An Analysis of the Effect of Near-Peer Tutoring on Student Emotional and Intellectual Wellness
David C. Sabatino, Brooke A. Szachnowicz, Demosthenis Katsaros, Matthew M. Lacroix, The University of Rhode Island.

Objective: This study aims to assess how near-peer tutoring impacts the wellness of students in their first professional year of pharmacy school. Methods: An electronic survey was emailed to each student in their first professional year of pharmacy school. The validated Rosenberg Self-Esteem scale measuring emotional wellness and the New General Self-Efficacy scale measuring intellectual wellness, were included. Other data collected from this survey included the number of tutoring sessions attended and a numerical score of each student’s self-reported wellness and academic performance. Results: Students self-reported that near-peer tutoring improved their wellness and academic performance (90.9%). Validated instruments assessing students’ self-esteem and self-efficacy showed a significant positive correlation with self-reported wellness and academic performance (p < .001). Conclusions: Students feel that near-peer tutoring is beneficial toward their overall wellness and academic success. When wellness is improved, students are more likely to remain in good academic standing and enrolled in the program. The validated scales identified students that self-reported low scores in regard to wellness and academic performance. This study suggests students are self-aware of their academic performance; however, it was unable to show that struggling students were accessing help through the near-peer tutoring program. Future studies are warranted to determine if using these scales can prospectively identify students in academic jeopardy, allowing for requisite allocation of academic support resources.

An Interprofessional Framework to Improve Health Literacy in Underserved Communities Inspired by Kotter’s Change Model
Mandhir J Johal, Farid Khalafalla, California Health Sciences University.

Objective: Underserved communities display higher rates of chronic diseases partially due to limited access to healthcare and poor health literacy. Herein, we propose a stepwise methodology for establishing interprofessional community engagement programs facilitated by trained healthcare professional students to improve health literacy and address priority health needs in underserved communities. Methods: 1) Identifying priority health needs for underserved community using published Community Health Needs Assessment (CHNA) reports (eg, obesity, opioid addiction, diabetes, tobacco use) and creating a sense of urgency. 2) Building a guiding coalition of experts in the identified area of health need. 3) Communicating the vision of improving community’s health literacy. 4) Enlisting healthcare professional student volunteers from different specialties and proactively planning for interprofessional educational sessions (eg, logistics and scheduling). 5) Training students interprofessionally on basic knowledge in the identified area of health need along with foundational coaching/motivational interviewing skills. 6) Assessing students’ knowledge, coaching skills and interprofessional competencies through mock interviews using standardized rubrics/surveys (eg, Interprofessional Collaborative Competencies Attainment Survey [ICCAS]). 7) Coaching underserved community members by trained interprofessional students and tracking health outcomes (eg, BMI to evaluate reduction in obesity). 8) Removing barriers to accessing community by getting buy-in from community leaders. 9) Ensuring sustainability by engaging community members and delegating leadership roles. Results: Pilot implementation of this methodology/data collection are underway. This framework is anticipated to enhance students’ interprofessional competencies and coaching skills along with improving health literacy and boosting health outcomes in underserved communities. Conclusions: This model introduces a structured, innovative platform for interprofessional education and practice, which engages students in meaningful patient-centered projects that contribute to reducing health disparities in underserved communities. This framework, inspired by Kotter’s Change Model, can be easily adapted by pharmacy and healthcare professional programs nationwide.

A Scoping Review of Operationalizing Integration in Pharmacy Curricula
Faustina T Hahn, Amber D. Frick, University of North Carolina at Chapel Hill.
Objective: The purpose of this study was to review and characterize the operationalization of integrated curricula within U.S. schools of pharmacy. Methods: Nineteen articles, describing integrated curricula within U.S. schools of pharmacy, were selected from a scoping review published by Kerr et al in 2019, which explored the designs of integrated pharmacy curricula. An additional search using PubMed, EMBASE, ERIC, Scopus, Web of Science, and PsycINFO from February 2019 to July 2019 yielded one additional article. Qualitative methods were used to analyze the data. Researchers created a codebook based on the implementation science “Hexagonal Tool,” which explicates six constructs: Evidence, Usability, Supports, Fit, Need, and Capacity. Originally, the Hexagonal Tool was used to better understand how a new or existing program fit into an implementing site’s existing work and context. All data were categorized according to the Hexagonal Tool constructs, quotes were extracted manually, analyzed, and emerging themes were identified. Results: While the articles do not specifically focus on the implementation of curricular integration, they can be categorized using the Hexagonal Tool. For example, in the Supports construct, which identifies the infrastructure and resources needed to initiate the pedagogy, preliminary data suggests that both pharmacy practice and pharmaceutical science faculty must participate and commit to curricular integration. Additionally, the most frequently mentioned barriers to buy-in found in the articles were the additional time and workload requirements needed to create course material and to cope with the course demands amongst other obligations. Conclusions: Curricular integration can require considerable resources and commitment by various key stakeholders. This study provides needed research that focuses on the implementation science of curricular integration in pharmacy education.

Assessing Long-Term Retention Through Simulation in a Re-Exposure Gaming Experience
Justin Q Luu, Christina R. Buchman, Washington State University, Kyle Frazier, Washington State University.
Objective: To assess the effectiveness of a simulation game in promoting retention of pharmacotherapy and pharmaceutical knowledge in third-year pharmacy students. Methods: Faculty at Washington State University College of Pharmacy and Pharmaceutical Sciences developed a pharmacotherapy-based murder mystery simulation implemented into the Applied Patient Care (APC) lab course during the PY3 curriculum. Topics covered in the game simulation included hypertension, heart failure, hyperlipidemia, diabetes, and antibiotics, which were previously covered during the PY1 through PY3 curriculum. Directly prior to the simulation, students were given a 10-question baseline assessment on the covered topics, ranging from lower-order questions to higher-order questions. During the simulation, students were challenged to identify the correct perpetrator from a suspect lineup list utilizing interviews and electronic health record evaluation. Eight weeks following the simulation, students were given the same 10-question assessment and scores were compared. Effectiveness of the game simulation was assessed based on student performance on the post-intervention assessment compared to performance on the pre-intervention baseline assessment. Results: A total of 164 third-year pharmacy students were enrolled in APC IV. 162 students completed the pre-simulation baseline assessment, with an average score of 4.94 ± 0.24 (95% CI). Eight weeks later following winter break, 156 students completed the assessment and improved 16.4% to an average score of 5.75 ± 0.28 (95% CI). A Mann Whitney U Test was used to compare the difference between the two sets of data and a p-value of 0.0042 was calculated. Overall, student performance on each question improved with the exception of an antibiotics-related question. Conclusions: This novel gaming simulation improved students’ retention of pharmacologic knowledge over an eight-week break.

Assessing Pharmacy Students’ Perceptions of Global Health Opportunities
Kelsey Merlo, Hanna Raber, The University of Utah, Craig P. Henchey, The University of Utah.
Objective: To assess the perceptions of the benefits and barriers to global health opportunities at the University of Utah College of Pharmacy among P1 through P4 pharmacy students. Secondary Aims: Assess and compare the perceptions of benefits and barriers among all University of Utah College of Pharmacy students who have already had prior exposure to global health compared to those who have not. Methods: This study will send a survey to all PharmD students at the University of Utah College of Pharmacy about the perceived benefits and barriers to global health opportunities during the PharmD curriculum. The survey will open mid-March 2020 and close after two weeks. The Likert scale survey questions will be converted to points and be recorded as a percentage in each question category of benefit or barrier. Comparisons will be drawn between each of the four classes. One delineating survey question will allow for further comparisons between students indicating prior global health experience compared to those without. Results: In Progress. Conclusions: For all four classes of PharmD students, we expect to see benefits related to personal development, cultural sensitivity, and clinical expertise to be rated the highest while we expect to see cost, family/work obligations, and lack of protected time to be the
highest rated barriers. For students with prior global health experience, we expect to see higher ratings in the benefit categories and lower ratings for the barriers.

Assessing Student Perceptions of Knowledge Gaps Prior to PharmD Matriculation
Kelly Speirs, Katie Watkins, Nicole Kwiek, The Ohio State University.

Objective: To assess PharmD students’ self-reported perceptions of knowledge gaps prior to entering the PharmD program and use that data to create an evidence-informed learning experience. Methods: A Likert-type survey was developed and distributed to all PharmD students at The Ohio State University College of Pharmacy. Students were asked to reflect on their transition from their undergraduate program to our PharmD program and indicate the importance of understanding select topics (ie, financial aid, the honor code, professionalism, a modular-based PharmD curriculum, mental health, time management, study skills, the rigor of a professional program, health requirements, and career development) in preparation for PharmD matriculation. Additionally, open-ended response fields were included to gather information about non-defined topics. Results: Respondents (n=111, 21.9% response rate) most frequently indicated the topics of financial aid, mental health, time management, study skills, program rigor, and health requirements as being ‘very important’. Topics of less importance were professionalism and information about the modular-based curriculum. Respondents equally indicated the career development topic as being ‘very important’ and ‘slightly important’. Most respondents indicated the honor code policy as being of ‘neutral’ importance. Conclusions: Currently matriculated PharmD students ranked varying topics as being important to understand during the undergraduate-PharmD transition. These results were used to develop educational resources to offer to incoming students as a pre-transition experience to the Ohio State PharmD program.

Assessing the Effectiveness of Faculty Development and a Self-Developed Tool on Exam Item Writing
Kristina M Nikl, Lisa M. Cillessen, University of Missouri-Kansas City, Maqual R. Graham, University of Missouri-Kansas City, Karen L. Hardinger-Braun, University of Missouri-Kansas City, Paul O Gubbins, University of Missouri-Kansas City.

Objective: Pharmacy faculty receive minimal training on writing multiple-choice items. Consequently, their exam items may contain flaws that negatively impact examinees and exam performance metrics. Faculty development focused on item-writing skills improves individuals’ item-writing abilities. However, user-friendly resources to sustain such skills are often lacking. This study assesses the impact of a faculty development seminar and user-friendly tool, on the prevalence of item-writing flaws and faculty perceptions of this approach to hone their item-writing skills. Methods: Using a scoring checklist developed from tertiary literature, two investigators determined the school’s baseline item-writing flaw prevalence and identified the most prevalent ones, by independently reviewing 239 randomly selected multiple-choice questions from the spring 2019 semester. The most prevalent item-writing flaws were compiled into a user-friendly item-writing tool. A faculty development seminar was presented that detailed the prevalence of item-writing flaws, including the most common, and introduced the tool. The tool and a short instructional video on its use were distributed to faculty writing items in the spring 2020. Next, investigators will independently review 235 randomly selected items from the spring 2020 semester. Item-writing flaw prevalence, checklist score, and item performance statistics from both phases will be compared using appropriate statistical methods. An investigator-developed survey will be administered to faculty writing items to assess their perceptions of the seminar and the tool. Results: We hypothesize that providing faculty with a faculty development on item-writing and a locally developed, user-friendly item-writing tool will lessen item-writing flaw prevalence, improve item performance, and be positively perceived by faculty. Data collection is currently in progress. Conclusions: This research details a scholarly approach to mitigate the prevalence and impact of item-writing flaws.

A Team-Based Application Exercise to Develop Critical Thinking Skills for Pharmacy Students
Brandon A Jimenez, Amulya Tatachar, University of North Texas Health Science Center, Hae Jin Cho, University of North Texas Health Science Center.

Objective: To assess the impact of a team-based application exercise on student perceptions and critical thinking (CT) skills. Methods: The team-based application exercise was administered to second year pharmacy students in an Integrated Pharmacotherapy recitation course in Fall 2019. The exercise consisted of patient cases in a hospital setting that integrated the three elements of higher-order CT skills: problem solving, clinical reasoning, and clinical decision-making. Two assessments were administered before and after the exercise. The first assessment used the same case-based questions in pre- and post-exercise to measure CT skills. The second assessment investigated the perception and self-evaluation of CT skills, which includes attitude, knowledge, and thinking skills. This pre-perception assessment had seven questions using the 5-point Likert-scale and one short
answer question evaluating student’s understanding of the CT process. The post-perception assessment included an additional question using the Likert scale regarding continuation of similar exercises in the future. A McNemar test, paired sample t-tests, and descriptive analysis were performed. A priori level of significance was set at 0.05.

**Results:** Of the 106 students enrolled in the course, 97 (91.5%) students completed the activity. Mean scores on questions related to problem solving decreased (p = 0.019), clinical reasoning increased without statistical significance (p = 0.320), and clinical decision-making increased (p < 0.001). Statistically significant increases were observed in six of the seven Likert scale questions and in the short answer question (p < 0.001). Furthermore, 90 (92.8%) students agreed that the implementation of similar activities should be incorporated more in the curriculum. **Conclusions:** Integration of a team-based application exercise enhances student’s confidence to engage in CT. Adoption of more purposeful CT-based activities into pharmacy curriculum may be beneficial for pharmacy students.

**Buprenorphine’s Pharmacodynamic and Pharmacokinetic Genomic Variance on Patients at a Comprehensive Opioid Treatment Clinic (COAT)**

Krystal A Hughes, Kayla Rose, West Virginia University, Phillip Purnell, Vincent Setola, West Virginia University, David Siderovski, University of North Texas Health Science Center, Laura Lander, West Virginia University, James Berry, West Virginia University, Marina Galvez Peralta, West Virginia University.

**Objective:** The objective of this study is to address the gap on knowledge regarding the high variability of buprenorphine response in patients. **Methods:** After patients provided their informed consent, urine samples and buccal swabs were collected. DNA was isolated from buccal swabs, quantified, and tested for purity using QiaAmp DNA Kit and Qiagility. Genotyping of single nucleotide polymorphisms (SNPs) was performed by Rotor Gene Q RT-PCR thermocycler and TaqMan® real-time PCR reactions. Twelve different single nucleotides polymorphisms (SNPs) associated with buprenorphine pharmacodynamics and pharmacokinetics were analyzed (rs1530351, rs9479757, rs1800497, rs678849, rs529520, and rs581111, rs 11708067, rs 10509681, rs 10929303, rs 887829, rs 7438135, rs 1128503). Allelic frequencies were compared with the reported allele frequencies in a comparable demographic population (1000 human genome database) and performing Chi-square test (Prism 7) to identify statistical differences. Urine samples were analyzed by LC-MS/MS and buprenorphine (BUP) and norbuprenorhine (NOR) were quantified. This study was IRB approved.

**Results:** Eighty-nine patients consented to participate. Inclusion criteria: patients admitted at the Chestnut Ridge Opioid Treatment Clinic (COAT). Pregnant women were excluded. SNPs genotyping results revealed that our patient population varied statistically significantly vs human genome database on SNPs of opioid receptor delta 1 (rs529520 and rs581111) (p = 0.0046 and p = 0.00002, respectively) as well as SNPs on UGT, CYP2C8 and Pgp variants rs 11708067, rs 10509681, rs 10929303, rs 887829, rs 1128503 (p = 0.01860, p = 0.0112, p = 0.0340, p = 0.0140, p = 0.0074, respectively). **Conclusions:** This pilot study will impact the field of substance use disorder treatment by identifying factors that could better predict patient response to buprenorphine, particularly in our population paradigm.

**Cardiopulmonary Resuscitation and Advanced Cardiovascular Life Support Training at US Colleges and Schools of Pharmacy**

Brooke Witmer, University of the Sciences, James M. Hollands, University of the Sciences, Angela Bingham, University of the Sciences.

