

SCHOLAR Day Posters 2023

Poster 1

Hannah Bell

Physician Assistant Studies

Prof. Vanessa Worley

Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections (PANDAS): Current Understanding and Future Directions

Pediatric autoimmune disorders associated with streptococcal infections (PANDAS) is a rare, controversial neuropsychiatric disorder characterized by sudden onset of obsessive-compulsive symptoms, tics, and other dramatic mood and behavior changes following a streptococcal infection. PANDAS is believed to result from an autoimmune response leading to inflammation and dysfunction of the part of the brain responsible for movement and behavior regulation. The diagnosis of PANDAS is challenging due to a lack of specific tests and symptoms that can overlap with other neuropsychiatric disorders, leaving some medical professionals skeptical about the condition. This systematic review of literature aims to discover the most effective treatment regimen for children diagnosed with PANDAS by comparing antibiotic therapy, intravenous immunoglobulin (IVIG) to suppress the autoimmune response, tonsillectomy, and cognitive behavioral therapy in double-blind randomized, placebo-controlled trials. Results showed that antibiotic therapy and IVIG were most effective in eradicating the streptococcal infection and symptoms associated.

Poster 2

Malcolm Golias

Exercise Science

Dr. Ronald Mendel

Evan Days

Exercise Science

The Effects of Chronic PNF and Static Stretching Techniques on Running Economy

The purpose of this study is to compare the effects of proprioceptive neuromuscular facilitation (PNF) and static stretching on the running economy of the lower limb extremities during aerobic exercise. This study is specifically looking at cross-country runners from the University of Mount Union who practice regularly and compete on the team. The practice and warm-ups were administered by the researchers and a specific stretching protocol was assigned to groups consisting of PNF, static, or control. A metabolic cart was utilized for indirect calorimetry as well as the use of heart rate monitors. This data will be used to compare the roles that the PNF, static, and control groups have on the running economy of the participant. With this information, we can identify which recovery stretching protocol is most beneficial to collegiate cross-country runners for their running economy.

Poster 3

Jocelyn Eber

Biology

Dr. Phillip LaScola

Watching Like a Hawk: The Effect of Enrichment on the Natural Behaviors of Hawks in Human Care

Enrichment of hawks (*Buteo*) in human care has been a topic of discussion among falconers, animal rehabbers, and zookeepers since they have been utilized in early practices of falconry. Enrichment practices consist of introducing new items to the birds to alter their daily lives, encourage them to develop their natural behaviors, and keep them mentally and physically stimulated (Potts, 2016; Hauber et al., 2017; Podturkin, 2021). The purpose of this study was to evaluate the effectiveness of enrichment items and assess if the correct goal behavior was achieved. The subjects of this study were three focal species: the Harris Hawk (*Parabuteo unicinctus*), the Red-Shouldered Hawk (*Buteo lineatus*), and the Red-Tailed Hawk (*Buteo jamaicensis*). Enrichment of the subjects is determined by a schedule based upon how often they receive enrichment and which behavior is to be targeted. Data collection was not complete at time of abstract submission.

Poster 4

Anna Kokitka

Physician Assistant Studies

Prof. Vanessa Worley

Benign Paroxysmal Positional Vertigo: Does Vitamin D Play a Role?

Have you ever spun around in circles quickly to make yourself feel dizzy? Imagine having the feeling of your surroundings spinning without being able to control it. That sensation is known as vertigo. One of the most common causes of vertigo is benign paroxysmal positional vertigo (BPPV), which is vertigo triggered by positional changes. Some risk factors for developing BPPV have been identified such as a history of head trauma, but low vitamin D is a risk factor currently under investigation. Though vitamin D deficiency is common, it is not routine to test levels of vitamin D when BPPV is diagnosed. This systematic review of literature was performed to determine if protocols should change and if supplementation with vitamin D in BPPV patients with deficient or insufficient levels leads to decreased recurrence of vertigo episodes. Results show there is a promising improvement in the recurrence and severity of vertigo episodes when abnormal levels of vitamin D are identified and corrected.

