

### APRIL 12, 2019 | 8:30AM - 3:30PM

# College of Allied Health 9th Annual Research Day

8:00-8:30		<b>Registration</b> OKC: Carole A Sullivan Atrium. Tulsa: LC145	
8:30-8:45	Welcome Address: Susan Sisson, PhD, RDN, CHES, FACSM, Assistant Dean for Research		
8.45-0.45	Keynete Address: Zcelt Nagykaldi, PhD, Associate Professor		
0.45 9.45	Director of	Research in the Department of Family & Preven	tive Medicine
	Translo	ating Research Into Practice and Practice Into R	Research:
	A Vision f	or Community & Patient-Centered Science and	Healthcare
	OKC: A	HB 1117*, 1046, 1047, 2058, 2059, 2065; Tulsa: L	C145/222
9:45-10:00	Short Break		
10:00-11:00	Track 1	Track 2	Track 3
	Moderator: Christi Barbee	Moderator: Lynn Jeffries	<i>Moderator</i> : Hongwu Wang
	<i>ОКС:</i> АНВ 1117*, 1046	<i>OKC:</i> AHB 1047*, 2065	ОКС: АНВ 2058*, 2059
	Tulsa: LC 145	Tulsa: LC220	Tulsa: LC222*
	Anna Marie Jilla: Hearing Aid Affordability in	Kayla Quashie: The Relationship between	Jessica Tsotsoros: Implementation of a Health
	the United States: Big Data from the	Dietary Zinc and Protein Intake in Patients	and Wellness Program for Adults with
	American Community Survey.	with Pancreatic Cancer.	Persistent Behavioral Diagnoses.
	<b>Thubi Kolobe:</b> The utility of EEG as a measure	Tycen Elygare: Clinical Instructor	Anna Tran: Effects of Larger Neck Tissue
	of motor developmental and intervention	Productivity When Educating Doctor of	Density in Thyroid Studies.
	outcomes.	Physical Therapy Students.	
		, , , , , , , , , , , , , , , , , , , ,	
	Natalie Wansick: Movement Selection and	Bradford Gildon: Visible Body Art among	Jennifer Morrison: Creating an Intestinal
	Progression in Children at High Risk for	Radiographers: Perceptions and Impact	Epithelial Cell Culture Model to Screen Novel
	Cerebral Palsy versus Children at Low Risk for	within the Profession.	Phytochemical Therapies for Postmenopausal
	Cerebral Palsy.		Women.
	Krista Wolfe: Yttrium-90 Sir-Sphere Spills: A	Hannah Blanden: Correlation of Grip	Alvssa Rucci: Effectiveness of Occupational
	Pilot Study to Determine Efficient Clean-Up	Strength and Patient-rated Outcome	Therapy Intervention Post-UE Injury on
	Practices.	Measures in Orthopedic Dysfunction.	Reported Performance and Satisfaction of
		1 /	IADLs.
11:00-11.10	Short Break		
11:10-11:55	Lab Tours & Poster Presentations (OKC: Carole A Sullivan Atrium)		
12:00-1:00	ID/IEP We	ek Keynote Address: Kathrin A. Eliot, PhD, RD	N/LD, FAND
	Office of Interdisciplinary Programs Interprofessional Educators and Practitioners Association		
	"We Can Do It!" Co-creating Excellence Through Interprofessional Education		
	OKC: AHB 1117*, 1046, 1047; Tulsa: LC145/222		

1:10-1:55	Lab Tours & Poster Presentations (OKC: Carole A Sullivan Atrium & Tulsa: Innovation Commons)		
2:00-3:00	<b>Track 1</b> <i>Moderator</i> : Jennifer Graef <i>OKC:</i> AHB 1117*, 1046 <i>Tulsa</i> : 3102 <b>Danielle Knight:</b> Evaluation of Hearing Performance with a Variety of Wireless Remote Microphone Technologies.	<b>Track 2</b> <i>Moderator</i> : Ashley Hobson <i>OKC:</i> AHB 1047*, 2065 <i>Tulsa</i> : 3106 <b>Yong Zhou:</b> Dietary Protein Intake Correlates with Body Weight in Pancreaticoduodenectomy Surgical Candidates.	<b>Track 3</b> <i>Moderator</i> : Carole Johnson <i>OKC:</i> AHB 2058*, 2059 <i>Tulsa</i> : 3108* <b>Ken Randall:</b> Using Social Simulation to Teach Rehabilitation Science Students about Adverse Childhood Experiences (ACEs) and Trauma Informed Care (TIC).
	<b>Danielle Smith:</b> Percent Efficiency of a Well Counter Detecting Y-90 SIRSPHERES.	<b>Hongwu Wang:</b> Effects of a Wearable Focal Vibration Device on Gait and Mobility in Diabetic Peripheral Neuropathy.	<b>Kortney Bush:</b> Socioeconomic Impact and Hearing Loss: Big Data from the American Community Survey.
	<b>Elizabeth Hile:</b> Two Weeks of HI-FIVE Exercise & Diet Prehabilitation Improves Physical Function before Pancreaticoduodenectomy in a Pilot RCT.	<b>Taylor McCurtain:</b> Tracheal and Bronchial (TB) Airway Deposition of TC-99M DTPA during Nuclear Medicine Lung Ventilation Studies.	<b>Kaitlyn Lutz:</b> Plantarflexion Range of Motion Using Goniometery and Motion Capture of Elite Ballet Dancers.
	Jessica Smith: The Effect of a Health and Wellness Program on Bone Mineral Density among Children with Acute Lymphoblastic Leukemia.	Nana Twum-Ampofo: The Complexity of Movement Velocity at different stages of Sitting Posture Development among Infants: A Pilot study.	<b>Anna Williams:</b> F-18 Axumin (Fluciclovine) and a Multidisciplinary Approach in a Case of Metastatic Prostate Cancer.
3:10-3:20	OKC: AHB 1117*, 1046, 1047, 2058, 2059, 2065 Tulsa: 3102/3108	Short exit remarks and presentation of award	ls

Lab	Description	Room Number	Faculty
Behavioral Nutrition & Physical Activity Lab	Dr. Sisson conducts her research in the Behavioral Nutrition and Physical Activity Laboratory in the Department of Nutritional Sciences at the University of Oklahoma Health Sciences Center. Research in the lab focuses on promoting healthy lifestyle behaviors such as dietary intake and physical activity in children to prevent lifetime chronic disease such as obesity, diabetes, and cancer. Physical activity, nutrition, and sedentary behavior epidemiology are areas of expertise. Early childcare and education settings are of particular interest and Dr. Sisson actively collaborates with many Native American tribes and nations in Oklahoma	3121	Susan B. Sisson, PhD, RDN, CHES, FACSM
Center for Human	The goal of this Core Facility is to advance human performance measurement to enhance		Carol P.
Performance	health and well-being through the development and application of new knowledge, guided		Dionne, PT,
Measurement: Core	by the principles of promoting discovery through research in human performance science		DPT, PhD,
Facility	and proving evidence to validate interventions that promote optimal performance. Within the center is the newly installed motion analysis system, composed of 12 state-of-the-art motion capture cameras, 4 in-floor force sensor plates and 16 lead EMG that, together, analyze any type of human movement. The center helps researchers study biomechanical aspects of human movement through kinematics, kinetics and muscle activation from a 3- dimensional perspective. The center's researchers can capture subtle deviations that may be early warning of pending injury or pathological process. This facility is the sole provider of such human performance measurement to the region. Center staff are able to provide a comprehensive, interprofessional study of normal and disordered human performance that optimizes function, including walking, running, lifting, carrying, jumping, throwing or dancing. The output of motion analysis provides researchers, educators, health care providers, students, and the public state-of-the-art measures related to human performance of basic daily activities, forms and modes of locomotion, and of elite, skilled or disordered movement. Center for Human Performance Measurement services are available this to members of the Health Sciences Center and community.	3020	OCS, Cert MDT
Child and Family	The primary mission of the University of Oklahoma Stuttering Research Lab is to better		Katerina
Stuttering Research Lab	understand the role of emotions, speech-language planning, and domain-general processes (attention and executive function) in the onset and maintenance of developmental stuttering through the use of converging methodologies (psychophysiology, parent-report questionnaires, behavioral tasks). Our long-term goal is to use theoretical knowledge to revise assessment protocols and inform clinical decision making for the implementation of customized, individualized, patient-centered treatment approaches for children who stutter	2074	Ntourou, PhD, CCC- SLP

Cognition and Speech Perception Laboratory	In this laboratory we are studying how the ability to recognize speech is affected by imposing demands on cognitive processing, and more specifically demands on inhibitory control, selective attention, and working memory. The research participants include healthy adolescents and young adults, adolescents with family history of alcohol-use disorder, and	2074-B	B. Espinoza- Varas, PhD
-	cancer patients undergoing chemotherapy.		
CT Lab	The MIRS CT lab contains a Philips Brilliance 16 slice CT machine that is used to familiarize radiography, nuclear medicine, and radiation therapy students with the controls and functions of computed tomography machines.	1036	Jeff Berry, MS, RT (R) (CT)
3-Dimensional Printing Lab	The 3D Printing Lab provides a workspace for the Co-Directors, Dr. Boyce and Professor Gildon, to build 3D printed anatomic models, patient specific pre-surgical models and prototypes. Our current 3D printer (Form 2 SLA) uses several types of light sensitive resins. Each resin has unique physical properties and is opaque or translucent. Dr. Boyce, Professor Gildon and Dr. Rachel Childers, a faculty member in the Stephenson School of Biomedical Engineering at the OU-Norman campus currently have an IBEST grant for developing 3D printed medical sonography phantoms. This summer we will also have students participating in a variety of 3D printing projects. The MIRS 3D Printing Lab, in the College of Allied Health is developing a business plan to accept 3D printing & consultation orders from other OUHSC departments and individuals. We expect most prints to be from the following categories: 1) Anatomic instructional models (general, not patient specific) 2) Patient specific pre-surgical planning models (usually anatomic models) 3) Research and development prototypes	1034 (located within the AHB 1032 Radiography Lab Suite)	Kari Boyce, PhD, & Bradford Gildon, MA, BSRT, RT (R)
Mechanical Therapy Clinical Research Lab	The lab is available at any time necessary, and provides ample space for data collection for clinical assessment and portable and community-based performance testing, most recently focused on work performance testing of those with transfemoral amputation.	3160	Carol P. Dionne, PT, DPT, PhD, OCS, Cert MDT
Technology for Occupational Performance Laboratory	This research laboratory combines engineering, clinical and medical rehabilitation to develop rehabilitative and assistive technology for sustainable rehabilitation interventions and for data-driven assessment. The mission of the lab is to continuously improve the function and participation of people with disabilities through advanced engineering in clinical research and medical rehabilitation.	3158	Hongwu Wang, PhD

Poster Session 1 (only OKC campus): 11:10-11:55am	
First Author	Title of Poster
Sandra Arnold	Determining dimensionality of scales: Implications for clinical practice
Racheal Beck	Comparison of computed tomography and ultrasound in detecting urolithiasis
Amber Davis	The efficacy of alternative seating for students with autism spectrum disorder and attention deficits
Sophia Dillon	The genre of music impacts how loud it is perceived
Carol Dionne	Monitoring work performance by men with transfemoral amputation and controls
Erin Elmore	Biomechanics, injury risk, and injury prevention in golfers
Nicole Halliwell	Experience of sleep: Families of young adults with autism spectrum disorder
Jeffrey Hammontree	Postural control, visual attentiveness, motivation to move and cognition: Comparing infants with and without motor delay
Ashlee Lusch	Parent-perceived performance and satisfaction of child's swimming and safety skills following iCAN swim camp
Landon McGee	Screening audiometry using noise-cancelling headphones
Mina Moradi	Gender and the early use of past tense markers in African American English
Anna Pettit	Can the use of positron emission tomography show different mental disorders in the brain?

Poster Session 2: 1:10-1:55pm		
Oklahoma City		
First Author	Title of Poster	
Denise Bender	Blending curricular design, faculty development, and research to launch a campus-wide interprofessional initiative	
Melissa Bold	Invasive versus non-invasive prenatal diagnostic procedures: Which is best?	
Jonathan Day	Motion analysis of gait of a prosthetic user after osteomyoplastic transtibial limb loss and an able-bodied control	
Kristyn Dixon	Comparison of methods for conditioned play audiometry	
Charlotte Dzul-Garcia	Facilitators and barriers of school based physical therapy	
Katelyn Fawcett	PRESTIGE: Providing exemplary interprofessional graduate education	
Elizabeth Hile	Adherence to exercise and diet prehabilitation in pancreaticoduodenectomy: a critical window for behavioral change	
Eryn Jordan	Exploring threats to successful high school to college transition: an occupational therapy perspective	
Josiah Rippetoe	Developing a Protocol for data analysis in Visual3D™	
Julie Smith	Family social participation in young children with autism: Phenomenological analyses	
Maghan Tada	Comparison of contrast-enhanced ultrasound and computed tomography detection of hepatocellular carcinoma and liver	
weynan raue	metastases	
Kingh and Alaina	Evaluating dancers' foot biomechanics using motion capture: Literature review and methodological framework for model	
KIIIDEIIY VEIIS	development	
Alyssa Windom	Acceptability of hand sanitizer options among students in communication sciences and disorders (CSD)	
Tulsa		
Kimbarly Acton	Improving ergonomics of diagnostic medical sonographers through education and interventions and identifying	
	ergonomic barriers	
Emily Ingram	Effect of patient-centered occupational therapy intervention in inpatient rehabilitation	
Alejandra Oropeza	The efficacy in choice of CABG based on location, involvement with stenosis, and morphological characteristics	
Matthew Pummill	Teaching medical students with sonography	

#### IMPROVING ERGONOMICS OF DIAGNOSTIC MEDICAL SONOGRAPHERS THROUGH EDUCATION AND INTERVENTIONS AND IDENTIFYING ERGONOMIC BARRIERS

K. Acton<sup>1</sup>

<sup>1</sup>Department of Medical Imaging and Radiation Sciences, College of Allied Health, University of Oklahoma Health Sciences Center, Tulsa, OK

**Background:** Research studies show that musculoskeletal disorders have been a complaint amongst diagnostic medical sonographer for many years. Musculoskeletal disorders are caused by a number of ergonomic issues including poor working posture, uncomfortable workstations, and long scanning durations. Most common areas of work related musculoskeletal injuries are shoulder, back, hand, wrist, and neck. It is important for sonographers to know of equipment and modifications to work environment, that can prevent these injuries, as well as postures and positions that influence musculoskeletal disorders. To reduce the prevalence of musculoskeletal disorders; on-going education and interventions need to become a priority for sonographers, universities, and clinics.

**Purpose:** The goal of this literature review are: 1) Identify interventions that prevent musculoskeletal disorders, 2) identify the benefits of educating sonographers on how to prevent musculoskeletal disorders and utilize ergonomic equipment 3) to identify barriers to improving ergonomics amongst sonographers. **Methods:** A search was performed using Web of science search using key words: (ergonomics OR ergonomic) AND (ultrasound OR diagnostic imaging OR sonography OR ultrasonography) AND (technicians OR sonographers OR health personnel OR health care providers). 17 research articles were chosen for analysis of the 23 articles that were selected for review.

**Results:** This review presents the analysis of pain and musculoskeletal disorders amongst diagnostic medical sonographers and how to prevent these injuries. The results found that musculoskeletal disorders are still common even with ergonomic education, ergonomic equipment, and identifying barriers to improving ergonomics. On-going education and interventions can help reduce musculoskeletal disorders.

**Discussions/Conclusion:** Musculoskeletal disorders are a common complaint amongst diagnostic medical sonographers and due to the prevalence of these injuries; steps to be taken to reduce the problems. Studies regarding interventions show promise that strides can be made to assist in ergonomic solutions. Ergonomic education has been shown to be more effective when done in a more personal nature at universities and ongoing throughout sonographers' careers. More attention needs to be given to reduce barriers that prevent good ergonomics and conditions that prevent WRMSD, such as scheduling. Sonographers place priority on patient images over personal health in many situations, so a team effort between universities, clinics, and sonographers must be implemented in order to prevent injuries to sonographers and to prevent sonographers scanning in pain.

**Relevance to Allied Health:** Allied Health professionals should be proactive in preserving their health in the preventions of musculoskeletal injuries. Sonographers, educators, and clinics will each need to take an active roll in order to reduce musculoskeletal disorders amongst diagnostic medical sonographers while achieving the best medical images. It is important for all Allied Health workers to prevent injuries and have a career without pain. Rehab Specialists should also be aware of ergonomic equipment available and postures and positions that will help reduce the risk for musculoskeletal disorders.

#### DETERMINING DIMENSIONALITY OF SCALES: IMPLICATIONS FOR CLINICAL PRACTICE

S. Arnold, PT, PhD<sup>1</sup>, TKA Kolobe, PT, PhD, FAPTA<sup>1</sup> A. E. Smith, PhD<sup>2</sup> <sup>1</sup>Department of Rehabilitation Sciences, University of Oklahoma Health Sciences Center, OKC, OK; <sup>2</sup>College of Education, University of Illinois at Chicago, Chicago, IL

**Background**: Currently no consensus exists on the best approach to determine a scale's responsiveness; the ability to detect a change and addresses the clinical relevance of change. Most studies of responsiveness use the True Score Theory (TST) approaches, however limitations exist. Limitations of TST include sample dependency of item and test indices, and the item dependency of a person's ability estimate. Rasch Model analysis, a form of item response theory, can assess a range of abilities that are specific to individual performance, is sensitive to measuring meaningful change, and uses item fit statistics to measure underlying scale dimensions. However, validating a scale with Rasch analysis requires input from users to discern the utility of the scale. Rasch analysis with clinician contribution offers a novel way to explore change scores and their meaningfulness, which has not been used to measure change in students who receive school-based occupational or physical therapy.

**Purpose:** The purpose of this study was to examine two student age sample Rasch analyses of the School Outcomes Measure (SOM), a new program outcome measure of physical therapy and occupational therapy services provided to students with disabilities in the school settings, to determine the SOM's dimensionality and improve its precision in measuring student change in activity and participation. **Methods**: We used Rasch models to analyze SOM data of 100 elementary and 108 secondary students to determine scale dimensionality and compute student ability and item difficulty estimates. We examined item fit statistics to evaluate if the data adhere to model requirements of a unidimensional model and local independence. An Outfit MnSq of > 1.3 that occurred with an Outfit Zstd > 2.0 represented misfit. We further assessed model requirements through principal contrast analysis of the residuals to detect departures from the unidimensionality requirement of the Rasch model. We inspected the item maps to see if the SOM item difficulties and thresholds were spaced along the continuum, and whether items were too easy or too difficult, relative to students' abilities. We considered items well-targeted if estimates of item difficulties and thresholds fell within +/-2 logits of a person's ability.

**Results**: The SOM items demonstrated multidimensionality for the elementary students, with two separate constructs of Mobility and Manipulation in Learning, and three constructs for the secondary students, Mobility, Manipulation in Learning, and Behavior. The construct items fit the Rasch model, formed predictable hierarchies, and showed limited redundancy in item difficulty.

**Discussions/Conclusions**: Identification of distinct constructs, based on school age, increases the potential to measure change in student performance compared to a single scale total score that could conceal changes in any one dimension. Further analysis is needed to examine dimensionality when studying student severity levels.

**Relevance to Allied Health**: The development and validity of multidimensional tools for allied health professions, is important for measuring patient change over time. Specifically, the SOM provides a mechanism for therapists to measure change among students with different functional limitations, compare those changes with and among students with varying abilities, and use the student data for program evaluation.

#### COMPARISON OF COMPUTED TOMOGRAPHY AND ULTRASOUND IN DETECTING UROLITHIASIS

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**Background:** Urolithiasis is a stone found in the urinary tract that can be painful when passing through the ureters and into the bladder. Urolithiasis can result in obstruction of the urinary tract, which can lead to a number of problems. Detecting urolithiasis is important because if left untreated, permanent renal dysfunction can occur. Urolithiasis is common among the population, with men having the highest incidence. Health care professionals should be aware of the imaging modalities used to detect urolithiasis and which one has the better outcome.

**Purpose:** The aims of this literature review are: 1) to review the steps taken for a Computed Tomography and Ultrasonography exam when looking for urolithiasis, 2) to review the limitations of each imaging modality, and 3) to determine the diagnostic accuracy in detecting urolithiasis based on stone size. **Methods:** An online search to find articles that pertained to urolithiasis and the imaging modalities used to detect urolithiasis was conducted. The databases used were OVID Medline, CINAHL, and PubMed. Urolithiasis, kidney stones, calculi, computed tomography, CT, ultrasound, and US were the keywords used in different combinations to produce these article results. A total of 47 articles were found and 12 were selected. The articles were assessed to ensure each modality was well explained, contained key factors to confirm diagnoses, and sensitivity and specificity of each modality in detecting urolithiasis was included.