**Objective:** Given hypothesized variability, our objective is to describe student pharmacist cardiopulmonary resuscitation (CPR) and advanced cardiovascular life support (ACLS) training requirements and/or opportunities at US colleges and schools of pharmacy. **Methods:** Deans for the 143 US-based colleges and schools of pharmacy were requested to identify the most appropriate faculty member to describe student pharmacist CPR and ACLS certification requirements and opportunities. A 52-item survey was emailed to the identified faculty members and deans who did not identify a faculty member. After unsuccessful attempts, the survey was distributed to the Department Chair of Pharmacy Practice and Director of Experiential Education respectively to capture a response. **Results:** Responses were collected from 117 schools (82%), representing all geographical regions in the US and public (48%) and private (52%) institutions. The majority of schools required CPR certification before the first (43%) or second professional year (41%) with the experiential office maintaining record of certification (68%). Training for healthcare professionals, rather than lay responders, was the only acceptable certification for 74% of the responding institutions. On-campus CPR courses are offered for student pharmacists at most institutions (79%) and are taught by external instructors (56%), with only 3.4% incorporating peer-led instruction. Five percent report ACLS certification is a formal requirement and only a minority of schools require didactic ACLS education (38%) or offer ACLS certification opportunities (22%). **Conclusions:** Variability exists in CPR and ACLS certification requirements at US colleges and schools of pharmacy. While CPR certification is
almost a universal requirement, ACLS education and certification offerings are limited, representing opportunities for pharmacy education expansion. Colleges and schools of pharmacy may benefit from this knowledge for evaluation of their CPR/ACLS certification and training opportunities.

Caveat Medicus: Harrowing Experiences of Clinician Whistleblowers Who Publish Near-Fatal Oncology-Associated Adverse Drug Reactions
Ashley C Godwin, Charles Bennett, University of South Carolina.

Objective: Less than 1-10% of adverse drug reactions (ADRs) are reported. It is even more rare that these ADRs are published in the medical literature. At a Senate hearing concerning the safety of Vioxx, the clinician reporter was termed a “whistleblower” by a senator, despite never filing a formal whistleblower report. We consider the clinicians in this study as whistleblowers for their work in publishing about serious ADRs. Our objective was to investigate the personal experiences of those clinician whistleblowers who chose to publish their findings on serious ADRs they saw in their patients. Our hypothesis was that the personal and professional risks faced by these clinicians are formidable and represent significant barriers to reporting and publishing ADR information.

Methods: Clinicians treating individual patients who developed oncology-associated serious ADRs were asked to participate. Inclusion criteria included having index patient information, reporting case series, and being collaborative with investigators from two NIH funded pharmacovigilance networks (RADAR and SONAR (1998-2019)). Thirty-minute interviews addressed feedback from pharmaceutical manufacturers, FDA personnel, and academic leadership, and recommendations for improving pharmacovigilance. Responses were analyzed using constant comparative methods of qualitative analysis.

Results: 18 clinicians met inclusion criteria and 14 interviewees are included. Toxicities included central nervous system infections, arterial/venous thromboembolism, gastrointestinal toxicity, cardiac arrhythmias, and cancer development/progression. Six clinicians received feedback characterized as supportive from academic leaders, while four clinicians received feedback characterized as negative. Responses from pharmaceutical manufacturers were characterized as negative by 12 clinicians. Responses from FDA employees were characterized as negative by six clinicians. Nine clinicians endorsed initiatives not involving clinician reporting.

Conclusions: Considering the harrowing experiences clinician whistleblowers reported, caution should be taken when publishing serious ADRs.

Comparison of Psychiatrists’ and Primary Care Physicians’ Comfort Prescribing Medications for Psychiatric and Non-psychiatric Conditions
Cassidi C. McDaniel, Chiahung E Chou, Auburn University, John D Abrams, Auburn University, Joel Farley, University of Minnesota, Marisa E Domino, University of North Carolina at Chapel Hill, Richard A. Hansen, Auburn University.

Objective: Given the widespread prevalence of comorbidities in patients with mental disorders, potential confusion in prescribing roles by psychiatrists and primary care physicians (PCPs) can arise. This study identifies discrepancies in psychiatrists’ and PCPs’ comfort prescribing medications for cardiometabolic and psychiatric conditions.

Methods: This cross-sectional study collected physicians’ prescribing practices through a validated, pilot-tested, anonymous survey via Qualtrics. Eligible physicians included psychiatrists and PCPs with U.S. prescribing authority and involvement in patient care (≥two days/week). Physicians’ own-comfort with prescribing and their comfort with other specialties’ prescribing (cross-specialty) medications were measured on 7-point Likert-type scales. The primary outcomes were psychiatrists’ own-comfort and cross-specialty comfort in prescribing cardiometabolic and psychiatric medications. Multiple linear regressions examined predictors of own-comfort adjusting for physician characteristics. Paired t-tests assessed discrepancies between physicians’ own-comfort and cross-specialty comfort prescribing medications.

Results: Respondents included 50 psychiatrists and 50 PCPs. When adjusting for confounders, physician specialty was the sole predictor of own-comfort prescribing cardiometabolic medications, with psychiatrists reporting significantly lower comfort than PCPs (p<0.001). Physician specialty was the strongest predictor of own-comfort in prescribing psychiatric medications, but psychiatrists reported significantly higher comfort than PCPs (p<0.001). Psychiatrists reported significantly lower own-comfort compared to cross-specialty comfort prescribing cardiometabolic medications (antihypertensives, antihyperlipidemics, and antidiabetics) but significantly higher own-comfort prescribing psychiatric medications (antidepressants, anxiolytics/sedatives/hypnotics, and antipsychotics) (p<0.001). PCPs reported significantly higher own-comfort compared to cross-specialty comfort prescribing cardiometabolic medications (antihypertensives, antihyperlipidemics, antidiabetics) but significantly lower own-comfort prescribing anxiolytics/sedatives/hypnotics and antipsychotics (p<0.05); no differences in comfort were seen for antidepressants.

Conclusions: Findings indicate discrepancies in psychiatrists’ and PCPs’ comfort in
prescribing medications for cardiometabolic and psychiatric conditions, suggesting increased need for collaboration between psychiatrists and PCPs in prescribing medications.

Comparisons of Ketoprofen Release from Semisolids Using the Phoenix™ DB-6 Diffusion Tester Versus Immersion Cells
Rachael McKinney, Jacob R. Dunbar, South College.
Objective: USP General Chapter <1724> describes various apparatuses used for in vitro release tests (IVRT) of drug from semisolid formulations - one of which is the immersion cell. The purpose of this study was to compare immersion cells to the Phoenix™ DB-6 Diffusion Tester (DB-6) for IVRT of ketoprofen release from 5%, 10% and 20% formulations of a pluronic lecithin organogel (PLO) and a Lipoderm®-based cream. Methods: Formulations were loaded into the sample compartments of immersion cells and DB-6 cell caps (n=3 per formulation x strength). A 0.45μm Supor® membrane provided the interface between the sample and receiver media. Assembled immersion cells were placed in flat bottom vessels (USP 2 apparatus) containing 100mL phosphate-buffered saline (PBS), pH 7.4, at 32°C and paddle speed of 100 RPM. Assembled DB-6 cell caps were placed on the diffusion cells containing 30mL PBS at 32°C, magnetically stirred at 200 RPM. Samples were taken at 0.5, 1, 2, 3, 4, 5, and 6 hours with ketoprofen concentration determined by HPLC. Results: Data from the DB-6 and immersion cells showed that cumulative ketoprofen diffusion from both formulations, expectedly increased with drug concentration, except in the DB-6 where flux from the 20% did not exceed that from the 10% formulation. We believe this is likely due to compromised sink conditions of the lower-volume, DB-6 cell. Data from both apparatuses demonstrated greater ketoprofen release from the PLO formulation compared to Lipoderm® at all strengths. Conclusions: IVRT results of ketoprofen formulations using the DB-6 apparatus versus immersion cells demonstrated comparable, reliable release profiles. Based upon simplicity, reliability, and ease of use, the Phoenix™ DB-6 Diffusion Tester should be considered an IVRT system of choice.

Coping Mechanisms Regarding Stress and Mental Illness Among Pharmacy Students in a 0-6 Pharm.D. Program
Carolina Caetano Guerreiro, Sarah Smith, St. John’s University, Elsen Jacob, St. John’s University.
Objective: The primary aim of this study is to determine factors contributing to stress, and the coping mechanisms used by students enrolled in a Doctor of Pharmacy (Pharm.D.) program at an urban, private university. The study also aims to increase awareness of perceived stress and mental illness among pharmacy students and measure student awareness of campus mental health resources. Methods: An IRB-approved, sixteen-question, web-based survey was distributed via email to students in a 0-6 year Pharm.D. program. Students aged 18-25 were invited to participate in this anonymous and voluntary survey. Descriptive statistics were used to analyze the results. Results: Of the 1,411 enrolled pharmacy students, 145 responded to the survey. 73.6% identified as female, 22% were undergraduates, and 77.8% were professional students. 52% reported feeling stressed or having negative feelings like the blues daily. Factors contributing to the most stress included academic workload, financial concerns, and competition for jobs, residency, and fellowship positions. Other stressors included a lack of leisure time, reduced personal satisfaction, and difficulty identifying a sense of self or purpose. The primary coping mechanism used by 69% of students was speaking with friends daily. Only 19.7% reported seeking help from professionals. 25% of students reported thoughts of suicide and 9% reporting attempted suicide. Conclusions: An alarming number of pharmacy students report stress, depression, and thoughts of suicide or attempted suicide. Yet, only a minority of students seek professional help on campus. Thus, it is vital to determine the unique needs of pharmacy students and to implement innovative programs that provide impactful mental health services.

Correlation of Diversity Parameters and NAPLEX Pass Rates for American Schools of Pharmacy
Abigail R Wiss, Ryan J Lopienski, Springfield College.
Objective: An important measure of success of a pharmacy school is the percentage of students passing the NAPLEX exam following graduation. Predictors of this measure may be a useful tool, and understanding the effect diversity has on graduates’ outcomes can further higher education research. This study’s purpose was to understand the effects of student body diversity and institutional data on school’s NAPLEX pass rates. Methods: NAPLEX pass rate data for 2016-2018 was gathered from the National Association of Boards of Pharmacy. School demographic data was collected from the National Center for Education Statistics. A multiple linear regression was calculated, predicting school’s NAPLEX pass rate based on the school’s percentage of nonwhite students, male students, students under 30 years old, cost per credit hour, and amount of degrees awarded annually. Results: A significant regression equation was found (F(5,87)=7.003, p<.001) with an R² of .3001. The percentage of nonwhite students enrolled (B=-.1689, p<.01), percentage of male students enrolled (B=.2868, p<.01), and amount of degrees awarded (B=.0008,
p<.05) were significant predictors of NAPLEX pass rate. Percentage of students under 30 years old (B = .0062, p = .399) and cost (B = .001, p = .565) were not significant predictors of NAPLEX pass rate. Conclusions: Diversity brings new ideas and learning opportunities for schools and students. However, schools must balance diversity with academics to produce successful outcomes. Despite diversity negatively correlating with exam pass rates in this study, it is a valuable aspect of student experiences. It is possible that schools with lower diversity in this study are more established, highlighting the importance of cultural education for faculty and students.

Crack the Code: A Digital Escape Room Experience for Pregnancy and Lactation Education

Brooke A Caswell, Sara Wettergreen, University of Colorado Anschutz Medical Campus, Laura M. Borgelt, University of Colorado Anschutz Medical Campus. Objective: The primary objective was to evaluate the use of an interactive, digital escape room in a pregnancy and lactation module as a means to improve learning. The secondary objective was to evaluate student perceptions of this active learning method. We hypothesized that students would find an interactive escape room beneficial and would likely prefer this method of active learning compared with lecture-based learning. Methods: Although escape rooms are increasingly utilized in higher education, there are no existing data to evaluate the use of this method for pharmacy students learning about pregnancy and lactation. Each student read one of five textbook chapters that included pregnancy planning and care; principles of drug therapy in pregnancy and lactation; high-risk pregnancies; preterm labor, labor, and delivery; and postpartum care. Students with knowledge from all five chapters then convened into teams in the digital escape room environment. Teams worked collaboratively to solve eight puzzles that integrated knowledge, applied key concepts, and encouraged team communication. A pre- and post-survey was used to assess change in knowledge. The survey also evaluated perceptions of the activity using previously published methods. Student’s t-test will compare pre- and post-knowledge results, and descriptive statistics will be used for all other analyses. Results: Thirteen students will participate in the digital escape room and results will be analyzed in March 2020. Conclusions: The use of digital escape rooms in higher education is a new active learning modality that appeals to the current millennial generation of students. Students that are familiar with and enjoy gaming have valuable perspectives about engaged learning environments.

Creating Future Pharmacy Leaders: Engaging Student Pharmacists in Community Pharmacy Practice Transformation

Sophia M. Cothrel, Kim C. Coley, University of Pittsburgh, Joni Carroll, University of Pittsburgh, Brandon Antinopoulos, University of Pittsburgh, Melissa A. McGivney, University of Pittsburgh. Objective: To describe how the University of Pittsburgh School of Pharmacy Community Leadership & Innovation in Practice (CLIP) Center engages student pharmacists in community pharmacy practice transformation initiatives to provide robust student experiences and develop future leaders. Methods: The CLIP Area of Concentration (ARCO) provides a tailored curriculum for students interested in advanced community pharmacy practice. In their third professional year, students participate in a summer research course that introduces practice-based research, implementation science, and practice innovation. Students work in teams to complete a longitudinal project providing research and leadership opportunities in community pharmacy practice transformation. Results: Since 2013, 73 student pharmacists have participated in the CLIP ARCO. Students completed 47 practice transformation projects resulting in 87 regional and national professional poster presentations. Projects focused on: innovative practice/service implementation (n = 28); population health (n = 14); workforce training and education (n = 3); and advancing community-based research (n = 2). In the last year alone, these projects have included efforts to support Flip the Pharmacy and an evaluation of the inaugural ACT (Academia-CPESN Transformation) Pharmacy Collaborative National Day of Service. To date, 100% of CLIP ARCO graduates have attained a full-time position upon completion of the program, often pursuing community and pharmacy practice residencies, community pharmacy workforce positions, and fellowships. Select CLIP ARCO projects were published in peer-reviewed journals. Conclusions: Students have a significant impact on regional, statewide, and national community pharmacy practice transformation. The CLIP ARCO provides students with a tailored educational experience while facilitating the scholarly work of the CLIP Center. This model can be replicated by faculty at other institutions to support practice transportation and develop future leaders in community pharmacy practice.

Description of Faculty and Student Perceptions of Their Writing Productivity During a Writing Challenge

Zachary J Krauss, Juanita A. Draime, Cedarville University, Aleda M. Chen, Cedarville University. Objective: The #RxWriting Challenge is a 14-day international initiative focused on encouraging faculty to
make writing a priority. However, little is known regarding the benefit of including students. Thus, the objective of this project was to determine student and faculty perceptions of participation and goal attainment. **Methods:** Faculty and students were encouraged to sign up to participate in the Challenge and were supported through a school-wide initiative in Fall 2019, including reserves writing space with snacks, group webinar attendance, goal setting, and prizes for participation and goal achievement. The student initiative also included social media posting challenges. A Qualtrics-distributed survey (categorical, 5-point Likert-type agreement, open-ended) was created, administered, and analyzed descriptively post-challenge to address key components of the Challenge and local initiative. **Results:** Of the 21 participants (11 faculty, 10 students), most (76.2%) said that the challenge made it easier for them to write, helped them to feel happier about their writing (61.9%), and helped to find a good environment in which to write (61.9%). Students said that the challenge helped them “get into a habit of writing every day” and that the implementation of social media into the challenge helped encourage them to keep up with their daily writing. A faculty member stated the challenge helped to place their writing into “realistic measurable pieces” that could be handled efficiently. **Conclusions:** Setting aside time to write can be the toughest challenge of successful scholarly endeavors. Participation in the #RxWriting Challenge that included local support resulted in helping faculty and students to meet their writing goals and were positively received by both. The inclusion of students in the challenge helped to foster student interest in scholarship.

