EUGENE APPLEBAUM
COLLEGE OF PHARMACY
& HEALTH SCIENCES

17th Annual Research Day

Wednesday, October 14, 2020

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Organizing Committees

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Agenda

10:00 a.m.	**Welcome** Catherine Lysack, Ph.D., Interim Dean
10:10 a.m.	**Housekeeping** Diane Adamo, Ph.D., M.S., OTR
10:15 a.m.	**Keynote Address** Introduction: Sara Maher, PT, PhD Keynote Address: James Thomas, PT, PhD
10:50 a.m.	**Q&A with James Thomas**
11:00 a.m.	**Presentation of Awards** STUDENT RESEARCH AWARDS Paul E. Kilgore, MPH, MD, FACP College Research Committee Chair FACULTY RESEARCH AWARDS Paul E. Kilgore, MPH, MD, FACP College Research Committee Chair

Keynote Speaker: James Thomas, PT, PhD

A professor of physical therapy at Virginia Commonwealth University, James Thomas's primary research focus is on how the central nervous system controls patterns of movement in a kinematically redundant system in healthy individuals and in those individuals with orthopedic or neurological impairments.

He earned his B.S. in Physical Therapy at St. Louis University and his Ph.D. in Kinesiology at the University of Illinois at Chicago. After 12 years of clinical experience in orthopedics, he joined Ohio University to teach and initiated the Ohio Musculoskeletal and Neurologic research Institute. He brings an innovative virtual reality research initiative to VCU. The Motor Control Lab (MCL), under the direction of Thomas, has been funded by the NIH since 2004. The primary focus of the MCL is to better understand control of trunk movements and how various orthopedic or neurologic impairments alter that control. He uses state of the art technology, equipment, facilities, and strong research methods to investigate back pain. In addition to offering a creative option to physical therapy treatment in the DPT program, he adds a new dimension to the Ph.D. in Rehabilitation and Movement Science.

Abstracts

Faculty

ABSTRACT NO. F01	
Name	Jeannetta Greer
Category	Faculty
Title	Radiation Therapists Keeping Our Compassion
Authors	Jeannetta M. Greer, M.S., B.S.R.T (T)
Abstract	Introduction: Radiation therapists are highly skilled healthcare workers that operate high tech treatment machines to localize and treat malignant and nonmalignant disorders. Provision of emotional support is a key component of care that complements highly skilled technical skills. Objective(s): The purpose of the study is to gain a better understanding of the role of compassion and how it is integrated into clinical care, specifically for cancer patients. Methods: A literature search was conducted to gain a historical and current perspective about the role of compassion. Results: The role of the radiation therapist is described in terms of technical skills, how they demonstrate compassion and the specific benefits of compassion to the patient and the radiation therapist. Conclusion: Compassion is a critical part of clinical care. Efforts to enhance clinical care is even more important at time when we are encouraged to remain distant from each other.

Postdoctoral Scholars

ABSTRACT NO. PD01	
Name	Lena Farhat, PharmD
Category	Pharmaceutical Sciences Graduate Programs
Title	Evaluation of Physician, Pharmacist, Nurse and Patient Agreement on Key New Medication Counseling Points
Authors	Lena Farhat, PharmD; Nedeen Berry, PharmD Candidate; David Sengstock, MD, MS; Rajiv John, MD; Anne Prouty, MSN; Sean McConachie, PharmD
Abstract	Introduction: Research shows that healthcare providers communicate limited information to patients when counseling on medications in both hospital and ambulatory settings. Additionally, research shows that patients often have differing opinions on the relative importance on certain aspects of patient counseling (i.e. side effects) than providers. There are limited studies in the literature assessing differing viewpoints on important elements of patient education and current medication counseling guidelines are paternalistic and do not take into account patient perspectives. Objective(s): Determine the areas of agreement and disagreement between physicians, nurses, pharmacists and patients in the relative importance of counseling points discussed during medication education. Methods: This study is a cross-sectional, quantitative survey to evaluate the beliefs of nurses, pharmacists, physicians and general medicine inpatients regarding major counseling points that are discussed during medication education at Beaumont Hospital, Dearborn. A 15-item electronic survey including demographic and counseling-based questions was developed and will be administered from September 1, 2020 through December 31, 2020. Counseling-based questions will require respondents to rank common counseling points (such as medication name, dose, cost, storage considerations, etc.) into three categories: “very important,” “somewhat important,” and “least important.” Statistical analysis will be performed to assess differences between groups with respect to their opinions and rankings of medication counseling points. The study will target a sample size of 250 respondents to detect a significant difference between groups at a significance level of $p < 0.05$. Results: Pending Conclusion: Pending

ABSTRACT NO. PD02	
Name	Jitender Gaddameedi
Category	Pharmaceutical Sciences Graduate Program
Title	Discovery of Highly Potent and Selective Ku-targeted DNA-PK Inhibitors for Treatment of Cancer
Authors	Jitender Dev Gaddameedi[1], Pamela VanderVere-Carozza[2], Tyler L. Vernon[2], Katherine S. Pawelczak[3], Leslyn A. Hanakahi[4] John J. Turchi[2,3] and Navnath S. Gavande[1,3]*
Abstract	Introduction: Cancer is one of the leading causes of death and death rate per decade drastically enhancing and the resistant to drug treatment leads to a serious issue. Targeting DNA repair and the DNA damage response for cancer therapy has gained increasing attention with the recent U.S. FDA (December 2014) approval of the poly-ADP ribose polymerase (PARP) inhibitor olaparib (Lynparza, AstraZeneca) as the first DNA repair targeting agent for cancer treatment. DNA double strand breaks (DSBs) are the most cytotoxic of DNA lesions. NHEJ pathway is responsible for the repair of majority of ionizing radiation (IR) induced DNA DSB. The DNA dependent protein kinase (DNA-PK) is a validated target for cancer therapeutics and to date, development of inhibitors for DNA-PK has focused on targeting the active site with ATP mimetics. Our current research is focusing on the unique and innovative approach to inhibiting DNA-PK via blocking the Ku70/80 heterodimer interaction with DNA, an essential step in DNA-PK activation and phosphorylation activity. Objective(s): Our goal is to identify drug-like lead molecules by developing the SAR study and synthesize a series of highly potent and specific DNA-PK inhibitors to treat various cancer. Methods: Structure-based drug design, multi-step synthesis, SAR, Electrophoretic mobility shift assay (EMSA), DNA Intercalation Fluorescence Displacement Assay, Thermal Shift assay and Cellular studies Results: We have successfully developed highly potent and selective DNA-PK inhibitors by targeting Ku-DNA interactions. Conclusion: Our novel DNA-PK inhibitors reduce NHEJ catalyzed DNA DSB repair *in vitro* and in cell culture models. Synthesis of new series and Structure-activity relationships (SAR) is underway to develop highly potent drug-like Ku inhibitors.

ABSTRACT NO. PD03	
Name	Yi-Ling Hu, MSOT, PhD
Category	Postdoctoral Scholar
Title	Change in Frailty Status Predicts Fall Risks among Older Mexican Americans
Authors	Yi-Ling Hu, MSOT, PhD; Heather Fritz, MSOT, PhD, OTR/L
Abstract	Introduction: Fall is a serious public health concern for older adults. Mexican American (MA) older adults have higher fall rates compare to their White and Black peers. Frailty is one of the predictors of falls but the relationship between frailty status conversion and fall risk among MA is unclear. Objective(s): To examine the relationship between frailty status change and fall risks among older Mexican Americans. Methods: We used data from the Hispanic Established Populations for Epidemiologic Studies of the Elderly (EPESE) Frailty Study. Frailty was measured by the frailty index. Three levels of frailty status change (improved, maintained, or worsen) were computed from the frailty index in wave 2006/2007 and 2008/2009. Fall risk was categorized into low, moderate, and high based on the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) algorithm. The algorithm incorporated the number of falls in the past year, fear of falling, and mobility measured by the Short Physical Performance Battery measured in 2008/2009. Results: Multinomial logistic regression was used to estimate the association between frailty status change and fall risk while controlling for other fall risk factors such as age, gender, faller/non-fallers status, and mobility at baseline. The results showed all levels of fall risk were predicted by worsen frailty status change (low fall risks OR = 5.6, CI=1.6–19.4; moderate fall risks OR = 12.1, CI=3.1–48.3; high fall risks: OR = 13.1, CI=3.2–53.4). Conclusion: Fall prevention should include annual frailty status screening and attention to those who maintained frailty status for fall prevention among older Mexican Americans.

ABSTRACT NO. PD04	
Name	Abdalhamid Lagnf, MBChB, MPH
Category	Postdoctoral Scholar
Title	Daptomycin or Linezolid Monotherapy versus Daptomycin or Linezolid Combined with a Beta-lactam for the Treatment of Vancomycin-resistant Enterococcus faecium Bacteremia
Authors	TAYLOR MORRISETTE, PharmD; SARA ALOSAIMY, PharmD, BCPS; MICHAEL RYBAK, PharmD, MPH, PhD1
Abstract	Introduction: Mortality rates after the onset of enterococcal bacteremia range from 20% to 50%. The prevalence of vancomycin-resistant enterococci (VRE) has increased in the U.S. Approximately 80%–95% of Enterococcus faecium isolates are vancomycin-resistant. There is limited clinical evidence to support daptomycin (DAP) or linezolid (LZD) monotherapy (MT) versus DAP or LZD combined with a beta-lactam (BL) for treatment of VRE bloodstream infections (BSI). Objective(s): To determine if CT group results in improved clinical outcomes compared with MT group. Methods: A retrospective cohort study of adults ≥ 18 years treated with DAP or LZD for VRE-BSI during 2010-2020 at Detroit Medical Center. Monotherapy (MT) was defined as DAP or LZD within 72 hours of index culture and no BL for ≥ 24 hours up to 96 hours following DAP/LZD initiation. Combination therapy (CT) was defined as DAP or LZD plus any BL for ≥ 48 hours within 72 hours of index culture. Primary outcome was composite endpoint of clinical failure defined as: (1) 30-day mortality and/or (2) 60-day recurrence. Secondary outcomes included in-hospital mortality and hospital length of stay following BSI onset (LOS post-BSI). Bivariate and multivariable analysis were used to determine the impact of therapy on outcomes. Results: A total of 115 patients were included, 66 in the MT group and 49 in the CT group. The median (IQR range) age of the study population was 63 (IQR: 50-72) years, (51%) were women, and (67.0%) were African-American. The median (IQR range) Charlson comorbid index, and Apache II score were 7 (4-9) and 22.5 (15.7-30), respectively. The median DAP dose was 9.5 mg/kg (IQR: 7.8–10). The median duration of BL combination was 6 (IQR: 4–8) days. Active BSI at start of study drug MT 48.5% vs CT 71.4%. The primary sources of VRE-BSI were intravenous catheter 30.4%, gastrointestinal tract 21.7%, and urinary-related 19.1%. CT was associated with reduced odds of clinical failure (unadjusted odds ratio, 0.466; 95% confident interval, 0.219-0.990). There was no difference in the secondary outcomes. In multivariable analysis, APACHE II score (aOR 3.4, 95% CI 1.2-7.8) and chronic kidney disease (aOR 3.0, 95% CI 1.2-9.4) were associated with composite clinical failure. Conclusion: Composite clinical failure was lower in the CT group compared to MT group in bivariate analysis. However, APACHE II score and chronic kidney disease were independently associated with composite clinical failure. Results must be interpreted with caution due to the retrospective design of the study and limited sample size.

ABSTRACT NO. PD05	
Name	Taylor Morrisette, PharmD, MPH Candidate
Category	Postdoctoral Scholar
Title	Preliminary, Real-World, Multi-Center Evaluation of the Clinical Effectiveness and Safety of Omadacycline in Patients Treated for Mycobacterium abscessus
Authors	Taylor Morrisette, PharmD, MPH Candidate; Sara Alosaimy, PharmD, MPH Candidate; Julie V. Philley, MD; Carly Wadle, BS; Catessa Howard, PharmD; Andrew J. Webb; PharmD; Michael P. Veve, PharmD; Melissa L. Barger, MD; Jeannette Bouchard, PharmD; Tristan W. Wore, PharmD Candidate; Abdulhamid M. Lagnf, MPH; Iman Ansari, MPH Candidate; Carlos Mejia-Chew, MD; Keira A. Cohen, MD; Michael J. Rybak, PharmD, MPH, PhD
Abstract	Introduction: Nontuberculous Mycobacteria are resistant to most antimicrobials and lead to significant morbidity/mortality. Mycobacterium abscessus complex are the most drug-resistant/pathogenic of rapidly growing Mycobacteria and are very challenging to treat, partly owing to extensive/expensive treatment durations. Omadacycline (OMC) is an aminomethylcycline available in an oral formulation. Due to recently reported in vitro activity of OMC against M. abscessus, it was expected that the medical community would have curiosity in its use for these infections. However, limited-to-no reports have evaluated the real-world outcomes of patients treated with OMC for M. abscessus infections. Objective(s): Describe preliminary, real-world experience of OMC for treatment of M. abscessus to evaluate its effectiveness and safety. Methods: Multicenter, observational evaluation at six geographically distinct medical centers between January-August 2020. Inclusion criteria: patients ≥18 years with M. abscessus positive culture and clinical suspicion for infection who received OMC for ≥3 months with ≥3 months of documented follow-up. The primary outcome was early clinical success, defined as survival, and lack of clinical/radiographic worsening, alteration of OMC therapy due to concerns for failure, microbiologic relapse, and culture persistence. Secondary objectives included reasons for OMC utilization and incidence of adverse effects. Descriptive statistics were utilized for analysis. Results: 12 patients met inclusion criteria (median (IQR) age: 58 (55-62) years, 50.0% female, 91.7% Caucasian). The sources of infection were primarily of pulmonary origin (58.3%). The total median duration of OMC was 6.2 (5.0-9.5) months, with duration of follow-up being 5.1 (3.5-6.4) months. Clinical success occurred in 75.0% of cases. The primary reasons for OMC utilization were due to antimicrobial resistance (66.7%), previous antibiotic failure (50.0%), and due to oral bioavailability (50.0%). Three patients experienced an adverse effect while on therapy. Conclusion: We report the largest analysis on the effectiveness/safety of treatment with OMC for M. abscessus. Prospective studies are urgently needed.

ABSTRACT NO. PD06	
Name	Mohd Ahmar Rauf, Postdoc
Category	Postdoctoral Scholar
Title	Dual targeted Nanoparticles enhanced Pancreatic Ductal Adenocarcinoma Diagnosis and Therapy
Authors	Rami Alzahrani, PhD Candidate; Mohd Ahmar Rauf#, PhD, PostDoc; Katyayani Tatiparti, PhD candidate, Samaresh Sau, PhD, Senior Research Scientist; and Arun K. Iyer*, PhD, Associate Professor
Abstract	Introduction: PDAC is the fourth highest cause of cancer-related death in the United States. PDAC represents one of the most challenging cancer due to its pathological characteristics, such as dense desmoplastic tissue with >90 % tumor stroma.CD44+ biomarker, c-Met,a surface biomarker that plays a pivotal role in pancreatic cancer development and tumorigenesis. Taking together, positive CD44+ and c-Met receptors are novel targeting biomarkers that can be utilized for drug development. Objective(s): We developed a dual-targeted polymeric nanoparticles (DTNPS) that can target the overexpressed CD44+ and c-Met. The DTNPs was designed to penetrate the pancreatic cancer stromal barrier and deliver the imaging agent deep to the core of the tumor. On the tumor tissue level, the co-localization study was carried out to evaluate the DTNPs localization with both CD44 and c-Met receptors using immunohistochemistry study (IHC). Methods: The efficiency of the imaging agent was tested on orthotopic PDAC model followed by studying the bio-distribution in different organs. Immunohistochemistry used to study the co-localization of the imaging agent with overexpressed CD44+ and c-Met+ tumor. In vitro and In vivo activity assessment of chemotherapeutic agent conjugated to dual-targeted nanoparticles compared to free drug. Results: The results demonstrated selective accumulation of the NIR dye anchored dual targeting ligand in CD44 and c-Met positive PDAC tumor. Our findings indicated that the tumor/liver ratio intensity of NIR dye anchored DTNPs is 7 folds higher than free dye. Gemcitabine conjugated DTNPs (GemDTNPs) showed better cytotoxic killing activity on AsPc-1 cell line compared to commercial gemcitabine.The tumor inhibition growth study showed better tumor regression after using GemDTNPs. Conclusion: Synthesis of a new dual targeting conjugate and demonstrate its utility in constructing nanoplatform for imaging and therapy of PDAC. The tumor inhibition growth study showed better tumor regression after using GemDTNPs + Everolimus with no significant effect on the liver/ kidneys enzymes (ALT, AST, and creatinine).

Health Sciences Graduate Programs

ABSTRACT NO. H01	
Name	Patricia Ader, SPT
Category	Health Sciences Graduate Programs
Title	Promoting Health and Wellness: Impact of Service-Learning on DPT Students
Authors	Patricia Ader, SPT; Samantha Bambach, SPT; Rachel Payne, SPT; Jennifer Dickson, PT, DPT, OMPT; Sara Maher, PT, DScPT, OMPT
Abstract	Introduction: PT's are well positioned to be leaders in health promotion and wellness, yet literature shows addressing physical activity habits with all patients is not routine clinical practice. Objective(s): The purpose of this study was to determine if integrating a health and wellness service-learning project into a DPT education program changed students' interest and confidence in addressing healthy lifestyle choices and behavior modification. Methods: A quasi-experimental repeated measures design was used. Thirty-six third year DPT students participated in service-learning wellness workshops at a low-income housing co-op. Prior to the workshop, each subject completed a 15-question survey to document level of interest and confidence in participating in a health promotion and wellness community activity. Subjects then developed and delivered a wellness workshop on an assigned topic. After completion of the project and workshop, each subject completed the survey again. Statistical analysis was performed using descriptive statistics to summarize demographic information. Wilcoxon Signed Ranks Tests were conducted to determine the direction of change and relative difference for questions of interest and confidence between the pre- and post-surveys. Frequencies were used to compare the responses of questions relating to beliefs, attitudes, and perceptions for the pre- and post-surveys. Data was analyzed with a significance set at $p < 0.05$ (0.007 with Bonferroni-type adjustment). Results: Statistical significance was found for each of the 6 questions relating to student's confidence in addressing healthy lifestyle choices and behavior modification. No significance was found for student's interest; interest was high prior to and after the service-learning project. Conclusion: DPT student's confidence in addressing healthy lifestyle choices and behavior modification as an entry-level physical therapist is improved with a dedicated opportunity to practice these skills during the entry-level program. Further research is needed to determine if these focused opportunities translate to increased health education in physical therapy clinical practice.

