# 2016 Forum on Evidence-Based Medicine

Each spring the College of Allied Health Professions sponsors a forum. This interprofessional event is intended as an opportunity for students and faculty in all CAHP programs to share scholarly activity that supports evidence-based clinical practice.

The primary goal of the scholarly activity that is presented in the forum is to promote the understanding of the research process in allied health. The ultimate goal is the continuous updating of best practices in clinical settings. The following research projects, critical reviews of the literature, and educational exhibits are organized by topic.

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ABSTRACT #1

Feasibility of mHealth Technology Use Among a Sample of Isolated Rural Men at High Risk for Cardiovascular Disease

Betsy Becker1, Christine Eisenhauer2, Carol Pullen2, Paul Dizona3, Patricia Hageman1. Faculty: 1. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE; 2. College of Nursing-Northern Division, UNMC, Norfolk, NE; 3. College of Nursing, UNMC, Omaha, NE.

Isolated rural men are considered a health disparities group at high risk for cardiovascular disease. The increasing availability of technologies for self-monitoring (ie mHealth) may show promise for engaging rural men in lifestyle modification. This study investigated the feasibility use a fitness monitor with text messaging support over a 3-week period. The study examined the men’s daily monitor use for tracking activity and eating and their perspectives about mHealth.

Twelve men, ages 40-69, from a US Department of Ag defined isolated rural area, participated. The men had a baseline BMI of 25-44 kg/m2 [34.8±6.6 kg/m2].

Men participated in 2 visits (baseline and 3 weeks). Assessments included health histories and vital sign biomarkers. The men received training using the fitness monitor and were asked to wear it daily for 3 weeks. Men received 1-3 text messages/day for reminders, education and motivation. At visit 2, men completed post-intervention surveys. Descriptive data were used for analysis.

Men were overweight (n=3) or obese (n=9) and most (9/12) were hypertensive with only 4 being treated with medications. Nine of 12 men wore the monitor during all 21 days, 2 wore it 9 and 15 days respectively and 1 lost the monitor. Survey data revealed 7 checked their step count more than 5 times/day, 6 reported using the smart phone app and 7 used the optional sleep log feature. Eleven of 12 men entered food into the log and most (9/12) did this on ≥ 15 days. Ten men indicated the log was helpful in learning about eating; though only 3 indicated it was easy to log food. All men reported reading reminder and motivational text messages sent during the study and 11 plan to continue using the fitness monitor.

Men were not well managed for blood pressure or overweight/obesity. Both the log records and the survey results indicated that using fitness monitors was feasible and acceptable among this population.

Using mHealth appears feasible as an action-oriented tool for therapists to recommend for lifestyle self-monitoring in isolated rural men. The findings reinforce the important role of therapists in assessing vital signs and making referrals as appropriate.

ABSTRACT #2

The Role of Computed Tomography in Trans-catheter Aortic Valve Replacement

Tammy Jones, Stephanie Lough. Faculty: Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE.

According to the American Heart Association, aortic stenosis, which is the narrowing of the aortic valve opening, remains one of the most common and severe valve disease problems. While surgical valve replacement is a treatment option for some, not all patients are candidates due to comorbidities or high-risk of surgical mortality. Trans-catheter Aortic Valve Replacement, or TAVR, is a safe alternative for surgical at-risk patients. Computed Tomography with its ability to acquire motion-free images at specific points in the cardiac cycle will play an increasing and crucial role contributing to the clinical evaluation of patients with aortic valve stenosis. Due to an increase in the frequency of TAVR procedures and the relative ease to evaluate viable surgical candidates, plan prosthetic deployment, and assess the success of the procedure after placement, CT’s role while increase dramatically in the years to come.

ABSTRACT #3

An Evaluation of Sterility in Connecting and Cutting Perfusion Tubing

Sebastian Gilmore, Jon Malpass, David Holt. Clinical Perfusion Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE.

Perfusionists make tubing connections or alterations on a daily basis in constructing a cardiopulmonary bypass (CPB) circuit; yet there are no requirements or suggestions on specific techniques when making tubing connections or when cutting tubing. This study examines how contamination of CPB circuits can be limited as well as examines the variables used when cutting polyvinyl chloride (PVC) tubing.
Methods: One hundred tubing connections were made with two inch sections of 3/8in tubing being attached to both sides of a 3/8in connector. Five groups of twenty samples were established to compare the bacterial growth of tubing connections made when no hand washing was used, thirty seconds of hand-washing, two minutes of hand-washing, use of alcohol based hand gel, and use of chlorhexidine scrub. Also in this study One hundred pieces of four inch (PVC) tubing were randomized into ten groups with manipulation of variables for antiseptic agent chlorhexidine 2% (CHG) and 70% isopropyl alcohol versus alcohol 70%, blade type; protected disposable versus surgical blade, and time of application; 2 seconds versus 10 seconds. Each sample was then transferred to a TSA agar and incubated for 48 hours and read by a microbiologist.

Results: There was statistical significance when comparing chlorhexidine antiseptic agents to no hand washing and hand-washing for 30 seconds with p-values of .0008 and .0072 respectively. There was also statistical significance when comparing alcohol based antiseptic gels to no hand-washing and hand-washing for 30 seconds with p-values of .026 and .024 respectively. Statistical significance could not be shown for cutting implement or type of antiseptic agent. However, statistically significant data was obtained when comparing the application times of the antiseptic agents.

Discussion: Results showed decrease in overall bacterial growth with use of Chlorhexidine scrub and alcohol based gels compared to all other methods when connecting tubing. In regards to cutting tubing, only application time was a significant factor in decrease of bacterial contamination.

**ABSTRACT #4**

**Maintaining Platelet Function in Whole Blood Stored During Acute Normovolemic Hemodilution: A Look At Temperature**

Matthew Hilgers, Jonathan Keck, David Holt. Clinical Perfusion Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Purpose: Acute normovolemic hemodilution (ANH) is a phlebotomy technique that is performed prior to various surgical operations. During ANH, fresh whole blood (FWB) is drawn from the patient often in the operating room (OR) and crystalloid or colloid is then administered to maintain normovolemia. ANH provides an available form of autologous FWB should the patient require blood transfusion post-procedure. The purpose of this study is to investigate the effects of temperature on platelet function (PF), specifically temperatures commonly encountered in OR environments.

Methods: Following approval by the IRB, approximately 10 mL of FWB was drawn from 19 human volunteers into 3 separate BD Vacutainer® Plus plastic citrate tubes. Using the Sienco Sonoclot®, a baseline PF value was determined. Each tube was then stored in a different temperature environment: 22-24 C, 18 C, and 14 C. At 4 and 8 hours, PF was reassessed and compared to its baseline value.

Results: The data demonstrates a significant difference (p < 0.01) from baseline PF for all temperatures at 4 and 8 hours, except for the 8 hour/22-24 C group, which is statistically similar to baseline (p = 0.90).

Conclusion: PF may best be maintained when stored in a 22-24 C environment.

**ABSTRACT #5**

**Does transfusion of a hemoconcentrated blood product from shed blood during cardiopulmonary bypass enhance patient coagulation state in comparison to a cell washing product?**

Timothy Langbehn, Luke Murphy, David Holt. Clinical Perfusion Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Background: The intraoperative processing of shed blood during cardiac surgery is typically done with cell salvage devices, which produces a product lacking coagulation factors, platelets, and other blood components. An alternative to cell washing that has been proposed would be to use a hemoconcentrator the shed blood, which would better preserve the coagulation factors in the blood.

Methods: This experiment utilized bovine blood, diluted to a hematocrit of 23-25% to better simulate a patient’s hematocrit during cardiopulmonary bypass. The diluted blood was then separated into three different containers and circulated on a cardiopulmonary bypass machine for 30 minutes. Then, 600 mL was taken from each of the three buckets and processed either using a cell saver, a hemoconcentrator circuit, or discarded. The products were analyzed using a thromboelastograph (TEG) and then returned to the corresponding container from which the volume was taken. Finally, a sample was taken from each container to be analyzed by the TEG to determine the effect of the processed shed blood on the patient’s coagulation state.

Results: The initial statistical analysis revealed that the hemoconcentration product’s HCT of 56.4%, hemoconcentration patient’s HCT 26.5%, cell saver product HCT 48.9%, cell saver patient HCT of 26.5% all
had a statistically significant higher HCT compared to the baseline HCT of 24.6%. The patient loss was the only test group in which the HCT was not statistically significant higher than the baseline HCT.

Conclusion: The results concluded that on average the patients who received hemoconcentrated blood transfusions had stronger clots overall and faster clot formation than the blood loss group and the cell saver blood transfusion group. However, the cell saver transfusion group had a quicker initial fibrin clot formation, in addition to having equivalent patient hematocrits. The utilization of a hemoconcentration circuit for concentrating shed patient blood had positive benefits in clot strength and how quickly the clot was able to form. Overall, both the cell saver and hemoconcentrator methods had advantages and disadvantages, but we can conclude with our results that the two methods on average yielded similar products that benefitted the patient.

ABSTRACT #6

Evaluation of Cardiopulmonary Bypass Reservoirs and the Creation of Vortices
Justin Rowe, David Holt. Clinical Perfusion Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Cardiopulmonary bypass (CPB) is necessary for many cardiac surgeries. Clinicians aim to improve the technique and equipment associated with it in order to achieve better outcomes. An uncommon but serious risk to patients is a massive air embolism resulting from entrained air in the extracorporeal circuit. An air embolism can result in significant postoperative complications such as neurological dysfunction. Vortices are capable of entraining large quantities of air in reservoirs.

In this study, vortex formation was evaluated and manipulated in hard-shell venous reservoirs at varying hematocrits (15, 25, and 35%), flows (4, 5, 6, and 7 LPM), and levels (50, 100, 150, 200, 250, and 300 mL). Vortices were classified with regard to intensity. Class A vortices were not capable of entraining air, but vorticity on the top of the fluid column was noted. Class B vortices were capable of entraining air; however, they would dissipate prior to being fully formed. Class C vortices were capable of entraining air in the circuit in a continuous manner. With regard to vortex intensity, the data consistently showed a negative correlation associated with level and hematocrit and a positive correlation with flow in the Medtronic Affinity and Maquet VHK 2001 reservoirs. No vortices formed in the Sorin Synthesis reservoir. The perfusionist can attenuate the risk of a vortex induced massive air embolus by closely monitoring hematocrit and level while operating at higher flows. The perfusionist should also reduce flow when operating at the manufacturers minimum operating level to prevent vortex development. The recommended minimum operating level might also need to be revised on certain reservoirs as well.