**Design and Evaluation of the Effectiveness of a Cancer Clinic Simulation**

Kate Norville, Ashok E. Philip, Union University, Zachery Halford.

**Objective:** To evaluate the effectiveness of a cancer clinic simulation in promoting knowledge and clinical skills of third-year (P3) student pharmacists. **Methods:** Two cancer clinics, focused on common cancers and supportive care issues, were developed for P3 students. For each clinic, students were divided into 6 randomized groups and tasked with completing a series of Pharmacist Patient Care Process (PPCP) activities, within 30 minutes. The PPCP activities were interwoven with engaging puzzles and games to simulate an escape-room. Standardized actors were recruited to play cancer patients. The impact on student learning was measured by pre- and post-simulation assessments. A 5-point Likert scale survey collected student perceptions regarding effectiveness of each clinic. Knowledge retention was assessed with a course level exam administered one-week following each simulation. Exam performance of the control cohort (Class of 2020; N=52) was compared with the intervention cohort (Class of 2021; N=38). **Results:** P3 (N=36) students completed the pre- and post-simulation assessments for each cancer clinic, which revealed a significant increase in knowledge (p<.0001). Survey results indicated that most students agreed: the clinics reinforced information (94%; 97%), facilitated PPCP (92%; 97%), enhanced problem-solving skills (86%; 94%), improved self-confidence (89%; 91%), promoted collaboration (83%; 94%), and emphasized the expanding role of pharmacists in providing cancer care (95%; 97%). Exam performance of the intervention cohort improved for 16 out of 19 exam questions, with a significant increase observed for 4 questions (p<.05). **Conclusions:** The cancer clinic simulations improved knowledge and clinical skills of student pharmacists. Students valued the intentional design and supported continuation of the activities. The oncology pharmacotherapy sequence will include cancer clinic simulations for all future cohorts.

**Determining the Cause: Analysis of 56,000 Patients’ Risk Factors for Prescription Versus Illicit Drug Abuse**

James Alexander D Lugtu, Amy o Farrarotti, California Northstate University, College of Pharmacy, Craig o Wetterer, California Northstate University, Jose o Puglisi, California Northstate University, College of Medicine, Ashim Malhotra, California Northstate University.

**Objective:** The opioid epidemic is at a crisis point with 279,065 overdose-related deaths in 2017. Our goal was to determine risk factors for prescription and illicit drug use in the U.S. **Methods:** Using the U.S. Substance Abuse & Mental Health Data Archive (SAMHDA) and the 2017 National Survey on Drug Use and Health (NSDUH), we analyzed the effect of race, age, gender, total family income, and education on self-reported drug use from 56,276 individuals. Hydrocodone, oxycodone, tramadol, codeine, morphine, fentanyl, buprenorphine, meperidine, hydromorphone, and methadone were included in our study. **Results:** Hydrocodone was the most abused prescription drug (2.6%), while ecstasy the most abused illegal substance (1.3%), with hydrocodone abuse equal to that of ecstasy, marijuana, crack, cocaine, and heroin combined; highest in the Native American population (4.8%), four times greater than ecstasy use (1%), two-fold greater than ecstasy use in Caucasians (3% vs. 1.4%) and Black/African Americans (2% vs 1%), and least in Asians (1%); with most likely age of abuse, 18-30 years. Hydrocodone abuse in the older population was 25-fold greater than ecstasy. Use was higher for individuals with college/associate’s degree (3.7%) than graduates (1.8%)
and higher where total family incomes were less than $20,000 (3.2%) compared to $75,000 or more (2.2%), p <0.01. Logistic regression showed that the variable most strongly correlated with drug abuse was education with a weight factor of 37.6%, followed by age-26%, gender-22.7%, and race-11%, while net family income only contributed 3.7%. **Conclusions:** Our study revealed that opioid prescription rather than illegal substance abuse was higher, hydrocodone was the most abused prescription drug in 2017, and the overall education level and total family income were poorly correlated risk factors for drug abuse.

**eCases: Assessing the Use of Interactive Fiction in Bringing Adaptive Patient Cases into the Classroom**
Noam Morningstar-Kywi, Rory E. O’Callaghan Kim, University of Southern California.

**Objective:** Engaging learners using active learning strategies remains a challenge in large classroom settings. Interactive fiction technology is available on open use platforms and can be leveraged to allow learners to individually explore the narrative of patient presentation, treatment selection, and therapeutic outcomes. The purpose of this study was to assess the feasibility and utility of electronic patient cases (eCases) in pharmacotherapeutics courses.

**Methods:** We developed a process for building digital “choose-your-own-adventure” patient cases using an open source interactive fiction platform (Twine). Learners complete the eCases on their personal electronic devices. Progression data is collected in real-time to provide formative feedback to faculty. Accessibility, satisfaction, and perceived efficacy are assessed continuously to inform ongoing development.

**Results:** Fourteen eCases have been created for 10 courses, implemented over 2 semesters. eCases have been built by student workers, requiring between 4 and 10 hours of effort with an average cost of approximately $100 per eCase. Faculty indicated that eCases increased student engagement, classroom discussion, and real-world application (n=11). Globally, students agreed or strongly agreed that the eCases were easy to use (90%), helped them assess their own understanding (91%), and helped them learn at their own pace (91%) (n=421). Following our most recent and robust eCase utilization, an increased number of students reported confidence in assessing a patient’s condition (27.9% before vs. 68.2% after, p<0.0001) and recommending appropriate treatment (26.2% before vs. 64.8% after, p<0.0001) (n=179). **Conclusions:** The use of eCases during classroom sessions is a feasible method for engaging learners in clinical reasoning, promoting self-directed learning, and providing real-time formative feedback. While eCases require more resources to develop and deploy than traditional cases, they provide more value to students and faculty.

**Effect of Death and Dying Elective on Student Empathy and Attitudes Towards Mortality**
Emily J Clemens, Jason B. Reed, Purdue University, Veronica Disher, Chelsea M. Baker, Purdue University.

**Objective:** Pharmacists may be exposed to death and dying as healthcare professionals. To help prepare student pharmacists, an elective focused on death and dying was created. The objective of this study was to assess the impact of the elective on student pharmacists’ empathy and attitudes towards mortality using validated survey instruments.

**Methods:** First (P1), second (P2), and third (P3) professional year student pharmacists enrolled in a 1-credit hour elective on the topic of death and dying. Student pharmacists completed surveys before and after the course on their self-perceptions of mortality and empathy. The survey instruments included: (1) 28-item Collett-Lester Fear of Death and Dying Scale (CL-FODS) measuring anxiety related to death of oneself and others; (2) 40-item Frommelt Attitudes Toward Care of the Dying (FATCOD) Scale measuring healthcare professionals’ attitudes toward caring for dying patients; and (3) 24-item Kiersma-Chen Empathy Scale (KCES) assessing empathy of pharmacy and nursing students. Anonymous, unique identifiers were used to link pre- and post-course survey responses. Data was analyzed using paired sample t tests.

**Results:** Twenty-seven student pharmacists (P1: 5, P2: 13, P3: 9) were enrolled in the elective. Of these students, 78% were female and 85% were 18 to 22 years old. Positive, statistically significant differences were observed in over half of all survey questions (KCES 13/24; CL-FODS 27/28; FATCOD 15/30). **Conclusions:** Instruction on end-of-life topics favorably impacted student pharmacists’ empathy and attitudes towards mortality. Additional opportunities to discuss death and dying concepts in pharmacy curricula could be explored to increase student pharmacists’ empathy and comfort with these topics; thereby, better preparing student pharmacists for subsequent exposure in their careers.

**Effects of Alzheimer’s Disease on Prescription Drug Utilization, Adherence, and Costs in Older Adults,**
Shirley B Robinson, Rongjie Shao, Minghui Sam Li, The University of Tennessee.

**Objective:** Neurodegenerative progression in elderly patients with Alzheimer’s disease poses a significant barrier to the effective management of their medications. This study was designed to examine the impact of Alzheimer’s disease on prescription drug utilization, adherence, and costs in older adults.

**Methods:** A cross-sectional study was conducted using the Medicare
Current Beneficiary Survey in 2016. Alzheimer’s disease was measured based on relevant ICD-10 diagnosis codes from Medicare claims. Prescription drug utilization was measured by the number of unique prescriptions received in a year based on Part D claims. Adherence was measured by self-reported cost-related medication nonadherence. Drug costs were measured by total prescription drug costs based on Part D claims. Negative binomial regression, logistic regression, and generalized linear regression with a log link and Gamma distribution were used to examine prescription drug utilization, adherence, and costs, respectively. Survey sampling weights were applied to generate national estimates. Results: Among 5,257 older adults (weighted N=34,400,785) included in this study, 2.21% (weighted %) were diagnosed with Alzheimer’s disease. Compared to those without Alzheimer’s disease, patients with Alzheimer’s disease used 15% lower number of unique prescriptions (incident rate ratio, IRR: -.15; 95% CI: -0.28 to -0.03). No significant differences were identified on cost-related medication nonadherence between those with and without Alzheimer’s disease (odds ratio, OR: 1.11; 95% CI: 0.47 to 2.59). Patients with Alzheimer’s disease had 51% lower prescription drug costs (estimate: -.51; 95% CI: -0.72 to -0.29) than those without Alzheimer’s disease. Conclusions: Older adults with Alzheimer’s disease had lower prescription drug utilization and costs. Healthcare providers should make sure that patients with Alzheimer’s disease have access to and receive necessary prescription drugs.

Elucidation of the Molecular Mechanisms Which Contribute to Prostate Cancer Health Disparities
Anhao Sam, Elizabeth Browning, California Northstate University College of Pharmacy, Shawna Evans, College of Pharmacy, Paramita Ghosh, UC Davis School of Medicine, Ruth Vinall, California Northstate University.
Objective: The goal of this study was to elucidate the mechanisms which cause dysregulation of Nrdp1 expression and localization in African American (AA) prostate cancer (CaP) cells. Patient and in vitro data have demonstrated that AA CaP cells express lower levels of Nrdp1, and that this is associated with worse patient outcome. Methods: Subcellular fractionation, western blot, immunofluorescence, and confocal microscopy were used to assess cellular localization and expression levels of Nrdp1 in a CaP cell line (LNCaP) and an AA CaP cell line (MDAPCa2b) following treatment with MG132, a proteasome inhibitor, or cycloheximide, an inhibitor of translation. Results: Treatment with MG132 caused a greater level of Nrdp1 accumulation in LNCaP compared to MDAPCa2b indicating that post-translational regulation of Nrdp1 via proteasomal degradation occurs to a greater extent in LNCaP cells. Time course treatments with cycloheximide determined that cytoplasmic Nrdp1 half-life is longer in MDAPCa2b compared to LNCaP (24 versus 8 hours, respectively). Subcellular fractionation and confocal microscopy confirmed that Nrdp1 is located in the nucleus and cytoplasm of both cell lines, however, MDAPCa2b cells express much lower levels of nuclear Nrdp1 and Nrdp1 levels do not appear to alter in response to cycloheximide treatment. Conclusions: Our combined data indicate that Nrdp1 levels can be regulated by different mechanisms in CA CaP versus AA CaP cells, and that restriction of nuclear translocation of Nrdp1 is a key mechanism which determines nuclear Nrdp1 in AA CaP cells.

Evaluating 3rd and 4th Year Pharmacy Student Post Graduate Plans.
Stephen R. Hill, The University of Louisiana at Monroe, Scott A. Baggarly, The University of Louisiana at Monroe, Bhavesh Patel, Beck C Hogwood, Charles Dronet, University of Louisiana College of Pharmacy.
Objective: To describe post-graduation career choices of third and fourth-year pharmacy students and examine the factors and motives influencing their choice. Methods: Third and fourth-year pharmacy students at our institution were emailed invitations to participate in an IRB survey assessing their post-graduate plans and motives. The survey included demographic questions and a question identifying the respondents’ preferred post-graduate area of interest; pharmacy residency, retail pharmacy, institutional staff pharmacy, additional training for specific certification, or other. Student’s motives were further analyzed by questions pertaining to salary, work environment, career advancement, desire to specialize, and influence of market saturation. Descriptive statistics were used to analyze the results. Results: 68 students participated in the survey, with 45 third-year and 23 fourth-year students responding. The top two preferred areas of pharmacy were split, with 36.8% desiring to work in a retail and 36.8% pursuing a pharmacy residency after graduation. Of the respondents that desired to pursue a residency, 84% revealed that an increase in job competition was their primary motivation. Of the respondents pursuing retail pharmacy, 79% would specialize in some other field of pharmacy if it was not for a decrease in pay during training. The most influential factors contributing to post-graduate career choices were work environment and job market saturation, while prior work experience and desire to specialize were the least influential. Conclusions: Results from this study show that the majority of students at our institution plan to pursue a job in retail pharmacy or a pharmacy residency upon graduation.
These results can help to tailor pharmacy education at our institution and help to identify the influence of current trends in the pharmacy job market on student career choices.

Evaluating Performance, Perception, and Assessment Methods in a Pharmaceutical Laboratory Errors and Omissions Activity.
Kaitlin E Comeaux, Ashley Barbo, The University of Louisiana at Monroe.

Objective: To evaluate pharmacy students’ performance and perception of our traditional errors and omissions lab and to assess new methods of presenting the activity with the expectation that the new methods would be superior.

Methods: In both activities, students were required to identify and correct errors and omissions of both handwritten and electronic prescriptions. The difference between the two activities was how the answers were documented. In the traditional method students described the error or omission and how they would correct it on a paper answer sheet. In the new method students were required to identify and correct an error or omission on an electronic label. After completion of each lab, students were offered a survey regarding their confidence, perception, and overall opinion of both activities.

Results: At least 90% of the 82 students completing both labs responded to the surveys. No statistically significant difference was found in student performance, but there was an improvement in student perception of the new method compared to the standard method. When asked if the new method would better prepare them for their pharmacy careers vs. the standard method, 81.08% strongly agreed. More students thought that they could accurately identify and correct errors and omissions in the new method vs. the standard method. Hand-written prescriptions were preferred over electronic prescriptions by 55.41% of students.

Conclusions: Although grades were not affected by the new method of presenting the activity, most students strongly agreed that the new method improved their ability to accurately identify and correct errors and omissions. With the prevalent use of electronic prescriptions in the field of pharmacy, there is a need to increase student comfort in checking electronic prescriptions.

Evaluating the Impact of Pharmacist-Led HIV and HCV Screening and Education on Adults Experiencing Homelessness
Sorosh Kherghehpoush, Kimberly C. McKeirnan, Washington State University.

