiological and pathological cellular processes makes them prime targets for therapeutic intervention. Antibody based therapeutics have been the mainstay for development of inhibitors of medically relevant PPIs. However, there are a number of limitations associated with antibody-based therapies. This study aims to explore a fundamentally new approach to address these limitations. Method: A series of bifunctional small molecules were designed to bind simultaneously to transthyretin (TTR) and an extracellular receptor. The TTR binding moieties were designed based on x-ray structural information obtained for a number of hits from a high throughput screen for TTR ligands that we performed. The bifunctional molecules were chemically synthesized and their ability to bind TTR and the extracellular target were evaluated using a number of biochemical and biophysical assays. Results: a number of bifunctional molecules were able to bind TTR and the extracellular target and the effect of recruiting TTR on inhibiting PPIs is currently being evaluated. Implications: a successful realization of our study could validate an innovative, general approach to the development of small-molecule PPIs inhibitors as research tools or for the treatment of human diseases.

Meperidine Analogs as Novel Analgesics Lacking P-glycoprotein and CYP3A4 Interactions. Susan L. Mercer, Lipscomb University/ Vanderbilt University Medical Center, Rachel Saylor, Lipscomb University, Britanny B. Duerk, Lipscomb University, Emily K. Holder, Lipscomb University, Jason R. Healy, West Virginia University, Rae R. Matsumoto, West Virginia University, J. Scott Daniels, Vanderbilt University Medical Center. Objectives: Meperidine, a moderately potent mu opioid receptor (MOR) agonist has low P-glycoprotein (P-gp) substrate activity. Meperidine therefore appears an excellent lead candidate to test our hypothesis that P-gp contributes to the development of central tolerance by actively effluxing morphine out of the CNS. However, the use of meperidine for the treatment of chronic pain is limited. Meperidine is N-demethylated by CYP3A4 to normeperidine, a non-opioid toxic metabolite, which has been reported to cause seizures and death due to metabolite accumulation. For this reason, we proposed to eliminate the formation of meperidine’s toxic metabolite while maintaining low P-gp substrate activity. Methods: In order to limit N-dealkylation and potentially prevent formation of a toxic metabolite, steric hindrance was introduced into the piperidine ring at the 2- and 6-positions, generating a series of 2,2,6,6-tetramethyl- (LUCOP 5-8) and 2,6-dimethyl-meperidine (LUCOP 11-14) analogs. Results: Intermediates and final compounds were submitted for P-gp and MOR binding analysis. LUCOP 5-8 were devoid of P-gp activity, having efflux ratios less than one in the MDCK-P-gp model. LUCOP 11-14 presented unanticipated ionization issues and P-gp data is currently unavailable. Addition of steric hindrance resulted in loss of MOR binding with the exception of LUCOP 11, which had very weak MOR binding (6547 nM). Implications: Potent meperidine analogs which lack P-gp and CYP3A4 interactions will allow for chronic dosing as novel analgesics useful in the treatment of severe chronic pain. Lack of P-gp substrate activity will aid in the CNS delivery of analgesic agents to morphine tolerant individuals when P-gp is up-regulated.

Novel GLT-1 Upregulators for Treatment of Cocaine Addiction and Withdrawal. Benjamin E. Blass, Temple University, Nicole Lounsbury, Temple University, Rong Fan, Temple University, Wayne E. Childers, Temple University, Magid Abou-Gharbia, Temple University, Rita Sattler, Johns Hopkins University. Objectives: Illicit drug use is a major health concern, with over 21 million Americans reported being “current” drug users. Cocaine is of particular concern, as chronic exposure results in adaptive changes that alter the regulation of synaptic glutamate concentration. Specifically, GLT-1, the primary synaptic glutamate transporter in astrocytes, is significantly down regulated upon cocaine exposure. This change in expression levels has been correlated with withdrawal and relapse. Thus, compounds that increased GLT-1 expression should have therapeutic utility for the treatment of addiction and withdrawal. Methods: It has been previously demonstrated that Harmine, a β-carboline, increases GLT-1 expression, but limited selectivity against monoamine oxidases prevent its clinical use. We have prepared a series of harmine analogs and screened them in an astrocyte/neuron co-culture cellular assay designed to detect increased GLT-1 expression in order to identify novel compounds for further studies. Compounds were also provided to the Psychoactive Drug Screening Program to identify additional avenues of research. Results: The structure activity relationship between the harmine substructure and GLT-1 expression is narrow, suggesting that further progress in enhancing GLT-1 expression will not be possible with the current set of molecules. However, significant activity at the serotonin receptors was observed for several compounds. Specifically, positive allosteric modulators of 5-HT1E, a subtype identified in 1989 that has been implicated in neuropsychiatric disorders, were identified. Implications: To date, there are no reports of selective 5-HT1E compounds and study of this receptor has been limited. Our compounds may be useful tools in elucidating the role of 5-HT1E.