**Results:** The evidence presented in this review suggests that both Computed Tomography and Ultrasonography are routinely used in the detection of urolithiasis. Computed Tomography provides a diagnostic accuracy range from 94% to 100%, and a sensitivity and specificity of 95% to 98%, respectively. Ultrasonography provides a sensitivity and specificity of 24% to 100%.

**Discussion/Conclusion:** For patients experiencing symptoms of urolithiasis, imaging is important. Computed tomography and ultrasonography are commonly used in detecting urolithiasis. This review proves that CT is highly accurate, sensitive, and specific in detecting urolithiasis, and should be considered the gold standard. Computed tomography is more expensive and increases a patients' risk of developing malignancies after being exposed to the ionizing radiation over a period of time. Computed tomography can detect smaller stones than ultrasonography. Although ultrasonography is not as sensitive or specific in the detection of kidney stones, it is a less expensive option, as well as a safer option in regards to not being exposed to ionizing radiation.

**Relevance to Allied Health:** Allied Health professionals should be aware of the different imaging modalities utilized in the detection of urolithiasis, as well as the limitations. It is important for them to be knowledgeable in order to provide information to their patients and even their loved ones to get them the best treatment.

### BLENDING CURRICULAR DESIGN, FACULTY DEVELOPMENT, AND RESEARCH TO LAUNCH A CAMPUS-WIDE INTERPROFESSIONAL INITIATIVE.

DG Bender, PT, JD<sup>1</sup>, CM Barbee, Au.D., F-AAA, CCC-A<sup>1</sup>, M Yozzo, DHEd, CHES, PA-C<sup>4</sup>, R. Leckie, LCSW<sup>3</sup>, M Robinson, M.Ed.<sup>2</sup>

<sup>1</sup>University of Oklahoma Health Sciences Center, College of Allied Health, <sup>2</sup>Office of interdisciplinary Programs, <sup>3</sup>Anne and Henry Zarrow School of Social Work, <sup>4</sup>College of Medicine Oklahoma City, Oklahoma

**Background:** The literature supports incorporating planned IPE experiences into professional education curricula as a means to prepare students to perform as a patient-care team after graduation. A team-based approach to the delivery of health care services provides an efficient and effective way to provide patient centered care. Planned IPE experiences help to bridge the divide that often exists between knowledge acquisition and actual patient care and are a necessary part of the education of health care professionals. **Purpose**: The University of Oklahoma Health Sciences Center (OUHSC) is a comprehensive academic health center. It has seven professional colleges serving approximately 4,000 students in more than 70 undergraduate, professional, and graduate degree programs on campuses in Oklahoma City and Tulsa. Other interprofessional initiatives already exist that addressed specific accreditation or departmental needs, but OUHSC lacked a coordinated, campus-wide initiative conceptualized to develop and coordinate interprofessional education across all disciplines. Our initiative formalized a planned structure for a campus-wide series of didactic, experiential, and clinical interprofessional activities. Methods: Beginning in 2013, a small group of OUHSC faculty volunteers proposed the development of a comprehensive, campus-wide interprofessional educational program based on the IPEC core competencies. In 2016, this small group received assistance from the OUHSC Office of the Vice Provost for Academic Affairs & Faculty Development to progress the program coordination and development. By 2017, the original core volunteer group had grown to 21 core members and subdivided into three permanent working committees for Faculty Development, Curriculum, and Research. By 2017, the faculty had formalized and presented a strategic plan to develop and conduct a two-year interprofessional curriculum. In 2018, committee structure expanded to include a Student-Faculty committee to assist with student engagement.

**Results**: Each working committee established individual goals that contribute to the planned mission. Research Committee has explored various qualitative and quantitative methods to capture data on the impact of these student experiences. After examining Life Circle Diagrams, qualitative minute papers, and RIPLS scales, they identified CHIRP and IPAS instruments. The Curricular Committee created programmatic evaluation and satisfaction surveys for faculty and student participants and have begun to gather feedback after every educational and clinical IPE experience. The Faculty Development Committee created the Interprofessional Educator and Practitioner Association (IEPA) to encourage faculty participation. They also developed a seed grant program designed to support interprofessional projects across campus that emphasize student engagement with one or more of the IPEC core competencies. The newly formed Student-Faculty committee has proposed a student-run campus clinic and has planned social programming to encourage interprofessional interactions outside of the classroom. **Conclusions**: Our interprofessional initiative's mission is to foster a culture change on the OUHSC campus. Through deliberately creating educational experiences at the didactic, clinical, and social level that involve all colleges and professions, students have the chance to can obtain a strong foundation in interprofessional practice principles prior to entering their health care professions.

**Relevance to Allied Health**: Interprofessional education is the essential first step in preparing an allied health workforce who can work efficiently in teams. This curricular initiative provides a planned series of educational experiences that allow allied health students to work together to learn and apply the interprofessional core competencies of teamwork, communication, ethics and roles and responsibilities.

#### CORRELATION OF GRIP STRENGTH AND PATIENT-RATED OUTCOME MEASURES IN ORTHOPEDIC DYSFUNCTION

#### Hannah Blanden, OTS-3<sup>1</sup>, Hongwu Wang, PhD<sup>1</sup>

<sup>1</sup>Department of Rehabilitation Sciences, College of Allied Health, OUHSC, Oklahoma City, OK

**Background:** Upper extremity dysfunction is common in the general population, and occupational therapists often measure it quantitatively using grip strength. (1) Grip strength is a measure that has been shown to successfully predict general weakness and frailty (2,3) as well as length of hospital stay (4). It is typically lower in individuals with chronic conditions, depression, and reduced self-rated health (5). The latter correlation is important to our study, as we used three patient-report outcome measures: Patient-Rated Wrist Evaluation (PRWE), Patient-Rated Elbow Evaluation (PREE), and the Quick Disabilities of the Arm, Shoulder, and Wrist Score (QuickDASH). These outcome measures assess patient perception of performance. In this study we will look at if grip strength correlates with an individual's perception of their occupational performance.

**Purpose:** The purpose of this study is to explore whether the quantitative measure of grip strength correlates with qualitative, patient-reported outcome measures that focus on satisfaction with condition to indicate impact of intervention. We hypothesized that in upper-extremity orthopedics, as grip strength improved, the patient-reported outcome measure would also improve.

**Methods:** We conducted a one-group longitudinal study to examine the possibility of a correlation between a patient-reported outcome measure and a measure of grip strength within an outpatient upper-extremity orthopedic setting over the course of 8 weeks. Inclusion criteria: 1) adults > 18 referred from an orthopedic specialist or primary care physician 2) with upper-extremity orthopedic dysfunction. This facility followed a protocol to treat each patient according to their referral or diagnosis. On the first day of admission, the occupational therapist tested each patient's grip strength and administered one of three patient-reported outcome measures: PRWE, PREE, or QuickDASH. Specifically, the PRWE assesses patients for wrist dysfunction and the PREE assesses patients for elbow dysfunction. The PRWE and PREE each consist of 15 items, with each item rated on a scale of 0 to 10, 0 meaning no dysfunction or pain and 10 being significant dysfunctions, and is a 15-item assessment with each item rated on a scale of 1 to 5. At discharge or at the end of the 8-week time period, grip strength was again tested and the same patient-reported outcome measure was administered. We analyzed the data using descriptive statistics and a correlation test.

**Results:** Of the participants sampled (n=12), the mean age was 49.5 years $\pm$ 22.1, 83% (n=10) were female, 92% (n=11) were white, 67% had hand or wrist dysfunction, 33% had elbow dysfunction. In order to directly compare the scores from each of the three outcome measures, they were converted to percentages. Post-intervention grip strength mean (M=41.3 $\pm$ 9.8) was significantly improved from the baseline grip strength mean (M=20 $\pm$ 9.7). This correlated with the mean of the post-intervention patient-rated outcome measure (M=41 $\pm$ 9.8) which was also significantly improved from the baseline (M=0.5 $\pm$ 0.1). Spearman's correlation test results indicated a significant (p=.001) positive correlation (r=0.8) between grip strength and the patient-reported outcome measures.

**Discussion:** Grip strength may be a helpful tool to measure patient improvement and impact of intervention, as it appears from this study to positively correlate with the patient's own report of their improvement. Future research could focus on a larger patient population with more diverse demographics to capture a broader picture of the correlation.

**Relevance to Allied Health Professionals:** When measuring impact of an intervention, it is important to use reliable, evidence-based outcome measures in every allied health profession.

#### INVASIVE VERSUS NON-INVASIVE PRENATAL DIAGNOSITC PROCEDURES: WHICH IS BEST?

M. Bold<sup>1</sup>

<sup>1</sup>Department of Medical Imaging and Radiation Sciences, College of Allied Health, University of Oklahoma Health Sciences Center, Oklahoma City, OK

**Background:** The use of prenatal screening is gaining popularity as the medical field is advancing. As chromosomal abnormalities are becoming more common, the use of invasive and non-invasive prenatal diagnostic procedures must be analyzed. Invasive procedures include amniocentesis, chorionic villus sampling, and percutaneous umbilical blood sampling. Non-invasive testing includes the routine second trimester anatomy sonogram, nuchal translucency measurement, cell-free DNA blood test, and the quad screen blood test. All of these procedures come with their own risks and benefits. The information derived from fetal screening tests allows patients to make educated decisions and allows health care professionals to advise the patient of the best treatment options.

**Purpose:** The goal of this literature review is to compare and contrast invasive and non-invasive procedures in prenatal diagnosis. To analyze which type of testing is best for the patient, the accuracy of the procedures will be reviewed as well as the complications associated with each procedure. **Methods:** Documents used for this article were obtained through the university library website and

Google Scholar. Databases such as OVID Medline, PubMed, and EBSCO were searched. Keywords included prenatal, invasive, non-invasive, amniocentesis, chorionic villus sampling, percutaneous umbilical blood sampling, cell-free DNA, quad screen, second trimester, nuchal translucency, risks, benefits, and reliability were used. Articles dating from 1992 to 2018 were included. Original research articles were mainly used with a couple descriptive documents explaining procedures. There were sixty-two articles assessed, and thirty-six articles were utilized.

**Results:** Data collected from the original research articles shows a relationship between invasive procedures and an increased risk for complications. The sensitivity and specificity from the articles that were compared demonstrated that while non-invasive prenatal diagnostic procedures have fewer risks, the invasive procedures are more accurate. When non-invasive testing is performed, the presence of abnormalities can be detected, but the severity of that abnormality cannot.

**Discussion/Conclusion:** Although invasive prenatal diagnostic procedures are associated with an increased risk of complications, they are more accurate than non-invasive testing. Having the ability to determine the degree of the abnormality can assist the patient and the physician in preparing for the next steps. Non-invasive testing should always be the first line of defense in assisting with prenatal diagnosis, however, invasive procedures should still be available as an option for patients.

**Relevance to Allied Health:** This data is relevant to Allied Health professionals because the severity of diagnosis in the fetus can determine the amount of care needed after birth. The ability to detect these challenges prenatally can help the parent and the physician begin to plan for the future of the infant. After birth, the infant may need care that involves other imaging modalities as well as physical therapy, occupational therapy, audiology, and dietary planning. The severity of the physical or neural defects can determine the amount of support the infant and the family will need.

#### SOCIOECONOMIC IMPACT AND HEARING LOSS: BIG DATA FROM THE AMERICAN COMMUNITY SURVEY

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**Background:** Adults with hearing loss have been found to have lower socioeconomic status (SES), are more likely to be under- or un-employed, and earn lower wages on average when compared to their normal hearing peers. Previous studies have examined the relationship between hearing and SES. However, they only accounted for poverty levels and age groups over 69 years and were conducted in countries outside of the United States (US). A study is warranted to further explore associations between perceived hearing difficulty and SES, particularly among populations who are more likely to have lower SES (e.g., young adults, non-whites, etc.) and may not be able to afford hearing aids at a current average selling price of \$2,366 per aid and rehabilitative hearing healthcare services which are seldom covered by insurance often resulting in additional out of pocket costs.

**Purpose:** This study examined how SES varies among those with and without self-reported serious hearing difficulty (SRSHD) when controlling for demographic variables (i.e., age, gender, geographic location, educational attainment, insurance coverage, and marital status). The study determined which of the aforementioned demographic variables predict SES among those with SRSHD, which in turn, provide insight into who might have difficulty purchasing hearing aids and experience financial barriers to accessing hearing healthcare services.

Methods: This study examined population-based data from the US Census Bureau's 2016 American Community Survey (ACS) for adults aged 18 and older. SRSHD was determined from the ACS item 17.A: "Is this person deaf or does he/she have serious difficulty hearing?" SES was used as the dependent variable, and was adjusted for number of people in the household. Independent variables included the following: SRSHD, age (in 10-year bins), gender, race, educational attainment, geographic location, insurance status (i.e., insured or not insured), and marital status. Both experiments employed least absolute shrinkage and selection operator (LASSO) regression with the first model being logistic and the second multivariate. **Results:** In the logistic model predicting SRSHD (N=2,360,775), the variables selected by LASSO were exclusively related to age (p < 0.001), with the exception of the married-female interaction term, which positively predicted SRSHD, controlling for the other variables in the model. As would be expected, those aged 70 years and older were 5 times more likely to have SRSHD (p<0.001). In the model predicting SES among the subsample with SRSHD (N=121,039), health insurance emerged as an important predictor. The positive effect of health insurance on SES among those with SRSHD was heightened for those who are white, married, and have college degrees. Lacking a high school degree was also a negative predictor of SES. **Conclusion:** Intuitively, age group was the strongest predictor of SRSHD. In the model examining SES among those with SRSHD, health insurance was a significant predictor of SES, although reverse causality is likely-those with higher-paying jobs are more likely to receive health insurance at work or be able to afford it themselves. Associations between lower SES and poorer educational attainment are not surprising as these are lower earners on average. The effects of being un-insured were consistent with previously documented SES, educational, and wage disparities among those with SRSHD. This study provided useful information on the SES of Americans with SRSHD who may not be able to afford access to hearing aids or hearing healthcare services, as many insurance plans do not provide comprehensive coverage for these devices and services.

**Relevance to Allied Health:** Allied health professionals should be aware of the impact that SES has on those likely to have SRSHD. Furthermore, allied health professionals should consider the impact of SES and affordability of health insurance, as it applies to all health professions. Findings from this study can help to inform and shape public policy for these disability-related economic disparities.

#### THE EFFICACY OF ALTERNATIVE SEATING FOR STUDENTS WITH AUTISM SPECTRUM DISORDER AND ATTENTION DEFICITS

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**Background:** Elementary school children are expected to sit and attend to instruction for much of their school day. This is challenging for many children, but for students diagnosed with Autism, Autism Spectrum Disorders (ASD), or Attention Deficit Hyperactivity Disorder (ADHD) this is especially difficult. Alternative seating is a sensory-based strategy often employed by school-based therapists to improve focus and attention to tasks within the classroom setting.

**Purpose:** To conduct a systematic review on the effects of alternative seating in the classroom setting on attention to task and participation for elementary-aged students with Autism (ASD) and/or Attention Deficit Hyperactivity Disorder (ADHD).

**Methods:** We searched nine search engines and databases between the months of February and March of 2018. Studies included were published within the past 10 years, measured participation and/or attention to task when students utilized alternative seating, and were available in English. Target subjects were elementary-aged students (Kindergarten through 5<sup>th</sup> Grade) with a diagnosis of ASD and/or ADHD. The intervention of interest was alternative seating (e.g., cushion, dynamic seating, or therapy ball). Article review followed the American Academy of Cerebral Palsy and Developmental Medicine (AACPDM) Methodology to Develop Systematic Reviews of Treatment Interventions for the two group studies and five single-subject studies included.

**Results:** The majority of existing evidence is low-level, with small sample sizes. Study methodologies are inconsistent. Research is limited and findings are inconclusive for alternative seating with elementary students who have ASD or ADHD.

**Conclusion:** Research for alternative seating for elementary-aged children with ASD or ADHD to increase participation and attention to task is limited. Further research is needed to determine whether this is an appropriate intervention for children who have difficulty participating in seated in-class activities. **Relevance to Allied Health:** Any provider (PT, OT, SLP, and dietician) in school-based settings should be aware of the lack of consistency in findings for use of alternative seating with students with ASD and ADHD. Utilization of alternative seating in a classroom setting is not a "one-size fits all" approach and should be considered on an individual basis. Therapists should use clinical reasoning to determine the appropriateness of this intervention and data should be collected to assess whether the alternate seating system is effective for the student. Prior to implementing this intervention for all children with attention difficulties, stronger experimental design studies are needed to determine whether or not alternative seating devices which provide dynamic movement can be recommended to increase attention to task for elementary students with ASD or ADHD.

#### MOTION ANALYSIS OF GAIT OF A PROSTHETIC USER AFTER OSTEOMYOPLASTIC TRANSTIBIAL LIMB LOSS AND AN ABLE-BODIED CONTROL

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**Background/ Purpose:** The overall purpose of this case control study was to examine the kinetics, kinematics, and spatiotemporal parameters of lower extremity function during gait of a man with unilateral osteomyoplastic transtibial limb loss (OTTLL) and a male control at self-paced and brisk-paced walking speeds. The authors hypothesized the man with OTTLL would produce greater ground reaction forces (GRFs) on the sound side and increased peak flexion at the knee and hip on the prosthetic side during the swing phase of self-paced and brisk walking. Further, the authors hypothesized the prosthetic side would exhibit increased swing time and less stance time during self-paced and brisk walking, consistent with the published literature.

**Case Description/ Methods:** Participants' 3-dimensional gait at self- pace and brisk pace speed was captured using a 12 camera Qualisys<sup>TM</sup> Motion Analysis System. Visual 3D<sup>TM</sup> and Excel<sup>TM</sup> software were utilized to analyze gait and output reports for analysis.

**Outcomes/Results:** All hypotheses were fully or partially supported through the data collected during the motion analysis of self-selected and brisk paced gait.

**Discussion/Conclusion:** The participant with OTTLL minimally differed in gait performance from the control in self-paced gait but indicators of gait instability were more evident during brisk-paced gait. Gait deviations were apparent on both the sound side and prosthetic side at different stages of the gait cycle. The prosthetic foot design limits ankle function on the prosthetic side changing the biomechanics compared to able-bodied ankle function.

**Relevance to Allied Health:** Some gait deviations are more evident through gait analysis using the motion analysis lab. Prosthetists and rehab clinicians can better understand gait deviations to improve prosthetic alignment and rehabilitation needed to maximize patients' gait and community participation.

#### THE GENRE OF MUSIC IMPACTS HOW LOUD IT IS PERCEIVED

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Purpose/hypothesis: To investigate how the genre of music affects the preferred sound level. Prolonged exposure to music at an excessive level can potentially cause irreversible damage to the auditory system, resulting in hearing loss. A study published in 2010 found that the incidence of hearing loss has risen in the past years and the attendance of musical festivals and concerts could be contributing to this problem. Although music-induced hearing loss, temporary and permanent, has been extensively researched, the music style has been poorly explored as an influencing factor. Therefore, it is important to see how preference towards music increases the likelihood of an increase or decrease in the volume. In addition, it is important be more aware of the level the music is played and how it affects hearing. Methods: 30 young adults with normal hearing, aged between 18-30 will complete a questionnaire regarding music preference and live music experiences. This questionnaire will include questions regarding musical genre preference, number of concerts attended, and perceived level of loudness of these concerts. Then the participant will complete an audiologic test battery, which contains audiometric thresholds, most comfortable listening level, uncomfortable listening level and acceptable noise level with speech stimuli, Then most comfortable listening level (MCL), uncomfortable listening level (UCL), and acceptable noise level (ANL) will be conducted with six musical stimuli of different genres. **Results:** Data collection is in progress and will be complete prior to presentation. Preliminary analyses (n=15) suggest the average MCL for the music ranged from 67.3 dB SPL to 72 dB SPL; average MCL for speech was 60.7 dB SPL. There was a significant effect of stimulus type on MCL (p < .001). MCL for all music genres was significantly higher (louder) than for speech (all p < .001). The average UCL for music ranged from 93.7 dB SPL to 97.3 dB SPL; average UCL for speech was 94.7 dB SPL. There was a small but significant effect of stimulus type on UCL (p = .03). There were some differences among types of music, but no music genre differed from speech UCL (all p > .05). Average (ANL) for music ranged from 2.0 to 7.0; average ANL for speech was -6.0. There was a significant effect of stimulus type of ANL (p < p.001). There were some differences among types of music, and ANL for all music genres was significantly higher than for speech (all p < .001). For all music genres, preference and MCL were not significantly associated (all p > .05). For all music genres, preference and UCL were not significantly associated (all p > .05). For the Dance genre only, preference and ANL were significantly associated (p < .05). .05) and some other genres approached significance. Average UCL for music (across genres) was significantly positively correlated with preferred volume (p < .01) – people who preferred louder music had higher tolerance for music at high levels. Participants who attended more concerts were significantly more likely to believe that the typical volume of music at concerts is uncomfortably loud (p < .05), but this did not diminish their enjoyment of loud concerts.