Objective: Over half a million people experience homelessness on a given night in the United States. As a result of increased exposure to disease, violence, malnutrition and substance abuse, homeless persons experience medical problems and treatment complications at higher rates than the general population. Chronic disease states that require uninterrupted treatment and high rates of adherence, such as HIV/AIDS, are more difficult to control in those with unstable housing. Individuals living with HIV or HCV who are unaware of their infection are more likely to transmit their disease to others. Gay and bisexual men account for the majority of new HIV diagnoses while injection drug users have the highest risk for HCV transmission, two sub-populations that are also disproportionately affected by homelessness. This study looks to evaluate the health impact associated with regular screening, improved health literacy, and increased access to care. Methods: Study participants are walk-in patients of First Avenue Pharmacy who are adults that are experiencing homelessness. The investigator begins by administering an HIV and HCV screening test which is followed by a risk determination questionnaire and comprehensive HIV/HCV education. Next, the investigator discusses personalized risk mitigation strategies and makes referrals to community partners based on the patient’s risk and test results for follow-up testing, treatment and partner notification. Three months after referral, investigators will receive follow-up data in the form of progress notes, lab/diagnostic tests, and medication lists.

Results: In progress

Conclusions: Pharmacist-led screening, education, and connection to care may have a significant impact on the course of illness in high-risk populations. Pharmacists are the most accessible healthcare providers and are poised to play a significant role in the HIV and HCV epidemic.

Evaluation of Longitudinal Teaching Development and Self-Efficacy Among Student Instructors in a Peer Education Program
Jordan Brooks, Conan MacDougall, University of California, San Francisco, Katherine Gruenberg, University of California San Francisco, Kelsey Mott, University of California San Francisco, Jeanny An, University of California San Francisco, Niamh O’Grady, University of California San Francisco, Leena Dolle, University of California San Francisco.

Objective: To evaluate the impact of teaching seminars on student instructors in the Student Taught Education Program (STEP). We hypothesize that participation in STEP develops teaching skills in student pharmacists.

Methods: STEP teachers participated in 5 teacher development seminars on instructional design, learning theory, formative assessment, feedback, and self-reflection. STEP teachers then planned, developed, and executed weekly small group review sessions for their peers between November 2019 and April 2020. STEP teachers were surveyed via a modified Teachers’ Sense of Efficacy
Scale (TSES) prior to the first teacher seminar and after the last review session. Growth in teaching skills was assessed by comparing recordings of early and late STEP review sessions using a standardized teaching assessment form. Self-perceived value of STEP was assessed through qualitative analysis of exit interviews with STEP teachers. Results: In process. Conclusions: In process.

Exploring Thiol Isomerase Enzymes in Cancer Progression
Jennifer A Merritt, Western New England University, Christina A. Verbetsky, Western New England University, Megan M. Pantos, Western New England University, Justine A Gelzinis, Western New England University, Lisa-Marie Holbrook, University of Reading, Shirley Keeton, University of Reading, Jonathan M Gibbins, University of Reading, Daniel R. Kennedy, Western New England University.

Objective: Thiol isomerase enzymes such as ERp57, ERp72, and PDI have polyfunctional involvement in the oncogenesis of cancer, playing vital roles in activation of oncogenes, avoidance of apoptosis, and cellular metastasis. We have recently discovered that zafirlukast inhibits these thiol isomerases and thus has the potential to slow cancer progression. The purpose of this study is to explore the effects of zafirlukast on cancer progression via the inhibition of EGFR and subsequent cancer growth and spreading. Methods: Western blotting was utilized to determine the effects of zafirlukast on EGFR activity by measuring EGFR-Y1068, Stat3-Y705, and AKT-S473. PrestoBlue growth inhibition assay was used to measure cell cycle progression and a cell scratch assay was performed to measure cell migration. Results: Zafirlukast inhibited cell cycle progression of 3 cancer cell lines with an IC50 in the 5-10 micromolar range. Stat3 phosphorylation and EGFR activation was also decreased after zafirlukast treatment. Furthermore, Zafirlukast treatment significantly attenuated wound closure values at both 16 hour and 37 hours post scratch, suggesting it diminishes cell migration. Conclusions: These results demonstrate that zafirlukast treatment has polyfunctional roles in the inhibition of cancer progression, suggesting it could be a useful agent for further exploration as an antineoplastic.

Exploring Zafirlukast for the Inhibition of Cancer Cell-Induced Platelet Aggregation and Factor Xa Generation
Megan M. Pantos, Western New England University, Justine A Gelzinis, Western New England University, Christina A. Verbetsky, Western New England University, Jennifer A Merritt, Western New England University, Daniel R. Kennedy, Western New England University.

Objective: Cancer patients are at an increased risk to develop both arterial and venous thrombosis when compared to the general population and patients undergoing active chemotherapy for cancer treatment are at an even greater risk. Thiol isomerases have both anti-cancer and anti-thrombotic indications. Zafirlukast was recently identified as the first FDA approved drug that is a broad spectrum inhibitor of thiol isomerases. Our goal was to see if zafirlukast may inhibit platelet aggregation within the general population, cancer cells for the cancer population, and cancer cells treated with chemotherapy. Methods: Cancer-induced arterial thrombosis was analyzed by adding platelets to known pro-coagulant cancer cell lines with various concentrations of zafirlukast. Alterations in aggregation were measured by a platelet aggregometer. Cancer-induced venous thrombosis was measured using tissue factor generation in the presence or absence of zafirlukast using the factor Xa generation assay. Results: Zafirlukast treatment was able to inhibit tissue factor release. Zafirlukast also inhibited platelet aggregation. Furthermore, zafirlukast inhibited the growth of pro-coagulant cancer cells. We also were able to reduce cancer-induced thrombosis in the presence of chemotherapeutic agents such as cisplatin and gemcitabine and it was effective under these conditions, as demonstrated in the assay. Thus, zafirlukast was effective at inhibiting thrombosis in the general population, the cancer population, and the cancer population undergoing active chemotherapy. Conclusions: Zafirlukast contributed to decreased factor Xa activity showing zafirlukast could be an effective adjunct therapy to chemotherapy in order to decrease cancer-induced thrombosis.

Extending Exenatide ER Once Weekly Dose to Once Monthly
Janie M Yu, Eman Atef, California Northstate University, Tony Eid, California Northstate University.

Objective: Exenatide ER (Bydureon) is a glucagon-like peptide-1 receptor agonist (GLP-1 RA) that is an approved intervention in patients with type II diabetes. The Exenatide ER dose is administered as a 2 mg weekly subcutaneous injection. Our research aims to study the hypothesis that a once-monthly injection of Exenatide ER would provide the needed therapeutic effect in patients with type II diabetes rather than every week. Methods: We performed a literature search to extract the Exenatide pharmacokinetic parameters of both immediate-release (IR) and extended-release (ER) formulations. The Plot Digitizer v. 2.6.8 was used to extract data from previous clinical trials to apply them to the current study. Comparing the drug release and elimination of the IR and ER formulations, we divided the elimination phase into different stages and calculated the elimination of each phase.
to finally describe and predict the Exenatide levels over several weeks after termination of Exenatide ER. **Results:** Our physiologically based pharmacokinetic (PBPK) analysis showed that the elimination of Exenatide ER can be described in three stages. During the first and second stages, the concentrations of Exenatide ER maintained a steady state over five to seven weeks after terminating the weekly injections of Exenatide ER. Seven weeks after stopping injections, the last phase of elimination described by stage three showed that the elimination of Exenatide even after 7 weeks was slower than a single once-weekly of Exenatide IR. **Conclusions:** We are reporting that Exenatide ER will provide diabetic patients up to one month of the therapeutic level of Exenatide while offering a cost-saving alternative and improvement of adherence.

**Graduates’ Perspectives of a Global Health Area of Concentration Within PharmD Curriculum**

Jennifer Ko, Vidya Balakrishna, Emily Liu, Sharon E. Connor, University of Pittsburgh, Lauren J. Jonkman, University of Pittsburgh.

**Objective:** Evaluating global health in pharmacy curricula is necessary to ensure that pharmacists are adequately prepared for their increasingly globalized role. The objective of this study was to describe graduate pharmacists’ perceptions regarding the impact of participating in a Global Health Area of Concentration (ARCO-GH) on careers, care provision to diverse populations, and awareness of health disparities. **Methods:** This qualitative study enrolled University of Pittsburgh PharmD graduates from 2014 to 2019 who successfully completed the ARCO-GH. Graduates satisfied ARCO-GH requirements if they completed six global health elective credits, two global health APPE rotations, and an approved project. Semi-structured interviews were conducted with graduates until thematic saturation was reached. Interview questions assessed perceptions regarding impact on career choices, care provision to culturally diverse populations, and health disparities. Interviews were recorded, transcribed verbatim, and coded to determine dominant themes. **Results:** Twenty-one interviews were completed including at least one participant from each academic year. A total of five themes were identified including 1) the value of personalized and consistent mentorship, 2) the benefit of tailored and unique learning experiences with a focus on care for vulnerable populations, 3) a wide range of soft skill development including communicating with diverse populations, navigating patient resources, and teamwork, 4) exposure to career opportunities in global health and care to underserved, and 5) that the ARCO participation impacted careers by shaping career focus and influencing daily practice. **Conclusions:** Graduate interviews demonstrate that a global health concentration in pharmacy curricula can facilitate the acquisition of valuable skills that are applicable across a wide variety of patient care contexts. A concentrated experience in global health provided unique opportunities for student pharmacists to further develop their career interests.

**Hunter Killer Peptide (HKP-1) Targets and Kills CD13 Positive Human Neuroblastoma Cells.**

Michael Gee Hoon Kim, Touro University California, Young Xiong, Tam Nguyen, Svetlana Shepovalova, Edith Mbakogu, Vanishree Rajagopalan, Touro University California, H. Michael Ellerby, Touro University California.

**Objective:** Hunter-killer peptide-1 (HKP-1), a 21 amino acid peptide consisting of two domains namely, CNGRC (CD13 targeting) and (KLAKLAK)2 (proapoptotic). It has demonstrated anti-cancer activity in animal tumor models by targeting and killing tumor vasculature that typically overexpress the NGR motif. Recent advances in cancer biology suggest that NGR peptides can be further useful in targeting CD13 overexpressing tumor cells. To evaluate this, we investigated the potential of HKP-1 to target and kill CD13 positive neuroblastoma (NB) cells. **Methods:** We conducted immunofluorescence (IF) on three NB cells, SKNF1, SHSY5Y, and SKNSH, to determine the levels of CD13 expression. This was followed by cell viability assays (MTS) performed on these cells upon treatment with HKP-1 as well as the two individual domains, CNGRC and (KLAKLAK)2 peptides. Finally, we studied the effect of the non-specific caspase inhibitor, Z-VAD FMK, on HKP-1 induced cell death in SKNF1 cells. **Results:** The IF results indicated that SKNF1 cells expressed high levels of CD13, followed by SHSY5Y cells, while SKNSH cells expressed the least. HKP-1 treatment selectively decreased the cell viability in CD13 positive SKNF1 cells by up to 45% at 100uM, while HKP-1 did not affect the viability of SKNSH cells. Similarly, CNGRC and (KLAKLAK)2 peptides by themselves showed no effect on the viability of all three NB cells. Pretreatment with the caspase inhibitor, Z-VAD FMK, prevented the HKP-1 treated SKNF1 cells from dying. **Conclusions:** Overall, our preliminary results suggest that HKP-1 can target and kill CD13 positive NB cells and this cell death is most likely caused by a caspase dependent mechanism. Further studies are ongoing to investigate the mechanism of HKP-1 induced cell death.

**Impact of an Underserved Patient Care Elective Course on Student Pharmacists’ Empathy**

Nira N. Kadakia, Natalie R Gadbois, The University of Kansas, Norman Fenn, The University of Texas at Tyler, Kimberly S. Illingworth Plake, Purdue University.
Objective: Empathy is an important attribute of health professionals. An elective course was developed to increase student pharmacists’ knowledge of challenges faced by underserved patient populations. The primary objective of this study was to evaluate the impact of an underserved patient care elective course on student pharmacists’ empathy. Methods: The course focused on barriers faced by underserved patients and preparing students to assist them in overcoming these challenges. Course activities included participation in service learning, simulation activities, and reflection exercises. Data were collected from course offerings in 2018 (N = 22) and 2019 (N = 22). Students were required to complete pre- and post-course surveys regarding self-perceived ability to express empathy. The Kiersma-Chen Empathy Scale (KCES) was utilized. The scale includes 15 items and uses a 7-point Likert scale, ranging from “strongly disagree” to “strongly agree.” Pre- and post-course surveys were linked through a unique personal identifier to allow for anonymous submission. Descriptive statistics were performed for all items. Paired t-tests were conducted to identify differences between pre- and post-course survey responses. Results: There was a statistically significant difference (p < 0.05) for three KCES items in 2018 and five KCES items in 2019. These items pertained to students’ ability to relate to patients’ feelings or experiences. Pre- and post-course surveys for the 2018 cohort showed no statistically significant changes (p=0.092) in the overall KCES composite score, whereas for the 2019 cohort a statistically significant change was seen (p=0.045). Conclusions: The results of this study will assist in developing and modifying course learning activities to enhance the development of empathy in student pharmacists, specifically in relation to interacting with underserved patient populations.

Impact of Work Experience on Pharmacy Students’ Perceived Confidence and Performance in Pharmacotherapy Courses

Joel B Castillo, Lauren Pamulapati, Virginia Commonwealth University, Tyler David Wagner, Virginia Commonwealth University, Rachel A Koenig, Virginia Commonwealth University, Lauren M. Caldas, Virginia Commonwealth University.

Objective: This study assesses the relationship between practice type and duration of work experience on student pharmacists’ confidence and performance in pharmacotherapy (PCT) courses. Our hypothesis is that hospital experience and longer duration will increase students’ perceived confidence and reported performance. Methods: This cross-sectional, optional survey for pharmacy students is designed to examine the relationship between pharmacy work experience and perceived confidence and performance in PCT courses. The survey was administered in January 2020 to assess student performance and confidence for the previous Fall 2019 semester and will be repeated in May 2020 for the Spring 2020 semester, capturing students who started experiences mid-semester. Surveys include an identifier to assess changes in perceived confidence and performance for repeated participants. Descriptive statistics will be reported for all participants and a Wilcoxon signed rank test will be conducted to determine the association between Likert scale responses across both the fall and spring semesters. Results: Preliminary data indicate survey participants (n = 27) were primarily P3 students (55.6%) who have a median GPA of 3.45 (IQR = 3.31 - 3.80) and have worked within a pharmacy setting for a median duration of 48 months (IQR = 26 - 60). A majority of participants are currently employed in a community pharmacy setting (59.26%), working a median 8 hours per week during the semester (IQR = 8.0 - 12.0) and 30 hours during breaks (IQR = 20.0 - 40.0). Conclusions: Data collection is currently in process. This research is anticipated to be used by pharmacy school faculty members to better guide students for impact of work experience on confidence and performance in PCT courses.

Improving Quality of Academic and Holistic Interviews for Pharmacy Admissions

Korie L Maryo, Timothy J Huskey, Lukas J. Everly, Northeast Ohio Medical University, Kunal Amin, Northeast Ohio Medical University, Fady Abdilrasul, Northeast Ohio Medical University, Madison Ivan.