ABSTRACT NO. H02	
Name	ERIKA BEALS MOT-S
Category	Health Sciences Graduate Programs
Title	Impact of peer-navigation services on the quality of life of aging caregivers of adults with disabilities: Preliminary analyses
Authors	Erika Beals, MOT-S; Preethy Samuel, PhD; Sharon Milberger, ScD; Christina Marsack, PhD; Elizabeth Janks, LMSW, ACSW; Julia Hernandez, MA; Michael Bray, MA, EdS.
Abstract	Introduction: Aging family caregivers often negotiate their declining health challenges while balancing demands of caregiving for their adult offspring with I/DD. The goal of the Michigan Older Caregivers of Emerging Adults with Neurodevelopmental Disabilities (MI-OCEAN) Family Support Project is to improve the health and well-being of aging family caregivers of adults with I/DD in Michigan using a community based-model of peer support. Project funded by the Michigan Health Endowment Fund. Objective(s): The purpose of this project is to analyze the quality of life (QOL) of aging of caregivers of individuals with NDD before and after receiving peer-navigation services through the MI-OCEAN project. Methods: Data was extracted from an ongoing mixed-methods project in which all participants had self-administered an online survey (Qualtrics) to measure the health and well-being of the caregivers and the care-recipients. The sample of interest for this study comprised 71 pre-tests and 21 post-test surveys completed by July 2020. Each participant received $20 after completing pre-test and $30 after post-test assessment. Caregiver QOL was measured using the WHO-QOL BREF which comprised four domains (Physical, Psychological, Social, Environmental) and an overall QOL item measured on a 5-point rating scale. Independent sample T-tests were ran using SPSS version 26.0 to examine if the caregiver's QOL had improved as a result of participating in the project. Results: The slight increase in the caregiver's QOL overall and in the four domains did not approach statistical significance. Item-level analysis indicated that four (satisfaction with self, personal relationships, sleep, and ability to concentrate) of the 25-items in the BREF QOL scale showed significant improvement at post-test. Conclusion: Despite lifestyle changes forced on families due to the pandemic, it is interesting to note that caregivers reported better QOL in the domains of physical (ability to sleep) and psychological (satisfaction with self, personal relationships, and ability to concentrate) functioning.

ABSTRACT NO. H03	
Name	Amy Blicharski, SPT
Category	Health Sciences Graduate Programs
Title	Successful Generation of Human Muscle Fibers in Host Mice
Authors	Olivia Kostadinovski; Leila K. Poncedeleon; Angela S. Vettori; Barbara J. Rosso-Norgan; Sujay S. Galen; Renuka Roche; Morium Begam; and Joseph A. Roche
Abstract	Introduction: Muscle generating stem cells known as satellite cells are necessary for muscle regeneration. Objective(s): To test the hypothesis that Minimally Invasive Muscle Embedding (MIME) promotes the development of functional human muscle fibers in a host mouse. Methods: We studied eight host mice (immunodeficient, green-fluorescent protein- expressing, males). Of these, we assigned four mice to the experimental MIME group, and four mice to a sham procedure (SHAM) group. For MIME, we implanted 10-12 mg of human cadaveric donor muscle into the left TA muscle in each host mouse. For the SHAM group, we did not implant donor tissue. In both MIME and SHAM groups, we injected the left TA muscle with a muscle-toxin (barium chloride, 1.2% BaCl2, 60 µl) to stimulate regeneration. We studied recovery of contractile function longitudinally for 12 weeks with a rodent isokinetic dynamometer. After 12 weeks, we euthanized the animals, harvested and froze their tissues with liquid nitrogen, and then made sections of muscle for histological analyses. Results: Both MIME and SHAM TA muscles recovered contractile force to pre-procedure levels ($p>0.05$), although at 1, 2, 3, 4 and 6 weeks, MIME TA muscles produced lower contractile force than SHAM TA muscles ($p<0.05$, ANOVA and SNK post-hoc comparisons). Histological studies of muscle sections revealed that in the MIME group, 21±2% (mean±S.D.) of the host mouse TA muscle was comprised of muscle fibers that were positive for human mitochondria, human nuclei and human spectrin. Conclusion: MIME is effective in promoting the development of human muscle fibers of cadaveric origin in host mice.

ABSTRACT NO. H04	
Name	Lauren Buckel, SPT
Category	Health Sciences Graduate Programs
Title	Expected vs Experienced Challenges Transitioning from Clinician to Academia: A Pilot Study
Authors	Lauren Buckel, SPT; Murant Delli, SPT; Erik Nowak, SPT; Nathan Champoux, SPT; Greg Walker, SPT; Kristina Reid PT, DPT, MS, C/NDT; Jennifer Dickson, PT, DPT, OMPT; Sara Maher, PT, DScPT, OMPT; Mary Anne Stewart, EdD, MLS (CSMLS)
Abstract	Introduction: Projected growth for health specialty teachers is faster than average. The need for qualified professionals to fill new job openings continues to rise and some fields recruit from practicing clinicians to address shortages. Current literature indicates there are considerable disparities between clinical practice and educational instruction, which pose significant challenges to clinicians as they transition into academia. Objective(s): The purpose of this study is to understand expected versus actual challenges experienced as a clinician transitions into the role of a health science educator. The findings may reinforce the need for supportive services for new faculty and may provide information on how to better assist clinicians as they transition to health science educators. Methods: Participants were recruited by contacting program directors within EACPHS at WSU via email to identify newly hired faculty. Participants received an email containing the initial questionnaire. A follow up questionnaire was sent to participants 6 months after the initial survey was completed. Data was analyzed using descriptive statistics and Wilcoxon Signed Ranks Test. Results: There were no significant differences between initial and follow up survey results. Based on initial and follow-up survey means, participants rated balancing teaching responsibilities with other educational responsibilities as the most challenging, while developing positive instructor-student relationships was rated least challenging. Conclusion: Challenges clinicians expect to experience as they transition to health science educators were not significantly different from actual challenges experienced after 6 months as educators. Three questions warrant further investigation, as challenge with time management skills, accreditation standards and procedures, and creating instructional materials had the greatest change. New faculty may want to seek mentors to assist them with the challenges transitioning from clinician to educator.

ABSTRACT NO. H05	
Name	Janela Castillo, SPT
Category	Health Sciences Graduate Programs
Title	The effectiveness of deep breathing in the reduction of test anxiety and subjective workload: A comparative study
Authors	Janela Castillo, SPT; Brianna Gallon, SPT; Lindsay Schuller, SPT; Karen Timm- Lenning, SPT; Kristina Reid, PT, DPT, MS, C/NDT; Fredrick Pociask, PT, PhD, MSPT, OCS, OMT, FAAOMPT; Sara Maher, PT, DScPT, OMPT
Abstract	Introduction: During stress, corticosteroid levels rise producing shallow breathing, lower blood oxygen levels and increased heart rate. These responses can impair declarative memory, concentration and learning. Deep breathing techniques have been shown to decrease heart rate, improve oxygen saturation, promote relaxation and reduce anxiety. Objective Clinical Structured Examinations (OSCE) utilized in Doctor of Physical Therapy (DPT) programs, produce increased testing anxiety in students. Objective(s): The purpose of this randomized controlled trial was to test the efficacy of deep breathing techniques for reducing test anxiety and decreasing cognitive workload during OSCEs in DPT students. Methods: Participants completed a demographic survey (biographical information, anxiety coping skills, and health questions) and the State Trait Anxiety Index (STAI) several weeks before OSCEs. The STAI examined emotional state related to anxiety as well as general states of calmness, confidence, and security. On the day of the OSCE, participants completed the STAI and had heart rate and pulse oximeter measurements taken. Participants were then randomly assigned into two groups. One group participated in five minutes of deep breathing using the Breathe2Relax app while the other group spent time as they normally would prior to examination. Immediately following the OSCE, participants completed the STAI, NASA-TLX, and instructional difficulty questionnaires. Heart rate and oxygen saturation were again measured. Results: The control group had a significantly decreased STAI score post-OSCE, while the intervention group showed no significant difference. This change was not clinically significant, as the scores for both groups fell within the moderate anxiety range both pre- and post-OSCE. The intervention group had a significantly lower NASA-TLX score post-OSCE indicating lower cognitive load during the OSCE compared to the control group. Conclusion: Physical Therapy programs should consider utilizing deep breathing interventions prior to OSCEs, although further research is needed to determine the ideal implementation.

ABSTRACT NO. H06	
Name	ERIN EDWARDS, BS
Category	Health Sciences Graduate Programs
Title	Backward Walking & Dual-Task Assessment Improve Identification of Gait Impairment in MS
Authors	E Edwards; D Kegelmeyer; A Kloos; M Nitta; D Raza; D Nichols-Larsen; N Fritz
Abstract	Introduction: Individuals with multiple sclerosis (MS) experience deficits in motor and cognitive domains, resulting in impairment in dual-task walking ability which may lead to injurious falls. The current FW dual-task assessment primarily rely upon forward walking measures which face limitations in detecting underlying ability and predictive validity for fall risk. Objective(s): The objective of this study was to compare performance of forward walking and backward walking in single- and dual-task conditions in persons with MS to age- and sex-matched healthy controls. We also examined relationships between forward and backward walking to cognitive function, balance, and retrospective fall reports. Methods: In a single session, spatiotemporal gait measures for forward and backward walking in single and dual-task conditions were collected. We a priori chose to evaluate velocity (m/s), stride length (m) and double support time (s) and these variables have been linked to balance in MS, elderly and other neurologic diseases. Clinical measures of mobility, cognition, balance and retrospective falls were also collected. A 2 × 2 × 2 mixed model ANOVA was used to compare differences in forward and backward walking in single- and dual-task conditions between MS and healthy controls. Spearman correlations were used to examine relationships between gait and cognitive function, falls, and balance. Results: Eighteen individuals with relapsing-remitting MS and 14 age- and sex-matched healthy controls participated. Backward walking velocity revealed significant differences between groups for both single-task (p=0:015) and dual-task (p=0:014) conditions. Persons with MS demonstrated significant differences between single- and dual-task forward and backward walking velocities (p=0:023; p=0:004), whereas this difference was only apparent in the backward walking condition for healthy controls (p = 0:004). In persons with MS, there were significant differences in double support time between single- and dual-task conditions in both backward (p < 0:001) and forward (p = 0:001) directions. More falls at six months were significantly associated with shorter backward dual-task stride length (r = −0:490; p = 0:046) and slower velocity (r = −0:483; p = 0:050). Conclusion: Differences in MS and age and gender-matched healthy controls are more pronounced during backward walking compared to forward walking under both single and dual-task conditions. Backward walking and backward walking dual-task assessment may provide additional tools that are clinically feasible and cost-efficient to supplement the current standards of forward walking assessment. Future work with a larger sample size is needed to validate the clinical utility of backward walking and dual-task assessments and mitigate the limited accuracy of the current dual-task assessments that primarily rely upon forward walking.

ABSTRACT NO. H07	
Name	Hussein Elhaj
Category	Health Sciences Graduate Programs
Title	PERCEIVED CONSUMPTION OF A HIGH DOSE CAFFEINE DRINK DELAYS NEUROMUSCULAR FATIGUE
Authors	Hussein Elhaj, Osama Imam, Brad Page, Joseph Vitale, and Moh H. Malek, PhD
Abstract	Introduction: The placebo effect is a concept in which a desired outcome arises mainly from the belief that the treatment (i.e., supplement or drug) was beneficial even though no active ingredient was given. The results of studies related to the placebo effect primarily examine functional performance. What remains unanswered, however, is whether these changes in performance are associated with neuromuscular alterations in the exercised muscles. Objective(s): The purpose of the study, therefore, was to determine the influence of the placebo effect on the electromyographic fatigue threshold (EMGFT) for a continuous exercise paradigm. To achieve this aim, subjects were told that they were participating in a study to determine the dosage response (low or high) of caffeine on neuromuscular fatigue when in fact no caffeine was given during the experiment. We hypothesized that the perceived consumption of the high dose caffeine drink would result in a higher EMGFT compared to the perceived consumption of the low dose caffeine drink and placebo. Secondarily, we hypothesized that the perceived consumption of the high-dose caffeine drink would result in a higher power output compared to the perceived consumption of the placebo. Methods: Nine healthy college-aged men [mean ± SEM: age, 25.7 ± 1.3 y; body mass, 84.4 ± 3.1 kg; height: 1.82 ± 0.02 m] volunteered to be in the study. For each of the visits, subjects were given an 8 oz. bottle of water with dissolved crystal light. After the drink was consumed, subjects rested in the laboratory for 1 h prior to performing the incremental single leg knee extensor ergometry. Immediately after the termination of the incremental single leg knee extensor ergometry, the subject was asked which caffeine dose (placebo, low, or high) they believed they consumed for that visit. Results: There were no significant mean differences for maximal power output for the three perceived conditions [placebo: 62 ± 3; low dose caffeine: 62 ± 4; high dose caffeine: 65 ± 3 W]. When the subjects perceived consuming the high-dose caffeine drink, there were significant mean differences (all p values < 0.01), for EMGFT, between the other conditions [mean ± SEM: placebo: 23 ± 3 W; low-dose caffeine: 26 ± 2 W; high dose caffeine: 42 ± 3 W]. This corresponded to a significant mean difference (all p values < 0.01) when the EMGFT was presented as a percentage of the maximal power output [mean ± SEM: placebo: 37 ± 5%; low-dose caffeine: 42 ± 3%; high dose caffeine: 64 ± 3%]. Conclusion: The application of our results may indicate that the subject's expectancy, to caffeine consumption, plays a critical role in delaying the onset of neuromuscular fatigue despite not receiving any caffeine in their drinks.

ABSTRACT NO. H08	
Name	Alexa Gazda, SPT
Category	Health Sciences Graduate Programs
Title	Dual Task Cost of Walking While Texting in Persons with Multiple Sclerosis: A Pilot Study
Authors	Alexa Gazda, SPT; Hanna Alzoubi, SPT; Anthony Davey, SPT; Alanna Farrugia, SPT; Nora Fritz, PhD, PT, DPT, NCS; Diane Adamo, PhD
Abstract	Introduction: Multiple Sclerosis (MS) is progressive neurodegenerative disease of the central nervous system that causes cognitive and motor dysfunction resulting in difficulty performing dual-tasks (two tasks at once). Multiple Sclerosis (MS) is progressive neurodegenerative disease of the central nervous system that causes cognitive and motor dysfunction resulting in difficulty performing dual-tasks (two tasks at once). Objective(s): The aim of this study was to investigate the dual task cost during both (manual texting while walking (MTW)) and (verbal texting while walking (VTW)), and (talking while talking on the phone (TPW)) conditions in persons with MS due to the high prevalence of cell phone use. Methods: 10 individuals with relapsing remitting MS participated in this single visit study. Dual-task walking performance in addition to demographics, cognitive function, proprioception, and physical activity measures were collected. Spearmans correlations were used to determine the relationship between dual task walking performance and baseline measures. A 2x3 repeated measures ANOVA was used to examine dual-task performance across walking conditions. Results: There were significant differences between baseline walking and MTW p=0.04; VTW p=0.039; TPW p=0.005, however there were no significant differences between the dual-task walking conditions. There was a significant dual-task cost interaction during MTW between the gait and cognition (p=0.021) and a significant interaction between the dual task cost of cognition between MTW and VTW (p=0.013). There were significant relationships between symptom duration (r =-0.634; p=0.049) and disease severity (r = -0.800; p=0.005) for the cognitive dual task cost in the MTW condition. Conclusion: This pilot study supports the hypothesis that dual task conditions requiring a verbal response might be more detrimental for both tasks in persons with MS, which has important implications for fall risk and driving function. Future research with a larger sample size needs to be conducted in order to support this hypothesis.

ABSTRACT NO. H09	
Name	Alyssa Redoute
Category	Health Sciences Graduate Programs
Title	The Effects of Isometric Training on the NuStep in Patients with Chronic Stroke
Authors	Alyssa Redoute, SPT; Melissa Rudow, SPT; Chelsea Shellman, SPT; Vicky Pardo, PT, DHS
Abstract	Introduction: The NuStep Transitt recumbent stepper allows subjects to work on limb movements required for ambulation while in a safe seated position. The Transitt has a tablet display with real-time feedback of performance during interactive games. The Paddle Ball game is controlled through alternating isometric contractions of the lower extremities. Objective(s): The purpose of this study was to determine the effect of isometric lower extremity training with visual feedback on functional mobility, strength, balance, endurance, and force production in individuals with chronic stroke. Methods: Twenty participants (16 female, 14 right hemiparesis, mean age 60.35±12.04) with chronic stroke were recruited. Participants completed pre- and post-evaluations (visits 1 and 10), which included gait on the GAITRite (normal and fast speeds), Maximum Voluntary Contractions (MVC) of knee extension (KE) and flexion (KF), ankle dorsiflexion (DF) and plantarflexion (PF), Lower Extremity Functional Scale (LEFS), Four-Square Step Test (FSST), Five Times Sit to Stand (5xSTS), 6- Minute Walk Test (6MWT), and the lower extremity motor (FMLE) and sensory (FM-sens) FuglMeyer assessment. Visits 2-9 consisted of 45 minutes of training on the Transitt twice a week. Between the 5-minute warm-up and cool-down, participants completed 35 minutes of visual feedback Paddle Ball gaming, alternating between Left vs. Right Push and Left vs. Right Pull. Breaks were permitted as needed. Demographic data were analyzed using descriptive statistics followed by parametric or non-parametric tests for each pre- and post-outcome measure. Independent t-tests were run for all comparisons except for the measures of STS, FSST, FMLE and MVC KE where Wilcoxon signed ranks were used due to non-normal distribution, as determined by Kolmogorov-Smirnov tests. Results: There were significant changes for 5xSTS [15.75 to 11.97 seconds ($p < 0.001$)], FSST [17.69 to 11.63 seconds ($p < 0.001$)], LEFS [50.05 to 54.45 ($p = 0.035$)], and 6MWT [948.4 to 1090.55ft ($p < 0.001$)]. There was a significant change in FMLE from 27.2 to 28.2 ($p = 0.004$), and for KE MVC on the hemi side from 56.19 to 58.40 lbs ($p = 0.045$). Fast gait showed significant changes for step length on the hemi ($p = 0.009$) and non-hemi leg ($p = 0.005$), stride length on the hemi and non-hemi leg ($p = 0.003$), and gait speed ($p = 0.005$). Normal gait showed significant changes for stride length on the hemi side ($p = 0.032$) and both step length ($p = 0.028$) and stride length ($p = 0.022$) on the non-hemi side, and gait speed ($p = 0.048$). Conclusion: Decreased use of the hemiparetic limb is a common problem for individuals post-stroke. Playing the Paddle Ball game caused the subjects to activate their hemiparetic leg with improved strength and coordination. The NuStep Transitt provided subjects with a challenging and engaging gaming experience which improved leg function, which resulted in significant improvements in functional mobility (sit to stand, stepping, gait and endurance). The significant changes in 5xSTS, FSST, 6MWT and gait parameters may translate to safer transfers, decrease in fall risk and improved functional mobility.