**Discussions/Conclusions:** With these preliminary analyses, we are not seeing that music makes a difference in an individual's MCL. We are also seeing that an individual's uncomfortable listening level for music and speech has similar results. The dynamic range of listening, tolerance is higher for music than speech, but both become uncomfortable around the same volumes.

**Relevance to Allied Health:** The present findings may have important implications for young adults regarding increasing their awareness on the loudness of music played and how it affects hearing.

#### MONITORING WORK PERFORMANCE OF MEN WITH TRANSFEMORAL AMPUTATION AND CONTROLS

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**Background:** Despite advances in medical and rehabilitation intervention intended to return men with transfemoral amputation (TFA) to the labor force, potential workers with TFA are disproportionally among the unemployed. Chief among reasons which preclude work participation is painful residual limb injury suffered during work activity performance.

**Aim/Methods:** To understand mechanisms of musculoskeletal pain and injury and prevent debilitating injury in this working-age group, one aim was to characterize work-related activity performed by otherwise healthy men with TFA and compare with controls at 2 visits over 12 months. Pulse rate, oxygen saturation, HbA1C, perceived exertion, and pain levels were monitored.

**Results:** At visit one, 26 men (6 TFA, 20 controls) and again in visit two (3 TFA, 18 controls) underwent 25-ft carry and walking (self-paced, brisk) tests. At visit one the TFA group carried less weight (p=0.001) and walked shorter distances at self- (p=0.045) and brisk-pace (p<0.001) and reported greater pain (0.046) than the controls. However at visit two, there were no differences in performance between groups (p>0.05).

**Discussion:** Plausible explanations to explore among controls include: attrition and worsening of post-test pulse (p=0.031), oxygen saturation (p=0.000) or A1C (p=0.002) scores between visits.

**Conclusions:** Results revealed that men with TFA can perform similarly to controls over a 12-month timeframe. However, investigators emphasize need to closely monitor experimental and control group performance, as general response to testing in controls showed a deterioration in post-test heart rate, A1C and other responses to testing in the control group at the 2nd visit.

#### COMPARISON OF METHODS FOR CONDITIONED PLAY AUDIOMETRY

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**Purpose:** Conditioned Play Audiometry (CPA) has been a viable way to determine hearing thresholds in children aged approximately 3 – 5 years since it was first described by Hoverston, Lowell, Rushford, and Stoner in 1956. However, methods for administration of CPA vary from clinic to clinic. One way in which methods vary is whether a second professional, labeled the "test assist," is present during testing. The audiology test assist is responsible for engaging the child, keeping the child interested and attentive, and keeping family members at ease so they can cooperate with test protocols. However, many clinics do not utilize test assists for various reasons such as a limited number of personnel and limited clinician time. The purpose of this study was to determine whether use of a test assist for CPA affects the reliability of audiometric responses obtained, as well as time to complete the test. The two methods of CPA that were evaluated in the present study are CPA with a test assist in the sound booth versus CPA without a test assist in the sound booth.

**Methods:** Participants were children, ages 3 to 5, with normal hearing and normal middle ear function. Testing was attempted on 11 children and completed on 7. Measurements were taken within the John W. Keys Speech and Hearing Center in a sound booth using a Grason-Stadler GSI 61 clinical audiometer following a conventional clinical test procedure for conditioned play audiometry as recommended by Madell and Flexer (2014). Screening tympanometry (an objective measure of middle ear pressure and compliance) was used to rule out conductive hearing loss and middle ear pathology. For each participant, one ear was tested using a test assist and the other ear was tested without the test assist. The order of testing and the assignment of test assist by ear were counterbalanced. Pure tone thresholds were obtained at 500Hz, 1000Hz, 2000Hz, and 4000Hz in each ear and a speech recognition threshold (SRT) was obtained in each ear. Paired comparisons were used to test for the effect of test assist on reliability (calculated as correlation between pure-tone average at 500, 1000, and 2000 Hz compared to SRT), and test time for each individual threshold as well as total time.

**Preliminary Results:** Preliminary analysis suggests a trend toward shorter test time when using a test assist (mean = 41. 9 seconds, SD = 16.4), with the no-assist condition (mean = 56.6 seconds, SD = 36.0) requiring an average of 15 seconds longer per threshold; however, this difference was not significant. Data collection is ongoing. SRT was approximately equally well predicted in the assist (mean SRT = 7.5 dB HL, SD = 3.8; mean PTA = 9.2 dB HL, SD = 3.3) and no-assist (mean SRT = 11.9 dB HL, SD = 3.7; mean PTA = 10.0 dB HL, SD = 5.7) conditions.

**Conclusions:** A trend toward more time-efficient testing was seen when a test assist was utilized for CPA, though further data collection is needed to confirm this apparent finding. Reliability was similar between the two conditions. Further testing will reveal whether there is a significant effect of having a test assist present when conducting CPA. If a significant difference is found, this would suggest that use of a test assist increases time-efficiency of CPA in pediatric clinics. This increased time efficiency would need to be evaluated in light of the additional human resource cost of conducting testing with additional personnel. If data from a larger sample does not find a significant difference in test time, this would suggest that use of a test assist does not improve time-efficiency of CPA. It may, however, improve the likelihood of obtaining test thresholds that are nearer the patient's actual thresholds, may help the child stay on task and increase sensitivity of CPA and other tests, and may reduce loss of attention to task in young children.

**Relevance to Allied Health:** There is a clear need to incorporate test methods for children which are time- and resource-efficient while providing results that are accurate and keep the child on task. Studies like the present investigation, which compare multiple common clinical methods for the same test, are needed to demonstrate best practices for hearing evaluation and to justify reimbursement which is appropriate for resources expended.

#### FACILITATORS AND BARRIERS OF SCHOOL-BASED PHYSICAL THERAPY

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**Background:** School based physical therapy services are related services under the Individuals with Disabilities Education Act, 2004. The ease of providing these services in school however, varies from district to district.

**Purpose**: The purpose of this study is to identify facilitators and barriers physical therapist encounter when providing school-based services.

**Methods:** Four focus groups, involving 22 school based physical therapists (PTs) from across the United States, were held via Zoom, an online video conferencing application. Therapists had expressed the interest in participating in a focus group following completion of an online survey regarding the use of evidence-based interventions in school-based settings. Each focus group lasted between 1.5 and 2 hours. During the focus group the mediator posed questions related to the use of evidence based interventions in schools and what therapists encountered as facilitators and barriers to implementing various interventions. Recordings were transcribed and currently one researcher has completed initial open coding and theme development and a second researcher is in completing this process. Further data review, coding, and theme development will ensue in the next two months.

**Results:** Based on initial open coding and theme development five themes 1) administration, 2) resources, 3) communication, 4) teachers and 5) time emerged as both facilitators and barriers of school-based services depending on the school district. Other facilitator themes were proximity and teamwork. Other barrier themes were caregivers and policies.

**Discussion/Conclusions:** This initial analysis indicates that often a facilitator for school-based PTs implementation of evidence-based services can also be a barrier, depending on the school district. Variability exists across the country and future research, at the district level, is needed to identify how to shift barriers into facilitators. PTs could also use resources to support their engagement in collaboration with administration to promote their ability to implement evidence-based services.

**Relevance to Allied Health**: These findings are relevant to all allied health professionals providing school-based services. This study provides insight into the barriers and facilitators PTs face which most likely are similar to those of other professions. The results also elude to the fact that facilitators and barriers can be similar depending on the lens used to make decisions regarding therapy services and professionals should seek ways to flip the lens to present a more positive and outcome to service.

#### SWING BIOMECHANICS, INJURY RISK, AND INJURY PREVENTION IN GOLFERS

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**Background**: Even though golf is an individual, low impact sport, injury is still common among both professional and amateur golfers. Therefore, knowledge of the biomechanics of the golf swing and indepth analysis of a golfer's swing are necessary to identify those golfers who may be at-risk for injury. Correction of a golfer's swing biomechanics using motor learning principles, in addition to a well-rounded strength and conditioning program, may help prevent injuries in golf.

**Purpose:** The aims of this review are: 1) to break down the modern golf swing into component parts and identify the range of motion (ROM) and muscle actions required for each phase, 2) to compare the biomechanics of five amateur golfers to the standard reported in the literature to determine risk of injury for each of the golfers, and 3) to develop a checklist for physical therapists to use when screening golfers to determine risk of injury, as well as to provide guidelines for injury prevention.

**Methods**: Utilizing Google Scholar, we conducted a review of the literature and chose twelve peerreviewed articles that discussed the phases of the golf swing, ROM considerations and muscle activation for each phase, the most common golf injuries and mechanisms, and injury prevention in golf. We also recorded five golfers using the Hudl Technique application on a smartphone and used various video features to view the swings in slow motion and capture still shots to measure joint angles. We then compared each golfer's swing biomechanics to the standard reported in the literature.

**Results**: Studies generally break down the golf swing into five phases: 1) Backswing/Takeaway, 2) Forward swing/Downswing, 3) Acceleration, 4) Early follow through, and 5) Late follow through. The percentage of the five golfers who fell within the standard ROM value ranged between 20-100% for the various phases, with the most deviations being noted in early follow through. Based on reviewed studies and video analysis, we compiled a checklist for physical therapists to use for injury risk and prevention for the golf swing.

**Discussions/Conclusions**: The most common golf injuries include low back, wrist, elbow, and shoulder pain. The two primary causes of injury in golf are poor biomechanics and overuse. Based on our analysis of five amateur golfers, biomechanical deviations are very common. A training regimen incorporating a dynamic warm-up, strength training (including stabilization exercises), aerobic conditioning, and flexibility may prevent injury. Motor learning strategies (such as augmented feedback, external focus, distributed practice, blocked practice for novices, and errorless practice) can help improve swing biomechanics.

**Relevance to Allied Health**: Possibility: Golf is a popular sport and recreational activity for athletes of all ages. Subsequently, allied health providers are very likely to encounter patients in their practice who play golf. A general understanding of swing biomechanics and common injury risk factors is necessary for clinicians to appropriately evaluate and treat patients who play golf. The use of an injury risk and prevention checklist would enable allied health professionals to efficiently evaluate these patients and identify specific areas of focus for injury prevention strategies.

### CLINICAL INSTRUCTOR PRODUCTIVITY WHEN EDUCATING DOCTOR OF PHYSICAL THERAPY STUDENTS

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**Background:** Clinical education experiences are essential components of physical therapy educational programs. Clinical Instructors (CIs) agree to support the student's clinical learning but must also fulfill employer productivity requirements. CIs report meeting productivity requirements and time constraints as reasons they decline to support student clinical experiences.

**Purpose:** The purpose of this study is to examine CI productivity while supporting Doctor of Physical Therapy (DPT) students during clinical education experiences.

**Methods/Description**: CIs completed demographic information and documented number of patients served/day for the two weeks prior to the students first day in the clinic. Patients served/day were then recorded daily throughout the clinical experience. For analysis clinics were grouped by outpatient (OP) services (i.e. private practice and hospital owned) or other services (i.e. acute care, inpatient rehab, skilled nursing, schools and early intervention, and home health). Descriptive statistics were computed and statistical analysis completed using SAS 9.4 (Cary NC). A longitudinal repeated measures model was constructed assuming an unstructured covariance matrix. All statistical tests were conducted assuming a 5% type one error.

**Results/Outcomes**: Productivity logs were received from 86 CIs, 49 OP and 37 other. Most CIs (42%) were in the 30-39 age category, 61% had been a physical therapist for 1-10 years, and 73% had been in their current setting for 1-10 years. The internship lengths were 6 weeks (n=11), 8 weeks (n=10), and 10 weeks (n=65). CIs in OP on average served 3.0 (95% CI: 1.5, 4.5) more patients/day across all weeks compared to other physical therapy services. The change in productivity among OP services did not differ from the change in productivity among other physical therapy services (p=0.18). However, among all physical therapy service types, productivity decreased 0.7 patients/day (95% CI: 0.1, 1.3) on the first week of internship compared to baseline (p=0.02). By week 6 of internship, productivity increased 0.7 patients /day (95% CI: 0.03, 1.3) (p=0.04).

**Conclusions:** This study demonstrates that, while supporting a DPT student, CIs have an overall increase in productivity. This is similar to other productivity studies completed in physical therapy. Though there is an initial decrease in productivity during the first week of the clinical experience, specifically in non-outpatient clinic settings, productivity quickly returns to baseline level. In OP settings productivity exceeds baseline levels by week three of the internship. By week six, productivity among all physical therapy service types significantly increases and maintains that level throughout the remaining experience. One should note the majority of the students were in their final two clinical experiences and more data is needed to compare between first, intermediate and final experiences.

**Relevance to Allied Health**: As most allied health students participate in clinical experiences during their education and this study's results are beneficial to allied health clinicians supporting students on clinical experiences. Initially it does take time to orientate the student to the clinical experience which can impact productivity; however, the clinician's productivity quickly returns to pre-clinical experience levels and actually exceeds the instructor's pre-student productivity.

### VISIBLE BODY ART AMONG RADIOGRAPHERS: PERCEPTIONS AND IMPACT WITHIN THE PROFESSION

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**Background:** Within the U.S., a significant number of individuals possess visible body art, as either tattoos or non-traditional (non-earlobe) piercings. Despite this popularity, a perceived stigma surrounds the display of body art in the healthcare environment. Visible body art and the concept of professionalism, as well as the implications on patient perceptions of healthcare practitioners, has been studied in multiple professions including medicine and nursing. Despite the significant role of medical imaging and its impact on perceptions of care received, an analysis in medical imaging related to body art has not occurred.

**Purpose:** To determine if there is an attitudinal difference in perceptions of (1) visible tattoos and (2) piercings in the clinical setting among radiographers without body art, those with non-visible body art, and those with visible body art.

**Methods:** An IRB-approved digital survey was delivered electronically to radiography clinical instructors working at hospitals affiliated with a radiography program in the south central U.S. Discussion board forum posts were created within the American Society of Radiologic Technologists Communities forum, targeting radiographers throughout the U.S. Responses were collected for 4 weeks and were compared quantitatively using linear regression, logistic regression, and chi-square analysis ( $\alpha$ =0.05). Qualitative results were examined for themes, and proportions among themes were reported.

**Results:** There were 943 valid responses from radiographers working in the U.S. Individuals without tattoos have a lower body art acceptance compared to those who have tattoos (p<0.0001). Individuals without piercings have a lower acceptance score compared to those with piercings (p<0.0001). Acceptance is lower for those who have tattoos but cover them at work, compared to those with visible tattoos at work (p<0.0001). Acceptance was not different among those with piercings that cover them compared to those with visible non-traditional piercings at work (p=0.0733). It is more accepted for members of the general public to display a tattoo than for radiographers to display a tattoo at work (p<0.0001). However if the radiographer's tattoo is medically related, then acceptability is higher (p<0.0001).

**Discussions/Conclusions:** A bias exists among radiographers regarding the display of body art while working. For those with body art, many were unaware whether or not body art workplace policies existed. Content or context of a tattoo may matter more so than the location of a tattoo towards acceptability. Among radiographers working in the U.S., a bias exists regarding the acceptance of visible body art for both tattoos and non-traditional piercings in the healthcare setting. Implications for practice include perceptions of radiographers displaying body art while working. These results are only generalizable to radiographers who accessed the survey online; the survey used for data collection presented an access limitation, as well as a limitation of non-response by those who did not participate. However, future evaluation may provide evidence of related radiologic technology professions, and give guidance to policy implementation for hospitals as it relates to perceptions of care received.

**Relevance to Allied Health:** The Association of Schools of Allied Health Professions (ASAHP) estimates that as much as 60% of the total healthcare workforce is comprised of individuals in Allied Health. This research provides data on perceived professionalism by patients from these members of the healthcare workforce, and may even have implications for healthcare delivery in general. Although this research involved radiographers only, the implications may relate to the attitudes, perceived bias, and hiring practices utilized across other allied health professions.

### EXPERIENCE OF SLEEP: FAMILIES OF YOUNG ADULTS WITH AUTISM SPECTRUM DISORDER

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**Background:** Autism spectrum disorder (ASD) is a neurodevelopmental disorder which, while typically diagnosed in young children, has a significant life-long impact on the lives of both persons with this diagnosis and their families. Sleep is a vital occupation across the lifespan which contributes significantly to daily function, health, and well-being of both individuals and families. A child's ability to get quality sleep significantly influences his/her daily engagement in a variety of occupations, which may be intensified for children with ASD who have difficulty with sleep. The impact of having a child diagnosed with ASD can profoundly affect family life as much of it revolves around the child in order to meet child's needs limiting engagement in family occupation. This includes sleep as lack of sleep is associated with poorer Health Related Quality of Life (HRQoL). Promoting good sleep hygiene is often considered the first line of defense in managing sleep disorders but can often be difficult to implement for children with ASD. Furthermore, unresolved issues related to sleep for children can magnify as they move into adolescence and for a child with ASD these disturbances can be even more substantial. Since sleep is crucial to health and well-being and lack of restful sleep is a known problem for children with ASD and their families it follows that further exploration of disrupted sleep and its influences on families raising a child with ASD is needed.

**Purpose:** This study aims to investigate the experience of sleep for families of children with ASD. To achieve this aim, illuminating the family's experiences surrounding the occupation of sleep, demands qualitative methodology, specifically a phenomenological approach in the tradition of Moustakas, (1994). Therefore, the purpose of this study is to investigate the experiences of families of children with ASD surrounding sleep which, once revealed, may inform our understanding and further research of the nuances of sleep and potentially help to shape interventions that not only support the child with ASD, but also the family.

**Methods:** The aim of this study is to gain insight into the lived experience of a person or group of persons through the investigation of a phenomenon via in-depth interviewing. Through the interview process and systematic analysis of the interview data the research team seeks to synthesize the common experiences of participants to illuminate the essence of the experience- in this case the family's experience of sleep as an occupation.

**Results:** This study has yet to be conducted but we anticipate the results of this study will support the need for a more in depth understanding of the sleep experiences of families of children with ASD and how these experiences impact occupational performance of sleep for the family.

**Discussions/Conclusions:** This qualitative study is an initial step towards obtaining a better understanding the effect of sleep on the child with ASD and the family and is required to formulate future effective treatment strategies. The results of this study will inform rehabilitation sciences research and practice for professionals working with families of children with ASD by enhancing our understanding of the lived experience and the impact of sleep difficulties on the occupations of children with ASD and their families.

**Relevance to Allied Health:** This topic is relevant across all allied health professions due to the importance of sleep and its overall impact on health. As the ASD population ages, their use of allied health services continues to increase and they become patients across many settings. Understand the lived experience of sleep for these young adults and their families is crucial to developing interventions to support these populations.

#### POSTURAL CONTROL, VISUAL ATTENTIVENESS, MOTIVATION TO MOVE AND COGNITION: COMPARING INFANTS WITH AND WITHOUT MOTOR DELAY J.Hammontree, PT, MS, PCS, B. DeGrace, OTR/L, PhD, L. Jeffries, PT, DPT, PhD, PCS, T.H.A. Kolobe, PT, PhD, FAPTA<sup>1</sup>

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**Background:** The number of children receiving early intervention services for motor and cognitive delays is increasing on a yearly basis, yet these children are identified early to benefit from these intervention services. Developmental surveillance programs for infants primarily use standardized screening assessments that on milestone achievement or skill attainment and often miss subtle indicators of early developmental problems. Recent findings from infant development literature implicates other systems such as **vision, memory** and **cognition,** especially spatial cognition, as integral to functional movement. Understanding how these factors interact to influence development may improve early detection and improve intervention strategies of and for children with motor and cognitive delays. **Purpose:** The purpose of this project is to investigate the association among prone postural control (PD), visual attentiveness (VA), motivation to move (MTN) and cognitive ability (COG) in infants with and without developmental delays.

**Hypothesis:** We hypothesized that increased in postural control will be associated with increases in visual attentiveness and motivation to move in infants with and without risk for cerebral palsy.