Pharmaceutics

2D Peptide Nanofiber as a Therapeutic Carrier for Doxorubicin. Benedict Law, North Dakota State University, Anil Wagh, North Dakota State University, Mitulkumar Patel, North Dakota State University, Steven Qian, North Dakota State University. Objectives: For many years, doxorubicin has been used as the first-line treatment for metastatic breast cancer. Various FDA-approved liposomal formulations were developed, with the aim to reduce the dose-limiting toxicities. However, due to the prolonged circulating time, they are known to cause newer side effects, including hand-foot syndrome and mucositis. The objective of this study was to develop a new therapeutic platform for doxorubicin, with the long-term goal to enhance the therapeutic efficacy and to reduce the incidence of side-effects of doxorubicin. Method: A2D peptide-based nanofiber (NFP) was used as the drug carrier, which was chosen because it was shown to be biocompatible, had a short circulating time (t1/2 = 3.9h), and could be passively delivered to the tumor sites. In the current studies, doxorubicin was adsorbed onto the NFP. The drug adsorption was con-

firmed by changes in absorption, fluorescence, and FTIR spectra of NFP and doxorubicin. Drug release profile was characterized by the dequenching of doxorubicin fluorescence. **Results:** Substantial amounts of doxorubicin molecules could be adsorbed onto the surface of NFP (~70% w/w), which caused a significant red-shift of the absorption λmax and fluorescence quenching. FTIR also confirmed the formation of hydrogen bonds, as evidenced by the ν-OH and ν-NH vibration peaks of the adsorbed doxorubicin were shifted to the lower frequency range (from 3434 to 3413 cm⁻¹). Drug release kinetic was faster at an acidic pH. **Implications:** NFP may be a useful drug delivery platform to reduce the total accumulation in the body, thus the side-effects of chemotherapeutic agents.

**DNA and siRNA Hybrid Nanoparticle for Targeted Colon Cancer Therapy.** Peisheng Xu, South Carolina College of Pharmacy. **Objectives:** To develop a serum compatible gene delivery system that can efficiently carry both DNA and siRNA into colon cancer cells. The goal of this research is to pave the way for the clinical applicable colon cancer gene therapy and ultimately conquer colon cancer. **Methods:** We developed a tetraery gene delivery system named PoSC, consisting of polyethyleneimine (PEI), polyaspermine (PSP), and hyaluronic acid (HA). pEGFP plasmid and EGFP siRNA were employed as model DNA and siRNA. NIH3T3 and HCT-116 cells were treated with PoSC complexes containing either DNA or siRNA or both DNA and siRNA in the cell culture medium containing 10%, 25%, 50% serum. The transfection efficiency and gene silence effect were quantified with flow cytometry and fluorospectrophotometer. **Results:** In contrast to the DNA/PEI/HA ternary system whose transfection efficiency decreases significantly with increasing serum concentration, PoSC exhibits a high transfection efficiency of about 51 and 87% for NIH3T3 and HCT116 cells, respectively, at 50% serum concentration. Furthermore, PoSC shows no cytotoxic effect at its working concentration. In addition, the incorporation of DNA in the PoSC system for siRNA delivery could enhance the gene silence effect. **Implications:** Our study found that PoSC is a safe serum compatible system that can efficiently carry both DNA and siRNA into colon cancer cells, which suggests that PoSC could be a promising tool for colon cancer gene therapy.