ABSTRACT NO. H10	
Name	Sean David, SPT
Category	Health Sciences Graduate Programs
Title	(A PILOT STUDY:) CAN A WEARABLE MOVEMENT ANALYSIS DEVICE ASSESS KNEE INSTABILITY IN THE FRONTAL PLANE TO DETECT BREAKDOWNS IN THE KINETIC CHAIN IN YOUTH BASEBALL PLAYERS
Authors	Sean David, SPT; Michael Fowler, SPT; Carter Reid, SPT; Mario Suarez, SPT; Marie Pepin, DPT OMPT; Dave Philbrick, ATC
Abstract	Introduction: Throwing is a complex biomechanical process influenced by factors such as strength, neuromuscular control, range of motion (ROM) and balance. Additionally, it has been shown that poor stride leg (SL) placement and force generation from the lower extremity and trunk can impart up to a 34% increase in compensatory forces needed at the shoulder. Research shows that increased frontal plane (FP) knee instability can further stress the upper extremity (UE) during throwing. The severity/prevalence of FP knee instability in youth baseball players (BP) is unknown; this is concerning given that 75% will report arm pain at some point. Objective(s): To determine the severity and prevalence of stride leg frontal plane knee instability in youth baseball players as assessed by a quick, and user-friendly, validated movement analysis system. Methods: Cross-sectional research design. Subjects: Demographic/experimental data were collected on 78 youth (14-19 years old), male, right-handed BP in the greater Detroit area. Methods/Procedures: Subjects meeting inclusion criteria performed repetitions of single leg squat (SLS) and single leg hop (SLH) using wearable motion sensors (DorsaVi). Data was analyzed using SPSS. Analysis involved a frequency output providing the degree of FP knee excursion for each test on the player's SL. The frequency data was converted to a percentage for risk stratification. Paired t-tests were performed to look at FP differences between SLS and SLH using 95% confidence interval ($p < 0.05$). Results: Of the 61 right-handed BP included in data analysis, 46.7% were classified as having either moderate (27.0%) or severe FP knee instability (19.7%) on SL. Mean FP knee excursion: SLSvalgus (4.80° ± 4.30°), SLSvarus (2.97° ± 3.90°), SLHvalgus (2.77° ± 2.37°) and SLHvarus (12.05° ± 4.39°). There was significantly more knee varus excursion compared to valgus during the SLH ($p = .000$) while there was greater valgus during the SLS ($p = .059$), although this did not achieve statistical significance. Nearly half (46.7%) of the subjects showed moderate-severe knee instability of the SL during functional movements. Conclusion: Such a large percentage of BP demonstrating some form of FP knee instability is concerning given the SL impact on position, force delivery, and stress transferred through the UE. The extent to which this instability can be a prognostic indicator for injury is unknown, but given the risk for overuse injuries in this population, this breakdown in the kinetic chain could be a cause for concern. Many youth BP have moderate to severe SL FP knee instability assessed via the SLS and SLH. Clinicians should be aware that FP knee excursion direction may not be consistent from one movement to the other. Further research should examine the prevalence of UE injuries and its correlation to FP knee excursion in BP.

ABSTRACT NO. H11	
Name	Abigail Skallerud, SPT; Stephanie Fudalla, SPT; Aaron Brumbaugh, SPT, CSCS, EMT-P; Tiffany Parker, SPT; Marie-Eve Pepin, PT, OMPT, MSPT, DPT; Kristen Robertson, PT, DPT
Category	Health Sciences Graduate Programs
Title	Comparing Functional Lumbar Lordosis in Collegiate Dancers With and Without Low Back Pain
Authors	Aaron Brumbaugh, SPT, CSCS, EMT-P; Stephanie Fudalla, SPT; Tiffany Parker, SPT; Abigail Skallerud, SPT; Marie-Eve Pepin, PT, OMPT, MSPT, DPT; Kristen Robertson, PT, DPT
Abstract	Introduction: Sixty percent of dancers have experienced low back pain (LBP) during their careers. Previous research into causal factors has been inconclusive, and none have analyzed the relationship between functional lumbar lordosis and LBP in dancers. Objective(s): The purposes of this research study are to quantify lumbar lordosis during functional movements and investigate the relationship between lumbar lordosis and LBP. The authors hypothesized that dancers who developed LBP would demonstrate increased lumbar lordosis compared to those who did not have LBP. Methods: Thirty collegiate dancers enrolled in full time dance programs were recruited from three universities. Measurements of functional lumbar lordosis, passive ROM and core endurance were collected in one visit at each respective school. For four months, the participants completed weekly surveys through text message and asked about presence and severity of back pain and causative factors for the pain. Primary analysis was performed using independent t-tests, comparing measures between dancers who did and did not develop pain. Secondary correlation analyses were performed using Pearson's coefficient. Results: Eleven dancers reported no pain during the follow up period, 16 reported pain, and 3 did not respond to follow up surveys. Lumbar lordosis in the right développé and right retiré was significantly ($p<.05$) greater in the group who reported pain compared to the group who reported no pain. Lumbar lordosis in all other positions was greater in the LBP group although this did not achieve statistical significance. Increased hold times in the supine bridge position were shown to be fairly correlated ($p<.05$) to reduced lumbar lordosis in first position (pearson's $r = 0.381$), left retiré (pearson's $r = 0.396$), and right développé (pearson's $r = 0.365$). Conclusion: This research suggests that observation and measurement of lumbar lordosis during functional dance positions, particularly those requiring single leg stance, has the potential to help identify collegiate dancers with increased risk of developing low back pain.

ABSTRACT NO. H12	
Name	Joseph Tocco, PA-S2
Category	Health Sciences Graduate Programs
Title	Healthcare experience impact on first-year physician assistant students' communication self-efficacy
Authors	Joseph Tocco, PA-S2; Sara Maher, PT, DScPT; Sara Lolar, M.S., PA-C
Abstract	Introduction: PA students have less healthcare experience (HCE) hours than in the past. It is unknown if having less HCE affects students' communication self-efficacy (SE). Objective(s): Determine correlations between SE and (a) number of HCE hours and (b) the type f HCE obtained by first-year PA students. Methods: A novel survey was created to record HCE hours before PA school, and type of training/education needed for HCE job. A previously published instrument by Michael et al, was used to measure communication SE. Program directors of Michigan and Toledo PA programs were contacted via email and asked to distribute the anonymous survey to their first-year students. Data analysis included means, standard deviation, and 95% confidence intervals. One-way ANOVA was used to compare SE means between schools, SE scores, number of HCE hours reported and type of HCE were used to calculate Pearson product-moment correlations. Results: Seven PA schools were contacted with an estimated total of 288 possible respondents. 101 responses were collected from 5 different PA schools, for a response rate of 35%. The average age of respondents was 25 (+/- 5.2) and were 84% female. Average number of HCE hours reported was 4820 (+/- 7902). Forty-nine percent reported HCE that required certificate/license, 35% reported no formal education/training requirements and 16% required an advance degree. The average SE was 65.19 (95% CI 63.89-66.49) out of 75. There was no difference between SE scores and school attended (p=.338). Number of HCE hours obtained prior to PA school was not correlated with communications SE (R=.159, p=.135). Type of training required for pre-PA HCE job was not correlated with communication SE (r=.063, p=.265). Conclusion: There was no statistically significant association between first-year PA students' perceived communication SE and (a) number of reported HCE hours and (b) type of HCE job. Michigan PA students had high reports of SE.

ABSTRACT NO. PSC01	
Name	Lana Alghanem
Category	Pharmaceutical Sciences Graduate Programs
Title	Molecular effects of Pioglitazone on skeletal muscle in insulin resistance and type 2 diabetes: A Systematic Review
Authors	Lana Alghanem, PharmD; Kyle Burghardt, PharmD.; Xiangmin Zhang, M.D./Ph.D.; and Zhengping Yi, Ph.D.
Abstract	Introduction: Skeletal muscle insulin resistance is one of the main contributors to Type 2 Diabetes (T2D). T2D is being treated with various medications, including Pioglitazone, a PPAR-γ agonist and a potent insulin sensitizer for skeletal muscle. Objective(s): To date, the molecular actions of Pioglitazone that sensitizes skeletal muscle to insulin is incompletely understood. The aim of this systematic review is to analyze the current literature to understand the molecular mechanisms involved in pioglitazone's insulin sensitizing effects in skeletal muscle. Methods: Relevant research articles were retrieved after literature search through PubMed, Embase and Medline from earliest available data to September 2020 using different key words combinations. 1304 studies were imported to Covidence software. 614 duplicates were removed. The remaining 690 were selected for title and abstract screening. Among them, 650 were irrelevant and 40 full text studies were assessed for eligibility. Studies were included if they analyzed molecular effects of Pioglitazone on skeletal muscle in insulin resistance and T2D. Results: 38 studies met the inclusion criteria. Among them, 7 studies reported the effect of pioglitazone on intramyocellular lipid content and lipid metabolites. 11 studies showed pioglitazone's ability to restore mitochondrial function and enhance FFA oxidation and uptake. 6 studies demonstrated that pioglitazone increased adiponectin levels and activates AMPK signaling. 5 studies highlighted the effect of pioglitazone on key insulin signaling proteins in skeletal muscle. 5 studies showed that pioglitazone enhanced glucose transport, metabolism and glucose transporter expression. 4 studies demonstrated the effect of pioglitazone on the expression of several genes that modulate insulin sensitivity and glucose uptake. Conclusion: These studies demonstrated several possible molecular mechanisms for insulin sensitizing effects of pioglitazone in skeletal muscle which could pave the way for future studies to identify multiple targets from different signaling pathways and to discover novel mechanisms for pioglitazone's action in skeletal muscle.

ABSTRACT NO. PSC02	
Name	Majed Alharbi, PharmD, MS
Category	Pharmaceutical Sciences Graduate Programs
Title	Protein Ubiquinome of Primary Human Skeletal Muscle Cells Derived from Obese Insulin Resistant Participants
Authors	Majed Alharbi, PharmD, MS; Berhane Seyoum, MD, MPH; Abdullah Mallisho, MD; Zaher Msallaty, MD; Aktham Mestareeh, MS; Xiangmin Zhang, PhD; Zhengping Yi, PhD
Abstract	Introduction: Type II diabetes (T2D) represents one of the most challenging diseases that human beings face nowadays due to its prevalence (i.e., ~ 30 million T2D patients in the USA) and life-threatening complications. Objective(s): It has been recently reported that the ubiquitin-proteasome system is hyperactivated in the skeletal muscle cells of obese people, which can be linked to insulin resistance. However, little is known about the site-specific ubiquitination of insulin signaling subunits in skeletal muscle cells of obese-insulin resistant subjects. Methods: In this project, we have conducted the first large scale mapping of site- specific protein ubiquitination in skeletal muscle cells derived from 4 obese insulin resistant participants. We have combined immunoprecipitation of ubiquitinated peptides with HPLC-ESI-MS/MS to identify the ubiquitination sites. Results: Our project resulted in identifying 3036 ubiquitination sites assigned to 2542 proteins. Among the identified ubiquitination sites, 1021 sites were novel and have not been reported previously in humans. Interestingly, we have identified ubiquitination sites in important insulin signaling proteins, such as GRB2 and GYS1. We have also identified ubiquitination sites in 27 kinases/kinases subunits (e.g. RIOK3, MAP3K14, JAK1, and DCLK1) and 12 phosphatase subunits (e.g. PPP1C, PPP2CA, PPP3CB, and PPP2R3A). We further analyzed the identified ubiquitinated proteins using DAVID bioinformatics tool. The results showed that different protein classes (e.g. cytoskeletal proteins, intracellular signal molecules, and transmembrane signal receptors), biological processes (e.g. response to stimulus, localization, and metabolic processes), and molecular functions (e.g. binding, transporter activity, and catalytic activity) were significantly enriched. Conclusion: The present study characterized the first global mapping of ubiquitination sites of skeletal muscle cells derived from obese insulin resistant participants and discovered numerous novel ubiquitination sites. These findings provide new targets for studies on insulin resistance in humans.

ABSTRACT NO. PSC03	
Name	Christopher Armstrong
Category	Pharmaceutical Sciences Graduate Programs
Title	Targeting pathogenic proteins of neurodegeneration diseases by a novel prodrug D-685
Authors	Chris Armstrong, Dan Luo, Skol Todi, Aloke Dutta
Abstract	Introduction: Parkinson's disease is a neurodegenerative disease characterized by tremors, postural instability, and psychiatric and cognitive complications. These symptoms are caused by pathogenic factors that include iron accumulation, α-synuclein aggregation resulting in the loss of dopamine neurons in the substantia nigra. Many people with PD suffer from dementia, which is characterized by cortical and limbic α-synuclein accumulation and amyloid beta (aβ) plaques in the striatum and neocortical areas. Objectives: Our goal is to develop a prodrug of a parent drug molecule D-520 which has been shown to inhibit aggregation of alpha synuclein protein and aβ peptide in vitro and in vivo experiments. Studies have shown that D-520 reduces toxicities of the toxic aggregates in Drosophila. The rational for a pro-drug is to increase in vivo stability with subsequent higher brain delivery of the parent drug. We hypothesize that the efficacy of the parent drug D-520 would be further enhanced in a prodrug. Methods: We have evaluated the effect of the dopamine D2/D3 agonist, D-520 on the inhibition of αSyn protein, Aβ aggregation and disintegration in vitro using purified proteins and cell culture models with MC65 cells. We further evaluated the effect of D-520 in in vivo Drosophila model of αSyn and Aβ. The prodrug synthesized from D-520 was used in animal studies to evaluate efficacy in a PD animal model for symptomatic response which should indicate brain penetration efficacy and in vivo stability. Results: We report that D-520 inhibits formation of αSyn and Aβ aggregates in vitro and promotes disaggregation of these aggregates. In Drosophila models of αSyn and Aβ dependent toxicity, D-520 rescued fly eyes from retinal degeneration caused by αSyn and Aβ toxicity. In a PD animal study, the prodrug D-685 showed higher efficacy than the parent drug D-520, indicating efficacious brain penetration of D-685. Results also indicate a higher brain penetration of the prodrug compared to D-520. Conclusion: D-520 is a potent D2/D3 agonist and inhibitor of alpha-synuclein and amyloid-beta oligomers. Conversion of D-520 into a prodrug D-685 has been carried out successfully. Our preliminary data from a PD animal experiment suggest D-685 crosses the BBB well and produces relatively higher efficacy compared to its parent drug D-520. Our future experiment with transgenic animal disease models will further shed light into the ability of D-685 to interact with these pathogenic proteins.

ABSTRACT NO. PSC04	
Name	Ayatakshi Barari
Category	Pharmaceutical Sciences Graduate Programs
Title	TARGETED NANOPARTICLE LOADED COMBINATION THERAPY TO TREAT PAPILLARY RENAL CELL CARCINOMA
Authors	AYATAKSHI BARARI, GRADUATE STUDENT; KUSHAL VANAMALA, GRADUATE
Abstract	Renal cell carcinoma is a genitourinary cancer that has a high mortality with steadily rising incidence rate. Each of its cell lines have different histology, making it all the more difficult to form a treatment method to envelope all aspects. Drug resistance also plays a major role in treatment problems, which may be attributed to active efflux pumps that remove the drug and their metabolites from the tumor, genetic factors, resistance due to hypoxia, and its interdependent angiogenesis, altered cellular metabolism, apoptosis impairment, and inflation of tumorigenic immune cells. The current treatment options include tyrosine kinase inhibitors like cabozantinib and mTOR inhibitors like everolimus drugs. So the goal is to use these two drugs along with a new class of apoptosis inducer, CFM 4.16(synthesized in the laboratory), as a combination drug treatment loaded in nanoparticle, to modulate multiple tumor survival pathways. Each drug targets a different downstream pathway in cancer cell. In such way there is a chance of profound effect of cancer killing compared to individual treatment. The nanoparticle is designed in such a way that it can deliver the drug directly to the tumor hypoxia core. SMA-DBCO nanoparticles were synthesized by copper free click chemistry and conjugated with oligomers of folate receptor beta and CA9 dual targeting ligands, as they are the most overexpressed in macrophages and tumor hypoxia respectively. This will then be used to encapsulate the drugs by co-solvent dialysis method, and the resulting nanoparticle should be in an optimal size range of 80-120nM suitable to reach kidney while bypassing other organs and drug resistances. Nanoparticle therapy approach targets drug directly and can be used as combination with treatments already in use to increase chances of survival by manyfold, while also overcoming drug resistance that could also be applied to several other hypoxic tumors.

ABSTRACT NO. PSC05	
Name	Ketki Bhise
Category	Pharmaceutical Sciences Graduate Programs
Title	Liposomes of Hypoxia-targeting Doxorubicin Prodrug Efficiently Kill Doxorubicin-resistant Triple-negative Breast Cancer Cells *in vitro*
Authors	Ketki Bhise[1], Samaresh Sau[1], Arun K. Iyer[1,2]*
Abstract	Introduction: Triple Negative Breast Cancer (TNBC) accounts for 10-20% of the total breast carcinoma cases and is highly aggressive and metastatic. Clinical targeted breast cancer therapy uses major biomarkers like estrogen, progesterone and Her-2, which do not work in case of TNBC because of the absence of these biomarkers. Solid tumors like that of TNBC are characterized by the presence of a hypoxic environment towards the core of the tumor. Objective(s): 1. Development of long-circulating liposomes of hypoxia-targeting Doxorubicin prodrug. 2. Scale-up and physicochemical characterization of the liposomes. 3. Testing the efficacy of the liposomes in vitro to assess the reduction in tumor cells in Dox-resistant-TNBC model. Methods: We developed a CAIX-targeted prodrug of Doxorubicin (CAIX-Dox). Further, we encapsulated the prodrug in long circulating, serum-stable liposomes (abbreviated CAIX-Dox-NP) that can selectively deliver Dox to the hypoxic tumor core, thus reducing Dox-associated toxicity. CAIX-Dox-NP were synthesized using high pressure homogenization for uniform particle size and narrow polydispersity index. MTT study was done to test the efficacy of the formulation in Dox-resistant-TNBC *in vitro* tumor model. Results: Nanoparticles with size ~200 nm and CAIX-Dox loading of 13-19% were synthesized, which were stable over 72 hours at 10% and 50% serum. CAIX-Dox-NP were optimized based on lipid composition and ratio of aqueous to organic phases. They exhibited a sustained release pattern at physiological and mildly acidic conditions *in vitro.* CAIX-Dox-NP were effective in killing Dox-resistant-MDA-MB-231 TNBC cells as compared to commercial Dox, thus playing a major role in reversing Doxorubicin drug-resistance. Conclusion: Towards this end, we are currently testing the efficacy of CAIX-Dox-NP in xenografted Dox-resistant-MDA-MB-231 tumors *in vivo* to assess the reduction of tumor burden compared to commercial Dox.

ABSTRACT NO. PSC06	
Name	Michael Crowley
Category	Pharmaceutical Sciences Graduate Programs
Title	Development of Replication Protein A (RPA)-DNA Interaction Inhibitors for use as Chemotherapeutic Agents
Authors	Michael Crowley1, Jitender Dev Gaddameedi1, Deepti Pandey1, Jeremy Kelm1, Sara Serafimovski1, Pamela VanderVere-Carozza2, John J. Turchi2,3 and Navnath S. Gavande1,3*
Abstract	Introduction: Cancer is the second leading cause of death globally, exceeded only by heart disease. The direct medical costs associated with cancer are tremendous, and access to treatment is available only to those fortunate enough to afford it. Progress in the field of chemotherapeutics will continue to send cancers into remission at a higher rate and at a lower cost, making universal access a possibility. Replication Protein A (RPA) was discovered in the late 1980's and its utility in the cell is to prevent single-stranded DNA from forming secondary structures - allowing polymerase to carry out its read/write function. RPA is essential to DNA repair pathways in cancer cells, thus making it an exploitable target for therapeutic intervention. In this work, we have developed a series of compounds that directly block the RPA-DNA interaction, without binding to DNA. Our ongoing efforts to design new drug candidates that can widen the therapeutic indices of treatment regimens, as they relate to RPA and cancer are described within. Objective(s): Our aim is to improve the clinical potential of current RPA inhibitors, by developing a new series of effective, structurally related, and drug-like analogs. Methods: Structure-based drug design, multi-step synthesis, PROTAC technology, in silico modeling, electrophoretic mobility shift assay (EMSA), fluorescent intercalator displacement (FID) assay, cytotoxicity assays, solubility and cellular uptake analysis, xenograft models, combination therapy. Results: A new series of RPA inhibitors was developed with improved potency, solubility, and cellular uptake. These compounds have shown potential to work as a single agent and synergistically improve the efficacy of approved platinum-based chemotherapeutics, in cellular and a mouse xenograft model. Conclusion: Subsequent studies to further validate the clinical potential of RPA inhibitors and their utility in various chemotherapeutic strategies are necessary to advance to human trials, with off-target cytotoxicity the obstacle to overcome.