ABSTRACT #7

Are plasticizers a problem in the extracorporeal circuits and can we control them?
Carrie Wattenhofer, Steve Mwangangi, David Holt. Clinical Perfusion Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Objective: Plasticizers are chemicals added to plastics to impart flexibility, heat tolerance, and resistance to kinking. DEHP is a concern in the medical field because is the most widely used phthalate plasticizer in medical devices. Studies show that long term exposure to DEHP and its metabolite MEHP can have an adverse effect on male reproductive development. Other studies show high plasma phthalate levels are linked to pubertal gynecomastia. The purpose of this project is to investigate the extent of DEHP and MEHP leaching from a typical extracorporeal circuit under changing variables of priming time, temperature, and re-priming.

Materials and Methods: Two separate experiments were conducted to examine the extent of DEHP and MEHP leaching from a typical ECC circuit. The first circuit examined the concentration of DEHP and MEHP that leached into solution after priming the circuit for 20 minutes with PlasmaLyte. Next, the circuit was de-primed and new Plasmalyte was added to determine the new concentration of DEHP and MEHP. A separate circuit examined the concentration of DEHP and MEHP leaching using warm PlasmaLyte. The second portion of the experiment examined the concentration of DEHP and MEHP that leached from the circuit over a 24-hour period.

Results: Concentrations of DEHP and MEHP were determined using high performance liquid chromatography. The concentration of MEHP present after 20 minutes of priming was 13.33 ppm. After the circuit was de-primed and re-primed with PlasmaLyte there was no measureable amount of MEHP present. The circuit primed with warm PlasmaLyte showed a MEHP concentration of 26.45 ppm. MEHP or DEHP were not found in the circuit after circulating for 24 hours.

Conclusion: No DEHP was found in any of the circuits because it quickly hydrolyzes to MEHP. MEHP was found in the circuit after 20 minutes of circulating.
MEHP was eliminated from the circuit after it was de-primed and re-primed with PlasmaLyte. Priming with warm PlasmaLyte produced a greater concentration of MEHP that leached into solution.

**ABSTRACT #8**

**Cardiomyopathy**
Mindy Kuck. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Cardiomyopathy is a disease that affects the muscles of the heart. The muscle tone of the heart is damaged, which causes the heart to not be able to effectively pump blood to the rest of the body. Many people affected with this disease are not even aware that they have it. Not being able to recognizing the disease means it cannot be treated, making cardiomyopathy very dangerous. Cardiomyopathy is also a leading cause of heart failure and the most common reason for a heart transplant. It is important to know exactly what causes cardiomyopathy to be able to avoid this dangerous disease at all costs. Being able to recognize the signs and symptoms of cardiomyopathy can also help with early diagnosis of the disease, so proper treatment can be given. However, there are four major types of cardiomyopathy, all effecting the heart in different ways. Diagnosing the disease early with a chest x-ray, echocardiogram, magnetic resonance imaging, or genetic testing can help the people affected get the proper treatment they need. This poster is going to explore the causes of cardiomyopathy, signs and symptoms of the disease, the different types and how to diagnose them, as well as the treatment and prognosis of cardiomyopathy.

**ABSTRACT #10**

**The Inside Look at Renal Failure**
Monica Wells. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Renal failure is a chronic kidney disease that affects the physiological methods of the kidney. There are many causes of renal failure; some are acute and some chronic. Either way it is most important to diagnose renal failure as early as possible to prevent progression of the damage to the tissues to a fatal extent. There are many tests and diagnostic tools used to find the stage of kidney failure. Using these stages will allow the physician to decide the method and aggressiveness of treatment for the patient. These diagnostic tools include: computed tomography, magnetic resonance imaging, ultrasound, blood tests, and/or urine exams. The prognosis of renal failure is fairly poor. There is no cure for renal failure, not even a transplant. There are only treatment methods and pain management through the rest of the patient’s life. Some of the treatments include: peritoneal dialysis, hemodialysis, and/or transplant.

**ABSTRACT #9**

**Cystic Fibrosis**
Braya Prince. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Cystic Fibrosis (CF) is a genetic disease caused by two mutated genes that get passed down from both parents. One mutated gene comes from each parent. It affects multiple parts of the body including the lungs, pancreas, liver, intestines, sinuses, and sex organs. CF affects the sweat glands as well. It is a dysfunction in the production of mucus. The body produces thick sticky mucus instead of thin slick mucus. This causes a multitude of issues throughout the body including airway blockages and intestinal absorptions issues. This poster describes in detail the cause, symptoms, diagnosis, treatment, and prognosis of the disease.

**ABSTRACT #11**

**Cytokine levels in workers occupationally exposed to long-term low levels of ionizing radiation: influence of lifestyle factors**
Iman Ahmad¹, James Temme¹, Maher Abdalla², Adam Case², Matthew Zimmerman². Faculty: 1. Division of Radiation Science Technology Education, College of Allied Health Professions, 2. College of Medicine, University of Nebraska Medical Center, Omaha, NE

Objectives: Ionizing radiation is known to induce chronic oxidative stress, thereby contributing to pathological states including inflammation, fibrosis, as well as DNA damage and cancer. The aim of this study was to investigate the effect of occupational exposure
to low levels of ionizing radiation in immune system cytokine production and how lifestyle factors may influence these parameters.

Methods: We investigated the concentrations of inflammatory cytokines (interleukin-8 (IL-8), IL-6, IL-10, tumor necrosis factor (TNF), and IL-12p70) in the plasma by a flow cytometry based bead array from 20 radiation-exposed workers and 20 control individuals. The inflammatory cytokines yield was analyzed by considering the effects of lifestyle factors, such as exercise, alcohol and dietary supplements.

Results: A significant decrease in TNF concentration in radiation-exposed workers as compared to controls was observed and no significance differences in IL-8, IL-6, TNF, and IL-12p70 levels were revealed. Interestingly, often exercise significantly lowered IL-10 level among radiation-exposed workers and with respect to controls. However, often exercise significantly raised IL-12p70 among radiation-exposed workers but not among controls. This suggests that often exercise can influence inflammation induced in humans by ionizing radiation. Among alcohol subgroups, significantly lower TNF levels were found in radiation-exposed workers with respect to controls. Furthermore, alcohol significantly lowered IL-8 level among radiation-exposed workers but not among controls. Dietary supplements significantly lowered TNF in radiation-exposed workers with respect to controls. Our results suggest that radiation-exposed workers have an altered immune response as compared to control individuals and a major awareness of lifestyle factors is crucial for improving occupational protection.

ABSTRACT #12

The Utilization of the Anatomage Virtual Dissection Table in the Education of Imaging Science Students
Tanya Custer, Kim Michael, Gregory Karst. Faculty: College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

A solid understanding of normal anatomy and function enhances students’ abilities to recognize how normal function may be affected when the anatomy has been altered as the result of a developmental defect, disease, or trauma (Miller et al, 2002). This understanding may be enhanced using technology such as anatomy visualization systems. Over the past year, UNMC faculty have been using innovative technology such as the Anatomage Virtual Dissention Table and Invivo5 software to improve educational practices and outcomes. The Anatomage Table is a life-size, virtual dissection table that displays gross anatomy models reconstructed from cadavers, or by using the Invivo5 software, allows for the creation of case studies from CT and MR images imported via DICOM files. Anatomy can be presented in 3D format and in coronal, axial, sagittal or user-defined planes. As the technology was incorporated, data were collected to evaluate students’ exam scores and perceptions and beliefs related to the implementation of this technology into the courses. This poster will highlight best practices, exam outcome data and perceptions related to the use of interactive technology in the education of imaging science students. IRB exempt status was granted for this educational research project.

ABSTRACT #13

Physician Assistant Student Outcomes After Learning Experiences in Cultural Competency
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Objective: Training in intercultural competency among health care professionals is necessary to bring a greater balance to the disparity currently found between those needing health care and those providing care. The purpose of this study was to determine what, if any, improvements in cultural awareness, knowledge and skills were measurable in physician assistant (PA) students as they matriculated.

Methods: The Multicultural Awareness, Knowledge and Skills Survey-Revised (MAKSS-R) was administered as a pre-test upon curriculum entry and again as a posttest at the conclusion of the program of study. Data were obtained from 93 PA students from four successive classes graduating from a private Midwest college between 2003 and 2007, and compared with data from 91 PA students graduating from a public Midwest university graduating between 2014 and 2015. All students were enrolled in specific didactic studies and clinical experiences in cultural sensitive and competency.

Results: The results demonstrated significant improvement in knowledge at the private college, and significant improvement in skills at the public university for all respective classes combined. Varying measured outcomes of awareness were noted within each institution and between institutions.

Conclusions: Enhanced curricular instruction such as exploring cultural assessment methods and controversies in health care differences, combined with increased clinical experiences with diverse cultures, are recommended to help move students toward greater cultural competency.
ABSTRACT #14

Beyond the Clinic: Physician Assistant Student Perspectives of Careers in PA Education
Cody Sasek1, Jenny Kluznik2, Carl Carrubba3. Faculty: 1. Division of Physician Assistant Education, University of Nebraska Medical Center, Omaha, NE; 2. Ausburg College, Minneapolis, MN; 3. Chatham University, Pittsburgh, PA.

The physician assistant (PA) profession has undergone rapid expansion of its professional training programs. As such, there has been an increasing need to develop a sufficiently robust PA education workforce. The current study sought to survey current PA students from all PAEA member programs to ascertain their level of interest in and understanding of PA education careers including faculty and precepting roles. The study found that interest was greatest in precepting roles. A higher level of education prior to attending a PA program correlated with a higher interest in PA education roles, however, a previously earned education-related degree did not demonstrate a significant relationship with such interest. These, and additional study findings are important to consider as the profession continues to work to develop the student and clinician to education careers pipeline.