**Methods:** We used a quasi-experimental and cross-section design with 56 infants with and without CP. The protocol entailed placing and videotaping the infants in prone for two minutes while playing with a caregiver and simultaneously being encouraged to move. We coded postural control, visual attentiveness, and motivation to move from the videos. Scores from the Bayley Scales of Infant Development (Bayley) were used to measure cognition (Bayley COG). We used Pearson R to test the hypothesis.

**Results:** The correlation coefficient between the PD and VA scores, PD and MTN scores; VA and MTN were r=.857, r=.347, and .390 respectively (P<05). The coefficients between the Bayley COG scores and the other variables ranged from r=.236 to r=.473, with p-values ranging from .01to .05. The coefficients were smaller for infants without CP compared to those with CP. The results support the conclusion that there is a relationship between postural control, visual attentiveness, motivation to move and cognitive development.

**Discussion:** The statistically significant results among PD, VA, MTN, and Bayley COG support interrelationships among these domains during early development. This indicates that postural control is relevant to the ability to attend and gain information regarding the environment. The significance of having a higher relationship in the high-risk group makes the notion of identifying prone postural control early in development as a good indicator for later motor and cognitive outcomes.

**Relevance to Allied Health:** Our findings suggest that other allied health professionals that work with infants in the areas of cognition, social emotional development, and vision can use this information to identify infants that may be at risk for developmental delays, thus improving early referral rates. This information can also benefit all stakeholders by reducing cost through enhanced time and resource allocation through improved accuracy in early detection of infants with motor delay.

#### PRESTIGE: PROVIDING EXEMPLARY STUDENT INTERPROFESSIONAL GRADUATE EDUCATION

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**Background:** An important contemporary charge in health services education is to prepare future interdisciplinary teams of healthcare professionals to deliver exceptional patient care across the lifespan. Interprofessional education for future health professionals is important in providing well - rounded care in a collaborative team. Allied health professions especially benefit from interprofessional education as they comprise over half of all health care providers and serve patients of all ages. Because best practice for children with disabilities specifically includes interdisciplinary family-centered team services and interventions, it is essential that pediatric health providers receive interprofessional education.

**Purpose:** The purpose of this report was to describe a unique, pilot, allied health course (PRESTIGE) for entry-level OT/PT/SLP students, designed to explore and experience interdisciplinary care for children with disabilities including autism.

Method/ Course Description: Primary faculty developed the 16-week course as an interactive educational experience, including Telehealth, for six OT/PT/SLP students in collaboration with professionals working with the Oklahoma Autism Network, ConnectedKids program. All entry-level students received information and an application to apply for six positions. The PI and CoPI interviewed and selected viable students for the course. Course components included a) four interprofessional/team-based course work sessions that built on each profession's disciplinary competencies and included discussion of interprofessional educational competencies (IPEC) in practice, b) training on the use of developmental and behavior analytic strategies to work with families and their children with autism to expand social engagement, communication, play, and imitation skills, and c) engagement in student-led school-based therapy interventions, via telehealth, for elementary-aged children. Students reflected on each learning session to solidify discussed concepts and views, and explore further ideas on appling what was learned to their future practices. **Outcomes:** The interdisciplinary course exposed students to methods for team-based service delivery in pediatrics, utilizing both teletherapy and direct intervention programs. Participation in PRESTIGE expanded the students' understanding of the expected competencies of allied health professions and provided a model for interprofessional collaboration. The low risk environment allowed students to practice clinical problem solving and develop skills for effective collaboration in an interdisciplinary team. Students achieved improved interprofessional competencies, expanded knowledge in methodology for child/family-centered therapy, and increased exposure to application of telehealth. **Discussion:** PRESTIGE expanded the student's exposure and knowledge of IPEC through introduction of telehealth and the ConnectedKids program curriculum. Students reported that the course should continue in the curriculum because it was a successful partnership that was realistic for students preparing for their future interprofessional employment. Future recommendations include having more direct OT and PT telehealth therapy services and potentially including students from nutrition and medical imaging and radiation. All students agreed that expanding this course to didactic-based in the Fall semester with hands-on experience in the Spring semester would be the best way to continue this great educational experience.

**Relevance to Allied Health:** Interprofessional healthcare practice is improving communication and collaboration among professions; conceivably, improving patient quality of care by establishing safer, coordinated care and patient-centered clinical guidelines. Incorporating IPEC into the educational foundation of allied healthcare students aids in the transition from student to professional in a multidisciplinary environment.

#### ADHERENCE TO EXERCISE AND DIET PREHABILITATION IN PANCREATICODUODENECTOMY: A CRITICAL WINDOW FOR BEHAVIORAL CHANGE

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**Background:** Pancreatic cancer (PanC) 5-year survival is 8.5%, and incidence & death rates are rising. Surgical resection is the only cure, but post-operative complications threaten quality & quantity of life after pancreaticoduodenectomy (PD). Pre-operative rehabilitation ('prehab') may improve outcomes, but there is no standard prehab prescription in PanC, and behavioral approaches require adherence to be effective. We designed **HI**gh-Frequency H<u>i</u>gh-Volume Exercise-PD (**HI-FiVE-PD**) for the 2-week window to PD.

**Purpose:** To quantify adherence to **HI-FiVE**-PD exercise & protein prescriptions, in a 2-arm feasibility RCT. We anticipated lower exercise adherence in PanC than is published in less lethal cancers. **Methods:** Patients with PanC and precancers scheduled for PD in 2 weeks were eligible if independent with household mobility and safe for HI-FiVE. All participants received nutrition counseling to target 1.3-1.5 g of daily protein/kg of body weight, using whey protein supplement and immune drinks. After randomization, survivors received individualized physical therapy instruction in moderate intensity daily home exercise of endurance training, plus 8 arm/leg exercises. Intervention Group S used <u>Resistance</u> for exercise; Comparison Group N performed Active motion. Participants in both groups received protein supplement, exercise equipment, a daily adherence log, and 1-2 phone calls. Adherence (%) was calculated for *Exercise as: <u>days performed / total days in intervention period</u>, and for <i>Protein as: <u>whey scoops (alt: immune drinks) consumed/ total scoops (drinks) prescribed</u>, and transformed to 3-categories: (75-100% = Full, 50-74% = Moderate/Mod, <50% = Minimal/Min) before correlation by Kendall's Tau. Categories were further collapsed into 2 (Full vs Mod/Min) for between-groups comparisons using Fisher's Exact Test (SPSS).* 

**Results:** Pooled adherence for 40 PanC participants ( $66.6 \pm 12.0 \text{ yrs}$ , 45% female, 87.3% white/ 6.4% Amer Indian/ 4.3% black, 2% Hispanic) to exercise were 75.0% Full / 10.0% Mod / 15.0% Min for Endurance; 80% / 7.5% / 12.5% for Arm/leg Exercise. More specifically, adherence to <u>Resistive</u> Arm/leg Ex (Group S, n=22), was 81.8% / 9.1% / 9.1%, and did not differ from Group N <u>Active</u> Ex (p=0.528). Protein adherence in the pooled sample was 50.0% Full / 26.5% Mod / 23.5% Min to whey; 72.2% / 13.9% / 13.9% to drinks; and did not differ between Groups S and N (p=1.0 whey; p=0.72 drinks). Exercise adherence did not correlate with protein adherence (tau=0.014-0.194; p>0.05).

**Discussion/Conclusions:** Adherence to HI-FiVE before PD was higher than anticipated. Co-survivor support, home program, and brief pre-op window were facilitators. Caregiver status was a barrier. Adherence to whey protein was lower, but some survivors increased protein through whole foods, a more sustainable approach. PanC survivors appear motivated to make short-term behavioral change before PD. **Relevance to Allied Health**: The 2-weeks leading to PD may be a 'critical window' during which patients with PanC and pre-cancers are motivated to begin behavioral interventions led by dietitians and physical/occupational/speech & language therapists. With medical imaging techniques like CT and DXA, allied health providers can assess body composition, to better quantify the need for, outcomes of, and mechanisms behind behavioral interventions for cancer survivors.

#### TWO WEEKS OF HI-FIVE EXERCISE & DIET PREHABILITATION IMPROVES PHYSICAL FUNCTION BEFORE PANCREATICODUODENECTOMY IN A PILOT RCT

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**Background:** Sarcopenia (low muscle mass & function) predicts worse outcomes in pancreatic cancer (PanC), including 63% higher 3-year mortality. Pancreaticoduodenectomy (PD) is the only chance at PanC cure, but the surgery and hospitalization worsen the skeletal muscle catabolism initiated by the cancer itself. Such post-operative sarcopenic frailty threatens the quality of an extended life. Exercise & nutrition before surgery ('prehab') mitigates post-op functional decline in other cancers, but PanC prehab studies target only those patients starting months of neo-adjuvant chemotherapy; 1-2 weeks to surgery is assumed insufficient time to benefit. We assert that optimally-dosed prehab could improve muscle mass and function in only 2 weeks, even with PanC sarcopenia, and such gains could sustain post-operatively. We developed HIgh-Frequency High-Volume Exercise-PD (HI-FiVE-PD) for this 2-week window. **Purpose:** We aim to quantify pre-operative changes in physical function after 2 weeks of HI-FiVE-PD. Methods: Patients with PanC and related diagnoses scheduled for PD in 2 weeks were eligible for this 2arm pilot RCT if cleared for exercise, independent with household mobility, and not exercising regularly. After baseline testing (V1), each participant met with a dietitian for high protein counseling, and after randomization, each met with a physical therapist for HI-FiVE-PD home exercise instruction. Participants in both intervention arms received endurance & arm/leg exercise, protein supplement, exercise equipment, adherence log, and 1-2 phone calls over the 2-wk intervention. The only difference in approach between Intervention (S) and Comparison (N) Groups was the use of resistance exercise in the intervention group (S). Measures of physical function [Handgrip Strength (HGS), Gait Speed (GS), Sitto-Stands (StS)] were repeated 1-2 days pre-op (V2), by a masked assessor. We compared pooled performance from V1 to V2 by paired t-test, and change between Groups S&N by 2-samples t-test. **Results:** 32 participants ( $67.2 \pm 10.6$  yrs; 47% female; 3.1% black, 3.1% Amer Indian, 3.1% Hispanic) were included in preliminary analyses. Baseline physical function did not differ between Groups S & N. In pooled analyses, V1-V2 change was significant for HGS (mean  $2.2 \pm 2.8$  kg; Range -2.0, 8.2; p=0.002) & StS (-1.0  $\pm$  1.6 s; -4.3, 1.8; p=0.003). GS change approached significance (0.1  $\pm$  0.1 m/s; -0.2, 0.4; p=0.059).

**Discussion/ Conclusions:** Physical function improved before PD, after <u>only 2-weeks of HI-FiVE prehab</u>, and in patients with a cancer known for muscle catabolism. These preliminary results provide early hope that patients with resectable tumors who are denied the chance at cure by PD for "borderline physical fitness" could become fit enough for surgery with only 2 weeks of optimal prehab. Future directions for this work include mechanistic analyses to test sarcopenia markers as mediators & moderators of physical improvement. We also plan a larger study, for fully-powered between-groups comparisons of <u>post-op</u> outcomes, including surgical complications and survival, and designed to isolate the impact of resistance training (S) in the HI-FiVE-PD prescription.

**Relevance to Allied Health**: Physical therapists, dietitians, occupational therapists, audiologists and speech/language pathologists all play critical roles in optimizing cancer survivors <u>before</u> surgical, medical, and radiation therapies. The impact can extend beyond improving quality of life, to improving quantity of life. Medical imaging allows the interprofessional oncology team to quantify need for, outcomes of, and mechanisms behind allied health and medical interventions for individuals with cancer.

### EFFECT OF PATIENT-CENTERED OCCUPATIONAL THERAPY INTERVENTION IN INPATIENT REHABILITATION

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**Background:** Every 40 seconds, an individual in the U.S. experiences a stroke, the leading cause of longterm disability<sup>1</sup>. Increased survival after a stroke and moderate impairment after stroke negatively impacts health-related quality of life.<sup>2</sup> Also, in the US there are 81,000 new cases of bladder cancer each year<sup>4</sup>, 2 million individuals are injured in motor vehicle accidents yearly<sup>5</sup> and the US has the highest rate of spinal surgeries world-wide<sup>6</sup>. Occupational therapists (OTs) utilize everyday life activities to promote participation in habits, routines, and roles within a variety of contexts<sup>3</sup>. Thus, OTs assess the whole person to improve their engagement in meaningful activities. OTs are uniquely equipped to improve quality of life for their patients. Additionally, there is limited research addressing the impact of patient centered occupational therapy on quality of life.

**Purpose:** The purpose of this outcomes research project was to investigate the clinical question: *Does* patient-centered OT intervention improve patient function and quality of life for individuals in inpatient rehabilitation?? We hypothesized that patient-centered OT intervention *delivered one hour a day, five days a week would improve function as measured by FIM and COPM, and quality of life as measured by the WHO QOL-BREF for adults admitted into inpatient rehabilitation.* 

**Methods:** This is a one-group longitudinal study focused on the effectiveness of patient-centered OT intervention on function and quality of life in inpatient rehabilitation over eight weeks. Inclusion criteria: 1) adults >18 admitted to inpatient rehabilitation; 2) metacognitive awareness; 3) ability to assess goals. An OT and her student assessed each individual and developed a personalized intervention plan to optimize function. Interventions varied based on the individual's needs and goals. The author used the Functional Independence Measure (FIM) excluding 'Stairs', 'Walk/Wheelchair,' and the 'Sphincter Control' section. The Canadian Occupational Performance Measure (COPM), suitable for variable diagnoses, tracked progress on patient-set goals. The World Health Organization Quality of Life- BREF (WHO QOL-BREF) measured quality of life. The author analyzed the data with descriptive statistics and paired t-tests.

**Results:** Of the participants sampled (n=5), the mean age was  $66.2\pm25.2$ , 40% were female (2/5), 60% were Caucasian (3/5) with the other two being American Indian and Hispanic, and 40% had a stroke (2/5), 20% had cancer (1/5), and 20% were orthopedic (1/5). Post-intervention FIM score means (90.4±1.8) were significantly (p<0.001) higher than the baseline score means ( $66\pm5.7$ ). COPM performance scores significantly (p=0.0018) increased from admission ( $1.6\pm2.1$ ) to discharge ( $6.9\pm2.6$ ). The differences on the scores of the WHO QOL-BREF was not significant (p= 0.17) between baseline ( $70.7\pm16.7$ ) and discharge ( $76.6\pm14.8$ ).

**Discussion:** The results partially fulfilled the hypothesis because OT intervention improved both therapist-rated (FIM) and self-reported (COPM) function for individuals in inpatient rehabilitation. OT may increase quality of life, but further research with a larger sample size and a smaller range of diagnoses is needed. The interventions in this study focused on the patient's goals, but their goals may not directly relate to their quality of life. Therefore, further research in this area should address areas that participants select as beneficial to quality of life, in addition to function, as a focus of therapy.

**Relevance to Allied Health:** Many allied health professionals work together within inpatient rehabilitation. It is important to understand that these professionals can improve comprehensive wellbeing for each patient.

#### HEARING AID AFFORDABILITY IN THE UNITED STATES: BIG DATA FROM THE AMERICAN COMMUNITY SURVEY

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**Background**: The average price of an advanced digital technology (ADT) hearing aid (HA) is \$2366 and has been cited a significant barrier to pursuing amplification. However, to date, no economic analyses using Big Data have determined what proportion of the United States (US) population, in general versus those who self-report a serious hearing difficulty, would face financial hardship due to purchase of a single HA. The catastrophic and impoverishment economic analyses have been used to gauge the affordability of healthcare provisions and interventions, but this has not included HAS. These data are a prerequisite for shaping pathways of accessibility to hearing healthcare.

**Purpose**: Our aim is to conduct catastrophic and impoverishment economic analyses to determine what proportion of all Americans > 18 years old, with and without self-reported serious hearing difficulty (SRSHD), who would face financial hardship as a result of the purchase of a HA. An additional aim is to determine what demographic groups (e.g., hearing status, race, age group) are at higher risk for HA affordability issues.

**Methods**: The catastrophic approach determined the proportion of the population for which the price of one HA would exceed a predetermined percentage of income (i.e., 3%, 5%, or 10%). Alternatively, the impoverishment approach examined income before and after HA purchase and determined the proportion who would fall below the US Federal Poverty Level (FPL) for the year (e.g., 1.0, 1.5, or 2.0 times the US FPL) as a result of the purchase. The catastrophic and impoverishment analyses were applied to data from the US Census Bureau's 2016 American Community Survey (ACS) to determine the proportion of the overall sample versus those with SRSHD, who would fall into financial hardship after the purchase of one HA at price points representative of the current market (i.e., \$250, \$500, \$1000, \$1500, \$2000, \$2366, \$2500, \$3000, and \$3500). Logistic regression was used to make comparisons among demographic variables (i.e., age, educational attainment, gender, geographic region, and race).

**Results**: Data were included for 2,348,274 ACS respondents who answered both the hearing status and income questions and 120,286 with SRSHD. At a per-ear price of \$2366, 12% (N = 33 1,435) of the total sample would fall 1.0 times below the poverty line and 61% (N = 1,432,454) would have to spend more than 3% of their annual income on a HA. Among the SRSHD sample, 12% would fall 1.0 times below the US FPL and 75% would have to spend more than 3% of their annual income income than 3% of their annual income on a HA. Among the SRSHD sample, 12% would fall 1.0 times below the US FPL and 75% would have to spend more than 3% of their annual income. Those with SRSHD were at higher odds of experiencing financial issues when compared to the total sample (catastrophic: Odds Ratio [OR] = 1.83, p < 0.01; impoverishment: OR = 1.63, p < 0.01). African-Americans and those with lower educational attainment were at higher odds for experiencing affordability issues with HAS when compared to their White counterparts and those with a graduate degree, respectively.

**Discussions/Conclusions**: The average purchase of a single ADT HA at \$2366 would cause significant financial hardship for a large proportion of Americans, and even more so for those with SRSHD. Moreover, rates of financial hardship vary among those with and without SRSHD and across race, age groups, gender, and geographic regions. Determination of policies for insurance coverage, third-party payers, and product development should only occur after accounting for hearing healthcare economic disparities.

**Relevance to Allied Health**: These methods provide examples of affordability analyses that can be applied by those in any of the allied health disciplines to influence reimbursement and insurance model.

#### EXPLORING THREATS TO SUCCESSFUL HIGH SCHOOL TO COLLEGE TRANSITION: AN OCCUPATIONAL THERAPY PERSPECTIVE

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**Background:** College is a significant milestone in life. However, dropout rates remain high in the United States and a rise in stress levels and mental health problems, as well as a decline in overall well-being, has been observed in college students. Several factors, including personal, environmental, and occupational, likely contribute to the lack of successful transitions from high school to college.

**Purpose:** The purpose of this exploration is to investigate common risk factors that lead to increased dropout rates, mental health problems, and threats to overall well-being in college freshmen.

**Methods**: Based on the PEO model, surveys were developed with the primarily focus on personal factors hypothesized to be negatively affecting successful transition from high school to college. The surveys were distributed primarily through social media and consenting individuals also participated in interviews. A total of 90 students and 10 faculty/staff were surveyed. The results were then analyzed and correlation tests were performed.

Results: Of the students sampled, 90% were female, 48.9% attended a public institution, and 20% were not involved in any campus organizations during their freshman year of college. 62% were in the high category for how high school prepared them, 72.2% were in the high category for stress rating during their freshman year, and stress management was evenly distributed. The majority of students rated their overall well-being as being moderate to high. There was a moderate positive correlation between ratings for how high school prepared students for college and overall well-being during first year of college, and between ratings for the level of stress management skills and overall well-being. There was a moderate negative correlation between the ratings of level of stress during first year of college and overall well-being during the first year of college. Of the faculty/staff members sampled, 50% have been working at their institution for five or more years and all respondents have at least a bachelor's degree. 80% were in the moderate category for how high school prepared college students and 80% were in the high category for stress rating of college students. Ratings for observed stress management skills of students were evenly distributed. 60% were in the high category for overall well-being. There was a moderate positive correlation between ratings for high school preparedness for college and overall well-being during first year of college and between ratings for stress management skills and overall well-being during first year of college. There was no correlation between ratings for stress level of freshman and overall well-being during first year of college.

**Discussion:** We found a moderate level of support for our hypothesis. Every predicted contributing factor to increased stress and decreased well-being was experienced by at least 15 students and was observed in college freshman by at least 3 faculty members. 7 out of 12 factors were experienced by more than 50% of students, and 10 out of 12 were observed by more than 50% of faculty. We believe occupational therapy would be beneficial in providing the necessary skills for young adults transitioning from high school to college.