**Modulation of MRP Drug Efflux for Improved Ocular Drug Delivery.** Pradeep K. Karla, Howard University, Ann-Marie Adouono, Howard University, Betty L. Hemdon, University of Missouri-Kansas City. **Objectives:** The objective is to screen the human corneal epithelium for the presence of new drug efflux transporters and develop sensitive yet cost effective HPLC method for the identification and quantification of Timolol drug concentrations in ophthalmic nanof ormulations. **Method:** Rabbit Corneal Epithelial Cells (SIRC) and Human Corneal Epithelial Cells (SV40-HCEC) were employed for screening analysis. RT-PCR was employed for gene expression. Flow cytometry, radio-active analysis were employed for drug-transporter screening. A Shimadzu HPLC-UV System with C18 column and a methanol:water with 0.1% formic acid (60:40 v/v) mobile phase was employed for analysis. **Results:** SIRC showed specific PCR bands at 101bp, 104 bp, 106bp, 103bp, 114bp, and 135bp, corresponding to MRPs 3, 4, 5, P-gp, SIMRP-7 and BCRP, respectively. These band profiles, together with MRP 1 (107bp), 2(114bp), 6 (105bp), and ABCCs 10 (114bp), 11(112bp) and 12 (112 bp) were observed in SV40 HCEC. Rhodamine intensity in cells treated with MK571, P-gp 4008, Timolol, Ganciclovir (GCV), and Latanoprost (LNP) at 50µM and 100µM was higher than control. 14C-Erythromycin in corneal cells was higher in the presence of 50µM Timolol. Timolol retention time for HPLC was 7.6 min. The LOD and LOQ were 0.21µg/ml and 0.68µg/ml respectively. The mean %RSD was found to be 0.17%. **Implications:** The results confirm the expression of multiple new transporters at gene level on human corneal cells. Flow-cytometry, radio-active screening studies revealed that major ocular drugs are substrates for drug efflux. A reliable and cost effective RP-HPLC method to determine Timolol release from nanof ormulations was successfully developed and validated.

**Pharmacy Practice**

**Bone Fractures in Pediatric Renal Transplant Patients.** Teresa M. Cavanaugh, University of Cincinnati, Cincinnati Children’s Hospital Medical Center, A. Desai, University of Cincinnati, Mantosh Rattan, Cincinnati Children’s Hospital Medical Center, Jens W. Goebel, Cincinnati Children’s Hospital Medical Center. **Objectives:** Knowledge of the scope of bone disease in pediatric transplant patients is inadequate due to limitations of traditional diagnostic tools. The objective of this study is to enhance understanding of bone disease in pediatric kidney transplant patients by determining the prevalence of subclinical fractures at the time of and in the years following renal transplant and evaluating factors predictive of those fractures. **Method:** Patients transplanted between 6/2008 and 10/2012 with evaluable routine chest radiographs and follow-up data were included. The Genant semiquantitative technique was used to identify and classify vertebral fractures by three reviewers. All potential fractures and 10% of non-fractured radiographs were confirmed by a consultant radiologist. **Results:** Vertebral fractures were identified in 4/31 (12.9%) patients; 3 fractures were wedge deformity, 1 was biconcave, 3 were grade 1 and 1 was grade 3. Previous steroid exposure occurred in 3/4 (75%) versus 3/27 (11%) (p = 0.008), and previous solid organ transplant occurred in 3/4 (75%) versus 1/27 (3%) (p = 0.001), in the fracture versus no fracture groups, respectively. One fracture was documented, the other 3 were subclinical. There were no differences in demographics, prednisone AUC (0.30±0.05 vs 0.32±0.23 mg/kg/day), eGFR (45.7±14.5 vs 37±12.8 mL/min/1.73m²), vitamin D (27.8±11.6 vs 26.3±6.9 pg/mL), tacrolimus serum level (8.4±1.2 vs 8.8±1.2 ng/mL), other laboratory values, donor type, height and weight. **Implications:** Subclinical vertebral compression fractures are occurring in pediatric transplant patients who have had multiple solid organ transplants and long-term exposure to steroids. Strategies to prevent bone disease in this high-risk population need to be developed.