ABSTRACT NO. PSC07	
Name	Yao Fu
Category	Pharmaceutical Sciences Graduate Programs
Title	Arsenic inhibits the tumor suppressor-like activity of aryl hydrocarbon receptor in epithelial cells
Authors	Yao Fu, Zhuoyue Bi, Qian Zhang, Priya Wadgaonkar, Wenxuan Zhang, Bandar Almutairy, Liping Xu, M'Kya Rice, Yiran Qiu, Akimasa Seno, Chitra Thakur, Fei Chen
Abstract	Introduction: The aryl hydrocarbon receptor (AhR) is an essential cytosolic ligand-activated transcription factor that has been widely studied. Emerging evidence indicates that AhR functions as a receptor and xenobiotic sensor of environment toxic or carcinogen. The expression and activation of AhR are involved in tumorigenesis as well as tumor suppression. However, the mechanism of how AhR affects various aspects of tumorigenesis remains to be fully elucidated. Arsenic is a human carcinogen and trivalent arsenic is widely disturbed in underground water contamination, air pollution, etc. In the current study we demonstrate that arsenic inhibits the tumor-suppressor activity oh AhR in epithelial cells. Objective(s): The objective of this study is to provide evidence showing that arsenic suppressed AhR transcriptional activity by the reduction of AhR binding to genome in epithelial cells. Methods: In this study, we used Western blotting assay to analyze AhR protein expression in Beas-2B cells after cells were exposed to 2-fold dilution of arsenic solution ranging from 0.25 to 4 μM. We extracted nuclear protein from whole cell lysis and analyzed AhR expression in nuclear and cytoplasm respectively. Luciferase reporter assay was performed to examine the inhibition of AhR transcriptional activity by arsenic. We used Chromatin immunoprecipitation sequencing (ChIP-seq) to map the binding sites of AhR in the genome in Beas-2B cells treated with 1 μM arsenic for 6 hours. Results: Western blot assay showed arsenic slightly induced AhR protein expression in a dose-dependent manner and promoted the activation of AhR protein by inducing the translocation of AhR from cytoplasm to nucleus. Luciferase reporter assay indicated arsenic reduced the AhR transcriptional activity. Chromatin immunoprecipitation sequencing was performed and indicated that AhR binding the gene loci in the genome was decreased by the exposure of arsenic. Conclusions: Our data revealed that arsenic inhibited the tumor suppressor-like activity of AhR in epithelial cells.

ABSTRACT NO. PSC08	
Name	SUHADINIE GAMAGE, MBBS, MS
Category	Pharmaceutical Sciences Graduate Programs
Title	P-Rex1 mediates glucose stimulated Rac1 activation and insulin secretion in pancreatic beta cells
Authors	Suhadinie Gamage, MBBS, MS; Vijayalakshmi Thamilselvan, PhD and Anjaneyulu Kowluru, PhD
Abstract	Introduction: Glucose stimulated insulin secretion (GSIS) is a physiological function performed by beta cells of pancreatic islets, to maintain glucose homeostasis. Literature suggests that small G-proteins (such as Rac1) play an important role in mediating GSIS by facilitating insulin containing granule docking and exocytosis. Small G- proteins are in constant cycling between their inactive form and active form and this conversion is regulated by guanine nucleotide exchange factors (GEFs), GDP dissociation inhibitors (GDIs) and GTPase activating proteins (GAPs). Objective(s): The function of Phosphatidylinositol-3, 4, 5- trisphosphate dependent Rac Exchange Factor 1 (P-Rex1) is unknown in pancreatic beta cells, although it has been identified as a GEF for Rac1 in other cell lines. GEFs facilitate the conversion of G- proteins from their inactive form to their active form. Therefore, the objective of this study is to investigate if P-Rex1 is a GEF for Rac1 activation and insulin secretion in pancreatic beta cells. Methods: Methods used are cell culture, rat islet isolation, western blot analysis, siRNA mediated knockdown technique, insulin secretion quantification by ELISA assay, Rac1 activation quantification by pull down assay and membrane- cytosol fractionation. Data is presented as mean ± SD of three independent experiments. Statistical analysis was done using the student's t-test. A p- value of < 0.05 was considered statistically significant. Results: P-Rex1 is expressed in INS-1 832/13 cells, rat islets and human islets and it is predominantly cytosolic. P-Rex1 depletion, using P-Rex1 siRNA, significantly attenuated glucose- induced Rac1- activation and insulin secretion. A significant reduction in membrane- associated Rac1 was observed in cells exposed to stimulatory glucose concentrations following P-Rex1 knockdown, suggesting a potential role of P-Rex1 in membrane association of Rac1. Conclusion: These data collectively serve as evidence to support the function of P-Rex1 as a GEF for Rac1 activation leading to physiological insulin secretion in pancreatic beta cells.

ABSTRACT NO. PSC09	
Name	Gioia Heravi, Pharm.D, Ph.D Student
Category	Pharmaceutical Sciences Graduate Programs
Title	Fatty acid desaturase 1 (FADS1) is associated with cancer survival via changing cholesterol metabolism
Authors	Gioia Heravi, Pharm.D, Ph.D student; Ze Long,Ph.D; Xiaokun Wang, Ph.D; Jing Gong, Ph.D; Leng Han, Ph.D; Seongho Kim, Ph.D; Wanqing Liu, Ph.D
Abstract	Introduction: Identifying biomarkers predictive of cancer survival is of importance to improve cancer treatment. Polyunsaturated fatty acid (PUFA) plays important role in cancer biology. Fatty Acid Desaturase-1 (FADS1) is a rate-limiting enzyme involved in PUFA metabolism, in which genetic polymorphisms have been demonstrated to alter PUFA metabolism. Objective(s): We aim to investigate the relationship between FADS1 mRNA expression, genetic polymorphisms and cancer survival. Methods: We assessed the relationship between FADS1 mRNA expression and patient survival in 29 cancer types using TCGA data with both a univariate and multivariate Cox regression models. We also investigated the pathways associated with altered FADS1 expression. Moreover, we examined the association between single nucleotide polymorphism (SNPs) of FADS1 locus and FADS1 expression in cancer. Results: Our analysis showed that among all cancer patients (N=11490), those with a higher FADS1 mRNA expression in their tumor have a significantly reduced disease-free survival (DFS) and overall survival (OS) (p.value <0.001 and 0.002, respectively). Interestingly, the higher FADS1 expression was significantly associated with increased survival among brain tumors. Transcriptome analysis of the genes significantly correlated with FADS1 expression revealed that FADS1 is positively correlated with genes involved in Cell Cycle and Cell division in the majority of the cancer types. Pathway analysis demonstrated that cholesterol metabolism and cell cycle pathways were significantly enriched as the top pathways associated with FADS1 expression. A total of 94 SNPs around the FADS1 locus are significantly associated with FADS1 expression in various cancer types (FDR <0.05, MAF>0.1). Among these SNPs about 85 are also associated with FADS1 expression in normal tissues. Conclusion: These results suggest that FADS1 over-expression is prognostic to lower survival in cancer patients via changing cancer cell biology, which is potentially mediated through altering cholesterol metabolism. The detailed causal relationship is warranted to continued investigation.

ABSTRACT NO. PSC10	
Name	Sai Pranathi Meda Venkata
Category	Pharmaceutical Sciences Graduate Programs
Title	Targeting orphan receptor GPR39: a novel approach to preserve endothelial cell functions
Authors	Sai Pranathi Meda Venkata, MS; Hainan Li, MS ; Jiemei Wang, MD Ph.D.
Abstract	Introduction: G protein-coupled receptor 39 (GPR39) is one of the orphan receptors expressed in a variety of tissues. Studies have shown that GPR39 is associated with metabolic disorders, including hyperglycemia and hypertriglyceridemia, but the mechanisms are unclear. Endothelial cells (ECs) are major victims of metabolic disorders. Whether GPR39 plays a role in EC function is unknown. We hypothesize that the mitochondrial function in ECs under hyperglycemia can be preserved by altering GPR39 expression. Objective(s): The main objectives of this study are to evaluate the role of GPR39 in the regulation of mitochondrial functions in healthy and diabetic ECs and to identify critical target molecules responsible for the GPR39 regulated EC function in the healthy and diabetic HAECs. Methods: The role of GPR39 in endothelial cell function was assessed in-vitro using healthy human aortic endothelial cells (H-HAECs) and diabetic HAECs (D-HAECs). The mRNA expression levels were analyzed by real-time PCRs. The expression of GPR39 in the ECs was manipulated using adenovirus transfection and siRNA transfection. In vivo ischemic limb model in streptozotocin (STZ)-induced hyperglycemic mice was used to evaluate the role of GPR39. The expression of various proteins was determined using Western blot. Results: We found that Diabetic HAECs had up-regulated GPR39 with compromised functionality compared to healthy cells. In vitro studies showed that activation of GPR39 by its agonist (TC-G-1008) treatment and overexpression of GPR39 by adenovirus transfection had reduced the functionality of the cells. In contrast, the depletion of GPR39 by siRNA rescued the functions and also showed lower levels of superoxide anions (by MitoSOX staining) and better mitochondrial membrane potential. This might be related to GPR39's suppression on the signaling of the sonic hedgehog (SHH) pathway. Better blood flow was observed in the STZ-GPR39KO mice compared to STZ-GPR39WT mice. Conclusion: Our data suggest that the deletion of GPR39 rescues the EC functions via protecting mitochondrial homeostasis under hyperglycemic conditions, in which SHH activation may play a role. Our study provides new insights into the identification of critical target molecules involved in the GPR39 regulatory network in ECs, which may open new revenue of therapeutic approaches for metabolic and cardiovascular disorders.

ABSTRACT NO. PSC11	
Name	Aktham Mestareehi, MS
Category	Pharmaceutical Sciences Graduate Programs
Title	Metformin Increases Protein Phosphatase 2A Activity In Primary Human Skeletal Muscle Cells
Authors	Aktham Mestareehi, MS; Xiangmin Zhang, PhD; Berhane Seyoum, MD; Zaher Msallaty, MD; Abdullah Mallisho, MD; Kyle Jon Burghardt, PharmD; Anjaneyulu Kowluru, PhD; Zhengping Yi, PhD
Abstract	Introduction: Diabetes is a group of metabolic diseases characterized by hyperglycemia as results of defects in insulin secretion, insulin action, or both. Skeletal muscle insulin resistance is one of the primary contributors of type 2 diabetes (T2D). Metformin is the first-line drug for the treatment of T2D. The primary effects of metformin include decreasing glucose production in liver and decreasing insulin resistance in skeletal muscle. However, the molecular mechanism of metformin's action in skeletal muscle is not well understood. Protein phosphatase 2A (PP2A), a major serine/threonine protein phosphatase, plays a pivotal role in cellular processes, such as signal transduction, cell proliferation and apoptosis, and acts through dephosphorylating key signaling molecules such as AKT, AMPK, etc. Objective(s): The overall goals of this study were to address the knowledge gaps regarding molecular mechanisms by which metformin increases the insulin sensitivity in skeletal muscle using a combination of clinical studies (for direct measurements of human pathophysiology), in vitro cell studies (for causal mechanisms). The specific mechanism of action within the skeletal muscle is not fully understood. However, whether PP2A plays a role in metformin-induced insulin sensitivity improvement in human skeletal muscle cells remains to be elucidated. Methods: In the present study, a hyperinsulinemic-euglycemic clamp was performed to assess insulin sensitivity in human subjects and skeletal muscle biopsy samples were obtained. Primary human skeletal muscle cells (shown to retain metabolic characteristics of donors) were cultured from these muscle biopsies that included 8 lean insulin sensitive participants (4 Female and 4 males; age: 21.4±0.8 years; BMI: 22.1±0.7 kg/m2; 2-hour OGTT: 96.5± 6.3 mg/dl; HbA1c: 5.3±0.1 %; fasting plasma glucose: 87.5±1.4 mg/dl; M-value; 10.9±0.8 mg/kgBW/min). Cultured cells were expanded, differentiated into myotubes, and treated with 50 μM metformin (the physiological concentration) for 24 hours before harvesting. PP2Ac activity were measured by a phosphatase activity assay kit (Millipore) (according to the manufacturer's protocol) and normalized to that of the controls. Results: The results indicated that metformin increased the activity of PP2A in the myotubes for all 8 participants, and the average fold increase is 1.59±0.13 ($P<0.01$). These results provided the first evidence that metformin can activate PP2A in human skeletal muscle cells derived from lean healthy insulin sensitive participants and may help to understand metformin's action in skeletal muscle in humans. Conclusion: Our results clearly demonstrated that metformin significantly increased PP2A activity in the myotubes derived from all eight lean non-diabetic participants, and the average fold increase is 1.59±0.13 (**$P<0.01$). These results provided the first evidence to suggest that metformin promotes activation of PP2A in human skeletal muscle cells and might aid potential new targets for novel mechanistic studies on skeletal muscle insulin resistance in humans.

ABSTRACT NO. PSC12	
Name	Aktham Mestareehi, MS
Category	Pharmaceutical Sciences Graduate Programs
Title	Proteomics Discovery of tRES+HESP-responsive proteins and pathways in Diabetic Endothelial Cells
Authors	Aktham Mestareehi, MS; Hainan Li, MS; Xiangmin Zhang, PhD; Zhengping Yi, PhD; and Jiemei Wang, MD, PhD
Abstract	Introduction: Diabetic foot ulcers that lead to amputations are a major health problem affecting ~20% of the 30 million diabetic patients in the US. The current regimen has limited success, and the amputation rates remain high. The coformulation of two dietary compounds - Trans-resveratrol (tRES) and hesperetin (HESP) - improves wound healing in diabetic animals. However, underlying molecular mechanisms for its beneficial effect are unclear. Objective(s): The objective of this work is to discover new proteins and pathways that are regulated by tRES+HESP in angiogenesis and tissue repair using state-of-the-art quantitative proteomics. Methods: Diabetic endothelial cells (ECs) were treated with tRES+HESP (both at 5μM) or vehicle control for 24 hours. Healthy ECs without tRES+HESP treatment were used as controls. Lysate proteins were subjected to in-solution trypsin digestion, TMT labeling, and UPLC-ESI-MS/MS analysis. Results: Proteomic analyses identified 3666 proteins. Among them, 179 proteins have significant differences between diabetic controls vs. healthy controls, while 81 proteins have significant changes upon the treatment of tRES+HESP in Diabetic ECs. Of interest, 16 proteins have differences between diabetic and healthy controls and the differences were reversed by the tRES+HESP treatment. These proteins are the likely players contributing to the beneficial effect of tRES+HESP on diabetic wound healing. Bioinformatics analysis for these 16 proteins indicated that: (1). Eight of them were involved in type 2 diabetes pathogenesis and 11 were involved in cardiovascular diseases. (2). Multiple biological processes were significantly enriched, including angiogenesis and blood vessel development, etc. (3). Multiple molecular functions were significantly enriched, including protein kinase C binding, TGF-β binding, and transmembrane receptor protein serine/threonine kinase activity, etc. Conclusion: Our results have provided, for the first time, tRES+HESP-responsive proteins and pathways in Diabetic ECs, which will lead to a better understanding of molecular mechanisms for the beneficial effect of tRES+HESP in diabetic wound healing.

ABSTRACT NO. PSC13	
Name	Huong Rachel Nguyen
Category	Pharmaceutical Sciences Graduate Programs
Title	A metformin-methylglyoxal imidazolinone metabolite (IMZ) increases endothelial cell-mediated angiogenesis via eNOS/HIF-1α pathway
Authors	Huong Nguyen, Jiemei Wang, and Terrence J. Monks
Abstract	Introduction: Peripheral arterial disease (PAD) is one of the major vascular complications in patients with diabetes due to impaired angiogenesis. Therapeutic strategies aimed at improving angiogenesis have been intensively studied in clinical trials, but with limited benefit. We previously discovered that metformin, the first-line medicine for diabetes, scavenges a biologically reactive endogenous dicarbonyl, methylglyoxal, to form a novel imidazolinone metabolite (IMZ). However, the impact of IMZ on endothelial cell function is unknown. Objective(s): In this study, we aimed to determine the effects of IMZ on angiogenesis and to elucidate its underlying molecular mechanism(s). Methods: The effects of IMZ on angiogenesis were examined using in vitro functional, an in vivo Matrigel plug assay, and a chronic hyperglycemic mouse model subjected to hind limb ischemia. We also investigated the signaling pathways engaged by IMZ using a combination of genetic and pharmacological strategies. Results: IMZ significantly increased aortic sprouting, cell migration, and network formation in endothelial cells, concomitant with an upregulation of multiple pro-angiogenic factors. Moreover, IMZ significantly increased protein levels of hypoxia-inducible factor-1α (HIF-1α), activated endothelial nitric oxide synthase (eNOS), and increased nitric oxide production. Knockdown of eNOS completely blunted the IMZ induced increase in HIF- 1α expression, suggesting that IMZ-induced HIF-1α expression by activating eNOS. In the in vivo angiogenesis model (Matrigel plug subcutaneous implantation), IMZ significantly promoted capillary formation compared to vehicle control. We also observed improved blood perfusion, increased capillary density, and reduced tissue necrosis in mice receiving IMZ (20mg/kg x twice/day) compared to the control mice in the chronic hyperglycemic mouse model subjected to hind limb ischemia. Conclusion: Our data demonstrate that IMZ promotes endothelial cell-mediated angiogenesis via activating eNOS/HIF-1α pathway. Further work is required to elucidate how IMZ provides the structural basis for the development of pro-angiogenic agents for the treatment of ischemic vascular diseases.

ABSTRACT NO. PSC14	
Name	Deepti Pandey, DVM
Category	Pharmaceutical Sciences Graduate Programs
Title	Development of Small Molecule Inhibitors of CARP-1-NEMO Binding to Enhance Anticancer Effect of Chemotherapy
Authors	Deepti Pandey, DVM; Jitender Gaddameedi, Ph.D.; Jaganathan Venkatesh, Ph.D.; Arun K. Rishi, Ph.D.; Arun Iyer, Ph.D.; Navanath Gavande, Ph.D.
Abstract	Introduction: Cancer continues to be a leading global health concern. Despite notable progress in current chemotherapeutics, drug resistance often contributes to treatment failure and poor prognosis. NF-kB signaling pathway has been long considering a prime regulator of normal biological processes as well as of tumor cells survival and proliferation, which results in resistant phenotypes. One of the reasons for the resistance is the interaction of CARP-1 protein with NF-kB- activating kinase subunit or NEMO that activates the canonical NF-kB signaling pathway in response to chemotherapy. High Throughput Screening (HTS) of the chemical library yielded a Selective NF-kB inhibitor (SNI) that showed remarkable inhibition of CARP-1 and NEMO interaction in various cancer cell lines. Objectives: Our aim is to synthesize and evaluate the SNI analogs and improve its solubility, stability and efficacy to enhance the anticancer effect of chemotherapy. Methods: We are utilizing Structure-Activity Relationship (SAR) to identify the substitution site and design a series of compounds in such a way that several modifications and changes at specific positions of the parent compound (SNI) could introduce the predictable progression towards compound drug-like properties, solubility, and biological activity. MTT assay and TNBC cell-derived xenograft syngeneic mice to investigate, the biological potential of compounds in combination (Adriamycin) as well as single agent. Results: GL-213 and GL-216 displayed more percent inhibition on cell viability assay at a concentration of 5μM, for 24 hr. as compared to the parent compound in combination with Adriamycin. Conclusions: Till date, we identified few lead compounds targeting CARP-1-NEMO. Drug targeting CARP-1 protein with fine-tuning with selective NF- kB inhibitor can offer novel tools or strategies to combat a variety of cancers and its resistant variance. Our current SAR studies and results certainly could bring more drug-like lead compounds that abrogates NF-kB signaling activation in response to various chemotherapeutic agents.