**Relevance to allied health professionals:** Allied health professionals are individuals who are not restricted to the hospital setting and may provide patient centered care to those seeking assistance outside of the medical model or within the community setting. This research suggests that college students, a population currently underserved by allied health professionals, could benefit from allied health services and opens opportunities for growth of allied health services targeted towards this population.

#### EVALUATION OF HEARING PERFORMANCE WITH A VARIETY OF WIRELESS REMOTE MICROPHONE TECHNOLOGIES

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Purpose/hypothesis: For individuals with significant hearing loss, cochlear implants (CI) may restore some auditory function to one or both ears. Cochlear implants are known to improve speech understanding, especially in quiet, but the CI users may continue to experience significant difficulty understanding speech in background noise. Hearing assistance technology, such as remote microphone (RM) technology, has been shown to enhance speech understanding in noise. A variety of remote microphone options are available and include a wireless accessory specific to the CI brand and a more universal, adaptive RM system. Thus, research is needed to identify which remote microphone technology provides the best outcomes. The objective of this study is to evaluate the potential improvement in speech recognition in noise that CI recipients obtain with the use of a variety of different wireless RM technologies. Methods: Twenty, bilateral Cochlear Nucleus 7 (N7) cochlear implant users, ages 8-75 years were recruited for this study. Prior to evaluation with the remote microphone technologies, speech perception testing was administered in quiet and in noise. Specifically, the CNC Monosyllabic word test was administered at 60 dB A in quiet to obtain a percent correct score and the BKB sentence test was administered in increasing levels of background noise to obtain the signal to noise ratio required to get 50% correct. Participants were then tested in a simulated classroom environment. AzBio sentences were presented from a loudspeaker located 8 feet, 6 inches in front of the participant, and classroom noise was presented from four speakers placed in the corners of the room. Sentence recognition was measured in quiet and in noise (at multiple levels ranging from 50 to 80 dBA) in each of four conditions: 1) no RM, 2) use of a wireless, fixed-gain accessory RM system (Mini Mic 2+), 3) use of a wireless adaptive universal personal RM system (Phonak Roger Pen coupled to Roger 20 receivers), and 4) combined use of an adaptive universal personal RM system with its radio receiver coupled to the Europort of a fixed-gain accessory RM system (i.e., "combined RM system") (Phonak Roger Pen and the Roger X receiver coupled to the Mini Mic 2+).

**Results:** Repeated measures analysis of variance (RM-ANOVA) indicated a significant main effect of noise level and a non-specific main effect of RM technology. Sentence recognition in quiet was significantly better than sentence recognition in noise, and sentence recognition decreased significantly with increasing noise level. Of note, all RM configurations outperformed performance without RM. However, similar performance was obtained across each of the three RM technology conditions across all noise levels. **Discussions/Conclusions:** Bilateral CI users often experience difficulty understanding speech in background noise. Use of remote microphone technology can improve listening in noise when worn by the speaker of interest. Results further indicate similar improvement regardless of coupling methods. The lack of difference across the various RM technologies may be attributed to the signal processing within the sound processors used by the participants in this study. Routine use of RM should be considered for all

cochlear implant users and coupling methods should be selected based on patient needs. **Relevance to Allied Health:** Health professions students and providers may interact with individuals with hearing impairment who use cochlear implants. When communicating with individuals with hearing loss, it is important to recognize that RM technologies may be needed to optimize communication. If a remote microphone is being used, the speaker will need to wear the microphone or position it nearby when speaking to the individual with hearing loss.

#### THE UTILITY OF EEG AS A MEASURE OF MOTOR DEVELOPMENTAL AND INTERVENTION OUTCOMES

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**Background:** Research suggests that interventions that produce sustained gains tend to be those that also show changes in brain structure and functioning, however, the brain-behavior relationship during motor development or skill acquisition is poorly understood. Less clear are neural biomarkers of motor performance that can be used to measure intervention outcomes, or to distinguish between potential specific intervention responders or non-responders.

**Purpose:** This exploratory study examined the utility of electroencephalography (EEG) as a biomarker of motor performance by determining changes in brain activity and movement proficiency during the development of prone locomotion, comparing differences between intervention modes, and between infants with and without Cerebral Palsy (CP).

**Methods:** We employed repeated measure design with twenty-two 4-5 month old infants with CP and without (TD), who were a part of a larger study on prone locomotion training using the Self-initiated Prone Progression Crawler (SIPPC) robotic system. The TD group (17) was further assigned to three SIPPC training modes resulting in four comparison groups. The study protocol involved weekly baseline recording of the infants' brain activity for 5 minutes using a 124 channels EEG followed by videotaped training in prone locomotion on the SIPPC for 15 minutes bi-weekly for 16 weeks. Movement proficiency scores were coded from the videotaped performance using the Movement Observation Coding System (MOCS). We used repeated measures ANOVA to compare weekly MOCS scores and EEG power densities. The power densities were plotted spectrally and spatially.

**Results:** The results showed progressively increasing mean MOCS motor proficiency scores over time, with the largest mean change in the TD groups (p<0.01) compared to CP group (p<0.08). Similarly, for the TD groups, the EEG peak distributions showed increasingly higher peak frequencies and mu rhythm shift from 6.6 Hz to 7.3 Hz at 5 to 8 months. Small differences between the TD groups were noted in the alpha, delta, and theta band activity. In contrast, the results of the infants with CP revealed large weekly fluctuations that prevented aggregating EEG data but allowed close inspection. The mu rhythm activity, which emerged around 5 months in the TD group, emerged around 7 months in CP group and showed different distribution patterns.

**Discussion:** Progressive shifts towards higher alpha and theta band peak frequency and mu- rhythm were consistent with trends in the movement proficiency change scores. However, the findings of the CP group reveal new information regarding the potential for EEG as a biomarker of performance and intervention outcomes that implicate age, type and timing of intervention, type of brain insult, and analytic approaches. Our results also revealed changes in the distribution of EEG rhythmic activity in different parts of the motor cortex that merit further exploration.

**Relevance to Allied Health:** Besides monitoring brain performance during development, a combination of changes in the various EEG rhythmic patterns and their distribution may inform activity-dependent neuroplasticity studies and distinguish potential treatment responders and non-responders of various interventions utilized by allied health professionals

#### PERCEIVED PERFORMANCE AND SATISFACTION OF CHILD'S SWIMMING AND SAFETY SKILLS FOLLOWING ICAN SWIM CAMP

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**Background**: iCan Swim is a program developed to teach individuals with disabilities swimming and water safety skills. Approximately 27% of children with Autism or another intellectual or developmental disability (IDD) have eloped over the past 12 months (Kiely, Migdal, Vettam, & Adesman, 2016). Parents of children with Autism and other IDDs face a higher level of concern than parents of typical children when it comes to water safety skills. In a child who tends to elope, swimming and water safety knowledge and skills can make a life or death difference.

**Purpose**: The purpose of this research project was to understand how the iCan Swim Camp impacts parent perceived performance and parent satisfaction of swimming skills, water safety knowledge, and water safety skills of individuals with disabilities. We hypothesized that having a child attend the iCan Swim Camp would increase parent perceived performance and satisfaction of that child's swimming skills, water safety knowledge and skills.

**Methods**: We completed a one-group study over the course of 5 days to assess the impact of the iCan Swim camp on parent perceived performance and satisfaction of their child's swimming skills, water safety knowledge, and water safety skills. An iCan Swim instructor led a group class with each swimmer having a 1:1 volunteer. An OT was present for swimmer behavior and task adaptation. Caregivers were given a survey on day 1 and 5 of the camp regarding their child's performance and their satisfaction of swimming skills, water safety knowledge and skills. It asked parent to rank their child's performance and their satisfaction of the performance on a scale of 1 to 5 with 5 being the highest in all 3 categories. Data was analyzed using a single-tailed Wilcoxon signed rank test with an alpha of .005.

**Results:** Of the 26 individuals who were signed up for the camp, 17 were included in analysis. A majority (n=13) of those had a diagnosis of Autism. Of the participants the mean age was 8.1 years with a SD of 3.1. Post camp perceived performance scores and satisfaction scores were significantly higher than precamp scores, evidenced by a critical value of 23 and testing statistic of 2 and 1, respectively.

**Discussions/Conclusions**: The iCan Swim camp is beneficial to families of individuals with IDDs when considering parent perceived performance and satisfaction of swimming and water safety skills. Future research by clinicians could determine if other areas are affected by the iCan Swim Camp.

**Relevance to Allied Health:** Many allied health professionals work with individuals with IDDs and their families. Knowledge of programs that can increase safety of individuals who wander is helpful to the practice of family-centered care.

#### PLANTARFLEXION RANGE OF MOTION USING GONIOMETERY AND MOTION CAPTURE OF ELITE BALLET DANCERS

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**Background:** Ankle range of motion (ROM) has well established normative values, however, research is limited on establishing normative values specifically for the dance population. ROM is measured using a goniometer by rehab specialists because it is accessible and inexpensive. The current normative value of 50° for plantarflexion (PF) does not account for the unique requirements that elite dancers need to be successful and healthy. If dancers have poor technique or form when performing or lack necessary total ankle PF ROM (combined talocrural and midfoot PF), then they could be at risk for injury. Ankle injuries, such as anterior talofibular sprains, fifth metatarsal stress fractures, and tendinopathies account for up to 31% of dancer reported injuries. One of the functional movements requiring greater ROM is tendu (extending the working leg to the point which only the toes touch the floor and ankle achieves full PF). One of the best methods to gather a complete image of these dancers is through motion capture. Utilizing the 3D motion capture system has been shown to give more extensive and accurate kinematic measurements.

**Purpose:** The purpose of this study was to compare total combined talocrural and midfoot PF measured with a standard goniometer and motion capture of the elite female ballet dancer to gain understanding of the dancer-specific normative values. We hypothesized that there will be no difference between measurements taken using a standard goniometer during non-weightbearing PF and a tendu measured with 3D motion capture.

**Methods:** Ten elite female ballet dancers between the ages of 18-30 participated in this cross-sectional pilot study. Total ankle PF ROM was measured with a standard goniometer in long sitting, non-weightbearing. Measurements were taken by the same licensed physical therapist. All kinematic data was captured using Qualisys<sup>TM</sup> motion analysis system and analyzed using Visual 3D<sup>TM</sup> software.

**Results:** Mean non-weightbearing total ankle PF ROM measures of all participants were more excessive than the normative value using both the standard goniometry  $(173.5^{\circ}\pm 6.69^{\circ})$  and motion capture  $(175.8^{\circ}\pm 2.57^{\circ})$  measures in tendu. Differences between the measures were tested using Wilcoxon sign rank test. No difference was found between goniometric joint ankles and motion capture derived angles (p= 0.3750).

**Discussions/Conclusions:** This study shows results to support that the goniometer is a valid tool for clinicians to use when measuring total ankle PF ROM in non-weight bearing of dancers. It also shows that there is a need to expand the PF value norms for dancers. Applying normative values of the general population to the dance population does not adequately represent the necessary flexibility for functional movements dance requires. Not achieving the needed ankle PF may place ballet dancers in greater risk for ankle injuries throughout their career.

**Relevance to Allied Health:** These findings have a large clinical implication for all allied health professionals because it is important to recognize the unique range of motion requirements for this patient population.

## TRACHEAL AND BRONCHIAL (TB) AIRWAY DEPOSITION OF TC-99M DTPA DURING NUCLEAR MEDICINE LUNG VENTILATION STUDIES

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**Background:** Nuclear medicine lung ventilation studies use technetium-99m diethylenetriamine pentaacetate (DTPA) to image airflow to the lungs. The Tc-99m DTPA dose is in aerosol form given through a medical jet nebulizer to the patient. A typical Tc-99m DTPA dose for an adult patient is 25-100 milliCuries, dependent on clinical protocol. The wide range of doses is explained by the poor efficiency of DTPA to deposit in the lungs, only about 1-10%

**Purpose:** The purpose of this research is to determine the percentage of a standard Tc-99m DTPA aerosol dose that shunts or deposits to the tracheal and bronchial (TB) airways compared to the lungs. Results will give baseline data to inform future 3D models of e-cigarette use to potentially improve the delivery of Tc-99m DTPA and/or other inhaled pharmaceuticals.

**Methods:** After IRB approval (#9837), a review of all lung ventilation studies between the years of 2016-2018 completed at OU Medical Center and The Children's Hospital was conducted. All images that contain TBTc-99m DTPA dose uptake will be included in this study, while those images without TB uptake will be excluded. We will draw a region of interest around all given counts in the image, including the head and neck region, lung region, and any TB uptake throughout the field of view. This region of interest will represent the total Tc-99m DTPA delivered to the patient. We will then draw a second region of interest around the lungs to obtain the amount of total lung dose uptake. The percentage of dose shunted to the TB airways will be computed by subtracting the lung counts from the total counts then dividing this number by the total counts. (eq 1).

### Eq1: %*Tracheobroncheal Counts* = $\frac{Total Counts-Lung Counts}{Total counts}$

This process will be completed for each lung study included for analysis. Binomial 95% confidence intervals will be calculated for the proportion of TB counts and will be presented descriptively. **Results Desired:** It is hypothesized that approximately 20-40% of the Tc-99m DTPA aerosol dose deposits to the TB airways. This is of importance because our previous study shows that Tc-99m DTPA can be delivered using an "off the street" e-cigarette, and we are currently working on 3D computer models to determine proper power (watts) to use in an e-cigarette delivery. However we need a good estimate of TB uptake with the medical jet nebulizer.

**Conclusion:** We hope to show that Tc-99m DTPA aerosol doses shows a high likelihood of depositing into the TB airways when given through standard medical jet nebulizer nebulizer. The results can inform our other research to improve Tc-99m DTPA delivery methods.

**Relevance to Allied Health:** We hope our data will eventually lead to a better delivery method for the Tc-99m DTPA dose for lung ventilation studies. With better dose delivery established with Tc-99m DTPA it could lead to better delivery of other inhaled pharmaceuticals. This has the potential to effect patients who are assisted from all other Allied Health professions.

#### SCREENING AUDIOMETRY USING NOISE-CANCELLING HEADPHONES

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**Purpose:** School hearing screenings are often conducted in environments where noise can reduce the reliability of the screening. Limited research has evaluated use of commercially-available noise-cancelling headphones for school hearing screenings to reduce ambient noise and provide more accurate responses (e.g., Clark et al., 2017). Noise-cancelling headphones have active and passive noise reduction abilities; however, the effective amount of noise cancellation in a typical hearing screening environment has not been detailed. The purpose of this study is to assess effectiveness of active and passive noise cancellation for commercially-available noise-cancelling headphones compared to passive noise reduction in standard audiometric headphones.

**Methods:** Participants with confirmed normal hearing were tested using pure-tone audiometry with 50 dBA of noise presented via sound field in a sound treated booth. Five different headphone conditions were assessed and five frequencies tested (octave frequencies 250 – 4000 Hz) in a counterbalanced manner. The five headphone conditions were (1) TDH-49 standard audiometric headphones (STD), (2) a low cost (MSRP ~ \$60) commercially-available noise-cancelling headphone with noise cancellation activated (LOW-ON), (3) the same low-cost headphone with noise cancellation deactivated (LOW-OFF), (4) a high cost (MSRP ~\$300) commercially-available noise-cancelling headphone with noise cancellation deactivated (HI-OFF). The participants also underwent a five pure tone hearing test via sound field under the same five headphone configurations to evaluate the passive and active noise cancellation of tones in sound-field, which is used to estimate attenuation of ambient noise in frequency bands.

**Results:** Data collection is in progress and will be complete prior to presentation. Preliminary results indicate that attenuation of low-frequency ambient noise is significantly more effective (p < .01) in the HI-ON condition compared to all other configurations. Interestingly, attenuation of ambient noise was similar in the LOW-ON and LOW-OFF conditions, suggesting little impact of the noise-cancellation software in this headphone. In the low-cost noise-cancelling headphones, activation of noise cancellation improved audiometric thresholds captured in a noisy environment by an average of 1.5 dB at 250 Hz (p < p.05); at all other frequencies, noise-cancellation did not increase or decrease thresholds by 1 dB or more. In the high-cost noise-cancelling headphones, activation of noise cancellation improved audiometric thresholds captured in a noisy environment by an average of 14.7 dB at 250 Hz, 16.4 dB at 500 Hz, 7.5 dB at 2000 Hz, and 2.4 dB at 4000 Hz (all p < .01). Surprisingly, there was no difference at 1000 Hz, the middle frequency tested. After adjusting for headphone impedance, thresholds were similar in the LOW-OFF and HI-OFF conditions (all p > .05). Thresholds were significantly better at 250 and 500 Hz (both p <.05) in the HI-ON condition compared to the LOW-ON condition. While use of noise cancellation improved thresholds in low frequencies, this appeared to be at the cost of high frequencies; thresholds in the STD condition were significantly lower at 2000 and 4000 Hz than all other conditions (all p < .01). **Conclusions:** Activation of noise-cancellation in the high-cost headphones resulted in a much larger reduction of noise than did activation in the low-cost headphones, and as a result lower thresholds were obtained at low frequencies using the high-cost headphones. However, both commercial headphones performed more poorly than standard audiometric headphones, likely because the audiometric headphones fit much more tightly (the commercial headphones are designed for comfort) which permits some escape of high-frequency sound.

**Relevance to Allied Health:** The ability to reduce unwanted stimuli and produce accurate school hearing screenings can have a tremendous effect on earlier identification of hearing loss in school age children. Earlier identification can lead to earlier intervention, which greatly benefits a child's development.

### GENDER AND THE EARLY USE OF PAST TENSE MARKERS IN AFRICAN AMERICAN ENGLISH-

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**Background**: For young children, African American English use often varies by gender in that females may use more Mainstream American English (MAE) and males use more features of African American English (AAE). In speech-language pathology it is important to differentiate between language error and dialect use as well as the patterns that exist in the populations speech-language pathologists serve. Language development and past tense markings (regular and irregular) have not been addressed through the lens of gender in preschool-aged African American English (AAE) speakers. This research will further speech pathologists' knowledge about dialect patterns in AAE-speaking children, specifically in regard to past tense features.

**Purpose**: In our study we want to look at past tense markings in the spoken language of preschool-aged AAE speakers. This will be a contribution to current literature as most of the studies on gender have focused on older AAE speakers. We aim to determine if a difference exists between male and female AAE-speaking preschool-age children in their usage of past tense marking (regular and irregular). **Methods**: Narrative language samples were obtained for 91 African American preschool-age children living in lower socioeconomic status communities (36-59 months; 42 male, 49 female). The samples were coded for grammatical features of AAE. Past tense AAE feature for irregular past (e.g., run, ran) and regular past (e.g., tie, tied) verbs will be analyzed to look for differences in the frequency of AAE past tense usage for male and female participants.

**Results**: The goal is to complete analyses with the help of a statistician. We hypothesize that AAE past tense usage will be significantly higher for male than for female participants. We predict this because previous research has reported that males use more dialect features than females in spoken language. This research will contribute to the field because there are limited findings for the preschool age group, gender, and the use of the AAE past tense markers.

**Conclusion**: Gender differences in AAE past tense marking (regular and irregular) by young children inform our understanding of language features used within AAE-speaking communities. The understanding of such differences across English dialects can inform our work in public health with children from linguistically diverse homes, both as researchers and as clinicians, as we try to distinguish language difference from language disorder.

**Relevance to Allied Health**: This topic is relevant to allied health professions since all professionals need to be aware and educated about potential language patterns that may differ from their own spoken language. Many allied health professionals work with a wide variety of peoples and communities. Understanding the community and its language patterns will allow allied health professionals to give quality care to clients and their families.

#### CREATING AN INTESTINAL EPITHELIAL CELL CULTURE MODEL TO SCREEN NOVEL PHYTOCHEMICAL THERAPIES FOR POSTMENOPAUSAL WOMEN

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**Background:** The intestinal epithelium serves as a selective barrier allowing nutrients to be absorbed while limiting the entry of pathogens into the body. This barrier is partly maintained by tight junctions (TJ) proteins. Metabolic stress or inflammatory conditions may compromise TJ barrier integrity by release of matrix-metalloproteinases (MMPs) from cells in the underlying connective tissues. Degradation of the TJ proteins lead to increased permeability of the small intestine. This may allow pathogens to move into the immune cell layer, leading to an inflammatory response. Previous research has shown that MMPs are up-regulated with estrogen deficiency. In postmenopausal women, there may be a causal relationship between intestinal permeability and the increased incidence of inflammation-related disease. In order to identify nutrients that attenuate this increase in permeability, we must understand the mechanisms by which estrogen deficiency contributes to increased intestinal permeability. **Purpose:** The purpose of this project is to create an *in vitro* cell culture model, representative of the estrogen-deficient small intestine *in vivo*, to screen phytochemicals that may attenuate the increased intestinal permeability observed with a decline in estrogen levels.