**Influenza & Obesity: A Prospective Study of Patient Outcomes and Antiviral Resistance.** Emily T. Martin, Wayne State University, Carolyn Archer, Wayne State University, Richard Evans, Wayne State University, Caitlin Biedron, Wayne State University, Vicki Collins, Wayne State University, John P. McRoberts, Wayne State University, Taylor Thurston, Wayne State University, Janice Kulik, Wayne State University, Samia Arshad, Henry Ford Health System, Paul E. Kilgore, Wayne State University, Keith Kaye, Wayne State University. **Objectives:** Individuals with obesity were found to have increased disease severity and mortality during the 2009 Influenza A/H1N1 pandemic. The objective of this study was to identify outcomes of influenza illness and risk factors for severe complications, specifically lower pulmonary disease (LPD), among patients with obesity. **Method:** We prospectively identified hospitalized patients with laboratory-confirmed influenza. Body mass index (BMI), demographics, medical history, and disease outcome were collected through chart abstraction and patient interviews. Obese patients were compared to non-obese patients for rates of LPD (defined as infiltrates or consolidation noted on chest x-ray and/or hypoxia) and severe outcome (defined

**American Journal of Pharmaceutical Education 2013; 77 (5) Article 109.**
as intensive care unit admission, intubation, or readmission within 30 days of discharge), controlling for chronic comorbidities and medical history. Results: 58 patients were enrolled during the fall 2011–winter 2013 seasons. Of these, 29 (50%) had Class I through III Obesity, defined as a BMI of 30.0 or greater. Individuals with obesity had similar rates of LPD (Adjusted Odds Ratio (AOR): 1.27; p=0.68) and severe disease (AOR: 1.12; p=0.85) to non-obese individuals. Unexpectedly, non-obese individuals had a mean increase in hospital stay of 2 days, which was significant after controlling for medical history (p=0.01). Implications: We did not find a marked increase in influenza disease severity in individuals with obesity hospitalized during the 2010/2011 and 2011/2012 influenza seasons. Previous findings of increased severity may be influenced by lifestyle and health status, or changes in circulating strain types since the pandemic may have a lesser effect on individuals with obesity.

Trimethoprim (TMP)/Sulfamethoxazole (SMX) Loss in Modeled Continuous Renal Replacement Therapy (CRRT). A. Mary Vilay, The University of New Mexico, Jacob M. Kesner, The University of New Mexico, J. Michael Yardman-Frank, The University of New Mexico; Ronald M. Schrader, The University of New Mexico, Renee-Claude Mercier, The University of New Mexico, Dean Aryan, VA Cooperative Studies Program; Craig S. Wong, The University of New Mexico. Objective: Drug adsorption to medical devices can be an important source of drug loss. Our objective was to characterize whether TMP and/or SMX adsorbs to the CRRT circuit using an in vitro model. Methods: The model consisted of a glass chamber with human blood connected to an AN69 hemodiafilter (M100, Gambro) with polyvinylchloride tubing.TMP and SMX were added, a time zero sample was collected, and blood circulation through the circuit was started. Blood samples were collected at predetermined times over 60 minutes. A second dose of TMP/SMX was administered. Blood samples were collected at 1 minute and 60 minutes post dose. This was repeated for a total of 5 TMP/SMX doses. One liter Lactated Ringers was added to the blood reservoir. Blood samples were collected at predetermined time points over the next hour to determine reversibility of adsorption. Experiments were repeated 5 times each with and without a hemodiafilter. Results: SMX adsorption was observed with the first dose while TMP adsorption was observed with doses 1 through 5 in circuits with the hemodiafilter. Minimal to no SMX/TMP adsorption was observed in circuits without the hemodiafilter. SMX and TMP adsorption appeared to be reversible. Implications: Decreased blood concentration due to adsorption to the hemodiafilter occurred to varying degrees with SMX and TMP. SMX adsorption appeared to be minimal while TMP adsorption represented 30% of the amount added and appeared to be cumulative. TMP adsorption to CRRT circuits may have important clinical implications and should be verified with in vitro studies.