ABSTRACT NO. PSC15	
Name	Zoha Siddiqua, MS
Category	Pharmaceutical Sciences Graduate Programs
Title	A Method for Examining the Adverse Effects of Exposure to BTEX, Volatile Organic Compounds Derived from Petroleum
Authors	Zoha Siddiqua, MS; Paul Dobry; Shawn McElmurry, PhD; Tracie Baker, DVM, PhD; David Pitts, PhD
Abstract	Introduction: Emission sources of volatile organic compounds (VOCs) are ubiquitous and include outdoor and indoor sources. Among various VOCs, a group of petro-chemicals benzene, toluene, ethylene, and xylene more commonly known as BTEX are of particular concern due to their ability to adversely affect cardiovascular, renal, hepatic, respiratory, endocrine, immune and nervous system function. Understanding and elucidating adverse health effects associated with BTEX in a laboratory setting can be challenging due to the inherent ability of these chemicals to volatize at room temperature, making controlled exposures challenging. Since these VOCs exist as mixtures, the adverse effects from exposure to single VOCs may not accurately reflect the real-world impact of environmental exposure. Objectives: To address our gap in knowledge we have developed a novel sealed bioassay system to quantify the behavioral effects of BTEX in aquatic animals (e.g. Daphnia pulex and Danio rerio). As a proof of concept, we are testing our prototype, which can be scaled up to increase throughput and provide information needed to conduct genomic studies as the next step. Methods: Our method uses a glass-covered stainless-steel chamber to monitor behavioral changes using a digital camera under controlled experimental conditions and enables concentration-response studies that examine the effects of exposure to single VOCs or VOC mixtures. The VOCs are dissolved in media and perfused through the sealed chamber continuously. The behavior is quantified as distance moved (mm per 5 sec) and turning (mean angle) which are calculated from the 5 second video files taken every 5 minutes during the experiment. D. pulex (n=12) were exposed to increasing concentrations of toluene (0.5 to 25 ppm) over a period of 4 hours Results: Our preliminary results suggest that toluene inhibits swimming behavior (distance covered) at concentrations 5ppm or greater. The test of our prototype was successful, and we are continuing to evaluate BTEX components. Conclusions: Our preliminary results suggest that toluene inhibits swimming behavior (distance covered) at concentrations 5ppm or greater. The test of our prototype was successful, and we are continuing to evaluate BTEX components.

ABSTRACT NO. PSC16	
Name	Katyayani Tatiparti, PhD Candidate
Category	Pharmaceutical Sciences Graduate Programs
Title	Tumor-core targeting ultra-small nanoparticle as a therapeutic strategy in Glioblastoma multiforme
Authors	Mohd Ahmar Rauf#, PhD, PostDoc; Katyayani Tatiparti#, PhD Candidate; Samaresh Sau, PhD, Senior Research Scientist; and Arun K. Iyer*, PhD, Associate Professor
Abstract	Introduction: Glioblastoma multiforme (GBM) is a lethal brain tumor with only 12-15 months of survival post-diagnosis in children and older population. Chemotherapy is found to be ineffective due to poor blood–brain barrier (BBB) penetration by conventional methods. Ultra-small multifunctional nanoparticle is promising in overcoming BBB. Our research aims to develop BBB-targeted nanoparticle for selective drug delivery to the tumor core and trigger tumor cell-death. Objectives: We develop a biocompatible ultra-small nanoparticle having (i) LRP-1 (BBB receptor) component - Lactoferrin (Lac) protein; (ii) CA-IX (tumor hypoxia receptor) targeting component – acetazolamide (ATZ) for drug delivery to the tumor core. Lac-ATZ is hypothesized to enhance penetration across BBB and deliver drugs in hypoxic core of GBM. Methods: We chemically conjugated Lac with ATZ to obtain Lac-ATZ nanoparticle. We evaluated the CAIX receptors expression in human brain tumor section by IHC and Western blotting. We have evaluated the cytotoxicity, comparative cell uptake studies and the ability of the nanoparticles to cross a conditioned BBB model in vitro both in the normoxic and hypoxic condition in U-87MG cell line. Results: The SDS-PAGE analysis demonstrated conjugation of Lac with ATZ. Lac-ATZ demonstrated homogenous particle size of 10-30 nm using TEM. The IHC data demonstrated significant overexpression of CAIX in tumor tissue. Our preliminary data in U-87MG cell line suggested a dose-dependent cell uptake of dye-labeled Lac-ATZ nanoparticle. The nanoparticles have been found to be selectively targeting U-87MG cell over healthy brain cells. They are also found to have superior targeting capability in hypoxia. Conclusions: Based on the exciting preliminary outcomes in this study, a strong rational of using Lac-ATZ nanoparticle for overcoming the bottle neck barrier of BBB with improved anti-GBM response can be given.

ABSTRACT NO. PSC17	
Name	Katyayani Tatiparti, PhD Candidate
Category	Pharmaceutical Sciences Graduate Programs
Title	Ultra-Small Biomimetic Brain Targeted Nanodelivery System for Alzheimer's Disease
Authors	Katyayani Tatiparti#, PhD Candidate; Mohd Ahmar Rauf#, PhD, PostDoc; Samaresh Sau, PhD, Senior Research Scientist; and Arun K. Iyer*, PhD, Associate Professor
Abstract	Introduction: Alzheimer's disease (AD) is a form of progressive dementia accounting to 60-80% of all dementia cases that affects older population with a high death-rate. Abnormal intracellular neurofibrillary tangles of hyperphosphorylated τ (ptau) protein (tauopathy) cause death of neurons in AD. Poor understanding of the pathogenesis and selective-permeability of Blood-Brain-Barrier (BBB) impede therapy. Our research aims for developing a targeted delivery system for brain to eliminate the tauopathy. Objectives: Our objective is to develop Lactoferrin ultra-small nanoparticles (Lf-USNPs) that can primarily (i) enable transport of therapeutics across the BBB via low-density lipoprotein receptor-related protein-1 (LRP-1) overexpressed in AD; (ii) promote their accumulation in the desired brain region; and (iii) assist in reduction and clearance of neurofibrillary tangles of ptau. We test the efficacy of drug-combination therapy of protein-kinase inhibitors on curtailing ptau. Methods: We have used solvent-evaporation method to synthesize drug-loaded Lf-USNPs followed by homogenization to achieve the desired particle size. We have identified the expression of target receptors using western blotting and IHC. We have used SH-SY5Y, SVG-p12 and BV2 brain cells to evaluate the efficacy of the Lf-USNPs in terms of cell-uptake and ability to cross the in vitro conditioned-BBB model. We employed okadoic acid in SH-SY5Y cells to mimic AD pathology in vitro for testing drug combination. Results: The TEM analysis showed well-defined spherical Lf-USNPs with an ultra-small size of ~20-30 nm that allows efficient penetration across the BBB. Further, the data obtained from our preliminary studies in vitro on various brain cells suggest dose-dependent cell-uptake of dye-labeled Lf-USNPs. We also found that the Lf-USNPs could penetrate the in vitro BBB in a time-dependent manner. GSK3+STAT3 inhibitors combination is found promising for therapy in AD. Conclusions: The promising outcome of our study portends a strong rationale to employ Lf-USNPs to overcome BBB for efficient targeting for delivering combination therapy in AD.

ABSTRACT NO. PSC18	
Name	Priya Wadgaonkar, PhD candidate
Category	Pharmaceutical Sciences Graduate Programs
Title	Role of endoplasmic reticulum stress-mediated unfolded protein response and mitochondrial dysfunction in arsenic-induced malignant transformation and cancer stem-like cells
Authors	Priya Wadgaonkar, Lingzhi Li, Zhuoyue Bi, Qian Zhang, Yao Fu, Bandar Alamutairy, Wenxuan Zhang, Chitra Thakur, Fei Chen
Abstract	Introduction: Exposure to high levels of arsenic in drinking water (> 10ug/L) is a global health issue, as more than 150 million people are affected worldwide. The International Agency for Research on Cancer has classified arsenic as a group I carcinogen. It is known to cause lung, skin, bladder cancers. Arsenic (As+3) induced oxidative stress, and other stress responses have been known to cause malignant transformation of cells; however, the exact mechanisms are not clearly understood. Objectives: The current study aims to investigate how ER stress-associated unfolded protein response (UPR), mitochondrial dysfunction, and autophagy are involved in the malignant transformation of lung cells. Methods: To achieve this aim, we conducted our studies in the human bronchial epithelial BEAS-2B cells, an in vitro model for arsenic toxicity using techniques like transcriptomics, metabolomics, real-time PCR, reverse transcriptase PCR, western blot, immunofluorescence, and Seahorse analyzer. Results: Our studies showed that the arsenic-treatment (0.125-0.25 uM) for six months lead to the malignant transformation of BEAS-2B cells. Some of these transformed cells acquired features of cancer stem cells (CSCs), for example, enhanced expression of some key stemness genes, such as Nanog, Oct4, Sox2. An upregulation of glycolytic intermediates and reduced expression of the oxidative phosphorylation, ER stress-related and autophagy genes were also observed in the CSCs. Acute arsenic exposure (0.25-4uM) in BEAS-2B cells for 6 hours revealed an upregulation of activating transcription factor 6α (ATF6α), along with UBE2G2, CEBPβ, MAPK10, HSPA1B genes. ATF6α is a transcription factor-stimulated only under ER stress conditions. Acute arsenic exposure activated ATF6α and increased glycolysis and oxidative phosphorylation in BEAS-2B cells. Conclusions: To summarize, our studies indicate that acute arsenic exposure induces ER stress-related UPR via ATF6α, increases glycolysis in short-term arsenic-treated BEAS-2B cells and CSCs, and reduces expression of ER stress-related genes and autophagy in CSCs, suggesting a link between ER stress and mitochondrial dysfunction in arsenic carcinogenesis. More studies need to be conducted to understand the connections between UPR, mitochondrial dysfunction and autophagy in arsenic-induced cancers for potential anticancer therapy.

ABSTRACT NO. PSC19	
Name	Qian Zhang, Ph.D. Candidate
Category	Pharmaceutical Sciences Graduate Programs
Title	Loss of mdig impairs the entry of SARS-CoV-2
Authors	Qian Zhang, Ph.D. Candidate; Yao Fu, Ph.D. Candidate; Zhuoyue Bi, Ph.D. Candidate; Fei Chen, Ph.D.
Abstract	Introduction: The outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the cause for coronavirus disease 2019 (COVID-19), is devastating the public health and social economics, with 30 million confirmed cases and 0.9 million deaths worldwide. SARS-CoV-2 is highly contagious for the high affinity of its spike protein to cell receptor ACE2. However, little is known why some patients developed mild symptoms but some turned to fatal diseases. Nationwide epidemiologic studies revealed that environmental factors like PM2.5 significantly increased the fatality of COVID-19 patients. Mineral dust-induced gene (mdig) is an environmental induced regulator for glycan metabolism, a critical process in virus entry and immune evasion, as well as inflammation, a key determinant for severe symptoms. Objectives: We investigate how environmental factors worsen the prognosis of COVID-19 in mdig-dependent mechanisms. Methods: We evaluate the virus entry by examining the cleavage of spike glycoprotein as well as the expression of essential proteases by transfecting Wildtype (WT) and mdig knockout (KO) human bronchial epithelial cells with a vector expressing spike glycoprotein. Results: After the transfection of SARS-CoV-2 spike protein, mdig protein was up-regulated. Meanwhile, the depletion of mdig reduced the cleaved spike proteins, while the full length proteins are in similar level relative to wildtype (WT). In addition, the proteases promoting the virus entry like Furin, TMPRSS2, and Cathepsin D were reduced in transfected mdig KO cells. Conclusions: Our data suggested that loss of mdig impairs the entry of SARS-CoV-2. Future work will focus on how mdig promotes the entry of virus, and how to mediate the inflammation response, worsening the prognosis. Our study will fill the gap that how environmental factors increase the fatality of COVID-19, and may help identify potential drug targets for this disease.

ABSTRACT NO. PSC20	
Name	Aktham Mestareehi, MS
Category	Pharmaceutical Sciences Graduate Programs
Title	Protein Phosphatase 2A in Metformin's Action in Primary Human Skeletal Muscle Cells
Authors	Aktham Mestareehi, MS; Xiangmin Zhang, PhD;Berhane Seyoum, MD; Zaher Msallaty, MD; Abdullah Mallisho, MD; Kyle Jon Burghardt, PharmD; Anjaneyulu Kowluru , PhD; Zhengping Yi, PhD
Abstract	Introduction: Diabetes affects more than 30 million people in the USA and more than 90% of diabetic patients have (T2D). Insulin resistance is a main characteristic feature of T2D. Protein phosphorylation regulates many key cell signaling events, including insulin signaling. Abnormal protein phosphorylation has been implicated in the development of skeletal muscle insulin resistance and T2D. Metformin is an effective oral biguanide antihyperglycemic drug and the most frequently prescribed as a first-line therapy for T2D. It is widely accepted that metformin can reduce glucose production by the liver and increase insulin sensitivity (i.e., decrease insulin resistance) in skeletal muscles. However, the precise molecular mechanisms of metformin's action in skeletal muscle remains to be elucidated. Objectives: Emerging as a key technology in exploring signal-transduction, phosphoproteomics has mapped many different phosphorylation events in signaling networks and cascades. Nonetheless, no large-scale phosphoproteome studies on primary skeletal muscle cells derived from lean healthy insulin sensitive and obese insulin resistance participants have been reported. The goal is to address the knowledge gaps regarding molecular mechanisms by which metformin increases the insulin sensitivity in skeletal muscle, using a combination of clinical studies (for direct measurements of human pathophysiology), in vitro cell studies (for causal mechanisms), and cutting-edge proteomics (for global analysis of cell signaling & unbiased discovery). The outcome will provide new phosphatase-based molecular mechanisms responsible for insulin sensitizing effect of metformin in skeletal muscle cells, and may provide novel targets for drug development for skeletal muscle insulin resistance and T2D. Methods: Hyperinsulinemic-euglycemic clamp was performed to assess insulin sensitivity in human subjects and skeletal muscle biopsy samples were obtained. Primary human skeletal muscle cells were cultured from these muscle biopsies from 8 lean insulin sensitive and 8 obese insulin resistance participants. The cells were expanded, differentiated into myotubes, and treated with 50μM metformin (the physiological concentration) for 24 hours, okadaic acid 5nM for 30 minutes and Insulin 100nM for 15 minutes, before harvesting. The resulting human skeletal muscle cells were subjected to in-solution trypsin digestion, followed by quantitative phosphoproteomics to determine global phosphorylation profile changes and protein expression levels . The resulting phosphopeptides were analyzed by high mass accuracy and high mass resolution UPLC-ESI-MS/MS (Orbitrap Fusion Lumos) to identify and quantify phosphorylation sites and phosphoproteins. MaxQuant was used to process the raw mass spectra and generate protein group intensities and phosphosites for the database search using human protein FASTA files, followed by bioinformatics analysis. Results: We have identified >21,300 phosphorylation sites in 5,753 proteins, which is one of the largest catalog of experimentally determined phosphorylation sites in primary human skeletal muscle cells. Among all phosphorylation sites identified 1,718 were not report in human and 1,544 were not reported in any species in the PhosphositePlus database, thus appears to be novel. We identified phosphorylation sites in 270 kinases/kinases subunits (e.g., AKT, AMPK)and 29 phosphatases subunits of protein phosphatase 2A (e.g., PPP2R1B, PPP2R2B, PPP2R3A, PPP2R5A, PPP2R5D, and PPP2R5E). Bioinformatic analysis indicated that multiple biological processes, (e.g., protein phosphorylation, mRNA splicing, intracellular signal transduction, and signal transduction), molecular functions (e.g., protein binding, poly (A) RNA binding, protein serine/threonine kinase activity) as well as KEGG pathway (e.g., insulin signaling pathway, ErbB signaling) were significantly enriched for these phosphoproteins. Conclusions: We have characterized the largest phosphoproteome and proteome of primary skeletal muscle cells derived from 8 lean insulin sensitive and 8 obese resistance participants, and identified multiple biological processes, molecular functions, subcellular localizations and pathways that were significantly enriched in the phosphoproteins. These results provide potential new targets for mechanistic studies on skeletal muscle insulin resistance in humans.

ABSTRACT NO. PSC21	
Name	Ruchi Jaiswal
Category	Pharmaceutical Sciences Graduate Programs
Title	Deciphering molecular mechanism of Olanzapine induced skeletal muscle insulin resistance
Authors	Ruchi Jaiswal
Abstract	Introduction: Atypical antipsychotic drug – Olanzapine is known to have worst metabolic side effects but molecular mechanism is still unclear. Olanzapine inducedskeletal muscle insulin resistance is critical to analyze, since it's a clinical precursor to type 2 diabetes in psychotic patients. Objectives: The purpose of this systematic review is to summarize the current molecular evidence of Olanzapine induced insulin resistance and address the knowledge gap. Methods: Systematic review is being performed using Pubmed and Embase from earliest data to August 2020. Studies are included if analysis done on skeletal muscle. Covidence is used to screen articles. Database search terms included a combination of "Atypical antipsychotic", "Olanzapine", "skeletal muscle", "glucose uptake", "insulin resistance", "peripheral resistance". Results: Out of 102 studies found, 18 studies were included. Study design, methods, sample source and study population varied across all studies. 3 studies analyzed creatine phosphokinase. 13 studies individually analyzed change in muscle fiber type, insulin signaling & resistance, glucose uptake, Akt phosphorylation, GLUT4 & TCF7L2 expression, kynurenine metabolish, tissue chromium, sphingolipid levels, free fatty acid, fat deposition and macrophage migration inhibitory. 1 extensive study in L6 cells analyzed glycogen content, IRS-1 associated PI3K activity and Akt, GSK3 phosphorylation. 1 study in C2C12 myoblast investigated 2-deoxy glucose uptake, in-vitro glucose disposal, Akt and AMP-dependent kinase and glucose transporter GLUT-4. Conclusions: So far, this is the only systematic review focusing exclusively on Olanzapine induced skeletal muscle insulin resistance, which gives insight of current data and highlights need for future multi-omic studies.