Objective: A holistic approach to pharmacy admissions strives to review candidates beyond academic performance alone. The purpose of the quality improvement project was to find a way to take academic and holistic data to evaluate an applicant in an objective manner. Methods: The project was designed to evaluate both academic and holistic data by generating an overall numeric score for applicants based on risks for course failure within the first-year pharmacy curriculum. PharmCAS was used to collect applicant data from six previous years in subject area GPA’s, prior college attendance and select demographic information. Progression data from the university registrar’s office was matched against stated cohorts and analyzed using backward elimination regression to find predictors for course failure within the first year. Results: The quality improvement project identified predictors used to score applicants including: major, course repetition and GPA’s based on the following subjects: biochemistry, biology, inorganic chemistry, organic chemistry, math and microbiology. This model was tested against an enrolled second-year pharmacy student cohort and showed clear applicability in
predicting course failures during their first year. Applicants also receive a score from faculty interviews which are tallied for review by the admissions committee. 

**Conclusions:** In conclusion, an objective applicant scoring metric that incorporates both academic and holistic data has improved both consistency and efficiency of the admissions process.

**Increasing Pharmacy Student Knowledge and Confidence in LGBTQIA+ Patient Care**

Chelsey K. Llayton, Krista L. Donohoe, Virginia Commonwealth University, Abigale T. Matulewicz, Virginia Commonwealth University, Apryl N. Anderson, Virginia Commonwealth University, Alexis N. Crawford, Virginia Commonwealth University, Tyler David Wagner, Virginia Commonwealth University, Lauren M. Caldas, Virginia Commonwealth University.

**Objective:** To assess the impact of a lecture and active learning activities within skills laboratory courses on first-, second-, and third-year pharmacy students’ confidence and knowledge in LGBTQIA+ patient care. 

**Methods:** Students were provided an LGBTQIA+ lecture containing preferred pronouns, common terminology, health disparities, appropriate health screenings, and gender-affirming hormone therapy. During laboratory sessions, students engaged in a learning level-specific activity, such as patient counseling or identifying health screenings, to apply lecture topics. Students completed a pre- and post-survey assessing their knowledge (dichotomous questions), confidence and activity experience (5-point Likert-type questions). Pre- and post-surveys were analyzed using Wilcoxon signed-rank tests and two-sided paired t-tests. 

**Results:** A total of 233 students (response rate: 67%) across the three pharmacy cohorts completed the pre- and post-surveys. Students showed a statistically significant increase in confidence in understanding the role of the pharmacist in caring for LGBTQIA+ patients (3.81 to 4.40, p<0.0001), their ability to care for LGBTQIA+ patients (3.62 to 4.17, p<0.0001), and using appropriate terminology when counseling patients (3.50 to 4.17, p<0.0001). 93% of students agreed or strongly agreed this activity was a positive experience. Following the completion of a lecture on LGBTQIA+ patient care, students performed significantly higher on 5 out of 6 knowledge-based questions (p<0.0001). 

**Conclusions:** Students’ knowledge and confidence in caring for LGBTQIA+ patients increased across three pharmacy cohorts following a lecture and active learning activity. Other schools of pharmacy may want to include a similar learning experience on LGBTQIA+ content if not present in their curriculum in correlation with ACPE Standard 3.5 on cultural sensitivity.

**Integration of LGBTQ+ Health and Cultural Competency in the Pharmacy Curriculum to Promote Inclusive Practices**

Claire Gabrielle N. Pamintuan, Grace Singson, Janelle Francisco, Tam C. Phan.

**Objective:** Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) patients face unique health care disparities. Future pharmacists should be cognizant of these health challenges in order to provide patient-centered care. The objective of this study is to implement and assess a co-curricular LGBTQ+ Cultural Competency training for pharmacy students. 

**Methods:** Pharmacy students at the University of Southern California (USC) are invited to participate in a 2-hour LGBTQ+ health and cultural training. Covered topics include LGBTQ+ terminology, social determinants of health, and strategies to integrate inclusive practices. Participants also completed pre- and post-training surveys that assessed their perception, willingness, and knowledge. Perception and willingness questions were graded on a Likert Scale from 1 to 5, where 1 is no knowledge and 5 is extensive knowledge. 

**Results:** A total of 184 students completed the competency training and pre-training survey; 168 of those students completed the post-survey. After the competency event, students demonstrated statistically significant improvement in their perception of serving LGBTQ+ patients (P<0.0001) and their motivation to adopt culturally competent practices (P<0.05). Regarding the knowledge-based questions, students showed a 12% improvement in correct answer after the competency training. Notably, one knowledge-based question demonstrated a significant increase in recognizing and addressing micro-aggressions in patient care (P=0.03). Results were analyzed using descriptive statistics and non-parametric tests. 

**Conclusions:** Integrating LGBTQ+ care in the pharmacy curriculum is a vital component to provide an inclusive pharmacy practice. After completing the competency training, students demonstrated increased perception and willingness to adopt a culturally competent practice. As both the scope of practice for pharmacists and awareness of LGBTQ+ communities increase, pharmacy programs should adopt or implement LGBTQ+ cultural competency training for its students.

**Investigating D4R-Selective Antagonists as Potential Pharmacotherapies to Treat Cocaine Use Disorder**

Rebekah Placide, Thomas M. Keck, Rowan University, R B Free, National Institute of Neurological Disorders and Stroke, Chun Wu, Rowan University, David R. Sibley, National Institute of Neurological Disorders and Stroke, Comfort A. Boateng, High Point University.
Objective: Presently, there are no FDA-approved medications available for the treatment of cocaine use disorder (CUD). The purpose of this study was to develop novel dopamine D4 receptor (D4R) antagonist ligands with high binding affinity and subtype selectivity as potential pharmacotherapeutic agents for the treatment of CUD. Methods: A series of analogues were synthesized using a computational modeling approach based on the parent scaffolding of D4R antagonist 2-(3-(4-(pyrimidin-2-yl)piperazin-1-yl)propyl) benzo[d] thiazole. Compounds were initially screened using [3H] N-methylspiperone radioligand binding displacement assays in human embryonic kidney 293 (HEK293) cells stably expressing dopamine (D2R, D3R, D4R) receptors to determine their binding affinity and subtype selectivity in vitro. Functional assays were then performed using β-arrestin recruitment inhibition displacement assay to determine intracellular signaling pathways of the compounds. Results: Structural modifications to the parent compound displayed improvements in D4R affinity as well receptor subtype selectivity. Modifications in the pyrimidinylpiperazine moiety of the parent pharmacophore revealed high binding affinity (<100 nM) for D4R along with >100-fold selectivity compared to the other D2R-like receptors. These modifications have provided testable predictions for further SAR profiling and modeling studies using Molecular Dynamics (MD) simulations. Conclusions: These ligands displayed high binding affinity and selectivity for D4R. The development of these novel D4R analogues has expanded our understanding of ligand-receptor interactions and will promote further exploration of D4R antagonism as a potential treatment strategy for CUD. Future studies will evaluate these analogues in vivo in order to provide insight into D4R-targeted drug discovery for CUD, and contribute to the current state of knowledge of D4R functions within the brain.

Learning Health Literacy by Teaching Non-English-speaking Patients

Jonathan N. Lam, Bernadette R. Cornelison, The University of Arizona. Objective: To develop a learning experience to increase understanding of health literacy in refugee populations at an ambulatory care pharmacy practice site. Methods: The student completed the CDC health literacy training and topic discussions on health literacy in patients that are refugees. A pamphlet that detailed the medication refill process was created for refugee patients that spoke Somali, Nepali, Kinyarwandan, and Arabic. Refugee patients that spoke English as a second language were identified using the health system’s electronic health record. Utilizing a certified translator, the student reviewed the step by step medication refill process pamphlet with the patient. The teach back method was used to assess patient understanding and provide additional education if needed. The student was required to reflect on each patient encounter, identifying any barriers to communication and improve on their next patient encounter. Results: The independent study was conducted at an ambulatory clinic that provides services to the underserved and refugee population. The student spent 60 hours onsite during the fall semester (about 4 hours per week). A total of 9 patients were seen and provided with education, 5 Arabic, 3 Kinyarwandan, and 1 Nepali patients. The following areas were identified and improved upon at each patient encounter: teach back method and communication techniques. Conclusions: An independent study that allows students to have direct interactions with patients increases the student’s understanding of health literacy while enhancing their communication skills.

Learn Together, Work Together: A Qualitative Analysis of Interprofessional Learning During Experiential PharmD Education

Dalia Ameripour, Megan E. Matthews, Ying Wang, University of Southern California, Edith Mirzaian, University of Southern California, Rory E. O’Callaghan Kim, University of Southern California. Objective: Introductory and advanced pharmacy practice experiences (IPPEs and APPEs) allow students to engage with other healthcare professions and prepare them to practice in team-based care. This study assessed alignment of student reflections from interprofessional experiences during the experiential component of a PharmD curriculum with the Interprofessional Education Collaboration (IPEC) competencies. Methods: An electronic survey was sent to students following completion of experiential rotations. Multiple choice questions were used to gather general information about sites and student reflections were qualitatively mapped to IPEC competencies: Values/Ethics, Roles/Responsibilities, Interprofessional Communication, and Teams/Teamwork. Results: The PharmD student response rate on the IPE survey was 30%, with 29% of total responses from P1 IPPEs, 37% from P2/P3 IPPEs, and 34% from APPEs (n=1360). Across all experiences, IPEC competencies were met at the following rates: Values/Ethics (25%), Roles/Responsibilities (48%), Interprofessional Communication (36%), and Teams/Teamwork (48%). Each competency area was met at similar rates for IPPEs and APPEs. Reflections from hospital experiences (n=547), compared to community experiences (n=514), reflected more responses in Roles/Responsibilities (59% vs. 42%,
Interprofessional Communication (44% vs. 30%, \( p<0.0001 \)) and Teams/Teamwork (61% vs. 35%, \( p<0.0001 \)) and community experiences reflected more Interprofessional Communication (44% vs. 30%, \( p<0.0001 \)). Values/Ethics was reflected at a low rate for both hospital and community experiences (26% and 24%, \( p=0.49 \)). As experiential education progressed from IPPE to APPE, trends showed decreasing reflections in Roles/Responsibilities and increasing reflections in Teams/Teamwork. **Conclusions:** IPEC competencies were met at similar rates in IPPEs and APPEs. However, there were differences when comparing types and level of experiential rotations. Current hospital-based experiences may offer more opportunities to learn about the roles of healthcare professionals and how they work in teams, whereas community experiences may provide more opportunity for interprofessional communication.

**Lifetime Misuse of Prescription and Non-Prescription Substances Among Student Pharmacists**

Kyle C. Fischer, University of Southern California, Allison B. Chacon, USC School of Pharmacy, Lisa Goldstone, University of Southern California. **Objective:** The study objective was to identify substance misuse patterns among student pharmacists. **Methods:** Subjects included student pharmacists in their first through third professional years at a four-year doctor of pharmacy program. Using Qualtrics software, an anonymous survey was designed to assess the lifetime misuse of prescription and non-prescription substances. Subjects indicating any misuse were asked to indicate the reason for misuse. Participants indicating no substance misuse were asked to rank reasons for not engaging in misuse. **Results:** A 27.1% response rate (155/572) was obtained. The most commonly misused substances were stimulants with 34.2% of respondents indicating lifetime misuse. Other substances with reported lifetime misuse included other prescription medications (23.9%), cannabis (21.9%), opioids (15.5%), and illicit substances other than cannabis (10.3%). A significant difference was seen between students in their first versus third professional year (28.8% vs 48.3%, \( p=0.02 \)). Enhanced academic performance was the number one reason for stimulant misuse (47.2%). For students who did not report misuse, personal health was ranked as the most important reason with stigmatization being least important in the decision to not misuse substances. **Conclusions:** The majority of student pharmacists have not misused prescription or non-prescription substances. However, lifetime misuse remains prevalent within the population. Given the significant difference in stimulant misuse between students in the first versus third professional year, educational strategies informing students of substance misuse risks should be included in the curriculum. Interventions focused on wellness should also be considered as the majority of students reported non-recreational misuse which could be related to academic and/or other stressors.

**Medical Residents’ Perceptions of Interprofessional Education After Rounding with Pharmacy Students in an Outpatient Clinic**

Urvinder (Silky) Kaur, Richard J. Silvia, MCPHS University–Boston, Robert L. Dufresne, The University of Rhode Island. **Objective:** As interprofessional education is a key component in medical education, this project studied the relationship between medical residents’ perception of pharmacy students in an outpatient clinic and the interventions students made during their patient care experiences. Goal was to look for correlations between family medicine resident scores on the standardized survey, Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education (SPICE), and APPE student intervention data at an ambulatory care clinic. **Methods:** Minor language alterations of the SPICE survey tool were made to reflect use in medical residents rather than students. The revised tool was distributed to all medical residents at the site who worked with pharmacy students during their clinical rotations and was collected over a 5-week period. Correlations between the survey scores and intervention data were assessed in regard to (1) number of interventions made during patient visits, (2) number of interventions accepted by medical residents, and (3) level of impact of interventions. **Results:** Nine of 12 medical residents completed the SPICE survey with a mean score of 45 (max score = 50). Twenty-two pharmacy students recorded 457 interventions over an 8-month period. No significant correlations were found between SPICE scores and either the number or impact factor of pharmacy student interventions made. ANOVA showed significant differences among residents in regard to mean impact factor scores, with significant individual differences seen between residents 1, 6, and 8 versus 9. **Conclusions:** While correlations between the SPICE survey and student interventions were not significant, the impact of pharmacy students working with residents can be seen through other measures. This study demonstrates how residents appreciated the opportunity to interact with pharmacy students in an interprofessional clinical setting.