Poster 5

Breanne Welsh

Biomedical Engineering

Dr. Loay Al-Zube

Jessie Kasper

Biomedical Engineering

Ryan Meister Jr.

Biomedical Engineering

Assessing the Elastic Modulus of the Multiflora Rose through Mechanical Testing

The multiflora rose is a perennial shrub of the rose family that was originally an ornamental plant used for conservation, but later became identified as an invasive with uncontrolled growth. The purpose of this study was to use mechanical testing to determine the elastic modulus of the multiflora rose stem under various conditions to determine the best method to effectively control this invasive species. Stems were collected from the Huston-Brumbaugh Nature Center and were prepared consistently for each type of test. Three-point bending, compression, and tensile tests were all performed on the Instron machine. The data collected from testing was assessed and used to calculate the elastic modulus of the multiflora rose

stems. The stems proved to grow back stronger after being mowed or sprayed, which is useful in determining a future treatment method.

Poster 6

Madison Pepper

Exercise Science

Dr. Ronald Mendel

Olivia McLean

Exercise Science

Can Citric Acid Supplementation Taken Before Moderate to Intense Exercise Prolong the Onset of Muscle Fatigue in Division 3 Collegiate Soccer Players

As soccer is an intense and physically demanding sport, the onset of muscle fatigue can be detrimental to an athlete's performance. In order to prolong this onset of fatigue, a supplement is warranted to be able to maximize the energy supply in the muscles. Citric Acid, which is a main ingredient in lemon juice, plays a key role in replenishing energy for the working muscles in the body. The purpose of our study was to determine if additional citric acid supplementation taken before exercise can prolong the onset of fatigue and shorten recovery time in soccer players. Twenty male and female division III collegiate soccer players from the University of Mount Union were recruited for this study. Each subject went through three separate testing sessions where they drank 32 oz of a different supplement before each session: citric acid, Gatorade, or flavored water. Each testing session the subjects performed a 30-second Wingate, which is a maximal cycling test where their fatigue index, power, and subjective fatigue were assessed. Data collection is still being completed at the time of abstract submission.

Poster 7

Heather Schlenker

Physician Assistant Studies

Prof. Vanessa Worley

Genicular Nerve Radiofrequency Ablation for Knee Osteoarthritis: A Minimally Invasive Alternative to Knee Replacement Surgery?

Many people who suffer from severe knee osteoarthritis have other medical conditions such as diabetes and heart disease that make them poor candidates for a total knee replacement. Genicular nerve radiofrequency ablation (GNRFA) is a potential non-surgical option for these individuals. GNRFA targets the main nerve in the knee that sends pain signals, and ablation (heat or cold energy used to create tiny scars in the tissues) of the nerve reduces transmission of these signals. This systematic review will look at GNRFA's effect on knee pain and functionality with comparisons before and after as well as comparisons to control groups. Recent publications found in multiple medical literature databases were collected and critiqued for this research with the goal of determining if the evidence supports GNRFA as an alternative to surgery. The results are mixed but some people may be better candidates than others. Come learn the exciting truth about GNRFA!

Poster 8

Jason Jeffries

Geology

Dr. Andrew Hutsky

Impact of Road Salting on Conductivity in the Mahoning River, Beech and Deer Creeks

Waterways are at a delicate balance in our ecosystem and impact various systems such as aquatic life and erosion. To maintain this balance, it's important that humans remain cognizant of their impact. In the winter, salts are used on roadways to assist in icy conditions but often end up in nearby waterways. The goal of this study was to determine the chemical impact of these salts in waterways. This study's methods was a measure of conductivity, defined as the ability for water to conduct electricity due to dissolved ions, using a conductivity meter. Water was taken multiple times from three locations and compared against snowfall to determine trends. The expected outcome of this study is to see increases after large snow events. Repetitions of this research is useful in understanding the impact of road salts on waterways, and lead to the development of more environmentally conscious options.