ABSTRACT NO. PSC22	
Name	Dima Awad
Category	Pharmaceutical Sciences Graduate Programs
Title	COGNITIVE DISTRACTION AND DRIVING: HOW A SIMPLE MEMORY RECALL TASK CAN AFFECT DRIVING PERFORMANCE
Authors	Dima Awad, Edison Nwobi, Tylor Zohr, Jessica Andrews, Tariq Masri-zada, Tyiesha Head, Doreen Head and Randall Commissaris
Abstract	Cognitive distraction when driving, i.e., thinking about something other than the driving task, is a significant problem; every year thousands of lives are lost to drivers not paying attention to the road. The present paper reports on a simple method for demonstrating and quantifying the effects of cognitive distraction on driving performance. One subject was tested for crash avoidance reaction time (CART) in a simulated driving task. In this two-choice reaction test, the subject drove at a steady speed (70 mph) on a straight roadway. On multiple occasions during this drive, the subject was forced to make an emergency steering response (to the left or the right) to avoid crashing into a stalled car that 'appeared instantly' only 40 meters ahead in the roadway. The primary dependent variable was the CART, measured as the time (in msec) from the appearance of the stalled car until the driver made an avoidance steering response of > 5 degrees. Cognitive distraction was created by adding a verbal memory/recall task (remember/recall a series of three playing cards) during the driving procedure. In the absence of any distraction (control), the average CART was 310-325 msec. Initially, cognitive distraction during the driving test significantly increased CART. Repeated driving tests in combination with the memory task, however, revealed a reduction in the effect of the cognitive distraction over time. (Supported by the Office of the Provost and the Department of Pharmaceutical Sciences, WSU; WSU IRB #066716B3E)

ABSTRACT NO. PSC23	
Name	Hainan Li
Category	Pharmaceutical Sciences Graduate Programs
Title	G Protein-coupled Receptor 35 suppression prevents deoxycorticosterone acetate (DOCA)-salt-induced blood pressure elevation by protecting vascular endothelial cell functions
Authors	Hainan Li, MS, Huong Nguyen, Ph.D, Sai Pranathi Meda Venkata, MS, Jiemei Wang, MD, PhD
Abstract	Introduction: G protein-coupled receptor 35 (GPR35) is a poorly characterized receptor with controversial endogenous ligands and unclear intracellular signaling pathways. Recent studies have suggested a potential association between GPR35 and hypertension. We hypothesize that the deletion of GPR35 protects blood pressure (BP) through augmenting endothelial cell (EC) function. Objective(s): We tested the hypothesis that the deletion of GPR35 plays a protective role in vascular endothelial cell functions. We further explored the possible pathways through which the loss of GPR35 regulates vascular tone and BP levels. Methods: Human aortic endothelial cells (HAECs) were cultured in vitro. Mouse aortic endothelial cells (MAECs) isolated from adult male GPR35 global knockout (GPR35KO) mice and their wild type control (GPR35WT) litters were cultured. Cell functions were evaluated by angiogenesis by 3D tube formation, migration by Boyden Chamber assay and proliferation by MTT assay. Blood pressure was measured by tail-cuff method. Results: HAECs with knockdown of GPR35 showed improved cell functions, including angiogenesis and migration, enhanced tetrahydrobiopterin (BH4) and NO levels, and decreased level of $O_2^{\bullet-}$ formation. GPR35KO MAECs showed improved cell functions compared with GPR35WT MAECs, with enhanced eNOS protein expression phosphorylation (p-eNOS). The enzyme in BH4 de novo synthesis, GTP cyclohydrolase 1 (GCH1) was also increased in GPR35KO MAECs. In the in vivo study, GPR35KO mice had 18 mmHg of decrease in mean blood pressure (MBP) compared to GPR35WT mice. Acetylcholine (Ach)-induced endothelium-dependent vasodilation in aortas from GPR35KO was significantly enhanced compared with GPR35WT mice measured by myograph assay. In a deoxycorticosterone acetate (DOCA)-salt induced low-renin hypertensive mouse model, GPR35 deletion lowered MBP by 11 mmHg. Conclusion: Our data suggest that the deletion of GPR35 can prevent BP elevation in DOCA-Salt mouse model by improving endothelial cell function through activation of eNOS. This effect is attributed to the enhancement of GCH1-mediated BH4 synthesis. Our data suggested that the genetic deletion of GPR35 improved endothelium-dependent vasodilation, contributing to the low BP in GPR35KO mice.

PharmD Candidates

ABSTRACT NO. PPR01	
Name	Alvin Tomika, PharmD Student; Ghada Aalibrahim, PharmD Student; Redjon Hasimllari, PharmD Student, Helen Berlie, BHS, PharmD, BCACP
Category	PharmD Candidates
Title	Pharmacy Students as Camp Counselors in a Virtual Camp for Children with Type 1 Diabetes
Authors	Ghada Aalibrahim, PharmD Student; Alvin Tomika, PharmD Student; Redjon Hasimllari, PharmD Student
Abstract	Introduction: The American Diabetes Association (ADA) Imagine Camp was a virtual, in-home camp experience for children ages 5-17 with type 1 diabetes (T1DM). The ADA Camp is normally a one week in-person experience in Fenton Michigan, which was swiftly altered to a virtual experience during the COVID-19 pandemic. Pharmacy students had the opportunity to be camp counselors to children with type 1 diabetes during the virtual camp experience. Objective(s): 1. Educate children living with diabetes and their caregivers about proper management, new tools, and living well with diabetes through traditional camp activities replicated in the home. 2. Engage campers and their families in activities and sessions throughout te summer from the safety of their home. 3. Virtually connect children across the country and increase social skills, confidence, independence, and create lifelong friendships. Methods: First discuss the training that the pharmacy students received prior to engaging as camp counselors. You can include hours of training, training topics, etc. You can also include the time commitment of our camp counselor days/time. Every session involved: 1. Us welcoming the campers into our virtual cabin after taking attendance, explaining cabin chat rules and expectations. 2. Weekly icebreakers to engage and prepare the campers for the day's activities. 3. Weekly challenges they could then share online (TikTok, Instagram, Facebook). 4. Group discussions on topics related to their diabetes and the management of it. 5. Closing with a group singalong "cabin songs". Results: Pharmacy students educated the campers and their caregivers on how to best manage their T1DM through their childhood and into early adulthood. Camp Imagine provided a space where the children felt comfortable in an environment where their peers were dealing with similar issues and understood each other. It gave them time and the opportunities to learn about themselves and their diabetes. Conclusion: 1. We are now comfortable with communicating with children at their level about managing their diabetes. 2. We became more familiar with new ways to manage T1DM and using diabetic testing supplies/equipment. 3. We have practice preparing and implementing virtual activities through Zoom. 4. We have fostered the ability to work in a group setting with campers and volunteers across the country. The virtual T1DM camp provided a unique learning experience for pharmacy students. The students gained real-world experience and knowledge in the management of T1DM. In addition, they also learned how to effectively communicate with children, lead virtual group sessions, and collaborate with healthcare professionals and volunteers across the country.

ABSTRACT NO. PPR02	
Name	Sahar Ajrouche
Category	Pharm.D. Candidates
Title	Evaluation of a Student-Led Diabetes Outreach Initiative
Authors	Sahar Ajrouche, PharmD Candidate; Moaad Shariff, PharmD Candidate; Insaf Mohammad, PharmD, BCACP
Abstract	Introduction: A student-led outreach initiative was conducted at the Beaumont Schaefer Internal Medicine Clinic to evaluate the effect of outreach on patient reengagement in diabetes management. Objective(s): Our primary objectives were to quantify the number of patients reached via telephone through intervention and to quantify the proportion of patients that require diabetes management that scheduled a follow-up appointment or completed A1c post-intervention. Secondary objectives were to quantify completion of microalbumin and A1c monitoring and to quantify the proportion of microalbumin and A1c monitoring at or above goal following completion. Methods: This is a retrospective observational study that included patients with diabetes who were not seen in the clinic in the last year, had an outdated or uncontrolled A1c, and were not seen by the pharmacy team since their uncontrolled A1c. Patients were excluded if they did not meet the above criteria or were seeing an endocrinologist or primary care provider (PCP) out of office. Students identified eligible patients for enrollment through a screening process with May 26, 2020 as the reference date. Eligible patients were called to arrange an appointment or have lab slips mailed. We captured baseline demographics and descriptive statistics were used to evaluate the outcomes. Results: Following patient screenings, 156 patients were included in this study. We were able to reach 71% (n=111) of the patients via telephone and 26% via mail. A total of 54 patients attended an appointment post-intervention. Fifty out of 147 patients who needed an updated A1c visited a lab or office to have it completed. More than half of the patients who had their A1c completed were above goal and 45% (n=15) of patients had a microalbumin that was not at goal. Conclusion: These results suggest that student-led outreach can help identify and re-engage patients with diabetes in their diabetes management.

ABSTRACT NO. PPR03	
Name	Amina Ammar, Pharm.D. Candidate
Category	Pharm.D. Candidates
Title	Pharmacist Impact on Physician Practices in Diabetes Management: An Update
Authors	Amina Ammar, Pharm.D. Candidate; Lindsay M. Darghali, Pharm.D. Candidate; Miryan Elias, Pharm.D. Candidate; Sam Polina, Pharm.D. Candidate; Wassim Tarraf PhD; Helen Berlie Pharm.D.; Linda Jaber Pharm.D.
Abstract	Introduction: The American Diabetes Association (ADA) recommends that patients with diabetes achieve the following composite goal of: A1c <7%, blood pressure (BP) <140/90 mmHg, and low-density lipoprotein (LDL) <100 mg/dL, in order to reduce the risk of diabetes-related morbidities. Objective(s): The specific aims of the current study were to: (1) Examine the impact of the physical presence of a pharmacist on physician practice as it relates to diabetes management and (2) examine the pharmacist's impact on physician adherence to ADA standards of care in an outpatient primary care clinic. The central hypothesis is that the physical presence of a pharmacist has a significant positive impact on physician's practice pattern related to diabetes management. Methods: This was a retrospective, randomized, quantitative study comparing diabetes clinical outcomes in patients managed in a clinic with a pharmacist present (Group B - Intervention) to those managed in a clinic without a pharmacist present (Group A - Control). Data was collected between June 1, 2018 - December 31, 2019. Patients with diabetes aged 18 years and older seen by their physician at least twice during the evaluation period were eligible for inclusion. Those seen by the pharmacist were excluded. The primary outcome was to examine group differences in the achievement of the composite target for A1c, BP, and LDL. Group differences in achieving the individual targets for A1c, BP, and LDL as well as evaluating physician adherence to the ADA standards of care were examined. Statistical significance was defined by a 95% power (1-Beta) and a one-tailed t-test at a 5% significance level (alpha= 0.05). Results: Three hundred and ninety-four (394) patients were included (Group A: 191; Group B: 203). The two groups were comparable in demographics and A1c at baseline. Participants were 58.6% female with a mean age of 60.9 years. The three ADA goals were met by 16.7% of the entire study population, 19.9% in Group B and 13.4% in Group A; however, group difference did not reach statistical significance (p = 0.09, OR = 1.61). The mean ± SD A1c was 7.7 ± 2.1% for Group A and 7.4 ± 2.0% for Group B. For Group A, 51.8% achieved an A1c of <7.0% versus 58.6% of Group B (p=0.18). The mean ± SD BP was 137.8/81.4 ± 21.5/12.6 mmHg for Group A and 139.2/78.1 ± 21.5/14.1 mmHg for Group B. In both groups, 52.2% achieved BP <140/90 mmHg. The mean ± SD LDL was 102.7 ± 35.3 mg/dL for Group A and 99.6 ± 32.0 mg/dL for Group B. In Group A , 52.1% achieved the LDL goal of <100 mg/dL compared to 56.1% in Group B. When comparing individual physicians, those working directly with pharmacists were more adherent to ADA standards. Conclusion: This study demonstrated an overall trend toward improvement in diabetes management as a result of pharmacist presence. However, this trend did not meet statistical significance. Future prospective studies are needed to further characterize the impact of pharmacist presence on physician practices.

ABSTRACT NO. PPR04	
Name	Amina Ammar, Pharm.D. Candidate
Category	Pharm.D. Candidates
Title	Barriers to Pharmacist Managed Diabetes Clinic Visits: A Performance-Improvement Process
Authors	Amina Ammar, Pharm.D. Candidate; Lindsay M. Darghali Pharm.D. Candidate; Archana Sondor Pharm.D. Candidate; Jorden Tan Pharm.D. Candidate; Michelle McGarrity, PHD, Linda Jaber Pharm.D., Helen Berlie Pharm.D.
Abstract	Introduction: Health Centers Detroit Medical Group (HCDMG) is a private primary care clinic, providing care to predominantly underserved patients in the Detroit area. A recent study conducted at HCMD demonstrated consistent lowering of A1c in patients with diabetes seen in the Pharmacist Managed Diabetes Clinic (PMDC). This study also revealed that some patients who are referred to PMDC are lost to follow up over time. Objective(s): The specific aims of this study were to: (1) identify barriers that prevented patients from consistently following-up at the clinic and (2) reconnect patients to the PMDC. Methods: This was a prospective, qualitative, performance-improvement measure. Patients lost to follow-up were identified as inactive and screened for inclusion in this study. Inactive patients were defined as those who were seen at least once by the PMDC but had not returned for follow-up care within the last 12 months. Patients were excluded if they had never been seen by the PMDC team or if they had been seen within the past 12 months (active patients). Using the barriers survey, inactive patients were contacted via telephone to review barriers. A previously constructed survey was used to identify barriers preventing patients from returning to the PMDC. Results: Of the 341 patients that met inclusion criteria, 284 patients were reached and completed the phone interview. Multiple barriers were identified during these phone calls. The most common barrier was misconception of the need for follow-up with PMDC (43.5%). Other important barriers included: issues with facility (15.9%), perception of disease (11.0%), Cognitive barrier (7.7%), physical barriers (7.3%), other (4.4%), beliefs and attitudes (4.1%), financial barriers (3.7%), and time conflicts (2.4%). Patients were excluded if they were deceased, had outdated contact information, changed providers, or did not answer after 3 attempts. Clarifications of the PMDC services and relevant information was provided to all patients during these calls; all were given the opportunity to return to the PMDC. Phone call interventions resulted in 33.57% of patients scheduling a follow-up appointment with the PMDC. Conclusion: The most common reason for patients being lost to follow-up with the PMDC was unawareness that their primary care providers intended for continued followup. Education provided through these phone calls, resulted in some patients returning to the PMDC, promoting retention. Initiatives targeted at physician awareness of patient barriers and patient education of PMDC services as well as diabetes are key areas of improvement, which can help with future PDMC adherence. Additional process improvement measures regarding issues with the facility would also be of benefit. The long-term goal is to maximize patient referrals and retention to the PMDC, ultimately maximizing patient retention, available resources, and improving diabetes-related outcomes of this underserved patient population.

ABSTRACT NO. PPR05	
Name	Jessica Andrews
Category	Pharm.D. Candidates
Title	Marijuana Treatment Impairs Driving Performance in a Virtual Reality Driving Simulator via Changes in ATTENTION and not via Changes in Motor CAPABILITY
Authors	Jessica Andrews, PharmD Candidate; Tariq Masri-zada, Mohammed Mohammed, PharmD Candidate; Tylor Zohr, PharmD Candidate; Tyiesha Head, Sami Ftouni, Edison Nwobi, Doreen Head, PhD; and Randall Commissaris, PhD
Abstract	Introduction: In previous studies, marijuana (MJ) intoxication resulted in a dramatic increase in Crash Avoidance Reaction Times (CART). Objective(s): This study determined whether the effects of MJ on impairing driving performance are due to changes in ATTENTION versus changes in the CAPABILITY to execute the task (i.e., motor impairment). Methods: In a pilot study, a subject with a history of limited MJ use was tested for CART in a driving simulator task using a virtual reality headset and a gaming chair with a steering wheel and foot pedals. In this two-choice reaction test, the subject drove at a steady speed (70 mph) on a straight roadway. On multiple trials during a 'drive', the subject was forced to make an emergency steering response to avoid crashing into a stalled car that 'appeared instantly' (40 meters) ahead in the road. The dependent variable was the CART, measured as the time (in msec) from the appearance of the stalled car until the driver made a steering response > 5 degrees. On half of the trials, an alerting stimulus (Bell) was sounded 2 sec before the 'stalled car' appeared. The subject was tested at various times after oral treatment with MJ (12.5 mg, PO) or vehicle. Results: In the vehicle treatment and pre-drug tests, CARTs were approximately 320-330 msec on the 'No Bell' trials. MJ treatment significantly increased CARTs at 60 -180 min, but not > 180 min. The alerting Bell significantly reduced the effects of MJ. Conclusion: Thus, the effects of low-dose MJ intoxication on driving performance result from changes in ATTENTION to the road while driving and are not the result of changes in the CAPABILITY to perform the Crash Avoidance Reaction Task. (Supported in part by the Department of Pharmaceutical Sciences, WSU and the Office of the Provost, WSU; conducted in accordance with WSU IRB #066716B3E.)

ABSTRACT NO. PPR06	
Name	Ana Christine Belza, PharmD Candidate
Category	Pharm.D. Candidates
Title	Evaluation of Clinical Outcomes of Hydroxychloroquine and Supportive Therapies in the Treatment of Hospitalized Patients with COVID-19
Authors	Ana Christine Belza, PharmD Candidate; Sara Alosaimy, PharmD, BCPS; Taylor Morrisette, PharmD, MPH Candidate; Abdalhamid Lagnf, MBChB, MPH; Laura Cheaney, PharmD Candidate; Huzaifa Hussain, MSc Biomedicine Candidate; Iman Ansari, MPH Candidate; Shelbye Herbin, PharmD; Jacinda Abdul-Mutakabbir, PharmD, AAHIVP; Michael J. Rybak, PharmD, MPH, PhD
Abstract	Introduction: Coronavirus disease 2019 (COVID-19) has unprecedently impacted the world with its complications and mortality. As of September 16, 2020, nearly 114,000 cases stemmed from Michigan – a hotspot during the early pandemic. Despite progress, no therapies have been proven to treat COVID-19. Early on, therapies including hydroxychloroquine (HCQ) and supportive therapies (ST) were explored. We evaluated the association between clinical outcomes and HCQ versus ST in hospitalized patients with COVID-19. Objective(s) To determine the independent association between treatment groups and in-hospital mortality (IM) in patients with COVID-19. Methods: Hospitalized adults from the Detroit Medical Center with laboratory-confirmed COVID-19 from March – May 2020 were included. The primary outcome was IM. Secondary outcomes were symptom resolution and safety. The HCQ group received minimum one dose, and the ST group received minimum one dose and no HCQ. Analysis was conducted using chi-square test and Mann-Whitney U test. The independent effect of HCQ on IM was evaluated with multivariable logistic regression. Results: 309 patients were included. Patients were 56% male, 79% African American, with median age of 70 years (IQR 51-73). The most common ST were deep vein thrombosis prophylaxis (73%) and acetaminophen (63%). HCQ was not independently associated with IM (OR 1.075; 95% CI 0.433-2.667). Elderly patients, prior hospitalization preceding 90 days, and intensive care unit (ICU) admissions were independently associated with increased odds of IM (aOR 7.945, 7.367, 6.012; 95% CI 3.693-17.09, 1.399-38.78, 2.273-15.90, respectively). Adverse events occurred in both HCQ (12%) and ST (6%) groups (P = 0.340). The most common resolved symptoms were fever (77%) and tachycardia (57%). Conclusion: There was no difference between HCQ versus ST associated with IM. Neither treatment was independently associated with IM, though other factors were associated with higher odds of IM. Future studies are needed to determine if particular ST are protective from IM.