PK/PD Profiling of Extended Infusion Piperacillin/Tazobactam in Patients with Obesity. Ashley Woodruff, St. John Fisher College, Lisa Avery, St. John Fisher College, Megan Jensen, Kaleida Health, Melissa Danek, Kaleida Health, Lisa Voigt, Kaleida Health. Objectives: The purpose of this study is to compare extended infusion (EI) piperacillin/tazobactam (TZP) pharmacokinetic (PK)/pharmacodynamic (PD) profiles of obese vs. non-obese hospitalized patients. The primary objective is to estimate the probability of target attainment (PTA) in matched obese and non-obese, hospitalized patients receiving EI TZP. Secondary objectives will include estimation and comparison of PK parameters including, area under the concentration-time curve (AUC), maximum concentration, minimum concentration, volume of distribution (Vd), elimination rate constant (Kel) and clearance (CL). Methods: Obese patients (BMI> 30 kg/m2) were matched in 1:1 ratio to non-obese (BMI 18-25 kg/m2) patients by creatinine clearance (within a 10 ml/min range), age (within 5 years), race and gender. Each patient received TZP 3.375 g IV infused over 4 hours given every 8 hours. Serum piperacillin levels were collected from each patient. Levels were compared and used to calculate PTA and PK/PD parameters. Results: The likelihood of achieving PTA was highest in patients with poor renal function, lower BMI and older age. Additionally PK parameters including AUC, maximum concentration, minimum concentration, Vd, Kel and CL were affected by renal function, BMI and age. Implications: This preliminary data will be used to continue further research to determine the most optimal dosing regimen for obese patients receiving EI TZP. The current regimen of 3.375 g IV infused over 4 hours given every 8 hours may not be optimal for young patients with good renal function and high body mass indices.

Social and Administrative Sciences

Relationship Between Health Utility and Burden Among Caregivers of Autistic Children. Rahul Khanna, The University of Mississippi, Krutika Jariwala, The University of Mississippi, John P. Bentley, The University of Mississippi. Objectives: Using the EuroQol Five Dimensional Questionnaire (EQ-5D), the health utility of caregivers of autistic children was determined. Health utilities of caregivers were compared to the general US adult population. Predictors of health utility of caregivers were determined. Methods: A cross-sectional online survey of 316 primary caregivers of autistic children was conducted to collect study data. Caregivers registered with the Interactive Autism Network (IAN) were approached for participation in the online survey. Student’s t-test was used to compare health utility of caregivers and general adult population. Ordinary least square regression using a fully adjusted multivariable model was used to determine the factors predicting health utility of autism caregivers. Results: Autism caregivers 18-44 years of age had significantly (P<0.001) lower health utility scores on average as compared to their counterparts in the general US population. Female caregivers had significantly lower utility scores than females in the general US adult population. Caregivers of lower socioeconomic status had lower utility scores and reported more problems in EQ-5D domains than those from higher socioeconomic status. Caregiver burden was inversely correlated with health utility. Caregiver physical and mental health status, objective strain, education, and relationship with the care recipient were found to significantly predict health utility (adjusted R-squared ~57%). Implications: Our results signify that autism caregivers place lower utility for health states as compared to the general population. Study results could assist policy makers in making decisions to allocate healthcare dollars with the intent of improving caregiver well-being.