**Methods:** Human colorectal adenocarcinoma (CaCo-2) cells seeded on 12mm Transwell® inserts were co-cultured with 3T3 Swiss fibroblasts, a major source of MMPs in the intestines, in 12-well plates. Cells were pre-treated with 10  $\mu$ M universal estrogen receptor inhibitor (ICI 181,780; ABCAM, Boston, MA) for 1 hour, then treated with 10 nM estrogen (17  $\beta$ -Estradiol; Sigma-Aldrich, St. Louis, MO) with or without MMP-9 Inhibitor (MMP-9 Inhibitor I; Millipore Sigma, Burlington, MA). Transepithelial electrical resistance (TER) was measured at 24, 48, and 72 hours following treatment. Confocal immunocytochemistry was used to determine the expression and distribution of TJ proteins. Differences between treatment groups were analyzed via ANOVA using SAS 9.3.

**Results:** Inhibition of the estrogen receptors results in downregulation of TJ proteins in this model, suggesting a decline in the intestine epithelial barrier integrity. However, MMP 9 inhibition concomitant with suppression of estrogen signaling results in increased TER values, implicating MMP 9 inhibition as a therapeutic target for maintaining the intestine epithelial barrier integrity in an estrogen deficient environment.

**Discussions/Conclusions:** MMP 9 inhibition when estrogen signaling is blocked enhances the intestinal epithelial barrier integrity. Future work will use this model to identify food components, especially those known to inhibit MMP 9, that may attenuate the decline in intestine epithelial barrier integrity observed with estrogen deficiency. Our long-term goal is to identify nutrition-related therapeutic targets to decrease the various inflammation-related comorbidities associated with estrogen deficiency, thereby improving the health of postmenopausal women.

**Relevance to Allied Health:** Increased intestinal permeability has the potential to predispose postmenopausal women to multiple pathophysioloiges, including cardiovascular disease and osteoporosis. Elucidating the mechanisms involved in the progression of increased intestinal permeability offers Allied Health professionals greater insights into the health status of their patients. Nutrition is fundamental to positive treatment outcomes. Incorporating nutrition-related interventions in conjunction with other treatments may facilitate interdisciplinary connections between Dietetics and other Allied Health professions.

#### THE EFFICACY IN CHOICE OF CABG BASED ON LOCATION, INVOLVEMENT WITH STENOSIS, AND MORPHOLOGICAL CHARACTERISTICS

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**Background:** Cardiovascular disease (CAD) is considered the principal cause of death nationwide. The gold standard in treatment for this pathology is performed by a procedure known as coronary artery bypass grafting (CABG). The three more commonly used conduits for CABG are the saphenous vein (SV), internal thoracic artery (ITA), and the radial artery (RA). Considering that the primary advantage in treatment of CAD is solely based on the graft's function, remedy of this disease lasts only as long as the conduit itself. Graft efficacies are partly based upon location of blockage in the native vessel, the severity of occlusion within the native vessel, and the graft's morphological characteristics.

**Purpose:** The aims of this literature review are: 1) to establish which specific vessel territory locations utilizing particular grafts demonstrate higher patency rates, 2) indicate the relationship noted with vessel conduit chosen and the proximal severity of the occluded coronary artery (CA), and 3) determine that graft failure is dependent upon its inverse effect within its hemodynamic blood flow characteristics and diameter.

**Methods:** An online search for original research articles related to CABG was conducted. These searches were achieved by using online databases such as Ovid Medline, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Elton B. Stephens Company (EBSCO). CABG, grafts, conduits, diameter, SV, ITA, and RA were all keywords used in various junctions. Seventeen original research articles were found; however, only 10 out of 17 of these articles were used. All articles were analyzed for occlusion rates, host/graft diameters, and location of native vessel blockage due to a distinct similarity that was noted to these particular categories mentioned above in regards to graft patency.

**Results:** Higher patency rates are seen in certain grafts when targeted to specific vessel territory locations. For example, clinical trials consistently demonstrated that the left internal thoracic artery (LITA) has patency rates equal to or greater than 87% when placed to bypass the left anterior descending coronary artery. Several studies also indicated that stenoses of a native targeted vessel with occlusions greater than or equal to 90% have the lowest overall occlusion rates (less than 10.2%) when a RA graft is used instead of a SV graft. Morphological characteristics of vessel grafts are also another important factor involved in graft failure in that grafts with lower wall shear stress (WSS) measurements are noted to have a greater size in diameter and are more prone to atherosclerosis development than those grafts with smaller diameters resulting in higher WSS measurements.

**Discussion/Conclusion:** The overall efficacy of a patent conduit in the use of CABG is dependent upon several different factors. The placement of the graft is determined upon the known failure or success rate in regards to the specific CA-targeted vessel in question. In addition, the stenotic severity of a native vessel influences the success rate of the conduit. Increases in the hemodynamic flow factors and shorter graft diametric values also help in the prevention of plaque formation or stenosis and are of essence in the avoidance of graft failure.

**Relevance to Allied Health:** Allied Health professionals should be aware of several impingements a CABG can possess, hindering the graft's overall patency and function. As front line sonographers, we are of the first to evaluate these patient's post-surgery and cardiologists rely on us to help confirm the patency of the CABG. The efficacy of these conduits could in essence be dependent upon nutritional diets that aid in the reduction of atherosclerotic buildup.

### CAN THE USE OF POSITRON EMISSION TOMOGRAPHY SHOW DIFFERENT MENTAL DISORDERS IN THE BRAIN?

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**Background:** Mental health care has been of great focus in modern culture. Studies have shown in the past that brain activity and structure can predict and detect certain mental disorders such as depression, and schizophrenia.

**Purpose:** The purpose of this literature review is to hopefully expand the use of position emission tomography (PET) in order to help treat and diagnose mental disorders. It is believed that different mental disorders demonstrate different brain activity and metabolism patterns, so we are interested in a review of the literature on how PET imaging can be used in this area.

**Methods:** Ovid, MEDLINE, Access Medicine and Pubmed articles were reviewed; only those including PET use and mental health were included. Key words that were searched together were "Schizophrenia" and "PET scan", "Mental disorders" and "PET scan", "Depression" and "PET scan", "Anxiety" and "Pet scan". As well as each disorders over all etiology, diagnosis, pathology, and treatment was looked at in the search engine Dynamed. 20 different articles related to mental disorders and PET were finally included.

**Results:** Results show that it is possible to image different biomarkers in mental disorders like schizophrenia and depression. PET imaging with  $H_2^{15}O$  for depression/sadness, shows significant activated bilateral limbic and paralimbic structures as well as activated activity in brainstem, thalamus and caudate/putamen. Imaging patients with known schizophrenia using radiopharmaceuticals such as  $F^{18}$  DOPA show decreased metabolic activity in the frontal lobes as well as decreased activity in the basal ganglia.

**Conclusion:** It is possible to use positron emission tomography to image different mental disorders. So far there has been research completed on mental disorders such as schizophrenia and depression. With the use of PET imaging to see schizophrenia and depression in bran activity, this could help improve the treatment options in treating these disorders tremendously. It would also aid in the early detection of these debilitating conditions.

**Relevance to allied health**: PET use for early detection of mental disorders would further diagnosis and treatment plans and individuals with these diseases. Discovering new ways to diagnose and improve treatment plans, it could help dieticians with nutritional needs. For example, food use has been associated with depression, and early detection of this could trigger nutrition interventions.

#### SONOGRAPHY IN THE MEDICAL FIELD, HOW IS IT BEING TAUGHT?

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**Background:** As technology improves in sonography in terms of imaging technology as well as portability, the ability to utilize sonography as a teaching device becomes more feasible. Medical students interact with sonographers and sonographic images throughout their medical career due to sonography being less costly and generally safer in terms of bioeffects compared to other imaging modalities. Using sonography's ability to view structures on site can be beneficial in teaching anatomy and other classes as well as providing earlier exposure to an imaging modality that many medical students will interact with in their medical career.

**Purpose:** The aims of this literature review are: 1) to review medical school institutions uses of sonography in the classroom and how it is perceived by the medical students, 2) to look at instructor's assessment of student's skills compared to student's confidence in their skills, 3) observe when medical schools choose to incorporate sonography into their medical school curriculums.

**Methods:** Through a search using Pubmed, involving key words "teaching", "sonography" and "medical students." Twenty-five articles were picked from with fourteen being chosen from the group. Sources were grouped by: 1) Student confidence in the courses versus skills perceived by the instructors of the courses and 2) the point in the programs that sonography was incorporated into the medical school curriculum whether it was early on or later into the four years.

**Results:** The results from this review show that medical students felt more confident in their didactic and scanning skills related to sonography. Instructor's also noted the improvements but not nearly as high as the student's believed they had improved. The programs reviewed, implemented sonography between the  $1^{st}$  and  $4^{th}$  year of medical school with more programs favoring the  $1^{st}$  year.

**Discussions/Conclusions:** Medical Students believe they are performing and learning more than their instructors are recording in their skill tests involving tests and scanning skill assessments. This is due to being able to interact directly with scanning and correlate it with structures and pathology studied in didactic. This initially raises the students' confidence in initial impressions before being evaluated by instructors. Since there was no specific time frame emphasized for incorporating sonography, the consensus is that it is better the earlier medical students are exposed to sonography.

**Relevance to Allied Health:** Sonography is one of many professions within the Allied Health department that work along side doctors in the medical field. Increasing medical students' exposure to sonography and sonographers will help improve these students understanding of the field that they will work with on a regular basis. Using these hands-on activities such as sonographic scanning allows earlier cooperation between medical students and Allied Health as departments may be able to teach medical students through their respective modalities. This will then benefit both departments as medical students graduate and head into the work force, they will be more familiar with the multiple branches of Allied Health allowing easier cooperation.

#### THE RELATIONSHIP BETWEEN DIETARY ZINC AND PROTEIN INTAKE IN PATIENTS WITH PANCREATIC CANCER

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**Background:** Pancreatic cancer (PC) is a deadly disease with a low survival rate. Protein intake plays a vital role in patient recovery and health outcomes. Animal protein is a major food source of dietary zinc. Both animal protein and zinc have been associated with PC development and may influence patient outcomes. Understanding the relationship between zinc and protein may aid in the identification of improved treatment methods for PC.

**Purpose:** This study will determine whether participants meet their estimated protein needs at each stage of treatment and what percentages of their protein intake are from animal and plant sources. It will determine whether participants meet the Daily Reference Intake (DRI) amounts for zinc at each stage of treatment and what percentages of their zinc intake are from animal and plant sources. This study will also determine the relationship between dietary zinc and protein intake in patients diagnosed with PC. **Methods:** Participants (n=63) were enrolled in a prehabilitation study as part of the Cancer Rehabilitation Science Program at Stephenson Cancer Center. Participants included men (n=33) and women (n=30) ranging in age from 31 - 89 years. During treatment visits, participants were interviewed and provided data via a 24-hour dietary recall at four time points. Data was collected at baseline, around the time the participant was approved for surgery (1), about 1-3 days before surgery (2), 1-2 months after surgery (3), and 3-4 months after surgery (4). Following nutrient analysis using FoodWorks 17, statistical analyses and descriptive statistics will be performed. The sum for total protein will be calculated and compared to participants' estimated protein needs. Animal and plant protein and animal and plant zinc will be determined. Zinc intake will also be compared to the DRIs for zinc.

**Results:** Results were not completed at the time of this writing, but they will be completed before April 2019.

**Discussions/Conclusions:** Zinc is suspected to be a nutrient that contributes to PC development. Proposed treatment for PC has included zinc restriction. However, due to zinc's presence in high-protein animal foods, patients would decrease protein intake while attempting to restrict zinc. Decreased protein intake in patients with PC would exacerbate their conditions of sarcopenia and loss of lean body mass, and have subsequent effects on morbidity.

**Relevance to Allied Health:** These findings will help all allied health disciplines understand the complexity of dietary recommendations and their impacts on patient health outcomes. Manipulating dietary intake can have unintended effects on micronutrient levels and impact the health of patients.

#### USING SOCIAL SIMULATION TO TEACH REHABILITATION SCIENCE STUDENTS ABOUT ADVERSE CHILDHOOD EXPERIENCES (ACES) AND TRAUMA INFORMED CARE (TIC)

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**Background:** Recent research has identified the relationships between Adverse Childhood Experiences (ACEs) and adult adoption of health risk behaviors, negative health outcomes and measures of wellbeing. Given these findings, it is important to consider training models that educate allied health students about the relevance of ACEs to adult health across a myriad of practice settings and equip them with the skills necessary to help patients with a history of ACEs.

**Purpose**: This study reports on the evaluation of an innovative simulation-based training program, Professional ACE-Informed Training for Health Professionals (PATH) (1) conducted with physical therapy (PT) and occupational therapy (OT) students,

**Methods**: 26 out of 88 PT and OT students in their second year of coursework volunteered for the PATH training. The short-term clinical impacts of the didactic session and simulation-based training were measured with a standard pre-post educational assessment. Measures of knowledge, self-efficacy, and hope were collected at both pre and post-test and the post-test included space for qualitative comments about the experience.

**Analysis:** Repeated measures ANOVAs were used to test for changes in students' self-reported levels of hope, general self-efficacy, and knowledge of ACEs and TIC. Completed surveys were entered into IBM SPSS (version 24) for statistical analysis. All assumptions were satisfied prior to conducting the ANOVAs. Additionally, a content analysis was conducted of data gathered from the open-ended question pertaining to feedback about the didactic/simulation experience. Participant responses were analyzed for themes and patterns utilizing Braun and Clarke's (46) six steps of thematic analysis.

Results: Regarding self-efficacy, repeated measures ANOVA results showed there was no significant interaction between time and discipline (F(1,24)=.347,p=.561,  $p^{2}=.014$ ) on self-efficacy scores. The descriptive statistics showed that both PT and OT students demonstrated increases from preadministration (M=31.53,SD=1.92; M=30.45,SD=3.39 respectively) to post-administration (M=32.33,SD=2.55; M=31.64,SD=2.87 respectively). In relation to hope, the results demonstrated there was no significant interaction between time and discipline (F(1,24)=3.237, p=.085,  $\eta$  p^2=.119) on hope scores. The descriptive statistics showed that both PT and OT students demonstrated increases in hope scores from pre-administration (M=54.00,SD=3.18; M=53.73,SD=5.04 respectively) to postadministration (M=57.20,SD=3.28;M=54.82,SD=5.02 respectively). Concerning ACEs and TIC knowledge and importance scores, the repeated measures ANOVA results showed there was no significant interaction between time and discipline (F(1,24)=.521,p=.478, $\eta_p^2$ =.021). The descriptive statistics showed that both PT and OT students demonstrated increases from pre-administration (M=13.33,SD=1.88; M=13.91,SD=2.47 respectively) to post-administration (M=19.13,SD=2.47; M=20.27,SD=1.35 respectively). Nine distinct themes emerged from the qualitative analysis, with the most frequent responses indicating student appreciation of the experience and request for PATH and TIC be formally incorporated into the curricula.

**Discussion/Conclusions**: The results demonstrate that post training, there were significant overall increases in trainee self-efficacy, hope, and knowledge of ACEs and trauma informed care for both PT and OT students. The analysis of student responses revealed high levels of positivity, learning, and appreciation for the training opportunity.

**Relevance to Allied Health**: All Allied Health practitioners will encounter patients who have experienced adverse childhood events whether they know it or not. Having the knowledge and skills to identify past trauma and provide informed care can lead to improved patient outcomes.

#### DEVELOPING A PROTOCOL FOR DATA ANALYSIS IN VISUAL3D<sup>TM</sup>

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**Background:** Three-dimensional (3D) motion capture is widely utilized to determine kinetic and kinematic data from individuals' performance. Such data are evaluated for differences in healthy individuals and individuals with a pathologic condition or injury. Currently in the Center for Human Performance Measurement (CHPM) at the University of Oklahoma Health Sciences Center, Qualysis<sup>TM</sup> (QTM) motion capture system is employed to collect 3D motion data and Visual3D<sup>TM</sup> (V3D) for analyzing the motion data. Creating 3D models in QTM is relatively straightforward. However, analyzing the data (i.e. evaluating kinetic and kinematic data) in V3D can be daunting, regardless of training or online information. Therefore, it is imperative to create a standardized protocol for V3D to ensure accurate and timely results.

**Purpose:** The purpose of this project was to evaluate kinetic and kinematic data in V3D to develop a standardized protocol for analyzing 3D motion data in the CHPM.

**Methods:** The data used to establish a protocol were taken from a case study involving gait performance of an individual with Transtibial Limb Loss (TTLL) compared to an intact control. Utilizing static trials for both participants, automatic identification of markers (AIM) models were created to apply to all other respective gait trials in (QTM). These gait trials were performed at self-paced and brisk walking speeds. After the markers were identified in all trials, the trial data were then exported to a C3D file to be analyzed in V3D. Once the data were loaded, V3D models were built for data cleaning and analysis. Data with at least 5 full gait cycles were exported, integrated, and analyzed in the same workspace as the static model. To ensure quality signals, the data were interpolated and a lowpass filter was employed for data cleaning. Gait events, i.e. heel strike and toe off for the right and left foot, were generated for data signal normalization. Joint angles were then determined by selecting two body segments and calculating the transformation from one segment to the other, e.g. the right shank and the right thigh to calculate the knee joint angle. The 3D joint angles were computed: flexion/extension (x-axis), abduction/adduction (y-axis), and longitudinal rotation (z-axis).

**Results:** Reports were created to directly compare the kinetic and kinematic data between the two individuals at the two gait speeds.

**Discussion/Conclusion:** The most challenging task was to determine how to input the data into a report, which was accomplished by trial-and-error, due to the ambiguity of the sanctioned online instructions. However, the objective was met, and reports are now able to be generated. Currently, the protocol is being independently tested to ensure and further validate the report generation protocol.

**Relevance to Allied Health:** This study underscores the importance of an interdisciplinary team approach to robust human performance data processing, analysis, and report generation. Once validated, future studies can then apply this process to not only gait studies but to also other studies involving human performance.

### EFFECTIVENESS OF OCCUPATIONAL THERAPY INTERVENTION POST-UE INJURY ON REPORTED PERFORMANCE AND SATISFACTION OF IADLS.

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**Background:** In the U.S., the incident rate of upper extremity injuries is an estimated 3,468,996 per year. Due to the important role that the upper extremity plays in allowing individuals to engage in their daily activities, many individuals will be prevented from participating in desired occupations. The current focus of research is the effectiveness of OT intervention on ADLs (Activities of Daily living), therefore, this research study aims to look at the effectiveness of OT intervention on IADLs (Instrumental Activities of Daily Living).

Purpose/Hypothesis: The purpose of this study is to investigate whether OT intervention has an effect on individuals with upper extremity impairments performance and satisfaction of IADL goals and whether there is a correlation between the change in Upper Extremity Functional Scale UEFS) and Canadian Occupational Performance Measure (COPM) scores? We hypothesized that OT intervention in the outpatient setting would increase reported performance and satisfaction of IADL goals for individuals post UE injury, and that there would be a correlation between the change in UEFS and COPM scores. Methods: We conducted a one-group longitudinal study to examine the effects of OT intervention for individuals with upper extremity impairments on reported performance and satisfaction of IADLs. This study was conducted over the course of 8 weeks. Inclusion criteria: 1) upper extremity impairment; 2) receiving OT intervention in an outpatient setting; 3) reported deficits with IADLs. The OT intervention provided to the patients consisted of preparatory activities, therapeutic exercise/activities, manual therapy, and comprehensive home exercise programs. The UEFS and COPM assessments were administered at the beginning and end of an 8-week period. The COPM assesses performance (COPM P) and satisfaction (COPM S) of patient reported goals on a scale of 1-10, with 1 being a low level of performance/satisfaction and 10 being a high level of performance/satisfaction. The UEFS is a selfreported questionnaire that assesses function of the upper extremity on a scale of 0-4, with 0 being a high level of difficulty performing task and 4 being no difficulty performing task. The UEFS scores are reported as a percentage of impairment. We analyzed data using descriptive statistics, paired t-tests, and spearman's correlation test.

**Results:** Of the participants sampled (n=11), the mean age was  $67.3\pm2.5$  years and 63.6% participants were female. The final UEFS scores ( $0.37\pm0.23$ ) were significantly (p<0.001) lower than the baseline UEFS scores ( $0.69\pm0.22$ ), the final COPM P ( $6.5\pm1.9$ ) and COPM S ( $6.5\pm2.4$ ) scores are significantly (both p<0.001) higher than the baseline scores (P  $3.9\pm1.8$ , S  $3.06\pm2.1$ ). The correlation between the UEFS scores and the COPM P scores (r= -0.64) and the UEFS and the COPM S scores (r= -0.60), and the correlation between the COPM P and S scores (r=0.84), each result in a strong correlation.