**Mindful or Mind Full? Education Theory, Stress Management, and Mindfulness in the Pharmacy Curriculum**

Logan T. Murry, Matthew Witry, The University of Iowa. **Objective:** To describe how student pharmacists appraise their stress, identify student perceptions of mindfulness-oriented meditation (MOM) as a stress management tool, and discuss how the University of Iowa College of Pharmacy implemented these concepts through a course dedicated to mindfulness. **Methods:** A comprehensive search was conducted via online databases to identify literature related to mindfulness and stress management in pharmacy education. In addition, a survey tool was created and distributed to students in the pharmacy curriculum to gather data on their perceptions of mindfulness and stress management. **Results:** The survey results indicated that most students believe mindfulness can be beneficial in stress management. However, many students expressed concerns about the potential for mindfulness to be used inappropriately or misapplied in the pharmacy setting. **Conclusions:** The implementation of mindfulness-oriented meditation in the pharmacy curriculum can improve student stress management and promote wellness, but it is important to ensure that these concepts are taught and practiced appropriately to avoid any negative consequences. This study demonstrates the potential for mindfulness to be an effective tool for stress management in the pharmacy profession.
strategy, and describe student motivation to participate in MOM. Methods: This descriptive qualitative research study used focus groups. Students were recruited to participate via flyers, electronic message board postings, and email. Focus groups were conducted using a guide and recorded with participant consent. Recordings were transcribed and MAXQDA software was used to perform qualitative thematic analysis. A basic interpretivist paradigm was used to underpin the authors phenomenological approach; which involved rereading the transcripts, applying codes to text segments, and iteratively discerning themes through discussion. Results: In total, fourteen pharmacy students participated in three focus groups, lasting approximately 45 minutes each. Focus groups were comprised of homogenous groups based on first, second, and third-year student status. Students were interested in mindfulness, but had difficulty justifying the activity for personal benefit because of their busy-ness and drive for productivity. Students preferred to manage stress through activities resulting in a sense of productivity (e.g. cooking, cleaning), and often reported engaging in “mindless” activities that increased feelings of stress and negative self-talk (e.g. stress eating, social media). Students became interested in mindfulness when possibilities of professional improvement and tangible benefits (e.g. a mindfulness certificate) were discussed. Conclusions: Pharmacy students reported high stress levels and often used short-term management techniques to cope. Participants were reluctant to engage in MOM for self-care because such effort does not align with educational and professional evaluation criteria. Students were motivated when course credit or certification to engage in MOM for self-care because such effort does not align with educational and professional evaluation criteria. Students were interested in mindfulness, but had difficulty justifying the activity for personal benefit because of their busy-ness and drive for productivity. Students preferred to manage stress through activities resulting in a sense of productivity (e.g. cooking, cleaning), and often reported engaging in “mindless” activities that increased feelings of stress and negative self-talk (e.g. stress eating, social media). Students became interested in mindfulness when possibilities of professional improvement and tangible benefits (e.g. a mindfulness certificate) were discussed. Conclusions: Pharmacy students reported high stress levels and often used short-term management techniques to cope. Participants were reluctant to engage in MOM for self-care because such effort does not align with educational and professional evaluation criteria. Students were motivated when course credit or certification to engage in MOM for self-care because such effort does not align with educational and professional evaluation criteria. Students were interested in mindfulness, but had difficulty justifying the activity for personal benefit because of their busy-ness and drive for productivity. Students preferred to manage stress through activities resulting in a sense of productivity (e.g. cooking, cleaning), and often reported engaging in “mindless” activities that increased feelings of stress and negative self-talk (e.g. stress eating, social media). Students became interested in mindfulness when possibilities of professional improvement and tangible benefits (e.g. a mindfulness certificate) were discussed. Conclusions: Pharmacy students reported high stress levels and often used short-term management techniques to cope. Participants were reluctant to engage in MOM for self-care because such effort does not align with educational and professional evaluation criteria. Students were motivated when course credit or certification was proposed, as tangible benefits may provide students with a sense of productivity, professional gain, or observable measures by which to evaluate success.

miR-146a: A Negative Regulator of Acute Shear Stress-Induced Vascular Inflammation
Hassan M. Alshiyab, Soraya Abasi, California Northstate University, Mungid Sirag, California Northstate University, Sheena Thomas, Division of Cardiology, Emory University School of Medicine and Atlanta VA Medical Center, Kimberly Rooney, Division of Cardiology, Emory University School of Medicine and Atlanta VA Medical Center, Islam Mohamed, California Northstate University, Katherine Ferrara, Stanford University, Charles Searles, Division of Cardiology, Emory University School of Medicine and Atlanta VA Medical Center. Objective: micro-RNA-146a (miR-146a) is a negative regulator of vascular inflammation. Our preliminary studies showed that abdominal aortic coarctation (AAC), a unique model of acute induction of low magnitude oscillatory shear stress (OSS), results in decreased miR-146a & inverse upregulation of toll-like receptor (TLR) inflammatory pathway & barrier dysfunction in acute OSS compared with unidirectional shear stress (USS) segments. Therefore, we hypothesize that acute OSS results in vascular inflammation via dysregulation of miR-146a. Methods: Cultured HUVECs were subjected for OSS and USS conditions using standard orbital shaker platform. 11-13 weeks old male wild type (WT) mice were subjected to abdominal aortic coarctation (AAC); a unique model of acute induction of OSS in mouse abdominal aorta, for 3 days. miR-146a expression was enhanced by targeted delivery of miR-146a using tail vein injections (200ug/mouse/day for 2 days) of VCAM-1 Targeted nano-coated cationic lipoparticles (Targ-CCLs+miR-146a), compared with non-targeted (Non-Targ-CCLs+miR-146a), Targ-CCLs+scrambled miR or vehicle respectively as controls. Downstream acute OSS segments were compared to upstream unidirectional shear stress (USS) segments using total RNA deep sequencing, RT-PCR, western blot and ANOVA. Results: In cultured HUVECs, OSS resulted in increased expression of TLR-proinflammatory pathway; indicated by increased expression of TLR4, TLR2, HuR, IRF3, IRAK2 and MYD88 signaling targets. In WT mice, targeted CCLs+miR-146a treatment resulted in significant inhibition of VCAM-1, MCP-1 and MMP-9 expression in OSS compared with USS segments versus corresponding segments in non-targeted CCLs+miR-146a, targeted CCLs+scrambled miR or vehicle control groups. Conclusions: Our findings support a direct role for miR-146a as a negative regulator of the OSS-induced pro-inflammatory TLR pathway in vivo. Further studies are in development to characterize the key shear-sensitive signature response of miR-146a to OSS in vitro.

Now You See It: Creating an Infographic Rubric to Promote Visual Literacy in Pharmacy Students
Melissa A Gallo, Michael C Maiullari, Jessica H Leung, Stephanie L. Sibicky, Northeastern University. Objective: An assignment where Advanced Pharmacy Practice Experience (APPE) students create infographics to summarize clinical trials has been an effective way to teach clinical knowledge and non-verbal communication skills through visual expression; however, the lack of a concise rubric that emphasizes clinical knowledge and translation of information into visual components limits the widespread application of this assignment. The objective of this project was to transform the Infographic Design Rubric (IDR) by Kibar and Akkoyunlu into an easy-to-use format and assess its inter-rater reliability. Methods: Before revising the rubric, we created assignment objectives to guide its creation. Using the IDR, we selected concepts integral to the assignment including...
content generation, quality and organization of information, overall design, and specific details of design. Past APPE students’ infographics were graded using the IDR and the new rubric. Grades were compared to assess average scores, and inter-rater reliability was determined using joint probability of agreement between each combination of graders. **Results:** Nine infographics were graded independently by three graders using the new rubric, and five graders using the IDR. The average grade was 84.5% with the new rubric and 83% with the IDR. For the new rubric, graders assigned the same grade to an infographic 41% of the time. Graders had the same score only once for the IDR. Graders were within 5% of each other 92.5% of the time for the new rubric, and 58% of the time for the IDR. **Conclusions:** The new rubric has greater inter-rater reliability compared to the IDR for grading infographic assignments. It is a more practical option for grading that would allow for wide-scale implementation of infographic-creation assignments into pharmacy curricula.

**Optimization of an Ex-Vivo Co-Culture Timeline to Maximize Highly Viable Cells**

Jillian M Walters, Alyssa Krug, Bernadette D’Souza, Samford University.

**Objective:** Ex-vivo studies are a commonly used preclinical technique to assess the efficacy of a myriad of treatments. One consistent confounding variable of these studies is the use of low viability or undifferentiated cells to test hypotheses. This variable precipitates from a lack of a set ex-vivo timeline that accounts for both differentiation and viability of cells. The objective of this study is to optimize the duration of highly viable dendritic cells and T-cells in an ex-vivo co-culture experiment. Co-cultures generally require dendritic cells to be plated and treated for 24 hours before the addition of T-cells. Once T-cells are added, the two cell types need to interact for 72 hours to assess interactions.

**Methods:** Cells were isolated from C57/B6 mice. Dendritic cells were propagated from bone marrow, and T-cells were propagated from spleens. T-cells were then isolated from mixed splenocytes using magnetic negative selection. Cell differentiation from immature lymphocytes and cell viabilities were tracked for 9 days using flow cytometry. T-cells were tracked daily while dendritic cells were tracked every other day. **Results:** Dendritic cells reached max viability on Day 5; however, most cells had differentiated from immature lymphocytes to dendritic cells by Day 3. T-cells reached max viability on Day 4. Both cell types maintained viability until Day 9. **Conclusions:** The optimal ex-vivo co-culture timeline for C57/B6 lymphocytes is plating dendritic cells on Day 3, adding T-cells on Day 4, and completing the experiment on Day 7. This timeline optimizes cell differentiation and viability.

**Orientation for a Disorienting Experience: Design of a Longitudinal Onboarding Course for International APPEs**

Caroline W. Sasser, Sarah A. Dascanio, David R. Steeb, University of North Carolina at Chapel Hill, Laura Bratsch, University of North Carolina at Chapel Hill.

**Objective:** To describe the development of a pre-departure course for students participating in an international advanced pharmacy practice experience (APPE).

**Methods:** Students participating in an international APPE were previously offered a 1-day pre-departure orientation. This was adapted into a non-credit bearing, longitudinal onboarding course, consisting of 6 one-hour in-person class meetings between two campuses, connected by video teleconference (VTC). Topics covered included the pharmacist’s role in global health, social and behavioral determinants of health, global health ethics, cultural competency, cultural adaptation, professionalism, and global leadership. There was also class time reserved for logistics of travel and Q&A panels with previous international APPE students. This class utilized “flipped classroom” methods by asking students to prepare ahead of class with readings, videos, or self-guided discovery. In-class teaching methods included peer-to-peer learning, debate, discussion, reflection, scaffolded inquiry, and brief lecture. Post-class reflections and muddiest points were used to solidify learnings and address concerns. **Results:** The course was delivered to 55 students going to 9 difference country sites. Attendance and participation were high despite the lack of credit hours associated with the course. Challenges occurred with coordinating small groups collaboration across VTC in a class of this size. Student feedback has indicated a need to have logistics and Q&A topics earlier in the course. Post-class feedback will be available at conclusion of the class in April 2020. **Conclusions:** Preparing students for an international APPE is difficult to achieve in a 1-day orientation. A broadly designed, longitudinal course utilizing evidence-based teaching methods may better prepare students to succeed in an international APPE.

**Outcomes of an Immersive Pharmacy Research Experience for High-School Students: Reflection of 3 Cohorts (2017-2019)**

Carla Coste Sanchez, Antonio Bush, University of North Carolina at Chapel Hill, Samuel K. Lai, University of North Carolina at Chapel Hill, Jacqueline McLaughlin, University of North Carolina at Chapel Hill.

**Objective:** The Young Innovators Program (YIP) is an eight-week summer internship for high school students to participate in research at the UNC Eshelman School of
Pharmacy. Mentored research experiences alongside weekly activities expose students to a diverse pool of professionals and careers in multidisciplinary pharmaceutical sciences and pharmacy. The purpose of this study is to examine student experiences in three years of YIP.

**Methods:** Sixty-eight high school students participated in the program during the summers of 2017-2019. Each student was assigned a laboratory matching their research preference and completed a pre- and post-survey on their experiences. The post-survey included open-ended questions to gauge what students enjoyed, and challenges encountered. A Wilcoxon signed-rank test was used for pre-post survey analyses and multiple linear regression for subgroup analysis. Thematic coding was used to analyze responses to open-ended questions. **Results:** Response rate for the surveys was 97.1% (N = 66). Pre/post-survey results show a weak favorable influence of the YIP experience on student’s feelings (Interest, Fascination and Appeal) towards STEM. Gender was the strongest factor affecting pre-post differences; in every feeling category, female students saw a greater increase in favorability of STEM after the experience than male students (p<0.05). 100% of participants indicated they were challenged intellectually and would recommend the program. In open comments, participants reported benefiting from connections to experts and a third of participants stated interest in a pharmacy career. **Conclusions:** Participating in YIP provided students with meaningful, real-world research activities and career exploration. Results suggest the program can influence female participants’ perceptions of STEM in a positive manner. It also highlights the role a professional school can have in high-school students who are interested in STEM.

**Pan-cancer Analysis of Key Long-noncoding RNAs Related to Patient’s Prognosis**

Yingbo Huang, R. Stephanie S. Huang, *University of Minnesota.*

**Objective:** Long non-coding RNAs (lncRNAs), which are RNA with at least 200 nucleotides length and do not translate into protein, have been suggested to play critical roles in cancer etiology, progression and response to medications. The expression and alteration of lncRNAs are highly cancer-type specific, however, except for a few most-well studied lncRNAs, the pathological/pharmacological role of lncRNAs have not been evaluated in various cancers. Here, we proposed a systemic analysis of the potential function of key lncRNAs across 24 types of cancer using The Cancer Genome Atlas (TCGA) datasets. **Methods:** 50 lncRNAs with literature supported role in at least one cancer in vivo were selected for analysis. The gene expression of each lncRNAs were classified into high, medium and low categories and was associated with the patient’s overall survival (OS) in each type of cancer. Multiple testing correction was carried out using the Benjamini-Hochberg process with FDR < 0.05 defined as significant. **Results:** We found 41 significant lncRNAs-OS associations involved 27 unique lncRNAs across 9 types of cancer. Some of the findings were supported by literature, such as CYTOR in low-grade glioma (LGG). Others have not been reported in the cancer type we studied. Interestingly, survival of patients with LGG, kidney renal clear cell carcinoma (KIRC) and/or pancreatic adenocarcinoma (PAAD) were found to be associated with multiple lncRNAs. Moreover, many lncRNAs previously have been identified as an oncogene show tumor suppressor function in certain other types of cancer, such as ZEB2-AS1 and DANCER. **Conclusions:** By systematically examining the expression of candidate lncRNAs in various cancer types, we identified the dynamic role of many lncRNAs across different types of cancer.

**Pharmacists’ Perceptions, Barriers, and Potential Solutions to Implementing a Direct Pharmacy Access Policy in Indiana**

Jenny L. Beal, Ryan S Ades, *Manchester University,* Veronica P. Vernon, *Butler University,* Tracey Wilkinson, *Indiana University School of Medicine,* Ashley H. Meredith, *Purdue University.*

**Objective:** This study sought to determine pharmacists’ perceptions, comfort level, barriers, and potential solutions for implementing a direct pharmacy access policy in Indiana. **Methods:** An online survey was distributed to pharmacy preceptors in Indiana (N = 588) for this mixed-methods study. The survey assessed pharmacists’ perceptions of and comfort level with prescribing different hormonal contraceptives. Open-ended questions qualitatively assessed reasons behind resistance to and concerns regarding prescribing contraceptives, as well as proposed solutions to make implementation of this policy easier. **Results:** Pharmacists felt prescribing contraceptives would be beneficial (79.1%) and were interested in providing this service (76.0%); however, only 35.6% report having the necessary resources. Insurance reimbursement (86.4%), a training course (84.7%), a private counseling room (69.5%), and increasing pharmacy technician responsibilities to free up pharmacists from dispensing duties (52.5%) were identified as ways to increase implementation of this policy. Women were significantly more comfortable than men to prescribe progestin-only oral contraceptives, injections, and intravaginal rings (p<0.05, power = 0.74). Those who have previously used hormonal contraceptives were significantly more comfortable to prescribe combined oral pills, progestin-only
Objective: An increasing number of states are allowing pharmacists to prescribe hormonal contraceptives through direct pharmacy access policies. The majority of pharmacists in Indiana are interested in providing this service, while also citing similar barriers and concerns as those found in previous studies of other pharmacist populations. Insurance reimbursement, additional training, and expanding pharmacy technician roles were all proposed solutions for overcoming barriers such as time constraints and liability concerns.

**Portfolium or Annual Performance Evaluation? Capturing Students’ Professional Growth**

Mary E. Nolan, Rachel Huntsman, *Purdue University*, Jennifer Dexter, *Purdue University*, Kimberly S. Illingworth Plake, *Purdue University*.

**Objective:** Portfolium is an online networking platform that allows users to showcase projects and accomplishments. Student pharmacists participate in an Annual Performance Evaluation (APE) to assess their professional growth and address Accreditation Standard 4. The objective of this study is to evaluate student perceptions of their professional growth using the APE and Portfolium.