ABSTRACT PPR07	
Name	Dena Berri, PharmD Candidate
Category	Pharm.D. Candidates
Title	Evaluation of Adverse Drug Reaction Formatting in Drug Information Mobile Applications
Authors	Dena Berri, PharmD Candidate; Christopher Giuliano, PharmD, MPH; Sean McConachie, PharmD, BCPS
Abstract	Introduction: Formatting among drug information (DI) databases impacts healthcare professionals' interpretation of medical information, namely adverse drug reactions (ADR). These differences in interpretation may influence their medical decision-making. Objective(s): The purpose of this study was to evaluate the differences in the formatting of adverse drug reaction information among commonly-used DI database mobile smartphone applications. Methods: This was a cross-sectional analysis of ADR formatting across seven popular DI mobile application databases. Twenty prescription medications were analyzed within each mobile application. Formatting of each ADR section was assessed for the following criteria: presence or absence of placebo comparisons, severity assessments, onset of ADRs, quantitative formatting, qualitative formatting, references for ADR information, and grouping of ADRs by organ system. Descriptive statistics will be used to describe overall findings. Comparative analysis of each factor between the seven databases was conducted using the chi-square test. Results: Significant differences were found with regard to every formatting factor between the seven analyzed DI mobile applications. Placebo comparison information for ADRs was rare but was most common in Lexicomp (shown in 20% of analyzed medications). Severity assessment was only found in Micromedex and Epocrates mobile applications (100% in both applications). Quantitative formatting of ADR frequency was found in six of the seven analyzed mobile applications but absent in Epocrates. Qualitative frequency was commonly used in the mobile applications but absent in Lexicomp and Pocket Pharmacist. None of the applications included information regarding the onset of ADR. Comparative statistical analysis results are forthcoming. Conclusion: DI mobile applications vary in their formatting and presentation of ADRs. This may lead to variability in interpretation of this information and can influence health care decision-making. More studies are needed to assess how these differences may impact patient care.

ABSTRACT NO. PPR08	
Name	Caitlin Carron
Category	Pharm.D. Candidates
Title	Nephrotoxicity with Cefepime versus Piperacillin-tazobactam in Combination with Vancomycin Dosed by AUC
Authors	Caitlin Bolick Carron, MPH; Sara Alosaimy, PharmD, BCPS; Sarah C.J. Jorgensen, PharmD, MPH, BCPS; Abdalhamid Lagnf, MBChB, MPH; Michael J. Rybak, PharmD, MPH, PhD
Abstract	Introduction: Previously, we reported that the use of vancomycin (VAN) concomitantly with common anti-pseudomonal agents such as piperacillin/tazobactam (TZP) and cefepime (FEP) at our medical center was associated with a 29% and 11% rate of acute kidney injury (AKI), respectively. However, VAN was dosed to target trough concentrations at that time. Recent data suggests that VAN dosed by AUC results in lower rates of AKI, but it remains unclear whether this is also true when VAN is given concomitantly with TZP or FEP. Objective(s): To determine whether the risk of VAN-AKI is lower with FEP than with TZP. Methods: This was a retrospective cohort study of patients treated with VAN+TZP or FEP at Detroit Medical Center hospitals between 2015 to 2020. Adult patients started on VAN+FEP or VAN+TZP within 24 hours of each other and continued for ≥ 48 hours were included. Patients with no documented AUC dosing, acute kidney injury, end-stage renal disease, or renal replacement therapy prior to treatment were excluded. Nephrotoxicity was defined as an increase in serum creatinine ≥ 50% or 0.5 mg/dL, whichever was greater, over two consecutive measurements. Results: A total of 64 patients were included (29 VAN+TZP and 35 VAN+FEP); baseline characteristics were well-balanced among groups. The median(IQR) age was 57 years(47-65), 61% were male, and 69% were African American. The median(IQR) baseline serum creatinine was 0.68 mg/dL(0.58-0.85). VAN-AKI occurred in 14% of patients; 21% vs. 9% in VAN+TZP and VAN+FEP respectively (P= 0.15), with a number needed to harm (NNH) of 6. After controlling for age, IV contrast, culture source, and diabetes, VAN+TZP was not associated with increased odds of AKI. Conclusion: Our preliminary results suggest that the prevalence of AKI is higher in VAN+TZP vs. VAN+FEP. Although rates of AKI appear to be lower than previously reported, larger studies are needed to validate these findings.

ABSTRACT NO. PPR09	
Name	Laura Cheaney, Pharm.D. Candidate
Category	Pharm.D. Candidates
Title	A Descriptive Analysis of Patients Diagnosed with COVID-19 and Co-infection in Detroit during the Early Pandemic
Authors	Laura Cheaney, PharmD Candidate; Taylor Morrisette, PharmD, MPH Candidate; Sara Alosaimy, PharmD, BCPS; Abdalhamid Lagnf, MBChB, MPH; Ana Christine Belza, PharmD Candidate; Huzaifa Hussain, MSc Biomedicine Candidate; Iman Ansari, MPH Candidate; Shelbye Herbin, PharmD; Jacinda Abdul-Mutakabbir, PharmD, AAHIVP; Michael J. Rybak, PharmD, MPH, PhD
Abstract	Introduction: Coronavirus disease 2019 (COVID-19) is responsible for a global pandemic. A concern with COVID-19 are co-infections. Studies have reported between 5.8-8.1% of COVID-19 patients having documented co-infection(s); however, no study has reported the prevalence of co-infections during the early pandemic in Detroit, one of the first "hot spots." While the number of patients with COVID-19 and co-infections is low, there is limited to no information on the impact of acquiring these virulent and/or multidrug-resistant (MDR) pathogens. Objective(s): Investigate the prevalence of co-infections in the early pandemic in patients diagnosed with COVID-19 in Detroit. Methods: This study is a single-center, retrospective, and descriptive. All adult patients diagnosed with COVID-19 and admitted to Medical Center were screened from March to April 2020. Any patients with a documented co-infection with any pathogen were included. Descriptive statistics were utilized for analysis. Results: A total of 490 COVID-19 patients were screened, and 65 (13.3%) were found to have ≥1 co-infection (thus, total percentage >100%; bacterial: 93.2%, fungal: 7.7%, viral: 6.2%). The majority of patients were male (58.5%) and African American (76.9%), while median age and weight were 65 (60-74) years and 85 (73.2-105.5) kg, respectively. Of the 60 (92.3%) patients with a bacterial co-infection, 9 (13.8%) were infected with multiple bacteria, and 3 (4.6%) also had fungal and viral 1 (1.5%) co-infections. The majority of bacterial co-infections included Pseudomonas aeruginosa(13.3%), Staphylococcus aureus(11.7%), and Enterococcus faecalis(10%). Three (4.6%) and 2 (3.1%) patients had Candida albicans and Candida glabrata, respectively, and 3 (6.7%) patients had influenza. The pathogens were cultured from the blood(59%), sputum and/or bronchoalveolar lavage(26%), or urine(11%). Conclusion: Patients with COVID-19 and documented co-infections were more prevalent in Detroit compared to previous studies. Further studies should be conducted to efficiently identify the presence and impact of co-infections in patients diagnosed with COVID-19 to optimize patient outcomes.

ABSTRACT NO. PPR10	
Name	Tiana De Carolis, MS
Category	Pharm.D. Candidates
Title	Frequent weekly exercise reduces symptom-related distress and impairment in adults with posttraumatic stress disorder
Authors	Raquelle Wilson, MS and Tiana De Carolis, MS; Allesandra Iadipaolo, BA; Christine Rabinak, PhD
Abstract	Introduction: Physical exercise, both alone and in combination with first-line treatments, has been shown to be effective in reducing symptoms of posttraumatic stress disorder (PTSD), such as avoidance and hyperarousal. However, it is unclear whether physical exercise also improves overall perceived distress or impairments in the individual's social interactions, capacity to work, or other important areas of functioning. Objective(s): The objective of this study is to explore the relationship between exercise frequency and PTSD symptoms, perceived distress and impairment in a sample of trauma-exposed adults both with and without a PTSD diagnosis. Methods: 127 adults (ages 18-60 years, 77% female) were recruited from the Detroit Metropolitan area and completed a structured clinical interview. All participants endorsed exposure to a Criterion A traumatic event (e.g., physical and sexual assault) as defined by the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) and were categorized as either PTSD (n= 59) or trauma-exposed control (TEC, n= 68). Weekly exercise frequency was defined as the number of times per week, on average, participants engaged in exercise of any intensity for at least 15 minutes during their free time. Results: Surprisingly, weekly exercise frequency was not related to overall PTSD severity, total number of clinically significant symptoms, or severity of any symptom cluster in either group. However, higher weekly exercise frequency was related to lower PTSD-related distress and impairment in the PTSD group only ($p < 0.05$). Of note, the two groups did not differ on weekly exercise frequency. Conclusion: These results are the first to suggest that frequent weekly exercise may lessen PTSD symptom-related distress and buffer against the negative impact on everyday social and occupational functioning. Our findings support the use of frequent exercise as an accessible, low-cost, non-pharmacologic therapy to reduce disease burden and improve quality of life in individuals with PTSD.

ABSTRACT NO. PPR11	
Name	David Gutenschwager, B.S.
Category	Pharm.D. Candidates
Title	Community Pharmacy Implementation of a Medical and Medication History Form (P-MnM)
Authors	David Gutenschwager, B.S.; Tara Orzechowski, B.S.; Joseph Fava, Pharm.D.; Francine Salinitri, Pharm.D.; Richard Lucarotti, Pharm.D.
Abstract	Introduction: Patient medical and medication history is key information for the pharmacist to have in conducting drug therapy review, monitoring and counselling. Currently that information is not readily available nor routinely obtained by the pharmacists in the community setting. To facilitate obtaining this information in this setting, we developed a process for patients to self-complete a form that queries for this information. Objective(s): This project aims to study the time it takes a participant to complete the form and the time needed for review. The acceptance of the form by the participant will also be evaluated. Methods: The investigators conducted the study at Marinco pharmacy in Hazel Park, MI, an independently owned community pharmacy. Participants ages 18 and older were invited to complete a medical and medication history form using either a tablet or paper version. Participants were also asked to complete a short survey that assessed their attitudes towards the utilization of the form in a community pharmacy. A student pharmacist reviewed the form with the patient for completeness and discussed any areas that were not addressed by the patient. During this process, investigators recorded the time for the participants to complete the form and the time for student pharmacist review. Results: Preliminary data for 50 study participants was assessed. The average time to complete the form was approximately 8 minutes for 39 participants using the paper version and 11 using the tablet. The time for student pharmacist review with participants was approximately 6 minutes. Participants had generally favorable attitudes towards understanding the form, feeling comfortable providing all requested information, the importance of the pharmacist having all the information, and updating the form at future visits. Conclusion: The use of a self-completed medical and medication history form within a community pharmacy setting shows promise for being implemented into future pharmacy practice.

ABSTRACT NO. PPR12	
Name	Supreet Kaur
Category	Pharm.D. Candidates
Title	The Long-term Sustainability of the Respiratory Culture Nudge on Antibiotic Prescribing
Authors	Supreet Kaur; Corey J. Medler, PharmD; Mary Hutton, PharmD; Rachel M. Kenney, PharmD, BCPS
Abstract	Introduction: We previously demonstrated that addition of a "nudge" comment, "Commensal Respiratory Flora only: no S. aureus/MRSA or P. aeruginosa" to microbiology reports improved antibiotic prescribing patterns and outcomes in patients empirically treated for pneumonia. Objective(s): It is possible that the impact of this antimicrobial stewardship intervention may dwindle over time. The purpose of this study was to evaluate the sustainability and impact of this intervention on prescribing patterns and patient outcomes. Outcomes: antibiotic de-escalation, duration of therapy, and safety outcomes. Methods: This is an IRB approved, quasi-experimental study including adult patients admitted to Henry Ford Health System hospitals from 8/1/2018 – 1/31/2019, with a pneumonia diagnosis and receiving empiric antibiotic therapy for P. aeruginosa (PsA) and/or methicillin-resistant Staphylococcus aureus (MRSA). Comparator groups: early post-intervention ("Early," 8/1/2016 – 1/31/2017) and long-term follow-up ("Late" 8/1/2018 – 1/31/2019). Results: 206 patients included, 105 in Early & 101 in the Late groups, respectively. Median age 61 & 65 years, male sex 44% Early & 54% Late. All patients in the Early group received both MRSA and PsA targeted antibiotics; in the Late group 89% and 86% received each. MRSA antibiotics were de-escalated 71% in the Early group, 89% in Late ($P < 0.003$); PsA antibiotics were de-escalated in 71% & 86% ($P < 0.009$). Acute kidney injury: 14% Early vs. 3% Late ($P = 0.004$). Mortality: 20% Early vs. 0% Late ($P < 0.000$). No difference in C. difficile infection. See table 1 for additional details. Conclusion: The respiratory culture "nudge" was associated with antibiotic de-escalation in long-term follow up compared to early post-intervention. The behavioral "nudge" demonstrated a sustained improvement in anti-MRSA and anti-PsA treatment. Future analyses will explore the role of confounding factors and patient outcomes.

ABSTRACT NO. PPR13	
Name	Ulyana Kucherepa, PharmD Candidate
Category	PharmD Candidates
Title	Prescribing Patterns of Direct Oral Anticoagulants (DOACs) in Patients with Atrial Fibrillation in Michigan
Authors	Ulyana Kucherepa, PharmD Candidate 2021; Christopher Giuliano, PharmD, MPH
Abstract	Introduction: Anticoagulation in atrial fibrillation (Afib) is important for stroke prevention, estimated to be continued only 60% of the time. Previous research has indicated certain socioeconomic characteristics may influence anticoagulant use, although many do not control for all characteristics. Objective(s): The purpose of our study was to evaluate the association between DOAC prescribing patterns and socioeconomic characteristics in Michigan. Methods: We performed a cross sectional study evaluating prescribing patterns in patients with Afib enrolled in Commercial Blue Cross Blue Shield and Blue Care Network (BCBS/BCN) from 2015 to 2017. Data was analyzed at zip code level. Socioeconomic parameters were retrieved from American Community Survey and matched with BCBS/BCN percent of time with active coverage (PDC) and active claims for any DOAC (IND). The primary outcome was prescription of any DOAC. Quantile and linear regression were used in analysis. Variables were included if associated with the dependent variable at $p < 0.1$. Results: A total of 3435 zip counts were analyzed in four quantiles (20th, 40th, 60th and 80th). The same socioeconomic parameters were statistically significant in quantiles 0.2 and 0.4: proportion AA, unemployed, income and some high school education. Employment status, income, and education level showed negative correlations and proportion AA showed a positive correlation with DOAC IND. Parameters in quantiles 0.6 and 0.8 were not statistically significant and not reported in results. African American (AA) patients with a-fib were found to have less percent days covered for DOACs ($p=0.003$). Conclusion: These findings show associations between prescription of DOACs and indicators of socioeconomic status such as education, employment, income and race in Michigan. Employment and education had the largest associations. Proportion of AA led to higher initial DOAC prescription but with less PDC. Our findings highlight the importance of disparities in DOAC prescribing, as these differences may impact rates of stroke.

ABSTRACT NO. PPR14	
Name	Ulyana Kucherepa, PharmD Candidate
Category	PharmD Candidates
Title	First-Year Pharmacy Students' Opinions on a Career Fair in a Required Course
Authors	Ulyana Kucherepa, PharmD Candidate 2021; Mary Beth O'Connell, Pharm.D., BCPS, FASHP, FCCP, FNAP, AGSF, Professor
Abstract	Introduction: The best methods to increase student pharmacist awareness of pharmacy careers are not known. A career fair during the first professional year could help students expand their horizons beyond traditional pharmacy careers and make informed electives and rotation decisions. Therefore, in 2017 a career fair was implemented within a required winter semester first-year pharmacy Social and Administrative Sciences course to present career information early in the curriculum. Objective(s): The study's purpose was to evaluate student pharmacists' opinions about the career fair's impact on career knowledge, benefits of presenter interactions, and improvements. Methods: Before the career fair, students completed the American Pharmacists Association's Career Pathway Evaluation Program to familiarize with pharmacy careers. From the fairs' 15-18 career options, students picked 5 careers. Each career presentation lasted 20 minutes including career specialist introduction and Q&A period. After the 2018 and 2019 career fairs, students completed a seven-question, one-page reflection developed by course coordinator about the event; worth 3 points. Qualitative analysis using grounded theory was performed using Excel. Two researchers coded answers with differences adjudicated. Focused codes and themes were developed. Results: Reflection response rates were 2018 - 98% (111/113) and 2019 - 92% (89/97). Top themes (focused code numbers) were for learning about profession - career goals (n=277), career options (n=201), and variations of positions (n=102); for excitement about future - career diversity (n=267), positive impact (n=70), and bright future (n=71); for wisdom from speakers - build relationships to expand career option (n=241), keep an open mind (n=158), and continuously grow (n=115); and for improvements - scheduling (n=129), rooms (n=89), and logistics (n=48). Conclusion: The career fair allowed student pharmacists to expand their knowledge about pharmacy career options and gain career advice from the presenters supporting usefulness of a career fair early in the pharmacy curriculum.

ABSTRACT NO. PPR15	
Name	Andrew Mannino, Pharm. D Candidate
Category	Pharm.D. Candidates
Title	Efficacy and Safety of Ceftazidime/avibactam in Comparison to Colistin in Multidrug- resistant Gram-negative Organisms
Authors	Andrew Mannino, Pharm. D Candidate; Sara Alosaimy, Pharm. D., BCPS, MPH Candidate; Sarah C.J. Jorgensen, Pharm.D., MPH, BCPS ; Abdalhamid M. Lagnf, MPH; Susan L. Davis, Pharm.D.; Michael J. Rybak, Pharm. D., MPH, Ph.D.
Abstract	Introduction: Multi-drug resistance (MDR) limits treatment options for Gram-negative bacterial infections (GNI). Clinicians relied on colistin (CST), however acute kidney injury (AKI) can be up to 30%. Ceftazidime/avibactam (CZA) is a novel combination with unique activity against numerous MDR Gram-negative pathogens. We evaluated the safety/efficacy of CZA compared to CST in MDR (GNI) management. Objective(s): The study's objective was to compare efficacy and safety of CZA against CST in treatment of MDR infections. Methods: We included adult patients (April, 2010-June,2019) treated with CZA or CST 72 hours. Patients with end stage renal disease or Acinetobacter baumannii infections were excluded. Primary outcome was clinical success (30-day survival following drug initiation and absence of nephrotoxicity). The independent effect of CZA on clinical success was evaluated with multivariable logistic regression. Results: We included 111 patients (CST, n=41 and CZA, n=70). Patients were mostly female (51%), with a median(IQR) age of 59(48-68) years and had a median(IQR) APACHEII score of 18(11-25). The most common infection sources were respiratory and urinary tract; 50% and 18%, respectively. Common pathogens were Klebsiella pneumoniae and P. aeruginosa ;46% and 32% in the CZA-group and 54% and 69% CST-group, respectively. Clinical success was more common in the CZA-group (80%) vs. the CST-group (65%) (P=0.103). Thirty-day survival and AKI occurred in 87% and 23% in the CST-group and 79% and 7% of CZA-group (P=0.309, P=0.02), respectively. After controlling for clinical variables such as age and APACHE II; CZA was associated with higher odds of clinical success (aOR 3.653, 95% CI 1.163-11.476). The number needed to harm with AKI with a polymyxin/colistin was 7. Conclusion: For management of MDR infections, CZA is associated with higher success and lower AKI than CST. Our analysis should be validated in larger, randomized, multi-center studies.