ABSTRACT #15

Maximizing the Interdisciplinary Role of the Laboratory in a Student-Run Clinic
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The top priority of healthcare is the patient. This priority extends to the student-run clinic, where numerous medical disciplines converge for the common goal of positively influencing patient care. Often, patient care is dependent on accurately performed laboratory tests and properly collected patient specimens. This is accomplished through the efforts of Clinical Laboratory Science (CLS) students. Following a thorough training session, CLS students are prepared to perform various CLIA-waived point-of-care testing and prevent pre-analytical errors through specimen collection and preparation. A CLS presence in the student-run clinic ensures reliable and timely results for the patient and offers a multitude of benefits for clinic itself, as evidenced by the success of the University of Nebraska Medical Center SHARING Clinics. CLS participation in student-run clinics benefits the CLS students as well, as in-house testing allows for greater hands-on experience and supplementary clinical education. These opportunities ultimately lead to more capable laboratorians and a greater range of patient care. To fully encompass the aspects of self-sufficiency and timely testing, we as this year’s CLS representatives have developed and implemented a training system for the CLS students to ensure the best possible preparation as vital components of an interdisciplinary student healthcare team. Rigorous and consistent laboratory training promotes confidence as future health care providers in addition to enabling superior care for current patients.

ABSTRACT #16

Sonographic Evidence of AC Cysts
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An acromioclavicular (AC) cyst is a relatively uncommon condition which results from a rotator cuff injury or degenerative osteoarthritis of the glenohumeral and acromioclavicular joints. AC cysts develop due to the instability of the glenohumeral joint which eventually leads to a disruption of the AC joint capsule and eruption of glenohumeral joint fluid. The most common presentation of these cysts is a painless, subcutaneous mass over the AC joints which can mimic a tumor or a lipoma. Sonography is an important imaging modality when evaluating these cysts.

ABSTRACT #17

Ewing’s: Not your Typical Sarcoma
Samantha Gohr. Magnetic Resonance Imaging Program, Division of Radiation Science Technology Education, University of Nebraska Medical Center, Omaha, NE

This research topic addresses the diagnosis, imaging of, and treatment of Ewing’s sarcoma. Readers can expect to find an in-depth discussion of the diagnosis of the disease including the factors such as...
Exercise programs are becoming more popular in the and clinical relevance. Community-based aquatic were selected based on date of publication, reliability, and clinical relevance. Overweight and obese individuals with OA. Three studies were reviewed to investigate the effects of aquatic and land-based exercise in overweight and obese individuals with OA. Resources have identified exercise as an appropriate intervention to improve impairments seen with OA. The studies were selected based on date of publication, reliability, and clinical relevance. Community-based aquatic exercise programs are becoming more popular in the OA population. However, the most significant results are found in the overweight and obese individuals. BMI seems to impact the significance of the aquatic therapy on outcome measures such as pain, quality of life, and physical function. Benefits have also been shown when obese persons engage in land-based weight loss programs. One study found that there was no difference between OA disease progression in obese patients with increased joint loads compared with decreased joint loads. This indicates that land therapy does not accelerate disease progression and can also be used as an effective intervention in this population. In conclusion, aquatic therapy can be a great supplemental intervention to land-based therapy to decrease pain, increase physical function and increase quality of life. The ultimate goal of the exercise programs are to reduce overall disability levels in overweight or obese patients living with osteoarthritis.

**ABSTRACT # 18**

**Land Based Therapy vs. Aquatic Therapy in Overweight and Obese Individuals with Osteoarthritis**

Sarah Johansen, Logan Payne. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

The objective of this research was to determine whether aquatic therapy was superior to land therapy in improving physical function in overweight and obese individuals with osteoarthritis (OA). OA, also known as a degenerative joint disease, can lead to loss of function, mobility, and can cause pain with daily activities. The disease progression results in loss of cartilage and degenerative changes in bone, ligaments, and tendons. Higher body weight has been found to be associated with greater compressive forces in weight bearing joints, which can lead to a predisposition to developing OA. Resources have identified exercise as an appropriate intervention to improve impairments seen with OA. Three studies were reviewed to investigate the effects of aquatic and land-based exercise in overweight and obese individuals with OA. The studies were selected based on date of publication, reliability, and clinical relevance. Community-based aquatic exercise programs are becoming more popular in the

**ABSTRACT # 19**

For patients with plantar fasciitis, is a custom foot orthosis more effective in the reduction of pain than a prefabricated foot orthosis?

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The plantar fascia is a tough, fibrous, connective tissue spanning the sole of the foot to support the longitudinal arch. Repetitive trauma to the site of origin results in pain most frequently known as, plantar fasciitis. This condition is considered to be one of the most common foot complaints resulting in approximately 1 million visits to medical professionals each year. Foot orthotics are often used in the conservative treatment of plantar fasciitis to reduce the strain on the fascia during standing and ambulation. Both prefabricated and customized foot orthotics have been used in the treatment protocol. Eighty percent of patient’s pain will naturally resolve within 10-12 months, regardless of therapy. Therefore, as physical therapists, it is important to evaluate the cost-effectiveness of both orthotics for the management of our patients.

The objective of our study was to compare the effectiveness of a prefabricated orthotic to a customized orthotic for reducing pain. An online search was conducted using PubMed and EBSCOhost to examine the effectiveness of these devices. Keywords used for the search include: prefabricated foot orthotics, customized foot orthotics, and plantar fasciitis. All searches were limited to within the last ten years, level 2 evidence, the English language, and human subjects. After reviewing the literature, three randomized controlled trials with relevant information fitting the search criteria were selected for the analysis. Two
studies compared among customized, prefabricated, and sham orthotics. Both the customized and prefabricated foot orthotics was found to have similar effectiveness in the treatment of pain. The last study evaluated the effectiveness of three different types of prefabricated foot orthotics in the treatment of plantar fasciitis. A foam covered rigid self-supporting plastic orthotic was found to be superior to a soft supportive foam orthotic for pain reduction. These studies indicate that similar effects may be achieved with less costly interventions without impeding the quality of care for our patients. An objective measurement such as physical activity should be considered in future studies as a more specific way to detect functional weight-bearing improvements versus pain alone in patients with plantar fasciitis.

ABSTRACT #20

The Effect of Taping versus Bracing in Preventing Ankle Sprains in Athletes
Jena Mizner, Jamie Straube. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Objective: This research presents a critical review of published literature detailing the effectiveness of bracing compared to taping in preventing ankle sprain injuries in athletes. In addition, the feasibility of both methods is evaluated in terms of cost, comfort, and time efficiency.

Clinical Relevance: Ankle sprains are the cause of almost half of all sports-related injuries, preventing many athletes from participation. Common methods to prevent ankle injuries include a variety of braces and taping methods.

Methods: Four peer-reviewed articles were selected and analyzed. Two studies, one prospective randomized controlled trial (RCT) and one non-RCT, directly compared the effect of bracing versus taping in ankle sprain prevention. One RCT evaluated the incidence of injuries in athletes wearing ankle braces compared to a control group. The fourth study was a non-randomized test-retest design that examined the mechanical stability of ankle tape throughout an athletic training session.

Results: Both studies that directly compared ankle bracing to taping found equal effectiveness in ankle sprain prevention. The first study also found no significant differences in swelling, functional outcome, active stability and pain between the two groups. Non-compliance was twice as high in the tape group, with skin irritation cited as the main reason for not completing the intervention. The second study estimated the costs of bracing versus taping and revealed annual savings of $1,000 and 129 hours of trainers’ time when utilizing braces. When comparing ankle braces to a control group in the third study, injury incidence was significantly lower (61%) in the braced group. This study also found that ankle bracing did not increase the occurrence of knee and other lower extremity injuries. The final study examined inversion range of motion (ROM) in athletes wearing ankle tape and found a significant increase in ROM after 45 minutes of competitive activity.

Conclusions: Both ankle bracing and taping are effective methods to prevent ankle sprain injuries. Even though both methods can be utilized for successful injury prevention, bracing may provide long-term benefits for patients and clinicians in terms of cost, compliance, time, and independence.

ABSTRACT #21

High-Velocity Low-Amplitude (HVLA) thrust manipulation vs mobilization in treating patients with mechanical neck pain
Nate Peterson, April McDill. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Purpose: Mechanical neck pain is a common problem with patients who seek physical therapy for neck pain. Physical therapists have several manual therapy techniques for treating mechanical neck pain such as massage, ultrasound, electrical stimulation, mobilization, and manipulations. Recently it has been brought into question the appropriateness of therapists performing manipulations, high velocity low amplitude thrusts (HVLA), on the spine. However, many patients have benefited from using this technique and this paper presents evidence in regards to the effectiveness of HVLA in comparison to the less aggressive technique, non-thrust mobilization.

Methods: Three randomized controlled trials were chosen to analyze the outcome differences of HVLA thrust vs. non-thrust mobilization for mechanical neck pain. One study compared upper cervical and upper thoracic manipulations to spinal mobilizations for treatment of mechanical neck pain. Another study compared only thoracic manipulations vs. mobilizations, while the third study compared cervical manipulations vs. mobilizations.

Results: All three RCTs found greater outcomes in pain reduction and greater range of motion in patients who received thrust manipulation, thoracic and/or cervical, in comparison to those only receiving non-thrust manipulation. In comparing these three RCTs, a combination of thoracic and upper cervical HVLA thrusts are the most effective in treating mechanical neck pain.
**ABSTRACT #22**

**Low Back Pain: Effectiveness of Aquatic Therapy vs Land-Based Therapy in Decreasing Pain**
Spencer Trapp, Matthew Giffin. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Low back pain (LBP) has a prevalence rate of 60-80% in the total population, and LBP comprises nearly 50% of all patients seen in outpatient physical therapy clinics. Traditionally, LBP has been treated with manual therapy and modalities, as well as postural, therapeutic, and stabilization exercises along with patient education. More recently, aquatic therapy has been suggested to be an alternative to land-based therapy. This paper reviewed studies on the benefits of aquatic therapy on LBP to determine if land-based therapy should be replaced with aquatic therapy in treating patients with LBP. Five research articles were reviewed from the most current available studies. These studies were critiqued on their research design, reliability, inclusion/exclusion criteria, bias, reproducibility, and validity. Aquatic therapy provides an optimal environment for patients to perform aerobic exercise at a higher intensity than possible on land due to the reduction in joint loading. Also, the water can cause muscle relaxation, which could reduce pain and increase joint flexibility and functional ability. Even though benefits can be gained from aquatic therapy, it may be beneficial to also do land-based therapy to learn how to functionally use the improvements made in the water. This topic is still being studied as researchers continue to examine the long-term benefits of the two different types of therapy for LBP. Some researchers have suggested the use of aquatic therapy in conjunction with land-based therapy in the treatment of LBP. Further research needs to be done to verify the results currently available.