**Methods:** Participants were second (N=15), third (N=12) and fourth (N=15) professional year students. Second- and third-year students completed the APE in previous years. Fourth year students served as a control group and did not participate in the APE. Using Qualtrics, students completed pre- and post-surveys prior to and after using Portfolium. Students indicated whether APE and Portfolium assisted in their learning and development using a 5-point Likert scale (strongly agree to strongly disagree). Six specific areas (12 items) were assessed, including professional development, leadership development, cultural development, career planning, mental wellness and overall learning. Paired t-tests and Wilcoxon Signed Rank tests were utilized for comparisons.

**Results:** Twenty percent of second, 58.3% of third, and 60.0% of fourth-professional year students completed the study. After using Portfolium, student perceptions of the platform’s assistance in their leadership (P<0.05, power=0.75) and cultural development (P<0.05, power=0.75). Training, company culture, implementation, and physical environment were emergent themes in the qualitative data regarding resources needed to begin prescribing hormonal contraceptives.

**Conclusions:** An increasing number of states are allowing pharmacists to prescribe hormonal contraceptives through direct pharmacy access policies. The majority of pharmacists in Indiana are interested in providing this service, while also citing similar barriers and concerns as those found in previous studies of other pharmacist populations. Insurance reimbursement, additional training, and expanding pharmacy technician roles were all proposed solutions for overcoming barriers such as time constraints and liability concerns.

Fewer than half of the participants indicated that Portfolium should be included in the APE process.

**Promoting Wellness and Resiliency in Pharmacy Students Through Leader Academy**

Hanie B. Barakat, Tori Ferree, *Medical University of South Carolina, College of Pharmacy*, Jessica S. Roller, Kristy L. Brittain, *Medical University of South Carolina*, Cathy L. Worrall, *Medical University of South Carolina*.

**Objective:** Leader Academy is an established program for pharmacy students meant to foster communication and leadership skills. With increasing awareness of burnout and other mental health issues among healthcare professionals, Leader Academy also presents an opportunity for building resilience and promoting wellness for our students.

**Methods:** Small groups of students meet with a facilitator for a Leader Academy session each month during the academic year to discuss communication and leadership principles using GiANT Worldwide’s 5 Voices and 5 Gears programs. The 5 Gears tool educates on the awareness of “shifting” into the right gear at the right time to increase productivity and interactivity with others. During each Leader Academy session, students complete a survey evaluating the “health” of time spent in each of the 5 Gears and report their result from the Pharmacist Well-Being Index. The Well-Being Index is an assessment that measures the dimensions of distress and well-being including fatigue, quality of life, likelihood of burnout, and work-life integration.

**Results:** Preliminary survey results indicate that students struggle with spending the appropriate amounts of time in first gear (recharge) and fifth gear (focus). A well-being index score below average or lower was reported by 33% of students in September, 38% in November, and 7% in January.

**Conclusions:** Finding the balance between academic success and overall wellbeing is difficult for many students. Based on preliminary data, plans are underway to implement educational outreach and targeted communications to students during the 2020-2021 academic year to enhance their stress management, promote wellness, and increase resilience.

**Psychotropic Stigma Among Pharmacy Students**

Brandy R. Davis, Cassidi C. McDaniel, Kimberly B. Garza, *Auburn University*.

**Objective:** To measure student pharmacist stigma towards mental health and psychotropic medications.

**Methods:** A cross-sectional survey was conducted in first, second, third, and fourth professional year student pharmacists enrolled in a Doctor of Pharmacy program, using both paper and electronic formats. The Perceived Devaluation and Discrimination (PDD) Scale and a
modified Beliefs about Medicines Questionnaire (BMQ) were used to measure mental health stigma and psychotropic stigma, respectively on a 5-point Likert-type scale with lower values indicating greater stigma. MANOVAs were conducted to investigate relationships between student pharmacists’ characteristics, preferred mental health treatment, and stigma towards mental health and psychotropic medications. Paired t-tests were conducted to compare stigma toward mental health and psychotropics. Results: A total of 390 participants completed the survey and was mostly female (67%), white (79%), non-Hispanic (96%), and 19-24 years of age (80%). Most respondents had prior interactions with patients with mental health conditions (55%) or taking psychotropic medications (65%). Students’ personal preferences for mental health treatment were primarily psychotherapy (42%) or a combination of psychotherapy and psychotropic (40%). A positive association was found between preferring psychotherapy treatment and greater stigma towards psychotropic medications (p<0.001). Students also had increased stigma towards psychotropic medications (M = 2.650, SD = 0.602), compared to stigma towards mental health conditions (M= 3.154, SD = 0.615, p<0.001). There were no differences in stigma among first, second, third, and fourth-year students. Conclusions: Our results indicate a presence of stigma toward mental health conditions among student pharmacists, with an even greater degree of stigma towards psychotropic medications. Future research should focus on methods to decrease stigma through awareness-raising and education in pharmacy curricula.

Relational Leadership Initiative: Assessing Implementation and Learning Outcomes of an Interprofessional, Cross-Generational Collaborative Gursimran Kaur, Kyle Turner, The University of Utah. Objective: Determine the effects of the Relational Leadership Initiative (RLI) on participants’ sense of well-being and psychological sense of community. Methods: The Relational Leadership Initiative is an interprofessional, cross-generational learning collaborative at the University of Utah focused on enhancing self-awareness, teamwork, coaching and leading change. The three-month curriculum is delivered through large group didactics, small group activities, and self-reflection. Cohort participants complete the Well-Being Index (WBI) and the Psychological Sense of Community (PSOC) instruments at baseline, immediately post-course, and six-months post-course completion to assess multiple dimensions of distress and includes questions about satisfaction with work-life integration and meaning in work. Results: The Fall RLI Cohort consisted of 17 participants aged 24-58 years old with the majority being Caucasian (84%) and female (65%) from a variety of professions and backgrounds including nursing, pharmacy, medicine, health sciences research and administration. Of the total cohort, 13 participants completed both surveys at baseline and 9 completed both surveys immediately after the course. Baseline to post-course evaluations of the WBI survey indicates a 25% reduction in burnout from work, 13% reduction in worrying that work is hardening participants emotionally, and 10% reduction in feeling depressed/hopeless. Results from the PSOC show greatest improvements in dependence on cohort members (20%) and having a support system within the group (23%). Program features that were rated as most impactful by attendees include: psychological safety and trust created, sense of community created in small groups, opportunity for individual and group reflection, and trainers and facilitators modeling vulnerability and program skills. Conclusions: RLI improved well-being and sense of community scores for the cohort of attendees. Continued assessment is needed to determine the long-term impact of RLI participation on participants.

Research and Scholarship Within Pharmacy School and Post-Graduate Training Education: A Systematic Review Shuyan Huang, Kathryn A. Morbitzer, University of North Carolina at Chapel Hill, Jacqueline McLaughlin, University of North Carolina at Chapel Hill, Amanda Olsen. Objective: To identify the key components of the research training design, and assess the outcomes of the current research trainings within pharmacy school and post-graduate training education. Methods: A comprehensive literature search was conducted on six bibliographic databases and four electronic journals. The last search was completed in June 2019. Studies were included if they were: 1) conducted in the United States; 2) published in a peer-reviewed research article; 3) in English; 4) published between 2006 – 2019. To minimize bias, articles were screened systematically using an abstract review, full-text review, and audit. Each article was reviewed by two individuals and conflicts were resolved by an independent reviewer. Results: A total of 1,371 abstracts were screened, 121 articles underwent full-text review and 58 studies were included in the final analysis. Of the 58 articles, approximately 60.3% (35) described the research trainings in PharmD curriculum while the remaining 39.7% (23) discussed the scholarly activities in residency programs. Among the articles describing the research training in the PharmD curriculum, 34.3% (12) of them reported mandatory scholarly activities for all the pharmacy students while 65.7% (23) studies reported that
the trainings were elective. Additionally, 32 pharmacy programs invited faculties to serve as research mentors while only 4 residency programs reported faculty. Of all the articles, about 53.4% (31) evaluated the external dissemination while only 3.4% (2) described outcomes related to healthcare practice. **Conclusions:** Lack of faculty involvement in the residency research training suggests collaborative opportunities between medical centers and pharmacy schools, which can ensure the success of research training program. Additionally, extramural outcomes are the most commonly reported outcomes of research trainings. More types of outcomes should be encouraged to be measured.

**Self-reported Bias in Publishing According to Gender and Race/Ethnicity**

Monet K Luloh, Craig P. Henchey, The University of Utah, Joanne LaFleur, The University of Utah.

**Objective:** Due to concerns about implicit bias and risks of abusive publishing practices, we examined the associations between sociodemographic characteristics and dimensions of difficulty receiving accurate authorship attribution among academic researchers. We theorize that differences in risks of author attribution conflicts will be observable by gender and race/ethnicity, even when controlling for other factors. **Methods:** The target population for the survey included all US-affiliated academic authors of sponsored original research published in one of 12 target journals (covering outcomes research, pharmacoepidemiology, and pharmacoeconomics) from October 2018 through September 2019. To identify eligible authors, we hand-searched target journals. Meta-data about relevant citations was collected along with names and contact information for eligible authors. An online (Qualtrics) survey was developed and piloted to collect data on respondents’ authorship experiences in the context of their entire academic career. We inquired about 6 dimensions of authorship conflict including (a) authorship exclusion, (b) first-author demotion, (c) last-author demotion, (d) middle-author demotion, (e) cancelled/delayed publication, or (f) other conflicts. Respondents were asked to report the likelihood that they had experienced these dimensions of conflict on a 5-point Likert scale. **Results:** Out of 1,623 original research articles, only 298 (18%) reported sponsorship and had eligible authors (N=409). We are still in the data-collection phase, but will present frequencies and percentages of authors reporting one or more dimension of authorship conflict overall and stratified by sex and race/ethnicity. We will also report the odds of reporting such conflicts for females compared to males, while controlling for age, race/ethnicity, training, rank, and experience. **Conclusions:** If disparities are identified, a greater role for promoting education in ethical publishing may be warranted.

**Service-Learning Impact on Student Knowledge and Confidence in Assisting Patients in Navigating Medicare Part D**

Kobi Griffith, Sharon E. Connor, University of Pittsburgh, Miranda P. Steinkopf.

**Objective:** The Accreditation Council for Pharmacy Education recognizes the value of service-learning in fostering pharmacists who serve societal needs and seek justice in the distribution of health resources. Little is known about the impact of student confidence and attitudes in helping patients navigate the healthcare system. The objective of this study was to compare knowledge and confidence of first year pharmacy students in a service-learning course who were placed at Medicare Part D enrollment sites (placed) to students who were not placed at Medicare Part D enrollment sites (not-placed).

**Methods:** A pre/post survey was administered to 110 students. The baseline survey was conducted prior to all students attending a four-part lecture series on Medicare Part D and the endpoint was conducted at the conclusion of the year-long course. Knowledge was assessed with multiple choice questions, while attitudes and confidence were measured using a Likert Scale. This study was approved by the IRB. **Results:** Knowledge improved in both groups and the difference between groups was not significant (9.2% vs 4.1%; p=.199). Confidence increased in the placed group and decreased in the not-placed group; the difference in confidence pre to post-test between groups was statistically significant (0.416 vs -0.802; p=2.03x10-16). Attitudes decreased in both groups with no significance between the groups (-0.14 vs -0.33; p=.153).

**Conclusions:** Both groups improved in knowledge of Medicare Part D. Confidence increased in the placed group and decreased in the not-placed group while attitude decreased in both. A lecture series was sufficient to increase knowledge of Medicare while practical experience may be essential to the confidence that students have in their ability to empower patients to navigate healthcare access.

**Student Perceptions in APPE-Readiness After Participating in an Advanced Practice Pharmacist-Led Community Hypertension Clinic**

Jackie El-Sokkary, Bryan Herrera, Edgardo Mendoza, Kelven Tran, Crystal Zhou, University of California, San Francisco.

**Objective:** To determine if a Layered Learning Practice Model (LLPM) Advanced Practice Pharmacist-Led Community Hypertension Clinic (APPLe-CHC) improves APPE-readiness. The APPLe-CHC aims to improve patient outcomes via regular blood pressure...
screens and therapeutic lifestyle modifications (TLM) and challenges pharmacy students to become leaders and educators at various stages. **Methods:** This is a descriptive study that describes the APPLe-CHC, which started in October 2019. The team consists of two P1s, two P2s, a pharmacy resident, and an attending pharmacist who run the clinic at a San Francisco Walgreens Pharmacy on a weekly basis. Since the students are at varying levels of an accelerated three-year pharmacy curriculum, students are encouraged to improve their clinical and interpersonal skills during these clinics. P1s will start by providing blood pressure screenings, then advance to TLM recommendations under the guidance of P2s. The pharmacy resident helps the P2s create more patient-specific TLM recommendations and the attending pharmacist will approve each patient’s plan. All students are surveyed before and after volunteering with APPLe-CHC. **Results:** APPLe-CHC consists of a LLPM environment for different stages of pharmacy learners. A total of ten P1 and P2 students have participated in the APPLe-CHC. One hundred percent of the participants feel more confident in providing hypertension education to patrons, taking both an automatic and manual blood pressure measurement as compared to their experiences after learning about blood pressure measurement and hypertension therapeutics in the classroom. **Conclusions:** Our results provide a sustainable teaching model for pharmacy learners on the basis of clinical practice in the community setting that does not include prescription-dispensing responsibilities. In addition, the APPLe-CHC can help to prepare students for their Advanced Pharmacy Practice Experiences.

**Student Pharmacists’ Confidence and Comfort in Counseling Patients at Risk for Maternal Mortality**

Hee Seung Lim, Jamie C. Barner, The University of Texas at Austin.

**Objective:** The objective is to determine whether a pilot workshop improved pharmacy students’ confidence, comfort, and knowledge in assessing and addressing risk factors associated with maternal mortality. **Methods:** The two-hour workshop included a presentation, video and active learning counseling case studies focused on understanding the pharmacists’ role in prevention and treatment of the following maternal mortality risk factors: preeclampsia, postpartum depression and opioid overdose. P1-P3 student pharmacists were invited to participate and complete pre- and post-surveys. Confidence (N=5) and comfort (N=15) were measured using a 5-point Likert type scale (1= strongly disagree to 5 = strongly agree). Knowledge (N=12) consisted of true/false statements regarding risk factors of maternal mortality. Descriptive statistics, paired t-tests and McNemar’s tests were used, as well as Cronbach’s alphas to assess scale reliability. **Results:** Of the 27 students who participated, the majority were 18-25 years (85.2%), female (74.1%) and Asian (51.9%). Paired t-tests revealed that overall confidence and comfort increased significantly (p<0.0001) from pre- to post-intervention regarding students’ ability to: 1) explain preeclampsia (2.5±0.9 to 4.5±0.5); 2) explain postpartum depression (3.3±0.8 to 4.5±0.5); 3) identify opioid containing drug products (3.5±0.9 to 4.7±0.5); 4) identify maternal mortality risk factors (2.1±0.7 to 4.5±0.5); and 5) explain pharmacist services related to maternal mortality prevention (2.0±0.7 to 4.5±0.5). Knowledge significantly (p<0.05) improved on the majority (83.3%) of items. Scale reliabilities ranged from 0.78-0.92. Overall, students rated the workshop as extremely useful (74.7%) or very useful (25.9%) and would encourage other students to participate (92.6%). **Conclusions:** Schools/Colleges of Pharmacy should consider incorporating training on maternal mortality and pharmacists’ roles to better prepare students to counsel patients who are at high risk for maternal mortality.