**Discussion:** The t-test results are statistically significant, implicating that OT intervention may have been effective in improving performance and satisfaction of IADL goals. The UEFS and COPM have a strong correlation, implicating that function of the upper extremity and goal performance/satisfaction may be correlated. Clinically meaningful change in scores for the UEFS is 9 points (Change in UEFS scores was 32.2), and for the COPM is 2 points (change in COPM scores was 2.7), therefore, both assessments had a clinically significant change in scores.

**Relevance to Allied Health Professionals:** As health professionals, a common goal is to provide wellrounded client centered care in order to help individuals be the healthiest versions of themselves. Various allied health professionals work with individuals who have upper extremity impairments, and it is helpful for other professions to know the importance of the upper extremities in daily life and the benefits that occupational therapy intervention may provide to those with injury.

#### PERCENT EFFICIENCY OF A WELL COUNTER DETECTING Y-90 SIRSPHERES

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**Background:** Y-90 SirSpheres are a Beta emitter which makes measuring the amount of radiation activity in the isotope difficult. Y-90 SirSpheres can only be detected accurately with liquid scintillator detectors and most clinical Nuclear Medicine departments do not have funding for that type of equipment. The issue here is if there is a spill of Y-90 SirSpheres, common Nuclear Medicine departments cannot accurately detect the activity. Finding the efficiency of common scintillation well counters in detecting the activity of Y-90 SirSpheres would help technologists calculate the amount spilled. **Purpose:** The purpose of this study was to determine the efficiency of a common scintillation well

**Purpose:** The purpose of this study was to determine the efficiency of a common scintillatic counter in detecting Y-90 SirSpheres.

**Methods:** Ten samples of Y-90 SirSpheres were measured in a common (AtomLab-500 0-800kEV window) well counter. Measurements were taken every 8-10 hours for 1 week. Then after a three week period the samples were taken to a liquid scintillator for accurate counting. Since well counter efficiency depends on activity, two activity strata were created:  $0.1 \,\mu$ Ci or less and greater than 0.1uCi to 1uCi. Descriptive statistics for efficiency were reported among these 2 activity strata. Additionally, descriptive statistics for the sampled concentration calculated activities and the liquid scintillator activities were computed. We assumed independence of time measurements, even though each measurement was obtained from 10 samples decayed over time. Linear regression was used to determine efficiency estimates along with 95% confidence intervals over time. The estimated equation can be used to determine Atom Lab 500 well counter efficiency for Y-90. Lastly, liquid scintillation counter results were used to retrospectively calculate the activity of each sample with volume 0.1ml. These activity values were considered true activity, and were compared with concentration calculated activities for the efficiency samples using a Wilcoxon rank sum test. All statistical tests were conducted assuming a 5% chance of a type one error, using SAS 9.4 (Cary N.C.).

**Results:** The relationship between activity and well counter efficiency was different among the activity strata, so a separate model was created for each strata. (p<0.0001) Among Y-90 activities between 0.1  $\mu$ Ci and 1  $\mu$ Ci, activity was not associated with an increase in efficiency. (p=0.1021) For activities of Y-90 between 0.1  $\mu$ Ci and 1  $\mu$ Ci the well counter efficiency is estimated to be 44% (95% CI: 41.9%, 46.5%). However, well counter efficiency increases with decreasing activity among Y-90 activities below 0.1  $\mu$ Ci. (p<0.0001) For Y-90 Sir-sphere activity levels between 0.01 and 1  $\mu$ Ci, the well counter efficiency can be estimated by the following equation:

WC Efficiency = 76.9 - 516.2 (Activity in  $\mu Ci$ ); -516.2(95% CI: -398.8, -633.6)Lastly, there is evidence that suggests that the concentration calculated activities are lower compared to the comparable samples measured in the liquid scintillation detector. (p=0.0400). Liquid scintillation samples were 3.4  $\mu$ Ci (95%CI 0.13, 7.98) higher activity compared to the efficiency samples that were calculated from the vial concentration.

**Discussion/Conclusion:** The well counter increases in efficiency with lower activity. Also this provides and estimation equation for the efficiency of a well counter. Technologists that have a volume estimate of spilled Y-90 could use concentration relationships and the estimation equation to arrive at an approximate activity of Y-90 that is contaminating an area.

**Relevance to Allied Health:** These findings can help common clinical Nuclear Medicine department calculate the percent efficiency on their well counter to measure the spilled dose. Determining activity of a spilled dose could help other allied health professionals from entering a contaminated area.

#### HEALTH AND WELLNESS PROGRAMS IMPACT ON BONE MINERAL DENSITY AMONG CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKEMIA

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**Background:** Acute Lymphoblastic Leukemia (ALL) accounts for 75% of malignancies diagnosed during childhood. Due to the advancement of treatment techniques, 80% of children diagnosed with ALL will reach the 5-year survival rate. Survivors who improve will develop long-term complications, such as osteoporosis. Most skeletal mass is developed during childhood and into adolescence. Therefore, ALL during this time could predispose children to low bone mineral density (BMD), low peak bone mass, and an increased risk of fracture. Factors that may lead to a decrease in BMD include intensive chemotherapy treatments, decreased physical activity, and poor nutrition. Proper education on nutrition and physical activity may decrease their risk for developing osteoporosis and fractures later in life. Physical activity may be an effective way to increase BMD since it is known that exercise, specifically weight-bearing exercise, promotes increased BMD. Furthermore, childhood cancer survivors tend to consume diets high in saturated fats, sugar, and empty calories, and low in whole grains, fiber, and vegetables. Therefore, early interventions that aim to improve dietary quality and increase physical activity are appropriate and necessary.

**Purpose:** The purpose of this pilot study is to determine the effectiveness and feasibility of a 6-month nutrition and physical activity educational intervention on changes in BMD among survivors of ALL in maintenance therapy.

**Methods:** Participants included 6 children, aged 5-17 years, who were in maintenance therapy for ALL. BMD was measured prior to any intervention via dual energy x-ray absorptiometry or computerized tomography by radiologist and converted to z-scores matched for age and gender. Weekly physical activity sessions focused on weight-bearing, strengthening, endurance, and balance exercises. Monthly nutrition lessons included in-class activities and cooking demonstrations. Feasibility was measured by participant adherence to nutrition classes delivered within an interprofessional fitness and wellness program promoting healthy habits. Descriptive statistics will be used to assess feasibility and BMD status. **Results:** We hypothesize that the health and wellness program will be achievable for children in maintenance therapy for ALL. Further we hypothesize that BMD among children with ALL will be below the expected range for age. Results have not yet been analyzed but will be completed in time for presentation at Research Day.

**Conclusion:** This study is important because, while the childhood cancer survival rate has increased due to the advancement in treatment techniques, the risk for development of long-term complications, such as osteoporosis and fractures, is enhanced. Interventions that target the decrease in BMD may help prevent long-term detrimental effects and may enhance overall quality of life.

**Relevance to Allied Health:** This topic is relevant to many allied health professions due to the fact that skeletal health is a vital aspect to overall health. It is important that all allied health professions understand how cancer can decrease BMD and how it affects long-term patient health. Gaining this knowledge, allied health professions can use an interdisciplinary approach to better treat the patient.

#### FAMILY SOCIAL PARTICIPATION IN YOUNG CHILDREN WITH AUTISM: PHENOMENOLOGICAL ANALYSES

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**Background:** Children with autism spectrum disorder experience limited social participation compared to children developing typically, and their social difficulties continue into adolescence and adulthood with an increased risk of social isolation. Unquestionably, for young children the family provides the primary portal for social participation, well recognized as an important occupation that is essential to positive child development, quality of life, health and wellbeing. Through the everyday activities created by families, foundational opportunities exist for learning and developing social interaction skills, social relatedness, emotional connectedness, self-esteem, and role identity. As such, young children are dependent on their families, who serve as mediators of social participation, to either limit or facilitate these social opportunities. To our knowledge, no study has primarily explored the everyday experiences of social participation in the community by families raising a young child with autism. Firsthand, indepth accounts of families are critical to understand fully how they embody and find meaning to social participation in the community. This understanding may reveal meaningful and relevant information for occupational therapy researchers and practitioners to design interventions that enhance and enable family social participation.

**Purpose:** The specific aims of this study were to comprehensively explore the experiences and meaning of social participation in families raising a young child with autism focusing on two central research questions: "How does a family raising a young child with autism experience social participation?" and "What meaning does the family ascribe to their experiences of social participation?" The objective was to describe the essence or meaning of the common experiences for all families as a whole.

**Methods:** In-depth, semi-structured interviews were conducted with a purposive sample of seven families. A four-member team followed the phenomenological methods described by Moustakas to analyze the interviews. Scientific rigor was ensured through deliberate methods of triangulation, peer debriefing, member checks, audit trails and rich thick description.

**Results:** Preliminary results of the phenomenological analyses revealed core family experiences including 1) divide and conquer, 2) occupation in isolation and 3) pausing to reset engagement. These results suggest that family social participation is not only minimal while raising young children with autism, but often results in feelings of isolation. Families expressed the need to pause and evaluate family goals in order to create deliberate opportunities for social participation.

**Discussion/Conclusions:** This is the first study of its kind to illuminate specifically the experiences of family social participation. Family social participation, we argue, is an overlooked occupation and yet critical to child development. Additionally, social participation of adults with autism remains problematic and stems from childhood. Therefore, this deep understanding reveals opportunities for therapists to work with families to promote multiple opportunities for social participation in the context of everyday life. **Relevance to Allied Health:** Allied health professionals working in pediatrics will interact with children with autism and their families. This research prompts professionals to recognize the needs, efforts, and challenges of families to participate meaningfully in the community and therefore to incorporate assessments and interventions that promote family social participation.

#### COMPARISON OF CONTRAST-ENHANCED ULTRASOUND AND COMPUTED TOMOGRAPHY DETECTION OF HEPATOCELLULAR CARCINOMA AND LIVER METASTASES

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**Background:** Hepatocellular carcinoma is a primary cancer of the liver and is common in people with liver disease. Liver metastases is a secondary liver cancer that is spread from another location in the body. Contrast enhanced ultrasound and contrast enhanced computed tomography use contrast agents to help visualize structures and their characteristics in order to diagnose and differentiate between pathologies. Contrast enhanced ultrasound and contrast enhanced computed tomography are two imaging modalities that can be used in the detection of hepatocellular carcinoma and liver metastases.

**Purpose:** The aim of this literature review is to compare the detection of hepatocellular carcinoma and liver metastases using contrast enhanced ultrasound and contrast enhanced computed tomography and to determine which imaging modality has the highest accuracy for detecting these pathologies.

**Methods:** An online search for articles in relation to the detection of hepatocellular carcinoma and liver metastases with contrast enhanced ultrasound and contrast enhanced computed tomography was performed on PubMed, EBSCO, and Ovid MEDLINE. Keywords searched include: hepatocellular carcinoma, liver metastases, contrast-enhanced ultrasound, and contrast-enhanced computed tomography. Sixty-five articles were found but only 20 articles were selected. Of the 20 articles selected, all were original research, full text, and less than fifteen years old. The results obtained from these articles were then sequenced based on cancer type and modality of detection.

**Results:** The review found that there was not a large statistical difference between the two imaging modalities in the detection of hepatocellular carcinoma and liver metastases. Contrast enhanced ultrasound had a slightly higher specificity and sensitivity in the detection of hepatocellular carcinoma compared to contrast enhanced computed tomography and contrast enhanced ultrasound had a slightly higher specificity in comparison to contrast enhanced computed tomography in the detection of liver metastases.

**Discussion/Conclusions:** Both imaging modalities have their benefits and limitations. Because there is not a large statistical difference in the accuracy between the two imaging modalities in the detection of hepatocellular carcinoma and liver metastases, several aspects should be taken into consideration when deciding which imaging modality to use, such as: patient body habitus, cost, operator dependency, and radiation exposure.

**Relevance to Allied Health:** Allied Health professionals should be aware of imaging modality options in relation to the detection of pathology as well as the benefits and limitations of these imaging modalities. Having a good understanding will help Allied Health professionals understand not only the benefits and limitations of one particular modality, but also, the benefits and limitations of other modalities. This understanding will ultimately enhance both patient care and patient outcomes.

#### EFFECTS OF LARGER NECK TISSUE DENSITY IN THYROID STUDIES

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**Background:** Radioactive iodine uptake (RAIU) is a nuclear medicine test that uses a thyroid probe to determine thyroid function. The thyroid is a gland, located in the neck and produces two important hormones that regulate metabolism in the body: thyroxine (T4) and triiodothyronine (T3). Imbalances to these hormones may result in thyroid diseases such as hyperthyroidism and hypothyroidism. These conditions can cause goiter formation. A goiter is an enlargement of the thyroid gland. Because a goiter adds tissue density to the thyroid gland, this can cause isotope attenuation; therefore, decreasing counts collected by the thyroid probe.

**Objective**: To determine the effects of increasing neck tissue density on radioactive iodine uptake (RAIU), compared to a standard neck phantom.

**Methods**: All count values were corrected for radioactive decay and background. The control group consisted of counting the I-123 pill using the standard neck phantom alone, while each experimental group consisted of counting the neck phantom with added width of tissue density. Each group has 20 samples which were counted for 30-seconds. Each sample were counted approximately 20cm away from the thyroid probe. Tissue was simulated using ¼ inch, ½ inch, and 1-inch thick bologna slices, which simulates larger neck circumference. Normality assumptions were explored using data histograms, QQ plots, and Shapiro-Wilk tests for normality. Normality assumptions failed in the control and 1-inch tissue group, so differences among the added tissue strata were assessed using nonparametric Kruskal Wallis tests. Additionally, non-parametric Dwass, Steel, Critchlow, and Flinger (DSCF) multiple comparison tests were employed to examine individual strata differences. All statistical tests were computed assuming a 5% chance of a type 1 error, using SAS 9.4.

**Results**: Adding tissue thickness decreases collected counts from the thyroid probe. (p<0.0001) Compared to the neck phantom alone, all added thickness of tissue resulted in a decrease in thyroid probe counts (p<0.0001 for all strata). Adding ½ inch of tissue decreases thyroid probe counts, compared to adding ¼ inch of tissue. (p<0.0001) Likewise adding 1 inch of tissue decreases thyroid probe counts, compared to adding ½ inch of tissue. (p<0.0001)

**Conclusion**: Patients with larger than normal tissue density, like goiters, may have inaccurate RAIU values, if increased size is not accounted for. Future studies should use this data to inform corrective models for RAIU uptake values in cases of increased tissue density.

**Relevance to Allied Health:** The size of goiters can affect diagnostic tests. Allied health professions should be aware of the fact that goiters can possibly alter the results of their imaging quality. Many times thyroid patients may be referred to dieticians or other Allied health professionals. It is imperative that diagnostic studies are completed accurately so that proper treatment plans can be established. Additionally, this opens a discussion of possible alternative imaging approaches a patient with goiter.

#### IMPLEMENTATION OF A HELATH AND WELLNESS PROGRAM FOR ADULTS WITH SEVERE MENTAL ILLNESSES

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**Background:** Severe mental illnesses (SMI) refer to psychological problems that a person's ability to participate in functional and occupational activities. Adults with SMI have known health inequities including death 15-20 years sooner than those without SMI due to diseases that can be managed by healthy lifestyle habits. Occupational and physical therapists focus on habits and routines that enhance health and well-being, yet are underutilized services in mental health.

Regular exercise not only increases physical health, but also decreases stress and symptoms of depression and increases a person's mood, which includes reduced confusion, anger, and tension, and it promotes an overall sense of well-being. This program strives to utilize routine and habit based training to improve health and wellness outcomes for individuals with a mental health diagnosis. Currently, there is limited research concerning the effectiveness of this type of coaching intervention for individuals with mental health disorders in pursuit of sustainable health and wellness.

**Purpose:** The purpose of this study is to measure the effectiveness of a coaching intervention focused on health and wellness habits to improve psychosocial factors such as quality of life, improved occupational performance and satisfaction, and self-esteem. These variables were measured using the Canadian Occupational Performance Measure (COPM), Hope Scale, Depression Scale (PHQ9), Generalized Anxiety Disorder (GAD) Tests, Self-Esteem (Rosenberg Scale), and Short Form Health Survey (SF-36) **Methods**: The 9 participants (ages 25-72) in the initial cohort have diagnoses, including bipolar disorder, schizoaffective disorder, and schizophrenia, with limited fitness experience and decreased socialization. This was a quasi-experimental ABA, pilot study. Participants committed to a six-month intensive fitness and wellness program and attended two times per week sessions at the local YMCA. Student occupational and physical therapists served as the coaches during the program. The coaching program focused on the Seven Dimensions of Wellness Model and provided intensive 8-week services. Coaches met with participants twice a week for group education sessions and individuals exercise coaching, then fading from the program allowing the participants to use their newly developed habits independently. Pre and post biometric and psychosocial measures were used at baseline, midpoint, and final.

**Results:** We hypothesize that a program of exercise and activity positively influences the psychosocial health of people with behavioral diagnoses as it relates to measures of hope, depression, anxiety, and self-esteem. In addition, we hypothesize that this intervention will improve this group's occupational performance and satisfaction as measured by the COPM.

**Relevance to Allied Health:** Results of this study have clinical implications for allied health professionals that treat adults with severe mental illnesses. Understanding the impact that an intensive wellness programs has on this population may help allied health professionals guide patients to programs that can provide support and habit training to improve their health and psychosocial outcomes.

#### THE COMPLEXITY OF MOVEMENT VELOCITY AT DIFFERENT STAGES OF SITTING POSTURE DEVELOPMENT AMONG INFANTS: A PILOT STUDY

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**Background:** An upright sitting posture is critical for executing daily functional tasks yet infants with Cerebral Palsy (CP) attain this skill much later than their typically developing peers. Changes in biomechanical factors related to characteristics such as height, weight and joint stiffness differentially affect how infants control sitting, particularly movement velocity, during postural adaptations. Currently, characterization of mechanisms for attaining sitting postural control does not consider the effect of ongoing changes, unique to typically developing (TD) infants or infants with or at risk for cerebral palsy (CP). For example, studies among adults show that postural strategies in standing posture are influenced by velocity of movement, however, the impact of changes in velocity on the development of postural control in infants at different stages of sitting is poorly understood.

**Purpose:** This pilot study characterized and compared postural strategies that infants use by examining the center of pressure velocity (COPv) adjustments at three stages of the development of sitting: prop sitting, sitting without support for up to 30 seconds; semi-independent, and sitting independently for more than 30 seconds Optimal complexity of COPv adjustments suggests the ability to generate variable adaptive strategies to resist threats to a desired posture. We hypothesized that TD infants will demonstrate increased complexity of COPv at progressive stages of sitting but not for infants at risk or with CP.

**Methods:** We collected COP data from six infants (three TD infants and three infants with or at risk for CP), during sitting using a floor embedded force plate and motion sensor markers with the Qualisys<sup>TM</sup> data acquisition software at 1200Hz sampling frequency. Data analysis: We performed non-linear detrended fluctuation analysis (DFA) of COPv from three, 10 second trials, using specialized MATLAB codes to produce a scaling exponent alpha ( $\alpha$ ), for the COP time series of each sitting stage. DFA-  $\alpha$  values closer to 0.05 indicates improving ability to fine-tune postural adjustments to sitting. Lower or higher values than 0.05 indicate less optimal complexity of postural adjustments. For these preliminary results we used descriptive data and graphs to compare the complexity of postural adjustments during sitting at the 3 progressive stages. **Results:** Mean DFA-  $\alpha$  scores for TD infants at prop, semi-independent and independent stages were 0.027 (SD: 0.009), 0.019 (SD:0.004) and 0.042 (SD:0.004), respectively. For infants with or at risk for CP, DFA-  $\alpha$  scores were 0.015 (SD:0.004), 0.029 (SD:0.007) and 0.025 (SD:0.006). From the prop sitting stage to the independent sitting stage, the data plots depicting changes in the temporal structure of velocity for TD infants presented a U-shaped pattern while that of infants with or at risk for CP showed an inverted U-shaped pattern.

**Discussion:** At the prop sitting stage, minimal adjustments are made to control posture. As demonstrated by infants from both groups, the main strategy for maintaining balance involved increasing the base of support by leaning forward on hands. Exploration of boundaries of stability occurs more often during the semiindependent stage of sitting development. Increase in DFA-  $\alpha$  scores for infants at risk for CP indicated low exploration of boundaries compared to the TD infants. By the independent sitting stage, the TD infants with a score closer to 0.05 showed optimal complexity in postural adjustment. These findings suggest that change in velocity of movement at the semi-independent stage may be critical to the acquisition of independent sitting and may differentiate potential sitters to non-sitters. Further exploration with a larger sample is needed.