The Influence of Functional Health Literacy on Quality Patient-Pharmacist Communication. Sean R. King, Union University. Objectives: Patients receiving anticoagulation therapy require continuous medication therapy management. Adequate functional health literacy (FHL) may be especially important for those prescribed medications requiring such complex counseling. This investigation examined the relationship between FHL and the quality of patient-pharmacist communication among patients receiving anticoagulation therapy. Methods: Detailed telephone interviews were conducted with 220 patients from two rural, pharmacist-staffed anticoagulation clinics. A validated, one-item screening question was used to estimate FHL. Patients’ perceptions regarding general communication with pharmacists were elicited using six domains from the Interpersonal Process of Care (IPC) questionnaire. Responses were given on
Impact of Medicare’s Payment Policy Change on Prophylactic G-CSF Use and Outcomes. Xiaoyun Pan, G-CSF Use and Outcomes. Impact of Medicare’s Payment Policy Change on Prophylactic G-CSF use while controlling for patient clinical and non-clinical characteristics. Both risk adjustment (RA) and instrumental variable (IV) methods were applied to estimate whether or not G-CSF reduced neutropenia hospitalizations during first and second chemotherapy cycles. Results: Prophylactic G-CSF use among NHL patients on chemotherapy increased from 8.36% in 2002 to 38.40% in 2007. Compared with pre-policy era (2002-2003), G-CSF use increased significantly in the post policy eras (OR of 4.65 in 2004, OR of 5.22 in 2005-2007). Prophylactic G-CSF use was negatively associated with neutropenia hospitalizations during both first and second chemotherapy cycles, however, the relationship was not statistically significant. Conclusions: With Medicare’s payment policy change for cancer drugs, prophylactic G-CSF use increased substantially. Marginal patients whose treatments affected by the Medicare payment policy did not get clinical benefits in terms of neutropenia hospitalization reductions.

Impact of an Innovative, User-Centered Technology on Medication Self-Management. Andrea L. Kjos, Drake University. Objectives: This pilot study assessed the impact of a smart-device application on medication self-management in patients with diabetes. The primary objective was to assess the impact on self-reported medication adherence. Secondary measures of self-efficacy, perceived control, outcome comparisons, and cost were also measured. Psychosocial constructs were assessed using previously validated survey instrument tools. The Dynamic Exchange Model for Medication Adherence Levels and Comparison of Outcomes (DEMMALCO) was utilized as the conceptual framework. Method: Study participants were English speaking adults with diabetes who had access to the Internet, used a smart-device and were taking at least two chronic medications. The study used a prospective design that explored causal dependencies among the variables collected at time points over a period of six months. All primary and secondary objectives were assessed at baseline, three, and six months. Results: Locus of control and medication self-efficacy were evaluated as antecedents to medication adherence. The outcome of medication adherence was evaluated as outcome expectations of diabetes, possible outcome comparisons towards a treatment plan, and learned resourcefulness of using the technology-based application. It was anticipated that using the technology would impact these constructs. Short-term as well as longer-term relationships were represented and participants served as their own control. Impact on medication costs was measured by self-report. Implications: Findings contributed to understanding how technology influences medication adherence. Further, this study provided a foundation for future trials involving user-centered technology for smart devices.

Impact of Medicare’s Payment Policy Change on Prophylactic G-CSF Use and Outcomes. Xiaoyun Pan, West Virginia University, Wengin Tang, West Virginia University, Usha Samhamoori, West Virginia University, Suresh Madhavan, West Virginia University. Objective: To evaluate the impact of Medicare’s payment policy change on prophylactic G-CSF use and to examine the relationship between prophylactic G-CSF and neutropenia hospitalization among Non-Hodgkin’s Lymphoma (NHL) patients. Methods: We performed a retrospective cohort study. Using SEER-Medicare linked database, we studied patients 66 years or older diagnosed with first primary NHL from 2002 to 2007, and who had a first course of chemotherapy (N=8,459). Prophylactic G-CSF was measured if a patient had a G-CSF claim within the first five days of the first chemotherapy cycle. Logistic regression analyses were conducted to assess the effect of Medicare’s payment cuts on prophylactic G-CSF use while controlling...
EXCELLENCE IN ASSESSMENT WINNERS