**ABSTRACT #24**

**Ewing Sarcoma**
Jordan Lofing. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

This poster covers the topic of Ewing Sarcoma, its signs and symptoms, diagnosis through multiple imaging platforms, and treatment. Ewing Sarcoma is a highly aggressive malignant bone tumor primarily found in children and young adults, and is relatively rare. Once Ewing Sarcoma is suspected, radiographs are ordered for further inspection. The preliminary radiographs are followed by diagnostic imaging from other modalities such as computed tomography (CT), magnetic resonance imaging, and positron-emission tomography in conjunction with CT. This poster explores the importance of using of a variety of imaging platforms as it results in the most accurate information when viewing and examining for Ewing Sarcoma. These imaging lead to early detection of Ewing Sarcoma which is crucial and leads to the most effective treatment of the disease through radiation therapy, chemotherapy, or a combination of both.

**ABSTRACT #25**

**Kienbock's Disease: Osteonecrosis of the Lunate**
Kaleigh Petekavich. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Kienbock's disease is a rare disease that affects the lunate of the wrist. It is a progressive disease by nature eventually causing a necrosis of the lunate, which will lead to a complete collapse of the lunate, as well as a malalignment of the carpal bones. Though the disease
was discovered in 1910 by Robert Kienbock, its specific etiology is still unknown. There are many different factors that are believed to contribute to the development of the disease, but none have given a precise reasoning behind the actual origin. Kienbock’s disease is primarily diagnosed through the use of the imaging modalities: diagnostic radiography, magnetic resonance imaging (MRI), and computed tomography (CT). Each imaging modality plays a specific role in the diagnosis and staging of the disease. Initial treatment of Kienbock’s disease is typically nonsurgical by immobilization. If immobilization is not effective and the disease continues to progress and cause discomfort, there are many different treatments available depending on the stage of the disease. The treatments appear to be highly effective resulting in an overall satisfying prognosis for the patient.

ABSTRACT #26

Pectus Excavatum: Pathogenesis, Symptoms, Diagnosis, and Treatment
Jerilyn Scherbarth. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Pectus excavatum, also referred to as funnel chest, is a posterior depression of the sternum and adjacent costal cartilages. It is the most common congenital chest deformity, accounting for 90% of chest wall abnormalities. The depression may be present at birth, but occurs more commonly during the teenage growth spurt. Though the exact cause is unknown, there have been many hypotheses for the unwanted changes in anatomy, including developmental disorders and deficiencies in trace minerals that may cause the alteration of the matrix of the cartilage. These abnormalities in anatomical structure have been associated with a decrease in the patient’s respiratory and cardiac function. It also affects the patient’s social life and body image in many cases. After thorough examination of psychosocial and physical function, as well as radiographic tests, such as plain chest radiographs, magnetic resonance imaging, and computed tomography, many patients have the option to repair the deformity if the criteria for repair is met. The Ravitch, Nuss, vacuum, and magnetic procedures are options available to improve the patient’s quality of life.

ABSTRACT #27

Twice-A-Day Exercise Dose Improves Mobility, Balance, And Fatigue Measures in Individuals with Multiple Sclerosis
Heidi Reelfs1, Brenda Davies1, Kathleen Volkman2, David Arpin1, Min Liu1, Kathleen Healey3, Brad Corr1, Rana Zabad3, Max Kurz1. Faculty: 1. Munroe-Meyer Institute; 2. Division of Physical Therapy Education, College of Allied Health Professions; 3. College of Medicine, University of Nebraska Medical Center, Omaha, NE

Purpose: Intensive rehabilitation can result in substantial improvement in the mobility, balance and fatigue levels of individuals with Multiple Sclerosis (MS). Our protocol was performed twice-a-day, five days a week and was directed at igniting beneficial neuroplastic changes through a massed practice paradigm. The purpose of the current study was to compare therapeutic outcomes using this protocol with those who participated in a group exercise protocol.

Materials/Methods: 27 adults with relapsing-remitting or secondary progressive MS were assigned to either the Therapeutic Challenge Group (TCG); n=14 or the Exercise Group (EG); n=13. All subjects completed biomechanical, functional and quality-of-life tests before and after intervention. Both groups completed their training per the protocol for 6 weeks. The initial 2 weeks were completed in the clinic with a licensed physical therapist. The TCG completed training focused on motor control strategies, which has been previously reported. Each TCG session consisted of a 5-minute warm-up, 20 minutes of challenging balance training, and 20 minutes of challenging gait training one-on-one with the therapist. The EG completed 15 minutes of strength/flexibility exercise, 15 minutes of balance exercise, and 15 minutes of treadmill / overground walking with supervision. The EG group focused more on completing their assigned exercises rather than learning new motor control strategies and involved a group of 2-3 subjects training together with the therapist. Both groups completed the remaining four weeks of training at home using an exercise log, and were monitored through phone contacts.

Results: A significant Pre/Post main effect indicated all of the patients reduced their postural sway, increased their self-selected walking speed, increased their step length, and reduced fatigue after therapy. The Fatigue Impact Scale results showed a significant group
main effect. There were no other significant group main effects or interactions, indicating that the improvements were equivocal for the two groups.

Conclusions: A high dose of physical activity can result in clinically relevant improvements in the mobility, balance and fatigue of individuals with MS. Because there were no differences in results between groups, we suggest that the gains in balance and mobility were more likely related to the high therapeutic dosage rather than the type of therapy implemented. Our results also suggest subjects perceived that an intense exercise protocol improved their quality of life without adversely affecting fatigue.

**ABSTRACT #28**

Perfusion Studies in Magnetic Resonance Imaging
Stephanie Vas. Faculty: Magnetic Resonance Imaging, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Perfusion-weighted magnetic resonance imaging (MRI) provides the visualization of the steady-state delivery of blood into a tissue. Perfusion-weighted imaging (PWI) has been proven to provide valuable information in neurological conditions, most substantially in ischemic disease and malignancies, but is expanding into other departments of radiology including musculoskeletal and body imaging. However, despite the benefits and uses of PWI, this type of imaging is not standard in clinical practice, outside of academic institutions. The purpose of this exhibit is to educate individuals on the topic of PWI including the value of this imaging technique as well as the challenges of implementation.

**ABSTRACT #29**

Chiari Malformations
Jessica Heithoff. Magnetic Resonance Imaging, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Chiari Malformations are a congenital condition characterized by the herniation of brain tissues into the spinal canal through the foramen magnum. Based on the severity of the protrusion, Chiari Malformations are classified into six different types. Chiari Malformation findings are becoming more common as the use of diagnostic imaging has increased. Sagittal MRI images are used to help diagnose and classify the different types of Chiari Malformations. Researchers are working to narrow down the genetic aspects that could be the cause of this condition. The symptoms of Chiari Malformations depend on which type and vary from person to person. An occipital headache is the most common symptom among patients with Chiari Malformation. Some patients do not experience any symptoms at all while others range from mild to severe. Conservative treatments should be considered for patients with mild symptoms. Neurosurgeons use the MRI findings along with careful consideration to help determine if a patient is a candidate for surgical intervention. The benefits of surgery should always outweigh the risks. The goal of treatment is to allow adult and adolescent patients with Chiari Malformations to continue to carry out activities in their normal day-to-day life, or extend the life of an infant or child.

**ABSTRACT #30**

In Children with Cerebral Palsy, Does Equine Assisted Therapy Enhance Motor Outcomes as Compared to Traditional Physical Therapy?
Christopher Charvat, Gavin Schneider. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Children diagnosed with Cerebral Palsy (CP) suffer from a variety of lifelong impairments that cause both activity limitations and participation restrictions. Abnormal movement, posture, sensation, perception, cognition, and motor control are all common factors of CP. The traditional physical therapy approach involves including exercises to help develop coordination, build strength, improve balance, maintain flexibility, optimize physical functioning levels, and maximize independence. Equine assisted therapy (EAT), or Hippotherapy, aims to improve the child’s impairments using purposeful manipulation of equine movement to engage sensory, neuromotor, and cognitive systems to achieve functional outcomes. The purpose of this review is to determine whether EAT in conjunction with physical therapy enhances gross motor outcomes in children with CP as compared to traditional physical therapy. A literature search was conducted on PubMed to evaluate the effectiveness of EAT using the following key words: hippotherapy, equine assisted therapy, Cerebral Palsy, and gross motor outcomes. The search resulted in 20 studies, of which three randomized controlled trials (RCT) were included from the years 2009 to 2015. Each of the selected studies closely aligned with the posed research question of interest and compared the use of EAT to a control group to determine the effects of each intervention on gross motor outcomes. The studies included a form of the same gross motor outcome
measure, the Gross Motor Function Measure (GMFM), to determine the effects of the interventions.

The results of the studies indicate an enhanced benefit from EAT, as two of the studies showed a significant increase in gross motor outcomes while only one study did not. Regardless of statistical significance, there is a trend towards enhanced gross motor outcomes in children with CP who participate in EAT. Additionally, Davis et al. reported weak evidence of a difference in the Kidscreen (a parent reported quality of life outcome measurement tool). Overall, research indicates EAT can enhance gross motor outcomes in children with CP, but further investigation into the subject matter is necessary to be more conclusive.

**ABSTRACT #31**

Minimal Detectable Change in Dual Task Cost for Older Adults with and without Cognitive Impairment

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Introduction: Dual tasks (DTs) combine motor and cognitive tasks, typically causing a decline in quality of motor tasks. Larger effects occur in older adults including increased fall risk. Thus, physical therapists often use DT training as an intervention. Minimal detectable change (MDC) can determine if change with intervention is beyond the range of error. Few studies on reliability of DT outcomes have reported MDCs or included persons with cognitive impairment (CI), who generally have more difficulty with DTs than those without CI. Thus, DT training and measurement of change may be especially important for this population. We sought to determine MDCs in dual task cost [DTC: the decline in performance under DT relative to single task (ST) conditions] for gait variables in older adults and explore the impact of cognition and DT conditions on MDC.