**Students’ Perception of a Medicinal Chemistry Flipped Classroom Module in a First-Year Therapeutics Course**

Taha Alhayani, Thomas Solomon, Sarah Hierath, Lisa A. Daniel, Patricia R. Wigle, University of Cincinnati.

**Objective:** To determine student perceptions of a medicinal chemistry flipped classroom module in a first-year therapeutics course. **Methods:** Although medicinal chemistry is a required element of ACPE standards 2016, its coverage in therapeutics courses varies greatly from one college of pharmacy to another. A 15-minute video covering key medicinal chemistry concepts for dyslipidemia was created. A survey containing 12 questions was created in ExamSoft. In this survey, 9 questions were knowledge-based and 3 questions were qualitative and quantitative. The latter assessed student perceptions on preferred delivery method, whether the material **Results:** 90 students were enrolled in the course and 88 (98%) completed the survey. Students averaged 95% and 98% on the 6 multiple-choice and 3 fill-in-the-blank knowledge-based questions, respectively. Most students (69%) would prefer this material be delivered both in the pre-class video and in class prior to application. Forty-five percent of students would like this material to be assessed on an examination, in addition to a homework assignment. Seventy-eight percent of students would like more cardiovascular medicinal chemistry videos on other cardiovascular content in this module. **Conclusions:** Based upon performance on the survey questions and survey responses, more cardiovascular medicinal chemistry videos will be
utilized in this course and the assessment will continue to be via homework assignments.

The Ability of a College of Pharmacy to Utilize Parliamentary Procedure
April M Stelly, Bryan Donald, The University of Louisiana at Monroe.

Objective: Evaluate the knowledge and opinions of leaders within a college of pharmacy on the use of parliamentary procedure. Methods: Faculty and students within the ULM College of Pharmacy involved in leadership roles completed a survey and questionnaire. The survey assessed participants’ opinions on the use of parliamentary procedure, if they use it, and if they value its use. A ten-question questionnaire was administered to assess if participants knew proper parliamentary procedure to be able to utilize it during business meetings. Participants were excluded if they had a business or other degree that suggested enhanced knowledge of parliamentary rules. We viewed the data and assessed the correlation between the value of parliamentary procedure and the proper knowledge of utilizing it during a business meeting. Results: Data was analyzed using a McNemar test. Passing the quiz was defined as answering at least 6 of 10 questions correctly. Valuing Robert’s Rules of Order (RONR) was defined as a value Likert score of at least 3.0. Of the 14 respondents who passed, 4 (28.6%) valued RONR, compared with 6 (16.2%) of the 37 who did not pass (p = 0.454). Results express a lack of value in RONR, but also a lack of knowledge in its use. Conclusions: Utilizing proper parliamentary procedure is not always an easy task. This can lead to a lack of its use. Our data shows that members of a college of pharmacy do not value the use of RONR, but also are not able to utilize it correctly. This shows that more education is needed to enhance the quality of business meetings through proper parliamentary procedure.

The Impact of an E-Orientation Program on the New Pharmacy Student Orientation Process
Emily Kefer, Mario A Gutierrez, University of Houston College of Pharmacy, Greissy C Jerezano, University of Houston College of Pharmacy, Nekesa Sapp, University of Houston, Elizabeth P. Pitman, University of Houston, Matthew A. Wanat, University of Houston.

Objective: New pharmacy student orientations often contain a significant amount of information for incoming students to learn over a short period of time. In 2019, The University of Houston College of Pharmacy implemented a new e-orientation program (online) to supplement incoming student learning prior to the onsite orientation. The purpose of the study is to assess whether implementing an e-orientation prior to orientation week was effective in solidifying concepts of professionalism, campus policies, college resources, and student ability to effectively transition into the College of Pharmacy. Methods: E-orientation consisted of 10 online modules that were required for students to complete prior to orientation week, starting with the class of 2023. A survey was distributed to all pharmacy students in the class of 2022 (control) and 2023 (participated in e-orientation) after their orientation week. The survey asked for students to provide feedback regarding activities and topics covered during orientation week, and their level of comfort in transitioning into pharmacy school. Survey results will be compared between students who participated in e-orientation and students that did not to assess its impact. Student feedback was collected using a Likert scale (1 being strongly disagree, to 5 being strongly agree) and will be analyzed with an unpaired t-test (alpha = 0.05). Descriptive feedback was also obtained and will be reported. Results: Data analysis and results are pending. Conclusions: Pending.

The Outcomes of a Second-year Student Pharmacist Introductory Pharmacy Practice Experience on Patients’ A1c
Jasmine S Corn, Michelle B McElhannon, The University of Georgia, Ashley N. Hannings, The University of Georgia, Kay L. Brooks, The University of Georgia.

Objective: An introductory pharmacy practice experience was established to assist with a collaborative diabetes education service. Referred patients were educated by second-year student pharmacists on four individual diabetes self-care modules: Introduction to Diabetes, Nutrition and Exercise, Heart Disease, and Complications of Diabetes. After completion, follow-up appointments reviewed modules and evaluated metrics. During the IPPE pharmacists and second year student pharmacists provided medication reconciliation, education sessions, and recommendations. Patients’ A1c, blood pressure, weight and cholesterol levels were evaluated and documented. Methods: A retrospective review was conducted on all patients completing at least one session and having a follow-up A1c during 9/1/18 to 6/30/19. Minors were excluded. The primary outcome was change in A1c. Patients were stratified into two groups based on A1c at baseline: Poor diabetes control, defined by HEDIS as A1c >9%, and A1c<9%. Secondary outcomes include change in blood pressure, change in weight and change in low-density lipoprotein. A two-tailed paired t-test was used to evaluate data. Results: 44 patients met inclusion criteria. At baseline patients’ average age was 56.6 years old, 63.6% female and 63.6% African American. Patients completed an average of four modules. In patients with
baseline A1c ≥9%, the average A1c decreased from 11.2% to 7.6% (p<0.0001). In patients with baseline A1c <9%, the average A1c decreased from 7.27% to 6.7%. Significant Improvements in blood pressure, weight and lipids were also demonstrated. **Conclusions:** Interventions by second-year student pharmacists during an introductory pharmacy practice experience led to significant improvement in A1c, weight, systolic blood pressure and low-density lipoprotein. Studies should be repeated with larger sample sizes and more diverse patient populations.

**Trends in Gender and Race/Ethnicity of PharmD Students and Faculty in the US Pharmacy Schools**

Kaniz Afroz Tanni, Jingjing Qian, Auburn University.

**Objective:** To describe and compare the gender and racial/ethnic trends in PharmD students and faculty distribution in the schools and colleges of pharmacy accredited by Accreditation Council for Pharmacy Education (ACPE) in the US. **Methods:** Gender and racial/ethnic data for PharmD students and full-time faculty were obtained from the AACP Institutional Database, reported in the Profile of Pharmacy Faculty and Profile of Pharmacy Students for calendar year 2009-2018. PharmD students’ data were extracted for 3 cohorts including applications, enrollments and degrees conferred each year. Simple linear regression models were applied to test for trends in proportions of gender and racial/ethnic subgroups for full-time faculty, first professional degree applications, PharmD enrollments and PharmD degrees conferred. All analyses were conducted using SAS version 9.4 at significance level of p<0.05. **Results:** The percentage of female faculty increased from 45.5% in 2009 to 50.6% in 2018. Trends in proportion of female full-time faculty (p=0.004) and PharmD applications (p=0.004) and PharmD enrollments (p=0.002) significantly increased in 2009-2018, but the trend in female PharmD degrees conferred (p=0.142) remained stable at the same time. Regarding race/ethnicity, we found a significantly declining trend (p=0.027) in the proportion of African American/black but increasing trend (p<0.0001) in Asian/Hawaiian full-time faculty. Among PharmD applications, enrollments, and degrees conferred, trends in proportion of African American/black and Hispanic racial/ethnic groups all increased over time (all p<0.05). **Conclusions:** To better meet the education needs of PharmD students, we recommend implementation of effective diversity and inclusion strategies to increase the representations of in African American/black and Hispanic faculty in US Pharmacy Schools and Colleges.

**Use of Blended Learning to Teach the Evaluation of a Drug Information Paper Assignment**

Anna C. Aycock, Denise L. Walbranig Pigarelli, University of Wisconsin-Madison, Amanda Margolis, University of Wisconsin-Madison.

**Objective:** To assess the use of a blended course teaching the evaluation of student drug information paper assignments. **Methods:** A blended learning course was used to train pharmacists and pharmacy residents to evaluate student drug information paper assignments. The course required step progression in an online learning management system and involved videos and worksheets followed by a live teleconference. A survey was administered to participants following course completion. Change in grading confidence was measured through a post-retrospective question using a 5-point scale (1=poor to 5=excellent). Self-assessed ability to evaluate student skills was assessed using 11 questions and the same 5-point scale. Usefulness of the blended course delivery was assessed through 7 open-ended questions. **Results:** After course completion, 95.24% of participants (n=21) felt more confident in their overall ability to evaluate drug information papers (median increase 2 units; p<0.0001). Regarding self-reported skill in evaluating items including a PICO construct, an evidence-based answer, and appropriate citations the overall proportion reporting very good or excellent skills was 85.7% (range for individual skills 76.2% to 90.5%). Despite 53.4% of participants suggesting that a traditional in-person classroom lecture may have been easier to understand, 81% felt the program flexibility fit well with their other life responsibilities and 85.7% would recommend this program to their colleagues. **Conclusions:** Following completion of this blended course, participants had increased confidence in evaluating the drug information paper assignments. This blended program can be used as an example of how to design an effective assessment training for practicing pharmacists while being sensitive to learner’s time.

**Using PandemicTM as a Serious Game to Reinforce Infectious Disease Topics**

Boris K. Zhang.

**Objective:** The research team identified the infectious disease series, taught during fall semester of the PY3 curriculum, as a potential area where serious games could be beneficial. This project looks at the process of repurposing the board game PandemicTM as a serious game in the classroom to reinforce infectious disease topics from the curriculum. **Methods:** Game mechanics from the original game that went under review included game content, set-up, and play rules. New content created for the game included infectious disease topics with questions incorporating C. difficile, fungal infections, upper
respiratory tract infections, and hepatitis. Twenty-five questions per topic were created in order to generate a question bank. The goal was to simplify gameplay in order to focus on questions and discussions on infectious disease topics within two hours. **Results:** The resulting new serious game was a board game with PandemicTM mechanics that included multiple choice questions as its educational component. A new gameplay mechanic implemented was the rule: “In order to obtain the optimum number of “moves” that are utilized in the game for each player, the team must answer a question correctly per a facilitator’s supervision.” Two additional trial runs were done for quality improvement, and the last run was able to be completed by the players within two hours. **Conclusions:** With the advent of curriculums moving towards active-learning models, the use of serious games may be an essential supplemental learning tool within the classroom. Future plans for this board game include use with a pre-test and post-test of related ID subjects, incorporation of other infectious disease topics, and a survey on student perceptions on playing the serious game.

### We all Need Mentors! Evaluation of a Team-Based Junior Faculty Mentoring Program

Lana M. Minshew, Jackie M. Zeeman, University of North Carolina at Chapel Hill, Antonio Bush, University of North Carolina at Chapel Hill, J. Herbert Patterson, University of North Carolina at Chapel Hill, Jacqueline McLaughlin, University of North Carolina at Chapel Hill.

**Objective:** Faculty mentoring is recognized as an important component of professional development, with positive effects of job satisfaction (1) and productivity. (2,3,4) In 2006, the UNC Eshelman School of Pharmacy launched the Bill and Karen Campbell Faculty Mentoring Program (CMP). The purpose of this study was to evaluate CMP strengths and opportunities for improvement.

**Methods:** Data were collected from 46 stakeholders during 10 focus groups and 5 interviews in 2019. Stakeholders included Division Chairs, CMP mentors, CMP mentees (i.e. junior faculty), CMP graduates (i.e. mid-career faculty), and mid-career faculty who did not participate in CMP. Thematic coding was used to identify semantic themes from each stakeholder group. (5) **Results:** Three overarching themes were identified: structure, mentoring, and expansion. The formal structure of the program (e.g. monthly seminars, annual progress meetings) was seen as critical for ensuring mentee engagement and appropriate progression. CMP mentees identified CMP mentors as the most valuable aspect of the program while mentors and Division Chairs emphasized the importance of mentor/mentee fit. Stakeholders widely acknowledged that mentoring is needed for associate professors and discussed strategies for expanding the CMP program to include mid-career faculty. **Conclusions:** Faculty recruitment and retention are critical for schools of pharmacy and universities. This study suggests a structured team-based mentoring program that combines monthly seminars with individual mentoring sessions offers numerous benefits to junior faculty. Additionally, mentoring and support for mid-career faculty may be critical for supporting associate professors as they embrace new responsibilities such as administrative and leadership roles.

### What Does it Mean to Live with Asthma as a Young Adult?

Ruth N. Jeminiwa, Bidur Banjara, Md M Rahman, Kimberly B. Garza, Auburn University, Chiahung E Chou, Auburn University, Ana Franco-watkins, Brent Fox, Auburn University.

**Objective:** Young adults have unique challenges in asthma management because of their developmental phase. Health programs directed at this population must consider the challenges faced by this demographic. Yet, little is known about the experience of living with asthma as a young adult. Our objective was to uncover what it means to live with asthma as a young adult using a systematic literature review and qualitative meta-synthesis.

**Methods:** PubMed, CINAHL, and PsycINFO were searched from database creation to March 2019 by two researchers independently. Additional articles were identified through a high sensitivity search of Google Scholar. Qualitative and mixed methods studies describing the experience of living with asthma as a young adult (ages 18-29) were included. Preferred reporting items for systematic reviews and meta-analysis guideline was followed. The rigor of included studies was assessed using the MMAT Tool. Study findings were coded by two researchers independently. A grounded theory approach was used for data analysis and synthesis. **Results:** Seven high quality studies were identified with scores ranging from 75-100%. Five concepts related to “living with asthma as a young adult” emerged: 1) Needs (e.g., information on weather), 2) Barriers (e.g., decreased parental support), 3) Enablers (e.g., knowledge of asthma management), 4) Behaviors (positive eg, taking medication as prescribed; negative behaviors eg, stopping medications when better), and 5) Outcomes (disease, interpersonal, and personal outcomes). When needs are met, enablers are present, and barriers are removed, young adults are more likely to exhibit positive behaviors with desired outcomes. **Conclusions:** Young adults have several needs, barriers, enablers, behaviors, and outcomes as a result of living with asthma. Our findings may be leveraged to develop programs targeting young adults.
What Makes You a Pharmacist? Pharmacy Students’ Perceptions of Their Professional Identity.
Janet H. Cooley, The University of Arizona, David Rhys Axon, The University of Arizona, Jonathan Chien.

Objective: The purpose of this study is to identify and describe the self-perceptions of professional identity in student pharmacists located at one public pharmacy school in the southwestern United States. An established clear professional identity plays an essential role in the student pharmacists’ integration into the workforce and development of connection towards the pharmacy profession. Methods: This is a multi-methods study. An electronic survey will be administered to full-time pharmacy students. Based on Elvey et al.’s work, the survey will ask students to determine their level of agreement with a variety of professional identity descriptors that best describes their professional identity, describe their academic mentorship, work history, education level, and other demographic variables. The data will be analyzed using Kruskall-Wallis. Results: Preliminary findings will be presented at the AACP Annual Meeting in Long Beach California, July 2020. Conclusions: Since we do not have results yet, we cannot make conclusions.