Evidence-Based Curriculum Mapping through Embedded Assessment. Jane M. Souza, St. John Fisher College, Jennifer L. Mathews, St. John Fisher College, Richard F. O’Brocta, St. John Fisher College. Objectives: This study focused on mining existing test data (embedded assessments) to document curriculum coverage and track longitudinal performance of students on curricular outcomes. Method: After a pilot program, and a series of faculty development sessions on writing quality exam questions and coding them appropriately, the school began coding all test items at several levels: ACPE Appendices Topic Guidelines, Bloom’s Taxonomy, System, and Course Learning Outcomes. At the end of a full academic year, longitudinal reports were generated and resulting data were mined for multiple purposes. Results: Longitudinal data provided information at the macro level to inform depth and density of curriculum coverage; at the course level to assess teaching effectiveness, to align course goals with programmatic goals, and to analyze the quality of test items; and at the student level to identify areas of strength and opportunities for improvement. Implications: The use of carefully coded embedded assessments can provide data to support curriculum coverage as well as evidence of student learning. Data collected can be mined to serve multiple constituencies including Assessment and Curriculum Committees, Self-Study work groups, faculty, administrators, and students.

Measuring Pre-APPE Outcomes as Part of a PharmD Program Capstone Experience. Stuart J. Beatty, The Ohio State University, Katherine A. Kelley, The Ohio State University. Objective: To describe the use of a Capstone experience to: 1) assess student preparedness prior to Advanced Pharmacy Practice Experiences (APPE); and 2) gather program-level assessment data for continuous curriculum improvement and to meet Accreditation Council for Pharmacy Education (ACPE) requirements. Methods: A Capstone experience was added immediately prior to APPEs. All Capstone activities were developed to emphasize application and integration of didactic material and were mapped to ability-based outcomes, ACPE Pre-APPE outcomes, and to four curricular threads: professionalism and ethics, communication, problem-solving, and drug information. Evaluation rubrics are designed with an emphasis on formative feedback for students. Twelve assessments from eight learning activities was evaluated throughout the Capstone. Each assessment was graded as pass/fail; students must pass 10 of the 12 assessments to receive a passing grade for the Capstone. Results: To date, the Capstone has been delivered three times; only one student has not passed the Capstone while between 55-68% have passed all activities. Program-level assessment data obtained through Capstone have been used to provide details on individual student knowledge and skills prior to APPE as well as providing important information for accreditation purposes. These data have also been used to make important improvements to the curriculum. Implications: A Capstone experience can be a valuable addition to a PharmD curriculum. Activities can be used to assess student knowledge and skills; data gathered can support curricular revision as well as accreditation processes in Colleges and Schools of Pharmacy.

Yearly Progress Exams: An Analysis of Correlation Between Knowledge and Skills. Norma Owens, The University of Rhode Island, Celia MacDonnell, The University of Rhode Island, Marilyn Barbour, The University of Rhode Island, Eunsun Noh, The University of Rhode Island. Objective: Annual progress exams were created in 2001 as formative and summative assessments. Exam goals are to document sustained learning; provide students and faculty with feedback; and to evaluate changes in the curriculum. Correlation between the progress exam to course grades and observed skills was assessed. Methods: Faculty-created questions were validated by faculty, senior students, and pharmacy practitioners. The exams contained 60 questions that reflect the material for that year. Students receive a yearly personalized report of their score in relation to their class and also component scores in the clinical, pharmaceutical, and administrative sciences. Faculty receive a report with average scores, component scores and a description of concepts learned. The correlation between the progress exam scores, course grades, and observed skills score in practice laboratories was evaluated using SAS 9.3. Results: Course and progress exam scores were strongly correlated in all professional years (Pearson ($r$) =0.53, $p<.0001$ for P1; $r=0.63, p<.0001$ for P2; $r=0.55, p<.0001$ for P3), indicating students with high scores in courses also had high scores on the progress examination. The relationship between average scores on the progress examination and proficiency in observed skills assessment in the fall of the P3 year was also positively correlated ($r=0.20, p=0.05$). Implications: The creation and validation of progress exams can provide useful information about knowledge integration for students and faculty. Furthermore, these exams can identify students at the beginning of the P3 year who meet proficiency skills.