Methods: Subjects ≥ 65 years old attended 2 sessions within 7-19 days. The Montreal Cognitive Assessment was used to classify subjects into low or high cognitive groups. At each session, subjects performed 2 walking trials under 3 conditions: a ST of walking at a self-selected walking speed (SSWS), and 2 DTs of SSWS + counting forward by 1’s (SSWS1) and SSWS + counting backward by 3’s (SSWS3). Gait variables were collected with a pressure mapping walkway. Using the average of the trials, we calculated DTC for each DT condition for velocity, cadence, step length, stride length, and stride width. We calculated MDC for each DTC. A 3-way ANOVA was used to compare DTC between groups, tasks, and sessions.

Results: DTC was significantly greater for the low (n=23) than the high (n=27) cognitive group for all gait variables except stride width. DTC was significantly greater for SSWS3 than SSWS1 for all gait variables. We found no difference in DTC between sessions for any gait variable. MDCs were generally higher for the low cognitive group and SSWS3.

Conclusions: Persons with lower cognition must exhibit greater change in DTC to be beyond the range of error. Also, the DT with greater DTC had higher MDCs. Cognition and task difficulty should be considered when measuring change with DT training.

**ABSTRACT #32**

The Association between Functional Balance Ability and Performance of Virtual Obstacle Crossing Tasks in Patients with Diabetes

Chun-Kai Huang¹, Vijay Shivaswamy², Lynn Mack², Pariwat Thaisetthawatkul³, Ezequiel Piccione³, Ka-Chun Siu¹. 1. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE; 2. UNMC Division of Diabetes, Endocrine and Metabolism; 3. UNMC Department of Neurological Sciences, Omaha, NE.

People with diabetes mellitus (DM) for over 15 years have higher chance to develop diabetic peripheral neuropathy (DPN) along with abnormal/loss of sensation on their feet, and increase the incidence of tripping/falling. Stepping over obstacles is a common functional task in our daily living, but DPN populations with the decaying sensorimotor function increase the risk of tripping/falling during obstacle crossing task (OCT). Purpose: To compare the successful rate of OCT in a virtual reality environment in people with DM or DPN, and further examined the relationships between their outcomes of OCT and functional balance tests. Hypothesis: DPN with the lowest outcomes of functional balance test will be observed, and there would be significant correlations between the successful rate of OCT and functional balance tests. A total of 32 subjects (11 healthy, 11 Type 2 DM, 10 DPN) were recruited. All subjects completed functional balance testings: Time-Up-and-Go test (TUG), Berg Balance Scale (BBS) and a virtual obstacle crossing task. While walking on the treadmill, subjects were instructed to step over the virtual obstacles projected on the curve screen ahead. The real time body movement was synchronized to the virtual reality system so subjects saw their virtual toe markers projected on the screen. The collision event was defined as the timing when...
correlation coefficient was used to examine the relationship between AAIs. The allocation attention paradigm shifts from a positive relation in young adults (rho=0.325) to a negative relation in elderly (rho=-0.821). Most young adults speed up their gait when they allocated their attention to walking and increased the number of responses when they allocated their attention to the secondary task. However, a paradigm shift begins in middle-age group that the ability of attention allocation becomes less profound. A reversed relation (paradigm shift) was shown in older adults. In conclusion, the ability of attention allocation varied at different ages. The dual task performance of middle-aged group was at the middle level among three groups. As the use of dual-task paradigm becomes popular in physical therapy practice, physical therapists need to keep in mind that the ability of attention allocation between two tasks changes across different ages.

**ABSTRACT #34**

**Effectiveness of incorporating Wii Fit Training for Patients with Neurological Impairments**

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Objective: The purpose of this critical review was to investigate the effectiveness of two different treatment methods for improving functional mobility in neurologically impaired patients.

Clinical Relevance: Balance impairments are commonly observed in the physical therapy setting when working with neurologically impaired patients. As technology continues to advance, it is important to examine innovative treatment options for patients within this population.

Methodology: Three randomized controlled trials were selected and discussed that directly compared balance training using Wii Fit technology with conventional land-based therapy for improving functional mobility in neurologically impaired patients. All three studies implemented the Berg Balance Scale (BBS) and Timed Up and Go (TUG) as functional outcome measures to evaluate functional mobility.

Results: All three studies showed Wii Fit training to be an effective treatment intervention for improving functional mobility in the neurological rehabilitation setting. The first study showed that a physical therapy program combined with balance training involving Wii Fit visual biofeedback led to an improvement in body symmetry, balance, and overall function among stroke victims. However, it showed no statistical difference between the experimental (Wii Fit) group and the control (conventional therapy) group. In
the second study, the experimental group significantly increased their BBS after completing Wii Fit training while the control group did not. Results of the third study exhibited that participants who received Wii Fit training had a significant increase in static balance, based on BBS score, compared to those who underwent traditional therapy. Additionally, patients who participated in Wii Fit training showed significant improvement in their dynamic balance scores as well. Although, there was no significant difference in dynamic balance scores between the two groups, suggesting that both interventions are effective treatment options.

Conclusion: Both Wii Fit balance training and conventional land-based therapy are proven effective therapy interventions in neurological rehabilitation. Wii Fit training led to improvements in balance and functional mobility in each of the three studies. However, the improvements were similar to those achieved with conventional land-based therapy. Therefore, both interventions appear to be effective treatment approaches for improving functional mobility in neurologically impaired patients.

ABSTRACT #35
Neurofibromatosis Type 1: Diagnostic and Therapeutic Imaging
Elizabeth Brouillette. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Neurofibromatosis Type 1 (NF1), also called von Recklinghausen’s Disease, is an autosomal dominant genetic disorder that involves malignant or benign tumors along the nerves and affects multiple systems throughout the body. With a diagnosis by the average age of ten, patients with NF1 are exposed to numerous imaging procedures at a young age and continue to have these exams done throughout their lifetime.

ABSTRACT #36
Alzheimer’s Disease: Diagnosis and Treatment Using Ultrasound Enhanced Delivery of Therapeutic Agents
Marissa Kaluza. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Alzheimer’s disease (AD) is a type of dementia that causes problems with memory, thinking and behavior. AD is a progressive disease, where dementia symptoms gradually worsen over a number of years. The major underlying mechanism of AD is the accumulation of proteins within the brain. Unfortunately, AD cannot be slowed, stopped, or prevented. Magnetic resonance imaging (MRI) with high spatial resolution allows radiologists to visualize subtle anatomic changes in the brain that signal atrophy, or shrinkage associated with AD. MRI has shown a great reduction in medial temporal lobe and hippocampus volume of patients with Alzheimer’s disease. In AD, nerve cell death and tissue loss cause all areas of the brain, especially the hippocampus region, to shrink. Imaging continues to improve early diagnosis of AD and the lengthy search process continues for treatments to slow or prevent this devastating disease. There are some studies that demonstrate how low intensity focused ultrasound with a microbubble contrast agent (FUS-MB) in transgenic mouse models may be used to transiently disrupt the blood-brain barrier of those with AD. These findings suggest that repeated scanning ultrasound may be a noninvasive method for treating AD. This exhibit highlights the potential of FUS-MB treatment as a therapeutic approach for AD.

ABSTRACT #37
Congenital Insensitivity to Pain with Anhidrosis: Radiographic Applications in Diagnosis
Lyndsy Larson. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

The purpose of this exhibit is to explore and highlight the importance of using radiographic imaging as a front-line tool to diagnosis Congenital Insensitivity to Pain with Anhidrosis (CIPA) in pediatric patients. The diagnosis is often missed initially due to insufficient radiographic examination. The exhibit examines several case studies that utilize radiographic imaging to successfully diagnose the disorder in early childhood. Methods used included radiographs of the hands, feet, knee and skull to evaluate the area of suspected trauma. With proper consultation from radiologists and neurologists, radiographs can provide quick and reliable confirmation of the disorder if CIPA is clinically suspected.
ABSTRACT #38

Abnormalities in the ADHD Brain: Recent Developments with the Use of Magnetic Resonance Imaging
Regeana Ott. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Attention deficit hyperactivity disorder (ADHD) is a neurobehavioral disorder. ADHD causes a person to have exaggerated difficulties with inattention, hyperactivity and impulsivity. Although one of the most studied conditions affecting children, the cause is unknown, but it is believed that brain abnormalities may have something to do with ADHD. These abnormalities have been studied using various imaging modalities, with MRI and fMRI being the most frequently used due to the high-resolution images produced without the use of ionizing radiation. Studies have consistently shown that there is a 3-4% decrease in the overall volume of the ADHD brain, affecting the gray and white matter throughout all lobes. The future direction of ADHD brain studies is to find out what causes ADHD, the abnormalities seen in the ADHD brain, and to possibly use MRI and fMRI to help diagnose ADHD.

ABSTRACT #39

Diagnosing Multiple Sclerosis with Magnetic Resonance Imaging
Holli Peterson. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Multiple sclerosis (MS) is a complex disease that attacks the myelin of the central nervous system resulting in MS lesions in the brain. The attack or exacerbation of the myelin causes a disturbance in nerve pulses reaching their target, resulting in many signs and symptoms. It is believed to be an autoimmune disease, but the cause of this progressive white matter disease is still unknown. It is likely that is occurs from a combination of genetic, environmental, infectious and immunological factors. There is no definitive test used to diagnose MS, but magnetic resonance imaging (MRI) plays a crucial role in diagnosing the disease and tracking the progression. The diagnosis is based on evidence of dissemination in space and time. The use of MRI can produce images that will highlight the MS lesions in different parts of the brain. The developing diagnostic criterion has made it easier and faster to accurately diagnosis multiple sclerosis. If the diagnosis is made in a timely manner, the sooner the treatment can be started leading to a better prognosis. Although there is no actual treatment for multiple sclerosis there are medications that will help prevent relapses, modify the course of the disease, and alleviate symptoms.

ABSTRACT #40

A Preparatory Educational Program for Pediatric Cancer Patients Utilizing a Virtual Environment Radiation Therapy System (VERT)
Lisa Bartenhagen, Jana Koth, James Temme. Faculty: Radiation Therapy Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

According to the American Cancer Society, there were an estimated 1,658,370 new cases of cancer diagnosed in 2015. Approximately 50-60% of children with cancer will receive radiation therapy as one form of treatment. Throughout the actual treatment process, the patient is required to remain motionless. This unfamiliar environment along with the large radiation equipment can cause stress and anxiety to the child and family members. Children up to age 4 require anesthesia during treatment and children 4-6 years of age the necessity for anesthesia depends on the child’s developmental stage, coping mechanisms and physical state. Preparation programs have been established to help minimize anxiety in children in hopes of limiting the need for anesthesia. There are ongoing clinical trials investigating the safety of anesthetic agents and long-term risks associated with frequent pediatric anesthesia. The purpose of this exhibit is to demonstrate an educational program in which the Radiation Oncology team meets with pediatric cancer patients and their families to acquaint them with the radiation therapy process using the Virtual Environment Radiation Therapy (VERT) suite. The families will be able to see what a simulated treatment unit looks and sounds like by being able to “play” with the virtual equipment as well as any immobilization devices that may be needed for treatment.