**Relevance to Allied Health:** Optimal acquisition of functional skills including sitting is the end goal of the interventions provided by the various disciplines represented in Allied Health. Understanding factors that serve as barriers to independent sitting in infants at risk for CP is key to constructing objective methods of evaluating developmental delays and introducing preventive interventions early.

#### EVALUATING DANCERS' FOOT BIOMECHANICS USING MOTION CAPTURE: LITERATURE REVIEW AND METHODOLOGICAL FRAMEWORK FOR MODEL DEVELOPMENT

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**Background:** Dance movement requires excessive, repetitive range of motion (ROM) of the foot and ankle, possibly contributing to high injury rate among dancers. Yet, little is known concerning foot biomechanics during dance-specific movements. Total ROM during dance is proposed to come from combined ankle and foot (hindfoot, midfoot, forefoot, first metatarsophalangeal [MTP] joint) movement. Three-dimensional (3D) motion capture is a valid measurement tool with the capacity to evaluate total, inter-segmental, and intra-segmental *in vivo* kinetics and kinematics during gait and dynamic movement. Because more dance medicine researchers are utilizing 3D motion capture, a review of the literature and quality assessment is warranted.

**Purpose:** The aims of this literature review include 1) identification and evaluation of studies utilizing 3D motion capture to analyze *in vivo* biomechanics of the foot and ankle for a cohort of dancers during dance-specific movement, and 2) synthesis of information to develop a methodological framework for consideration when designing a 3D biomechanical foot model to evaluate the kinematics and kinetics of the foot and ankle during dance-specific movement.

**Methods:** Database searches conducted by the primary investigator through December 2018 include PubMed, Ovid MEDLINE, and CINAHL using keywords: dance, dancer(s), foot models, motion capture, biomechanics, kinetics, and kinematics. Hand searches for relevant articles were performed for the Journal of Dance Medicine & Science, Medical Problems of Performing Artists, and Dance Medicine and Science Bibliography (seventh edition). Articles included are studies that 1) are classified as either descriptive, exploratory or experimental research designs, 2) utilize a 3D motion capture system as the primary measurement tool, 3) uses a biomechanical model (marker-set) that includes a description of the ankle and foot segment(s), 4) describe a protocol incorporating dance-specific movements, and 5) investigate a cohort of dancers.

**Results:** Twenty-two studies of 460 reviewed were identified based on specific selection criteria. Number of foot segments (one-, two-, or multi-segment [3 or more segments]) was the grouping factor for information extracted from the articles. Regardless of study design, number of foot segments, or independent variable, kinetic and kinematic dependent variables measured using 3D motion capture foot models are generally similar. Three of the 22 studies used a dance-specific biomechanical model with purposefully designed foot segments to analyze the dancers' foot and ankle while the majority of the other nineteen studies used single-segment biomechanical gait models. All of the studies clearly described the main findings but the degree of methodological quality varied.

**Discussion/Conclusion:** Results provide evidence that using a multi-segment foot model has the potential to be a valuable tool to evaluate total, segmental, and inter-segmental ROM of the foot and ankle during dance-specific movement. Evaluation and synthesis of the extracted information reveal little evidence that marker-sets used to evaluate dance-specific movements accurately measure the extreme total, segmental, and inter-segmental ROM exerted by dancers. The proposed methodological framework is a stepwise tool for designing a model to evaluate kinetics and kinematics of the foot and ankle during dance-specific movement. It is structured so that a robust biomechanical foot model can be developed and applied to evaluate dance-specific research questions.

**Relevance to Allied Health:** Rehabilitation specialists who treat dancers must understand the unique biomechanics of the dancers' foot to appropriately treat this specialized population. All allied health professionals should be aware of how research design and methodology used for 3D motion capture studies affect outcomes and specificity of results regardless of study population.

### EFFECTS OF A WEARABLE FOCAL VIBRATION DEVICE ON GAIT AND MOBILITY IN DIABETIC PERIPHERAL NEUROPATHY

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**Background:** Diabetic peripheral neuropathy (DPN) is one of the most common complications of diabetes, affecting approximately 50% of all patients with diabetes and 1% of the world population. The estimated annual cost of diabetes in the U.S. in 2012 was \$245 billion, and about 27% of the health-care costs associated with diabetes can be attributed to DPN. Research documents patients with DPN have postural instability and gait imbalance that contributes to the incidence of falls, partially due to significant deficits in both sensorimotor function and balance. Existing solutions for DPN-related gait instability includes medication, diet control, mechanical aids, physical therapy, massage, acupuncture, and exercise, all with accompanying limitations with regard to availability, side effects, and cost; factors which prevent widespread use of these treatments.

**Purpose:** The purpose of our research is to explore and examine the short-term effect of focal muscle vibration on gait and balance in patients with DPN.

**Method:** We will perform a single site, single-blinded, parallel-group design pilot randomized clinical trial with a focus on clinical measures of gait and balance as primary outcomes. We will recruit 20 subjects in total and randomize them into two groups. Participants will either receive the focal vibration intervention for the intervention group or continue with their activities of daily living for the control group. The study will be 4 weeks long with the intervention group receives 10 minutes vibration at each of the three muscle groups of both legs daily for 3 days a week. During the two visits the following activities will take place a) Demographics (Baseline), b) EMG and Gait Testing (Baseline and Weeks 4), c) Balance Testing (Baseline and Weeks 4), d) Mobility Testing (Baseline and Weeks 4), e) Pre-Intervention Assessment and Instructions (Baseline), f) pain, and Utility of Myovolt Technology as well as experience and impressions (Weeks 4). Each visit will take no more than 3 hours. A blind assessor will record all study outcome measures. The 4-week intervention phase will start after the first Baseline visit. We will use a mixed model repeated measures ANCOVA to compare the outcome measures within and between groups over time and to control for baseline values and any differences between group demographics at baseline.

**Results:** We will present the demographic characteristics such as age, duration of injury, stage of DPN. EMG and gait variables, Berg Balance Scale, Timed Up and Go tests results at both the baseline and end of study will be presented as well as the significances on those measures. We will also present the qualitative results on participants' experience and expression on the wearable vibration therapy. **Conclusion:** We hope to find preliminary evidence on the effectiveness of focal vibration on balance and mobility for patients with DPN. The pilot data from this study will provide rich information on feasibility of the focal vibration training protocols and valuable information on effect sizes to power a larger study. **Relevance to Allied Health:** Optimal functional mobility is the end goal of the interventions provided by the various disciplines represented in Allied Health. Wearable technology could be a feasible and effective tool for clinical, home and community based interventions.

#### MOVEMENT SELECTION AND PROGRESSION IN CHILDREN AT HIGH VERSUS LOW RISK FOR CEREBRAL PALSY

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**Background:** Cerebral Palsy (CP) is a developmental disability with a large spectrum of restraint level on motor function impacting development throughout the lifespan. Prone mobility, a key component of motor function during infancy and a gateway to early learning, is extremely limited in infants with CP. While infants without CP (TD) learn this complex skill in the first year of life, little is known about the movement learning strategies they employ. Even less are those used by infants with CP.

**Purpose:** The purpose of our study is to compare movement strategies used by infants with and without risk for CP during the development of prone locomotion on the Self-Initiated Prone Progression Crawler (SIPPC-3). We focused on movements of the head/neck, lower extremity, and upper extremity that infants used to move the SIPPC. The SIPPC-3 is an interventional and evaluation robotic system that assists with prone mobility.

**Hypothesis:** We hypothesize infants at risk for CP will utilize more head and neck movements whereas infants with TD will utilize more lower and upper extremity movements to initiate and engage in prone locomotion on the SIPPC-3. We also hypothesize that by the end of the 20 week training period, infants with TD will utilize higher sequencing strategies than those at risk for CP

**Methods:** Twenty-four infants with TD (12) and risk for CP (12) were included in this study from a larger study on the SIPPC-3. Each of these infants trained on the SIPPC-3 for 15 minutes, two times per week, for up to 20 weeks. Each training session was video recorded for movement learning analysis. Exploratory and progression movement strategies initiated by head and neck, hip and knew, feet, and upper extremities were coded using the Movement Observation Coding System (MOCS). We used descriptive statistics and visual inspection of graphs to analyze the data.

**Results:** Mean head and neck scores for the infants with TD increased steadily during the first four weeks from 1 to 2 and remained relatively stable until about week 10. Mean upper extremity movement scores increased later between weeks 11 and 12 from 4.5 to 9.6, and were accompanied by an increase in hip and knee movement scores from 7.2 to 8.7. This coincided with a score increase from 1 to 2 in sequencing strategies scores. In contrast, the mean head and neck movement scores for infants with CP increased during weeks 18-20 from 1.1 in week 17 to 1.7 in week 20, hip and knee and upper extremity movement scores increased at 14 and 16 weeks 7.4 to 8.3 and 6 to 7.3, respectively, while the sequencing scores remained low. Unlike the low foot movement scores in infants with TD, the scores of infants with CP increased at 12 weeks 3.7 to 4.5.

**Discussion:** As expected, our results reveal differences in the movement learning strategies between infants with and without CP. However, the findings from infants with CP highlight problems with: a) *timing* as evidenced by late emergence of postural control of the head and increase in upper extremity use of in infants with CP; b) *muscle coordination*, demonstrated by simultaneous increase in feet and hip and knee movements, and c) *problem solving abilities* demonstrated by low sequencing and unchanging foot movement scores. These results also confirm that many of the mobility problems seen in older children with CP begin during infancy.

**Relevance to Allied Health:** Our results of movement strategies used by infants at high risk for CP can promote better understanding of how to tailor early intervention to promote prone locomotion, a skill that is associated with language and cognitive skills. This information can also be used by other allied health professionals who are working with infants with CP to promote their sequencing and problem solving skills in all domains of development.

## F-18 AXUMIN (FLUCICLOVINE) AND A MULTIDISCIPLINARY APPROACH IN A CASE OF METASTATIC PROSTATE CANCER

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**Background:** Prostate cancer is a cause for concern, as it is the second leading cause of cancer-related deaths to men in the US. Unfortunately, there is an estimated 20-50% patients who will experience biochemical recurrence. Normally recurrence is detected by an increase in PSA levels. F-18 Axumin (Fluciclovine) is recently FDA approved (2016) PET radiopharmaceutical designed to detect suspected prostate cancer recurrence based on biochemical indications, despite previous treatment. **Purpose:** Demonstrates a multidisciplinary approach to diagnosing and treating recurrent metastatic

disease resulting from prostate cancer.

**Case Description:** 65-year-old male with a history of T2bN0 M0 adenocarcinoma of the prostate with a radical prostatectomy (2003) and increased PSA. Patient received adjunctive prostate bed external beam radiation therapy (2003). Metastatic disease was diagnosed in 2014, and hormone ablation began with enzalutamide. PSA levels continued to increase, and the treatment was changed to abiraterone/prednisone (2018). With continued elevations in PSA, the patient was referred for an F-18 Axumin PET scan for evaluation for treatment of 223Ra dichloride (2018) (Figure 1). Results of the PET scan indicated spinal metastatic disease, and to continue further treatment with 223Ra dichloride.

**Outcomes:** Patient completed all six scheduled 223Ra dichloride injections without complaints or side effects. Patient reported an overall clinical pain improvement, and labs indicate a minor reduction in PSA with treatment. Post-223Ra dichloride treatment, the patient started on docetaxel anhydrous with the discontinuation of abiraterone. No further imaging has been performed at this time.

**Conclusion:** The Axumin PET scan played a key role in the treatment plan. By ruling out any visceral metastatic recurrence, treatment was adjusted to focus on the palliation of existing osseous sclerotic disease with 223Ra dischloride and chemotherapy. F-18 Axumin meets a need for the evaluation of recurring prostate cancer, where F-18 FDG, In-111 capromab pentetide (Prostascint), or CT may fall short.

**Relevance to Allied Health:** This topic has clinical relevance to allied health professionals, particularly in regards to the diagnosis and treatment of patients through medical imaging and radiation sciences. This case emphasizes the shortcomings that existed in routine diagnostic imaging procedures alone, and how a new radiopharmaceutical has fulfilled these shortcomings to build a better assessment for treatment. Through a multidisciplinary collaboration involving radiography, sonography, and radiation therapy, Axumin PET scans can help diagnose and develop the best course of action for patients with recurring prostate cancer. In regards to rehabilitation sciences and nutritional sciences, Axumin PET scans help accurately diagnose recurring prostate cancer so that rehabilitation plans and nutritional regiments may be adjusted for a more dimensional treatment approach.



#### Figure 1: Coronal and Sagital F-18 Axumin (fluciclovine) CT Fused Images

#### ACCEPTABILITY OF HAND SANITIZER OPTIONS AMONG STUDENTS IN COMMUNICATION SCIENCES AND DISORDERS (CSD) A.L. Windom, BS, M.A.<sup>1</sup> Hudson, PhD<sup>1</sup>, A.B. John, PhD<sup>1</sup> <sup>1</sup>Department of Communication Sciences and Disorders, College of Allied Health, University of Oklahoma Health Sciences Center

**Purpose/hypothesis:** Adherence to hand hygiene protocols is critical to infection control in healthcare settings. Hand hygiene protocols allow handwashing with soap and water or the use of alcohol-based hand rubs (ABHRs). Research has shown that healthcare workers, including audiologists, do not adhere to hand hygiene protocols for many reasons; including, skin irritation, insufficient numbers of sinks, and inadequate time. ABHRs are widely available, efficient and effective. However, a possible barrier to the use of ABHRs is the acceptability of the products (e.g. foams, gels, liquids). Researchers in medicine and dentistry have investigated preferences for ABHR formats in their respective professions; but to our knowledge, ABHR preferences have not been studied in Communication Sciences and Disorders (CSD) students. Identifying students' preferences for ABHR formulation may increase adherence to hand hygiene practices. The purpose of this study was to assess the acceptability of hand sanitizer options and determine whether certain types of ABHRs are preferred over others.

**Methods:** Data collection will occur in February, March, and April of 2019. We will ask undergraduate and graduate CSD students to use and rate six different ABHRs, including gels, foams and liquids. Using a provided questionnaire, students will rate statements regarding features of the ABHRs on a scale from one to five. We will collect ratings corresponding to the acceptability of the ABHRs as well as specifically identified features such as odor after the use of each ABHR. We will use a syringe to verify the amount/dosage (e.g. 1.5 ml) per ABHR trial. The order of AHBR products will be counterbalanced. Participants will wash their hands with soap and water between ABHR trials. We will ask participants to share any general comments they would like to address about each ABHR immediately after use. Responses will be analyzed using Kruskal-Wallis tests for the difference in ratings across ABHRs. Difference tests will be conducted at an alpha of .05. Descriptive statistics will be used to assess overall acceptability of and participants' reactions to ABHRs individually and as a group.

**Results:** Data collection and analysis are ongoing for this project. We hypothesize that gel hand sanitizers will be preferred over liquid and foam-based hand sanitizers, and that gel hand sanitizers will be rated as the most likely to be used.

**Discussions/Conclusions:** Adherence to hand hygiene protocols needs to be improved to decrease the likelihood of cross contamination and the spread of disease. Determining which ABHRs are relatively more acceptable to healthcare students (e.g. future healthcare providers) may help to improve hand hygiene practices. In this study, we found that most participants preferred (foam/liquid/gel) format. Characteristics of ABHRs reported to be preferable were X, Y, and Z (e.g. pleasant odor, clean "no residue" feeling, etc.). Ensuring that preferred formats of ABHRs are available for use in clinical settings will maximize infection control.

**Relevance to Allied Health**: It is important that all healthcare students and providers strive to protect their patients and themselves from unnecessary exposure to disease by consistently adhering to proper hand hygiene practices.

#### YTTRIUM-90 SIR SPHERE SPILLS: A PILOT STUDY TO DETERMINE EFFICIENT CLEAN-UP PRACTICES

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**Background:** Y-90 SIR-Spheres are Selective Internal Radiation Therapy (SIRT) radiopharmaceutical agents that are encased in microscopic glass spheres, suspended in saline solution. Spill precautions are taken when using this radiopharmaceutical, however in practice contamination and spills happen occasionally. Recently a local hospital had to shut down and interventional room and hallway due to the spread of Y-90 SIR-Sphere radioactive contamination. According to Sirtex, recommended clean-up procedures involve damp wipes while wearing booties, gloves, and discarding waste into a radiation labeled trash bag. However, according to literature and experience with this local clinical spill indicates that damp wipes may not be adequate to control SIR-Spheres that have escaped solution in a wide area. **Purpose:** We aimed to demonstrate the effectiveness of different cleaning techniques on dry Y-90 SIR-Spheres, compared to the recommended method.

**Methods:** We "spilled" Y-90 SIR-Spheres in the middle of 10 independent 1ft<sup>2</sup> tile areas surrounded by absorbent pads within 10 3ft<sup>2</sup> inch thick plywood boxes. (figure 1) The Y-90 SIR-Spheres were allowed to dry overnight, so all spheres were out of solution. Various cleaning methods were implemented: manufacturer control, contact paper clean up, and Swiffer wet mop. Measured outcomes included the ratio of pre to post cleaning GM survey meter exposure readings. Due to low sample size, non-parametric exact Kruskal-Wallis tests were used to determine differences in exposure ratios among the cleaning types. All statistical tests were conducted assuming a 5% chance of a type 1 error, using SAS 9.4 (Cary NC).

**Results:** The manufacturer control and wet mop methods were superior to contact paper methods. (p=0.0006, p=0.0005 respectively). There was no difference between the manufacturer control and wet mop methods, nor was the variability among the wet mop and manufacturer control different. (p=0.6826, p=0.2501 respectively) (figure 2)

**Conclusion:** Both the damp paper towels and wet mop methods cleaned a higher percentage compared to the adhesive paper method. Both show a high percentage of first cleaning contamination removal. We feel the wet mop is an easier method for large areas, and may be easier from a practical perspective. **Relevance to Allied Health:** If we can clean up radioactive spills more efficiently we can reduce dose to other healthcare providers. Other Allied Health Professionals would not encounter contamination procedures/situations if effective clean-up of long half-life radioisotopes (like Y-90) are used.

Figure 1: 3ft<sup>2</sup> Plywood Sample Boxes and Absorbent Pads Ready for Controlled Y-90 Spill



Figure 2: Y-90 SIR-Spheres Post-decontamination Percent Exposure Decrease Among Damp Towels and Wet Mop Methods (Wilcoxon p=0.6826, Ansari-Bradly p=0.2501)



#### ORIGINAL RESEARCH (PRELIMINARY WORK WHICH CAN DEMONSTRATE SOME BUT NOT ALL RESULTS) DIETARY PROTEIN INTAKE CORRELATES WITH BODY WEIGHT IN PANCREATICODUODENECTOMY SURGICAL CANDIDATES

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**Background:** Pancreatic cancer has a poor prognosis; surgery is the only cure. Adequate dietary protein intake is critical for surgical recovery, but pre-operative assessment requires a nutrition professional who may not be routinely available. Non-nutrition healthcare professionals need a way to quickly identify patients at risk for low protein intake.

**Purpose:** This analysis seeks to determine if body weight correlates with preoperative protein intake. **Methods:** This cross-sectional analysis of baseline data from a pilot RCT of multimodal prehabilitation before pancreaticoduodenectomy (PD) included 62 patients (46.8% female, age  $68.0 \pm 11.5$  yrs., 90.3% non-Hispanic white). Patients completed a 24-hour food recall with a registered dietitian. Protein intake was described in grams of protein consumed per kilogram of BW. BW was assessed with a bioelectrical impedance Analysis (BIA) scale. Pearson's correlation was applied for statistical analysis.

**Results:** There was a modest but statistically significant inverse correlation between dietary protein intake and BW (r=-0.371, p=0.003). The correlation remained significant after adjusting for age (r=-0.376, p=0.003).

**Discussions/Conclusions:** Higher BW is modestly but significantly related to lower protein intake in pancreaticoduodenectomy candidates, independent of age. These findings challenge the seemingly "common sense" assumption that individuals of higher body weight consume sufficient protein and may not require nutrition intervention. Instead, they provide preliminary evidence that pancreatic cancer survivors of higher BW may have even lower BW-adjusted consumption than their underweight peers. Results support the need to consider body weight when estimating the adequacy of protein intake in this population.

**Relevance to Allied Health**: These findings have clinical implications for all healthcare professionals who seek to identify individuals with low protein intake and offer them supportive interventions before resection of pancreatic cancers and precancers.

 $CLT^{2,3}$