ABSTRACT NO. PPR16	
Name	Tabitha Moses, MS
Category	Pharm.D. Candidates
Title	Evaluating the Unique Impact of Opioid Overdose Prevention and Response Training on Medical Student Knowledge and Attitudes toward Opioid Overdose
Authors	Tabitha E. Moses MS; Jessica Moreno PharmD; Rafael Ramos MS; Eva Waineo MD; Mark K. Greenwald PhD
Abstract	Introduction: As opioid overdose remains a leading cause of accidental death in the USA, healthcare professional programs have begun incorporating harm reduction training into their curricula. Initial data suggest these trainings improve student knowledge; however, it is unclear whether these changes persist over time and whether training provides added value beyond the traditional curriculum. Objective(s): This project examines the long-term impact of Opioid Overdose Prevention and Response Training (OOPRT) at WSU-SOM and evaluates whether students who received training (vs. those who did not) had greater improvements in knowledge and attitudes. Methods: Incoming students in the Class of 2023 were surveyed on opioid overdose knowledge, attitudes, and experiences. 50% of students were randomly assigned to receive a 1-hour OOPRT during the first month; the other 50% were a no-training control. All students completed a 1-year follow-up survey. We used RM ANOVA to compare 1-year change in knowledge and attitudes between groups. Results: Data were included from students who completed the baseline and 1-year follow-up (N=167), 49.7% (n=83) received OOPRT. Results revealed a significant effect of training on 2 of 4 opioid overdose knowledge domains: overdose signs ($F(1,165)=4.374$, $p=0.038$, partial $\eta 2=0.026$) and naloxone use ($F(1,165)=9.222$, $p=0.003$, partial $\eta 2=0.053$) and 2 of 3 opioid overdose attitude domains: competencies ($F(1,165)=26.419$, $p<0.001$, partial $\eta 2=0.138$) and concerns about managing an overdose ($F(1,165)=9.977$, $p=0.002$, partial $\eta 2=0.057$). Conclusion: These data show OOPRT effects (1) can be maintained without more structured educational intervention and (2) are unique to the training and not attained through the regular curriculum. This study provides the first evidence to suggest OOPRT may have unique, long-lasting effects on knowledge of and attitudes towards opioid overdose.

ABSTRACT NO. PPR17	
Name	Regina Pacitto, PharmD Candidate
Category	PharmD Candidates
Title	THC Alters Brain Activation and Improves Efficacy of Cognitive Reappraisal in Patients with PTSD: A Neuropsychopharmacological Approach to Therapy
Authors	Regina Pacitto, PharmD Candidate; Christine Rabinak, PhD; Craig Peters; Allesandra Iadipaolo
Abstract	Introduction: An estimated 8 million American adults experience post-traumatic stress disorder (PTSD) during a given year, but therapies for PTSD – largely cognitive and/or behavioral in nature – do not prove universally effective. A reported 60-72% of military patients retain their PTSD diagnosis after treatment, highlighting the necessity for improved therapy. Previous studies have shown that those with PTSD display hyperarousal of the amygdala with under-engagement of brain regions such as the prefrontal cortex (PFC) during cognitive reappraisal tasks compared to healthy controls. Prior research has also shown that in healthy subjects, low doses of Δ9-tetrahydrocannabinol (THC) attenuate amygdala reactivity and enhance activity in the PFC. The effect of an acute, low dose of THC on frontolimbic activity during emotion regulation in individuals with PTSD has not yet been studied. Objective(s): We aimed to investigate the effect of THC on negative affect and brain activation in *a priori* regions of interest during cognitive reappraisal in patients with PTSD. Methods: N = 77 individuals were randomized to receive 7.5mg THC or placebo before participating in a well-established emotion regulation task in which subjects are instructed to “Maintain” or “Reappraise” their emotions before viewing neutral and negative images during functional magnetic resonance imaging. Subjects reported their real-time affect during the task. Results: Among trauma-exposed individuals, THC but not PBO reduced negative affect during reappraisal ($p = 0.013$). In PTSD patients, THC but not PBO attenuated activity in the posterior cingulate cortex (PCC) to activation levels seen in trauma-exposed control subjects while viewing negative images ($p = 0.01$). Conclusion: An acute, low dose of THC improves the efficacy of cognitive reappraisal in trauma-exposed individuals perhaps via attenuation of hyperactivity in the PCC during exposure to negative stimuli. THC is a promising neuropsychopharmacological adjunct to therapy in the treatment of PTSD.

ABSTRACT NO. PPR18	
Name	Ruchi Patel, PharmD Candidate
Category	PharmD Candidates
Title	Time to initiation of bone modifying agents in patients with bone metastases from solid tumors or multiple myeloma
Authors	Ruchi Patel, PharmD Candidate 2021, Ryan DasGupta, PharmD, BCOP, Vanessa Millisor, PharmD, BCPS
Abstract	Introduction: Bone-modifying agents (BMA) play a vital role in optimizing outcomes for patients with bone metastases from solid tumors (BMST) or multiple myeloma (MM). The National Comprehensive Cancer Network (NCCN) recommends initiating BMA's at the time of initiating chemotherapy for BMST or MM to reduce incidence of skeletal related events (SRE). Despite this recommendation, adherence to the guidelines is lacking. Data shows that only 51% of Medicare recipients treated for myeloma received a BMA as part of their first-line chemotherapy. Objective(s): The purpose of the study was to evaluate adherence to guideline-based recommendations for initiating BMAs in patients with BMST or MM at Henry Ford Health System (HFHS). Methods: The study was a retrospective chart review that evaluated patients who received a BMA for the diagnosis of BMSP or MM from 01/01/2019 to 06/30/2020. The primary endpoint measure was number of weeks from the initiation of chemotherapy for BMST or MM to initiation of BMAs. Secondary endpoints included reasons for delayed BMA initiation (> 4 weeks from starting chemotherapy for BMST or MM), incidence of SREs in patients with delayed BMA initiation, and incidence of hypocalcemia among patients with severe renal impairment. Results: A sample size of 80 patients is desired. These patients will be analyzed to meet our primary and secondary endpoints after meeting the inclusion criteria. Data collection points will include patient demographics, drug therapy, pertinent past medical and surgical history and lab values. Conclusion: The MUE may help change the prescribing process of BMAs in patients with BMST or MM at HFHS. Results suggesting non-adherence to guidelines may lead to a system-wide policy to facilitate early BMA initiation (within 4 weeks from starting chemotherapy). Through pharmacist-based interventions, we hope to improve patient outcomes and quality of life by reducing the incidence of SREs in the future.

ABSTRACT NO. PPR19	
Name	Gaurangi Trivedi, Pharm.D Candidate
Category	PharmD Candidates
Title	The Jamaica Dental Mission: International Pharmacy Collaboration with Dentistry
Authors	Gaurangi Trivedi, Pharm.D Candidate; J Christopher Lynch, Pharm.D; Helen Berlie, BHS, Pharm.D., BCACP
Abstract	Purpose: The World Health Student Organization (WHSO) at Wayne State University's Eugene Applebaum College of Pharmacy and Health Sciences promotes interprofessional collaborations between pharmacy students and different disciplines both locally and internationally. Historically, these collaborations have focused on partnerships with physicians and medical students. Collaborations between dentists and pharmacists are less common than partnerships with medicine and have the potential to maximize student learning and interprofessional care. WHSO has begun collaborating with the Jamaica Dental Mission (JDM) to expose both dental and pharmacy students to each other's professions and establish awareness of the beneficial collaboration resulting in optimal patient care. Methods: A pre-post cohort survey assessing the perception of pharmacy participation in dental clinics was developed and conducted during the JDM in 2010 and 2015. Surveys were given to volunteers on the dental team. The 2015 survey was modified to include more questions and unique identifiers which were used to match pre- and post-survey data. The survey of Likert scale items was distributed on the first and last day of the trip to all the participants in the JDM (1 was ranked as no benefit whereas 5 was ranked as extremely beneficial). The data was compared to see how the JDM changed the perceptions of dental professionals after collaborating with the pharmacy team. Responses were analyzed in aggregate as group data and individual respondents pre- and post-trip results were compared using descriptive statistics. Wilcoxan signed rank test was used to determine statistical significance, alpha set at 0.05. In addition to assessing the perception of benefit of pharmacy participation, patients were assessed for potential undiagnosed or uncontrolled hypertension or diabetes. Results: The interprofessional healthcare team of JDM on average sees 1000 patients during the four clinic days. The pharmacy team performs around 700 blood pressure (BP) measurements per trip. Of these measurements, approximately 2% of the patients are referred for immediate medical care for elevated BP (> 180/110 mmHg). In addition, around 6% of patients are referred to their primary care physician (PCP) for further evaluation of undiagnosed or uncontrolled hypertension. An average of 143 point-of-care blood glucose (BG) measurements per trip, with 3.5% of the patients referred for immediate medical care for high blood glucose levels (> 400mg/dL). Furthermore, around 24% of patients are referred to their PCP for follow up of potential undiagnosed diabetes or uncontrolled diabetes. In 2010, 27 of 73 volunteers of the JDM participated in the surveys and in 2015, 34 of 72 volunteers participated. The areas consistently perceived as strongly beneficial prior to and after the trip both years were obtaining medical history of patients and overall benefit of pharmacy student participation in JDM. The areas the perceived benefit grew over time was counseling patients about proper oral hygiene care post-operation and their post-dental procedure medications. Conclusion: For most patients, the JDM is the only time they have access to proper oral health care. During this time, the pharmacy team was able to successfully perform medication reconciliations and screen patients for hypertension and/or diabetes while making clinical interventions. The dental professionals learned firsthand the importance of medical reconciliation in their practice and pharmacy professionals obtained knowledge on dental procedures and oral health care. Both professions value their beneficial collaborations and how together they are able to provide optimal patient-centered care.

ABSTRACT NO. PPR20	
Name	Anisa Wooten, PharmD Candidate
Category	Faculty, Pharm.D. Candidates
Title	Evaluation of Pharmacist Interventions for Patients with Uncontrolled Diabetes
Authors	Insaf Mohammad, Pharm.D., BCACP; Waleed Makkawi, PharmD Candidate; Anisa Wooten, PharmD Candidate
Abstract	Introduction: Diabetes affects over 34 million people in the United States, while approximately 865,000 of those individuals reside in Michigan. Patients with uncontrolled diabetes may face harmful consequences of the disease including vision loss, heart disease, stroke, kidney failure and amputation. Previous studies have shown that pharmacists can effectively monitor, manage and provide education to diabetic patients to improve outcomes. The Beaumont Schaefer Internal Medicine Clinic implemented an interprofessional diabetes management model in 2017 with an embedded ambulatory care pharmacist, pharmacy students, and pharmacy residents. Objective(s): To describe interventions made by the clinical pharmacy team for patients with uncontrolled diabetes in the Beaumont Schaefer Internal Medicine Clinic. Methods: This is a retrospective observational study. Medical chart review was completed on patients in the outpatient clinic from June 1st, 2019 - December 31st, 2019. Data collection was completed for each encounter involving pharmacy team including the date of the encounter, type of visit conducted and type of providers involved. The following parameters were collected: drug, new medication added, medication discontinued, dose increase, dose decrease, medication refill, adherence counselling, access resolution and the reason for the intervention. Other diabetes interventions were evaluated including hypoglycemia education, access to blood glucose monitoring supplies, education on blood glucose monitoring, diet/exercise education, as well as hypertension and hyperlipidemia disease state interventions. Results: 109 encounters were captured on a total of 33 patients (~3 encounters per patient). Total number of drugs intervened on was 119, and the total number of interventions was 105 (6 new medication added, 8 medication discontinued, 33 dose increased, 7 dose decreased, 8 medication refill, 38 adherence counseling, 5 access resolution). Conclusion: Clinical pharmacists perform a variety of interventions to help manage patients with uncontrolled DM. Future studies should be conducted to determine which interventions play a significant role in improving measurable patient outcomes such as HgbA1c.

ABSTRACT NO. PPR21	
Name	Nicole L. Zabik
Category	Pharm.D. Candidates
Title	Out with the Old, in with the New: A Preliminary Study on a Novel Pavlovian Fear Conditioning Paradigm
Authors	Nicole L. Zabik, B.S.; Allesandra Iadipaolo, B.S.; Craig Peters, B.S.; Christine A. Rabinak, PhD
Abstract	Introduction: Laboratory research investigating the pathophysiology of trauma-related psychiatric disorders utilizes Pavlovian fear conditioning paradigms to mimic the learning processes involved in trauma exposure and recovery. However, to date, these paradigms have been limited in their salience and the relevancy of the stimuli used. For instance, most stimuli do not mimic real environments or situations and stimuli used to invoke fear are more annoying rather than aversive in nature (e.g., white noise burst). Our lab has developed a realistic, but safe, immersive-reality Pavlovian fear conditioning paradigm to use during functional MRI (fMRI) scanning. Objective(s): The study's objective was to model the acquisition and recovery from learned fear with a novel immersive-reality Pavlovian fear conditioning paradigm in healthy adults. We expect to see activation of fear-related neural circuitry during the paradigm. Methods: 38 healthy adults (ages 18-37) completed a novel Pavlovian fear-extinction paradigm using virtual reality coupled with fMRI in regions of interest: hippocampus, ventral medial prefrontal cortex (vmPFC), dorsal anterior cingulate cortex (dACC), and amygdala. During acquisition, two conditioned stimuli (CSs) were presented: CS+ was paired with an aversive unconditioned stimulus (US), whereas CS- was never paired with the US (safety cue). During extinction, both CSs were presented in the absence of the US. 24 hours later, all CSs were presented without US during recall of extinction learning and fear renewal. Results: All participants were able to acquire differential fear to the CS+ and CS- and extinguish fear to the CS+. During acquisition, dACC activation was significantly greater than baseline (CS+; $p<0.05$). During late extinction, hippocampal activation was greater than baseline (CS+E; $p<0.05$). Amygdala and dACC activation were significantly greater than baseline during fear renewal (CS+E; $p<0.05$). Conclusion: The novel Pavlovian fear-conditioning paradigm elicited fear-related neural activation in healthy adults. These data suggest the novel paradigm is eliciting the learning associations innate to trauma-related disorders.

ABSTRACT NO. PPR22	
Name	Tylor Zohr
Category	Pharm.D. Candidates
Title	Wake Up America and Save Lives !!! Move the Drunk Driving Blood Alcohol Concentration (BAC) Cut-off to 0.05% !!!
Authors	Tylor Zohr, Edison Nwobi, Tariq Masri-zada, Jessica Andrews, Tyiesha Head, Dima Awad, Medina Sareini, Doreen Head and Randall Commissaris
Abstract	Introduction: We argue for an established Blood Alcohol Concentration (BAC) cut-off for impaired driving at 0.05%, aka 0.05 g/dl, for drivers in the United States. Methods: We will show that this argument is backed by scientific evidence collected over many years and in multiple countries using crash data and fatality data. In addition, we shall provide an example from our own driving simulator research. We will discuss how this cut-off can be effectively enforced at the roadside by law enforcement officers, both in terms of breathalyzer use and field sobriety testing. We will discuss the many national organizations in favor of a BAC at 0.05%, and we will address, and effectively counter, the major arguments raised by groups and individuals that are opposed to the move to 0.05%. Results: We will show how the BAC of 0.05% is consistent with where the rest of the world is headed. Finally, we will argue that BAC 0.05-0.08% should be associated with a lower level of punishment than for driving with BAC > 0.08%, as has been done in several jurisdictions around the world.

ABSTRACT NO. PPR23	
Name	Hassan Khatib
Category	Pharm.D. Candidates
Title	Initiation of Enteral Sedation in Patients Requiring Mechanical Ventilation
Authors	Hassan Khatib, Stephanie Edwin, Renee Paxton, Carrie Hartner, Chris Hughes, Samer Al-Samman, Christopher Giuliano
Abstract	**Purpose** Critically ill patients requiring mechanical ventilation frequently require analgesia and sedation to maintain comfort and optimize ventilatory support. COVID-19 has led to an increased demand for these agents as the number of patients requiring mechanical ventilation is significantly higher. Recent literature has supported the use of enteral clonidine as a means of down-titrating dexmedetomidine, as both drugs are central a2A-receptor agonists. Given the shortage that occurred with the availability of IV analgesia and sedatives during the initial COVID surge, our study wanted to evaluate the effectiveness and safety of this approach given the paucity of data. **Methods** The study conducted was a single-center, retrospective, observational study conducted at Ascension St. John Hospital that assessed requirements for IV sedation and analgesia in patients undergoing mechanical ventilation before and after administration of enteral agents. A list of patients requiring mechanical ventilation was obtained starting March 27, 2020. Patients at least 18 years of age were included if they received at least 12 hours of intravenous sedation prior to initiation of an enteral agent (oxycodone, methadone, diazepam, or clonidine). Only the first ICU visit meeting criteria will be included. Patients were excluded if they received paralytics, were admitted with acute stroke, traumatic brain injury, hypothermia, hepatic encephalopathy, or subdural hematoma, did not receive enteral sedation or analgesics, or had a Glasgow coma scale less than six for more than 24 hours off sedation. The primary outcome compared the requirements for continuous infusion analgesia and sedation before and after administration of enteral sedation. Sedative requirements were defined as relative amounts by averaging the requirements 24 hours prior to enteral administration and comparing the average amount for each 24-hour interval post-administration up to five days. A Pearson correlation test and linear regression was performed, as well as a 2-taialed significance. Sample size was determined using an effect size of 0.4, two-sided alpha of 0.05, and a power of 80%. **Results** Out of the 441 patients screened, 28 were excluded because of receipt of paralytics, 229 not on mechanical ventilation for greater than 24 hours, and 132 did not receive at least 12 hours of IV sedation prior to being switched to a combination of oral and intravenous sedation. After these exclusion criteria were applied, 52 patients remain in the study. Patients included had an average age of 59.9, 63.5% patients were male, 71.2% of the patients were COVID positive, average BMI was 33, average length of stay was 15.7 days, average duration of mechanical ventilation was 9.78 days, and 34 patients experienced AKI. In the univariate analysis both enteral opioid dose (-0.126, p=0.044) and enteral benzodiazepine dose (0.148 p=0.018) had a weak association with IV sedative administration. Time had the largest association (-0.292, $p < 0.001$). In the multivariate analysis, enteral opioids and enteral benzodiazepines were not associated with IV sedative administration. **Conclusion** There was no association between IV sedative utilization and enteral sedatives. Further studies should evaluate alternative strategies for decreasing IV sedative utilization.

Undergraduate Students

ABSTRACT NO. UG01	
Name	Ryan Jones
Category	Undergraduate Students
Title	Reducing Metabolic Syndrome and Unmet Needs among Rural Breast Cancer Survivors during Covid-19: A Feasibility Pilot Study
Authors	Ryan Jones; Yi-Ling Hu, MSOT, Ph.D.; Heather Fritz, Ph.D., OTR/L
Abstract	Introduction: Breast cancer survivors (BCS) with Metabolic Syndrome (MetS) are more likely to die from cardiovascular disease (CVD) than cancer recurrence. Interventions can reduce CVD risks by helping BCS develop healthy dietary and physical activity behaviors into habits, defined as cue-contingent behaviors that operate below conscious awareness. However, to date, no studies have examined the feasibility of a habit formation intervention among BCS with MetS, and no habit formation interventions have utilized a hybrid (in person and telehealth) delivery structure, which may hold promise for reaching rural populations. Objective(s): To determine the feasibility of a habit formation intervention for female BCS with MetS. Methods: BCS ages 18+ with MetS were recruited by purposive sampling. Occupational therapy students delivered the habit formation treatment during 2 in-person and 10 phone-based sessions. Trial feasibility was assessed as participant recruitment, retention, and attendance rates, and intervention satisfaction. Primary and secondary outcomes were assessed for feasibility and to estimate effect sizes for a future trial. Feasibility outcomes were analyzed with descriptive statistics, and effect sizes were estimated by Cohen's d. Results: Six BCS (mean age 56.5±10.8) completed post-intervention follow up. We retained 85.7% of participants through the end of the study with a session attendance rate of 100%. Satisfaction scores were high (mean score: 31.2). We detected small to moderate effects in preliminary efficacy outcomes. Conclusion: The emergence of Covid-19 posed several unforeseen challenges to trial implementation. With minor protocol changes, the intervention was feasible to deliver and satisfactory to participants. A future study with a control condition and larger sample size is needed to determine treatment efficacy.