A key component in this process is the use of immobilization devices. Research demonstrates that immobilization is needed to reduce the occurrence of set up inconsistencies. Variables in patient set up increases the chance of delivering an inadequate dose to the tumor as well as unnecessarily irradiating normal
ABSTRACT #41

Optimization and Comparison of Different Methods to Improve Cytology Cell Block Specimen Yield
Lan Nguyen, Mahan Matin, Alaa Afify. Cytotechnology Program, College of Allied Health Professions, University of Nebraska Medical Center, Satellite Program Location, University of California Davis Medical Center, Sacramento CA

Introduction: Cellblock plays an important role in cytology sample evaluation. Recently, several studies have indicated that cellblocks are vital to reach a specific diagnosis. Additionally, molecular studies are needed for different tumors which plays a major role in targeting therapy. It is important to prepare a quality cellblock that could be used for ancillary studies. The purpose of this study is to compare and optimize three different preparations and to determine the ideal cellblock that yields higher cellularity.

Methods: Cellblocks were prepared by three different techniques including Agar Gel, Collodion Bag, and Shidham's method (AV-marker). Three different specimens (two pleural fluids and one ascites fluid) were used in each technique. Each sample was diluted using five different concentrations. Cellblock tissue sections from each method were prepared, and a cell count was performed. Data were analyzed and compared.

Results: Sample from the lowest concentration showed acceptable cellularity consistently when using the Collodion Bag technique compared to the AV-marker and Agar Gel technique.

Conclusion: The results indicated that the Collodion Bag technique for preparing cell block yields a higher cellularity, which will aid in cytomorphologic interpretation and the use of ancillary techniques to support the diagnosis and help in targeting the treatment.

ABSTRACT #42

Breast Cancer: Diagnosis, Treatment, and Monitoring with Imaging Modalities.
Morgane Cernik. Magnetic Resonance Imaging, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Cancer is a deadly disease. Breast cancer, specifically, is one of the highest causes of death among woman. Fortunately, imaging technology has improved significantly within the last decade. Mammography, breast tomosynthesis, ultrasound, and magnetic resonance imaging are able to diagnose cancer while radiation therapy is able to treat, and positron emissive tomography can monitor the disease. Since imaging science is advancing, health professionals are now able to diagnose the prognosis of the disease better by using the tumor node metastasis system. This improvement helps physicians know which type of treatment is best for their patients such as surgery, radiation therapy, chemotherapy, or a combination. After treatment, patients should be monitored for metastasis. Positron emissive tomography scans are appropriate for monitoring breast cancer because it is imaging functional levels in the human body. These improvements in imaging have been an instrumental part of the decreased death outcome of breast cancer. Since these advances, physicians have been able to diagnose and treat the disease early, and save more lives.

ABSTRACT #43

The Use of Three-Dimensional Printing in Radiation Oncology: Patient Specific Bolus Fabrication
Samantha Ballard, Kacey Beason. Radiation Therapy Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

The use of three-dimensional (3D) printing has increased dramatically in recent years as the technology has become more widely available. While 3D printing has already been utilized in other areas of medicine, applications are now being realized within radiation oncology. There is current research on multiple uses such as 3D printed patient-specific phantoms for treatment QA, 3D printed immobilization devices, and 3D printed proton range compensators, however, one of the best potential uses in radiation oncology is 3D printed bolus for treatment delivery. Current research suggests 3D printed bolus appears to be clinically practical in creating bolus specifically for treatment fields over irregular anatomy. With more research, best methods for the manufacture and use of 3D printed objects can be decided. There is great potential that 3D printing will soon play a crucial role in providing patients with the most accurate radiation treatments possible.
ABSTRACT #44

Radiation Therapy and Chemotherapy Induced Epilation and the Utilization of Scalp Cooling Solutions
Bethany Raabe, Carly Bernhard, Nicole Carlson.
Radiation Therapy Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Epilation and alopecia affect cancer patients both physically and mentally and are common side effects of both radiation therapy and chemotherapy. Chemotherapy agents target hair follicles and other rapidly dividing cells, causing hair loss. Extent of hair loss during chemotherapy is dependent upon which drug and dose is given. Hair loss can occur in the treatment area from the administration of radiation therapy. Radiation therapy and chemotherapy induced epilation are not immediate side effects, they are observed several weeks into the course of treatment. Cryotherapy has been introduced to combat unwanted hair loss from chemotherapy. By reducing the temperature to the scalp, a limited concentration of chemotherapy agents are exposed to the hair follicles. Reduction of chemotherapy generated epilation will improve a patient’s overall quality of life.

ABSTRACT #45

Proton Therapy
Jacqueline York, Shawn Rounsborg, Stephen Baker.
Radiation Therapy Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Proton therapy is a form of radiation therapy that has developed over the past 100 years. Protons give an alternative to photon therapy due to the absence of exit dose. Protons deliver their dose to the target depth due to a principle known as the Bragg Peak. At the peak of the transfer of energy the maximum dose is delivered. Some drawbacks to proton therapy is the financial investment. Imaging and treatment planning for proton therapy are similar to photon therapy, with the addition of converting Hounsfield Units (HU) to a relative stopping power (RSP). Each pixel must be correctly converted in order to reduce range uncertainties. Setup errors must also be considered as the potential impact from any error is significant. Proton therapy can treat a wide variety of conditions, especially pediatric cases due to the reduction of dose to healthy tissues; however, there are few treatment centers across the United States due to its cost.

ABSTRACT #46

Gastric Adenocarcinoma: Etiology, Diagnosis, and Treatment
Michaela Eurek. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Stomach cancer, also known as gastric cancer, is cancer that originates in the mucus-producing cells in the lining of the inside of the stomach wall also known as adenocarcinoma. Developing any type of cancer can be frightening. Like most cancers, the cause of gastric adenocarcinoma is unknown. For diagnosis of gastric adenocarcinoma, the first diagnostic exams to be performed is an endoscopy and computed tomography (CT) scan. After the initial diagnosis, determining the stage is the next vital step. Stage can be determined by many tests such as CT, positron emission tomography (PET), magnetic resonance imaging (MRI), or an endoscopic ultrasound. When the stage is determined, treatment plans can be made so that the life of the patient can be prolonged. Typical treatment courses can include surgery, radiation therapy, or chemotherapy. Although there is no definite cure yet, strives are being made toward finding a cure, one strive being hyperthermic intraperitoneal chemotherapy (HIPEC).

ABSTRACT #47

Supine Versus Prone: An Examination of Advantages and Disadvantages in Positioning for Breast Radiotherapy
Emily Johnson. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

The purpose of this exhibit is to examine the current published works available concerning differences in supine and prone setups for radiation therapy of the breast in an attempt to determine the advantages and disadvantages of treatment in each position. Breast cancer is the most common malignant disease affecting women, and radiation therapy is a major aspect of its treatment. Due to the frequent use of radiotherapy and the large doses of radiation involved, it is imperative that the most effective means of delivering the dose is utilized. The supine and prone treatment positions were reviewed separately to
determine their own individual benefits and drawbacks. Advantages and disadvantages are appreciated for both supine and prone breast radiotherapy. The review concludes that most women who receive whole breast irradiation following breast conserving surgery will obtain the most benefits from a prone treatment setup due to the substantial decrease in dose to the organs at risk. However, in certain cases, such as for women with small breast size, the supine setup is still ideal for treatment.

**ABSTRACT #48**

**Supplemental Intervention on Radiation Therapy Treatment**

Jacqueline Monzingo. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Cancer treatment is highly dependent on the planning of the doctors and medical staff involved; however, the patient has an integral role in his or her treatment experience and outcome. The purpose of this exhibit is to understand radiation therapy and discover the effects of supplemental interventions on radiation therapy treatment. The supplemental interventions include guided imagery, music therapy, relaxation therapy, patient education, support groups, and faith in a higher being. The results of multiple data sets conclude that the addition of adjunct therapies to radiation therapy increases the patient’s quality of life, life expectancy, attitude on treatment, and satisfaction of treatment, as well as decreases patient distress, anxiety, and depression in radiation therapy treatment. Supplemental intervention has a positive impact on radiation therapy treatment, and should be added to radiation therapy treatment to improve the experience and outcome of the patient.

**ABSTRACT #49**

**Imaging the Transgender Patient**

Christina Gregg, Tanya Custer, Kim Michael. Faculty: Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Within the health care system, lesbian, gay, bisexual, and transgender (LGBT) persons face many obstacles that lead to health disparities. These disparities include social stigma, lack of provider knowledge and training, lack of sufficient health insurance coverage, and layout of physician practice. As noted by the Joint Commission, federal law prohibits the discrimination of individuals based on race, color, national origin, age, disability, and sex within the health care system. It is essential for all health care providers to be educated on the best practices in regard to caring for the LGBT patient.

The focus of this exhibit is to define and explain terminology important in the care of the LGBT patient, identify health disparities faced by the LGBT patient, describe the health care needs of the LGBT patient and to list the best practices in regard to creating a welcoming and safe environment for the LGBT patient.

**ABSTRACT #50**

**The Military Veteran Population in Higher Education: Success and Wellness Considerations**

Stephanie Vas. Faculty: Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

The combination of two recent military operations and the U.S. government approval of updated educational benefits for individuals who have served in the military led to a large cohort of veterans enrolling or re-enrolling into post-secondary educational institutions. The beginning influx of this population on to campus spurred researchers to look more closely at this group and the unique challenges they bring to campus. This poster explores recent research conducted on this population of students. Current research has brought insight to the military-to-campus transitional issues, including a disconnect between prior military and non-military peers, difficulties adjusting to a different life.
structure, and the negative perceptions of the campus climate. Institutions of higher education should consider utilizing this information in efforts to increase student-veteran success within higher education.

**ABSTRACT #51**

**The Effect of EP67 on Leukocyte Morphology**
Rachel Baldwin, Chelsea Manago, David Holt. Clinical Perfusion Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Background: cardiac surgery with the use of cardiopulmonary bypass (cpb) is associated with adverse postoperative complications due to alteration of the immune system. Ep67 is a synthetic response selective agonist of human c5a which has the potential to enhance immunity. This research study focused on the effect of ep67 on leukocytes, specifically if it causes any morphological change in white blood cells.

Methods: blood samples were collected from five subjects. The blood was separated into two one-milliliter aliquots. One of the aliquots received 100 micrograms of ep67 diluted into 20 microliters of saline and the other aliquot received 20 microliters of plain saline. The samples were stored at room temperature and blood smears were made using the manual wedge technique at 0, 8, 24, and 48 hours. The smears were stained using the wright-giemsa staining method.

Results: white blood cell morphology showed little variance in the results for the untreated blood versus the whole blood treated with ep67. Morphology appeared similar in both the control and test samples. White blood cell differentials showed a trend of decreasing percentage of neutrophils and increasing percentages of lymphocytes and monocytes. The average percentage decrease in percentage of neutrophils from hour 0 to hour 48 for the control and test group was 51% and 30%, respectively. The average percentage increase in percentage of lymphocytes present from hour 0 to hour 48 for the control and test groups was 64% and 40% while the percentage increase in monocytes was 128% and 64% respectively.

Conclusion: there was not enough of a difference in the cell morphology to determine if the addition of ep67 had any impact on the cells present and therefore, the null hypothesis was proven. There was a change in the percentage of types of cells present and the change was significant in the control group versus the test group. Based on this data, there should be additional research performed on ep67 and its effect on leukocytes.

**ABSTRACT #52**

**In children with developmental delays, does the child’s participation in their life roles change before and after training to use a modified ride on car?**
Liz Bus, Haley Hansen, Laura Porath. Division of Physical Therapy Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Background: The International Classification of Function (ICF) has become the model that physical therapy intervention follows, making the ability to participate in life roles the main goal of treatment. According to the ICF-Children and Youth model, participation is defined as including learning and applying knowledge, general tasks and demands, communication, mobility, self-care, domestic life, interpersonal interactions and relationships, major life areas, and community, social and civic life. Therefore, from a physical therapy perspective, participation is the ability to play and explore the environment with family and peers. However, for many children with disabilities, participation is hindered by their inability to move and explore their environment independently. This lack of independent mobility goes on to negatively impact their cognitive and socialization abilities. Researchers and therapists have found a way to give children with disabilities independent mobility through the use of modified ride on cars (ROCs). This increased independence gives children more opportunities to participate in life roles.

Purpose: The purpose of our paper is to analyze and summarize current research about modified ride on car use in children to determine the effect of the modified ROC on the child’s participation in their life roles.

Methods: Academic literature search engines were used to find current research articles concerning the use of early powered mobility in children with disabilities. Articles were selected if they were published in a peer reviewed journal and utilized modified ROCs.

Results: All of the children in the studies were able to learn how to independently drive the modified ROC. In general, the children demonstrated an increase in communication and ability to access their environments where they increased their interactions with their family and peers as described by caregivers.

Conclusions: Based on the current research, modified ROCs are useful in increasing the ability of children with disabilities to participate in their life roles. Modified ROCs have the potential to be a less expensive, feasible
way of increasing participation for children with disabilities.

**ABSTRACT #53**

**Relationship between physical activity, serum 25 (OH)D and inflammation markers in adults from the National Health and Nutrition Examination Survey 2005 to 2006**

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**Purpose:** We examined the relationship between physical activity, serum 25(OH)D and markers of inflammation.

**Methods:** We analyzed the effect of physical activity and serum 25(OH)D on neutrophil/lymphocyte ratio (N/L), white blood cell count (WBC) and C-reactive protein (CRP) using data from 2898 participants collected during years 2005-2006 of the National and Nutrition Examination Survey (NHANES). Assessment of possible interactions and regression models of weighted data were completed for different levels of 25(OH)D and physical activity. P<0.05 was considered statistically significant.

**Results:** Regression analysis showed that being active (mean duration of accumulated moderate to vigorous activity ≥ 21.4 min/day) (p=0.035) and younger (p<0.0001) was associated with lower N/L for all gender groups. There was a statistically significant 2-way interaction between 25(OH)D and gender group (p=0.0031) for WBC analysis. For pre-menopausal female, being active was associated with lower WBC (p=0.007). For menopausal females, younger age (p=0.04), higher activity (p=0.014), and ≥ 30 ng/ml serum 25(OH)D compared to 0-20 ng/ml and 21-29 ng/ml (p=0.0047 and p=0.0021) was associated with lower WBC. For males, only higher activity was associated with lower WBC (p=0.0006). There was a statistically significant 3-way interaction of gender group, activity level and 25(OH)D group (p=0.0041) for CRP. For pre-menopausal females and males, being active was associated with lower CRP (p=0.0079 and p=0.0099). For menopausal females, linear regression demonstrated that only serum 25(OH)D affected CRP with those having levels of 0-20 ng/ml or 21-29 ng/ml having higher CRP than subjects with ≥ 30 ng/ml (p=0.0048 and p=0.008).

**Conclusion:** Serum 25(OH)D influenced some inflammatory markers in menopausal females, but was not associated with inflammation in males or pre-menopausal females. Activity was universally associated with decreased inflammation, except for CRP in menopausal females.

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**ABSTRACT #54**

**Producing Evidence to Make Healthcare Safer: Implementation and Evaluation of Multiteam Systems to Decrease Fall Risk in Critical Access Hospitals**

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**Background/Purpose:** The risk of falls is significantly greater in Nebraska’s 64 Critical Access Hospitals (CAHs) than in its’ 18 larger hospitals Our previous research found that hospitals in which teams learned from data and integrated evidence from multiple disciplines had significantly lower fall rates than hospitals that did not. The purpose of our project, Collaboration and Proactive Teamwork Used to Reduce (CAPTURE) Falls, was to use multiteam systems (MTSs) to implement and coordinate fall risk reduction in CAHs. An MTS is made up of component teams that work together to achieve a common goal.

**Methods:** We partnered with 17 hospitals from 8/2012-7/2014 to implement CAPTURE Falls. The component teams in each hospital were: an interprofessional coordinating team accountable for the structures, processes, and outcomes of fall risk reduction; the core team of direct-care staff accountable for implementing interventions; and contingency teams composed of various team members who conducted post-fall huddles to learn from each fall.

We supported coordinating teams to: conduct a gap analysis, develop an action plan, and report and analyze fall events using a standardized instrument. We developed a web-based toolkit to disseminate evidence and supported coordinating teams to restructure interventions to fit their context. We used a pretest-posttest design—tracking changes in the structure, process, and outcomes of fall risk reduction and conducting qualitative interviews and assessments of safety culture and teamwork at baseline and project end. We analyzed fall rates using the negative binomial
model and survey results using generalized linear mixed models to account for the correlated nature of the data.

Results: Total and injurious falls/1000 patient days decreased from 5.9 to 4.1 and 2.1 to 1.4 respectively despite an emphasis on reporting assisted falls and more rigorous definition of injury during the intervention. Coordinating team effectiveness in developing and implementing policies/procedures educating staff, and communicating with other component teams was significantly and negatively associated with fall rates. Component team member perceptions of the intervention varied depending upon their participation in post-fall huddles.

Conclusion/Implications: Consistent with MTS theory, interprofessional teams that coordinate activities of component teams may be an effective structure to make healthcare safer.

ABSTRACT #55
Teamwork: Interprofessional Education for the Imaging Science Professions
Tammy Jones, Christina Gregg, Ellie Miller. Faculty: Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Interprofessional Education, or IPE, can be defined as the consistent demonstration of core values evidenced by professionals working together, aspiring to and wisely applying principles of, altruism and caring, excellence, ethics, respect, communication, accountability to achieve optimal health and wellness in individuals and communities. It is well known that healthcare professionals should not work in silos, but rather, collaborate and share knowledge in an effort to work as a team to optimize healthcare service delivery. There are a variety of educational activities that can be designed to foster interprofessional education. The anticipated outcomes of IPE activities are the demonstration of progressive phases of teamwork competencies. The IPE activities should successively build upon one another to create a scaffolding of knowledge. This exhibit will explore the IPE learning activities, provide examples for how the image science professions aim to participate, and offer outcomes for implementing IPE into a curriculum.

ABSTRACT #56
The validity of saline transported specimens for bacterial culture in FNA procedures
Erin DeYoung. Cytotechnology Program, College of Allied Health Professions, University of Nebraska Medical Center, Satellite Location site, Carle Foundation Hospital, Urbana, Illinois

The collection of specimens for culture during fine needle aspiration (FNA) procedures is important when a bacterial or fungal infection is clinically suspected. At Carle Foundation Hospital in Urbana, IL, patient samples are currently being transported in saline and then delivered to the microbiology department for culture. Unfortunately, little clinically significant results are currently being obtained. This brings into question the validity of current specimen transport procedures, which could be negatively affecting patient care. This study is to determine the survivability of bacterial samples transported in saline in comparison with a universal transport media.

ABSTRACT #57
Polyorchidism: A Case Report
Randi Grandgenett, Katelyn Moravec. Diagnostic Medical Sonography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Polyorchidism is a very rare congenital anomaly in which more than two testes are present. This anomaly is usually diagnosed during adolescence with a mean age of diagnosis being between 15-25 years. The exact etiology is unknown, but is thought that during embryonic life there is a longitudinal or transverse division of the genital ridge or a duplication of the genital ridge. In 75% of the cases reported, the supernumerary testicle is located within the scrotum and there are three testicles present. Sonography is an effective imaging modality for detecting the presence of polyorchidism and is the preferred modality for diagnosis. This case study presents an asymptomatic patient who presented with a palpable mass on the left testicle.

ABSTRACT #58
Sonographic Evaluation of Feline Pancreatitis
Kayla Purrington, Shelby Kohl. Diagnostic Medical Sonography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Pancreatitis is a common pathology in the human population, but the prevalence in felines is unexpectedly high. This exhibit will review select veterinary journal articles along with personal research
to outline feline pancreatitis. Methods of diagnosis will be discussed, as well as, the incidence, clinical appearance, causes, and treatment of feline pancreatitis. The sonographic appearance and technique for diagnosing feline pancreatitis will be reviewed.

**ABSTRACT #59**

**Gadolinium: Benefits vs Side Effects**  
Jeremiah Zwiener. Magnetic Resonance Imaging, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Gadolinium is an element found in the earth that had been modified for use in patients to help highlight specific tissues during imaging procedures in imaging departments. This poster will show you some of the side effects such as the different degrees of an allergic reaction, as well as the longer term side effects like gadolinium being retained in tissues, and the effect it has on kidney function. This information will help determine gadoliniums place in the healthcare field and whether or not gadolinium-based contrast agents can provide enough positive outcomes to outweigh the side effects it has on patients.

**ABSTRACT #60**

**Osteogenesis Imperfecta: Use of Radiation to Diagnose and Treat Osteogenesis Imperfecta**  
Nolan Vasa. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Osteogenesis Imperfecta is a heritable disorder of bone formation resulting in low bone mass and a propensity to fracture. Apparent at birth, the disorder exhibits a varying range of clinical severity from fracturing in utero and/or perinatal death to near normal adult stature and low fracture incidence. The common association between the classifications is a mutation in the gene that produces collagen, but is also not a prerequisite for the disorder. Effectively diagnosing patients is emphasized as palliative treatment is contingent upon diagnosis in the earliest possible stage. However, noting the radiographic dose administered to the patient as they will more likely be dealt an above average dose throughout their lifetime given their condition. Treatment for the disorder consists of using bisphosphonate therapeutic agents to help increase bone density and strength in all the different types of osteogenesis imperfecta. Other measures of treatment accommodate activities of daily living such as types of counseling, therapy, and even genetic advisors specifically tailored for individual cases have also proven to be beneficial.

**ABSTRACT #61**

**Intraoperative Magnetic Resonance Imaging: Evolution, Benefits, and Safety Considerations**  
Sydney Welch. Radiography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Intraoperative magnetic resonance imaging (iMRI) has dramatically evolved since its invention. Its ability to provide real-time intraoperative imaging increases neurosurgeons’ precision and helps to counteract the brain shift phenomenon that can hinder tumor resection. Studies demonstrate the use of iMRI can drastically improve surgery result and as well as quality of life. However, the use of an MR scanner in an operating suite can pose a serious hazard to patients and personnel. Personnel need to be aware of the unique challenges created by this environment. Failure to recognize the differences between the diagnostic MRI environment and the iMRI environment can compromise the safety of the patient and operating room staff. As technology continues to advance, iMRI is beginning to become an invaluable tool in neurosurgery.

**WOMEN’S HEALTH**

**ABSTRACT #62**

**The correlation of high risk HPV genotypes with cytological-histological correlation**  
Lui Li. Cytotechnology Education Program, College of Allied Health Professions, University of Nebraska Medical Center, Satellite Program Location, Carle Foundation Hospital, Urbana, IL

Background: Since the Cobas HPV test on ThinPrep specimens was approved by the FDA for primary cervical cancer screening in women older than 25 years of age in 2014, recent studies argued that high risk HPV (hr-HPV) only screening can offer better detection in CIN 3 or above than cytology-only screening. However, a study from Quest Diagnostic
Health Trends has shown that hrHPV-only screening has up to 19% false negatives to cervical cancer in women between 30 to 65 years of age compared to cytology-screening only (12%) and co-testing (6%).

Method: To investigate the sensitivity and specificity of hrHPV-only screening, 1000 de-identified cases of hrHPV testing on SurePath specimens from Carle Foundation Hospital were reviewed and correlated with concurrent Pap smears and surgical biopsies taken within 120 days.

Expected Results: hrHPV-only screening is expected to have a higher rate of false negatives than cytology-only screening.

Conclusion: Based on the initial review from previous studies, hrHPV-only is more likely to have a higher rate of false negatives on cervical cancer than cytology-only screening. After the data is compiled, we predict that hrHPV-only screening will not be suggested as a primary screening tool for cervical cancer in women.

ABSTRACT #63

Endometrioma at Caesarian Section Scar: Sonographic Demonstration
Bailey Adair, McKenzie Geiken. Diagnostic Medical Sonography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Endometriosis is a common gynecological condition which often presents as a cyclic and hormonally-stimulated pain in women during their reproductive years. Defined as ectopic endometrial tissue, endometriosis can be either pelvic or extrapelvic in location. In rare occurrences, a well circumscribed mass of endometrial tissue, an endometrioma, may develop along the abdominal wall and within a cesarean section scar. The identification of this rare phenomenon poses a diagnostic dilemma and calls for a thorough clinical examination of the area. This report discusses the imaging modalities used to definitively diagnose an endometrioma located within a cesarean section scar.

ABSTRACT #64

Granulosa Germ Cell Tumor: A Case Study
Courtney Knox, Lea Lambing. Diagnostic Medical Sonography Program, Division of Radiation Science Technology Education, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Granulosa germ cell tumors are a rare type of neoplasm that develop from ovarian stroma cells. They are the most common active estrogen secreting tumor and represent 1-8% of all ovarian neoplasms. Transabdominal and transvaginal ultrasound imaging are the best modalities to evaluate this tumor. The majority of these tumors have to be removed surgically due to their malignant potential. Granulosa germ cell tumors can also reoccur if they are removed and not all cells are extracted.

ABSTRACT #65

Educating the Public on Fetal Magnetic Resonance Imaging
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Most people do not know that the fetus can be visualized by using magnetic resonance imaging (MRI). Ultrasound is the primary diagnostic imaging source that is used and most commonly known when it comes to imaging the fetus. If an abnormality is detected when the expected mother is having an ultrasound, she may be asked to have MR imaging to further diagnose the abnormality. Magnetic resonance imaging uses non-ionizing radiation to produce images of diagnostic value. Ultrasound and magnetic resonance imaging both have their advantages and disadvantages. Ultrasound is not able to visualize the brain of the fetus as well as magnetic resonance imaging can. With technology advancing each day, MRI has been designed with faster pulse sequences to reduce the possibility of motion of the fetus while the pulse sequence is running. Magnetic resonance imaging is able to scan the fetus brain in three scan planes; sagittal, coronal, and axial producing optimal quality diagnostic images to further aid in the diagnosis of the abnormality found on an ultrasound.

ABSTRACT #66

Good Vibrations: Interpretation of fremitus and Percussion in a Chest Examination
Student Directors: Jamie Straube, Jena Mizner; Faculty Advisor: Sara Bills. Division of Physical Therapy
E-learning modules allow students to gain fundamental knowledge at a convenient time and pace. Knowledge gained through the module can then be applied during higher-level discussions in a group learning environment. The topic of this module is the interpretation of fremitus and percussion in a chest examination.

Fremitus and percussion are valuable components of clinician’s chest exam and help in developing a patient’s differential diagnosis and plan of care. The key to accurate interpretation of these tests relies on a solid understanding of the mechanical behaviors of wave transmission. Recognizing the characteristics of abnormal wave transmission enables the clinician to determine the likely underlying cause of shortness of breath and, in some cases, determine if emergent care is needed.

This module uses animated video to illustrate commonly known examples of physics principles to better understand how waves travel through mediums of different densities. Clickable interaction and embedded questions encourage viewers to examine a virtual chest and apply their knowledge of wave transmission to the lungs, pleura and chest wall. To keep the 15-minute module engaging and practical for students, knowledge checks with feedback are integrated throughout.

While intended to be viewed before class discussion, the module will be a readily available resource for students to revisit when preparing for exams or treating patients in the clinic.

ABSTRACT #67

Rapid On-Site Evaluation (ROSE) of FNA Specimens in Cytology
Student Directors: Haleigh Delavan, Jordan Hopkins, Sarah Hove; Faculty Advisors: Amber Donnelly, Maheswari Mukherjee. Cytotechnology Program, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

Rapid On-Site Evaluation (ROSE) of FNA Specimens in Cytology was chosen to help fill a gap in the Cytotechnology Program curriculum. The fine needle aspiration (FNA) technique is widely used to obtain cellular specimens from various body sites. Furthermore, it is advantageous to the patient for an immediate reading as to if enough cellularity was obtained for an accurate diagnosis, hence, ROSE was developed. With ROSE becoming more popular in the health field, it is pertinent that both Cytotechnology students and residents be familiar with the process.

The e-learning module is focused on teaching future health professionals involved in FNA the process of ROSE. ROSE is a widely used technique in FNA procedures to ensure adequacy, improve accuracy, and heighten efficiency. These factors are showcased while the module goes through a simulation of an FNA procedure involving ROSE. The simulation accurately portrays a real-life procedure guaranteeing familiarity when encountering a live procedure.

It is beneficial to show the module to future students and residents before they learn the course material to introduce them to the procedure as a whole, allowing for a more intimate breakdown of the procedure in lecture.

Our module is interactive to highlight the main concepts for users and keep them engaged. By testing users with follow-up questions over the procedure, the module ensures comprehension. At the end of the module, scenarios will be incorporated to apply the information users previously learned. The module will be tested with current Cytotechnology students, residents, and faculty to assess applicability and user-friendliness.

ABSTRACT #68

Telecytology
Student Directors: Ibrahim Saad, Andrew Johng; Faculty Advisors: Maheswari Mukherjee, Amber Donnelly. Cytotechnology Program, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE

The overall aim of this e-learning module is to improve the health professional students’ and practitioners’, particularly the Cytotechnology students’, understanding of the role of telecytology in cytopathology practice. Hence, help the cytology students and professionals to be able to clinically integrate and actively participate in the clinical management of telecytology.

This e-learning module contains short video clips for demonstrational purposes on the different practices of telecytology that are available for use. The video clips also compare and contrast these available technologies, and will briefly explain the types of equipment used in performing the different telecytology practices. This module allows the students to excel and better prepare themselves for the telecytology practices in future.

This e-learning module provides visual and auditory input, which will improve retention and comprehension. There are self-assessments to test knowledge gained from the information presented in the videos. The self-assessment tools included in this
e-module are multiple-choice questions and multiple response questions that encourage critical thinking and understanding of the students. Also included are survey questions for assessment of the module itself.

This e-learning module primarily targets cytotechnology students in their Fine Needle Aspiration cytology coursework. However, it will also benefit practicing cytotechnologists, pathology residents, and any other medical professional for reviewing purposes.