Poster 9

Garrett Bischof

Exercise Science

Dr. Ronald Mendel

Connor Hyndman

Exercise Science

The Difference Between a Deadlift Training Program vs. a Rack Pull Training Program on Rate of Force Development, Peak Force, and Lower Body Anaerobic Power

The aim of this study was to determine if there's a difference between the deadlift and rack pull on rate of force development, peak force, and lower body anaerobic power. Current research suggests that the deadlift exercise is associated with low back pain and injury, even with proper technique. By decreasing forward trunk tilt, with the rack pull, less force is applied to the lower back and therefore decreasing the risk of injury. Eight resistance trained subjects were split into two even training groups, one rack pull and one deadlift. Each subject completed three countermovement jumps (CMJs) on force plates pre and post completion of the 6-week training program. The best of the three jumps, pre and post, was recorded and the following parameters were calculated: rate of force development (RFD), peak force, and vertical jump height.

Poster 10

Morgan Snow

Physician Assistant Studies

Prof. Vanessa Worley

Dream Abnormalities: Are They a Risk of Selective Serotonin Reuptake Inhibitor Treatment or a Consequence of Living with the Diagnosis of Anxiety/Depression?

Do you battle feelings of sadness, hopelessness, irritability, nervousness, or insomnia? According to the National Institute of Mental Health, nearly one in five U.S. adults live with these symptoms. Generalized anxiety disorder and major depressive disorder are extremely prevalent within our society today. There are medications to treat the associated symptoms, including selective serotonin reuptake inhibitors (SSRIs). Theoretically, if you started treatment with an SSRI and experienced persistent dreams of developing cancer or dying, would you continue treatment with the medication, or would the risk outweigh the benefit of reduced anxiety? Advising patients about the side effects to pharmaceuticals is critical before initiation. To provide more information to individuals utilizing SSRI treatment, a systematic

review of literature was conducted to determine if healthcare providers should warn their patients about the potential adverse effect of dream abnormalities. Come find out whether your vivid dreams are due to anxiety/depression or SSRI treatment.

Poster 11

Alaina Metzler	Chemistry	Dr. Robert Ekey
Ian Black	Biology	
Chyenne Brammer	Geology	
Faith Brown	Mechanical Engineering	
Chance Coultrip	Mechanical Engineering	
Alejandro Elias	Civil Engineering	
Ethan Fletcher	Biomedical Engineering	
Brendan Friedrich	Mathematics	
Vincent Giument	Mechanical Engineering	
Christian Goodin	Physics	
Brady Graham	Mechanical Engineering	
Elias Holm	Mechanical Engineering	
Colton MacE	Mechanical Engineering	
Axel Magarrell	Biomedical Engineering	
Aidan McFerren	Exercise Science	
Sydni McQuilkin	Biomedical Engineering	
Alexander Mulvin	Mechanical Engineering	
Omar Najjar	Mechanical Engineering	
Devon O'Brien	Civil Engineering	
Samantha Orlosky	Intervention Specialist	
Benjamin Shaffer	Mechanical Engineering	
Annika Stankowski	Biomedical Engineering	
Alyssa Wilson	Biomedical Engineering	
Kevin Zurbrugg	Mechanical Engineering	

Performing Homemade Instruments

The course Science, Sound and Music examines the science of sound, music and acoustics, exploring ideas including how sound is produced and perceived, the creation and interpretation of music, the influence of room design on its acoustics and how musical instruments work. Throughout the semester, students explore these concepts from a scientific and aesthetic perspective integrating their own personal experiences with ideas from several disciplines including, physics, music and psychology. The final project for the course brings it all together, with each student designing, building and performing a musical instrument. This public performance will be the first and last time for this ensemble and these instruments. The performances will occur at 2:30 PM at the poster session. Feel free to ask the students about their instruments following the performance.

Poster 12

Elisa Summanen	Civil Engineering	Prof. Jake Noble
Savannah Kole	Civil Engineering	
Dan Shaffer	Civil Engineering	
Adam Hale	Civil Engineering	
Nick Antram	Civil Engineering	

Intersection evaluation and improvements for the East side of State Route 62 on/off ramps and State Street

There are a high number of crashes that occur at the intersection by the east side of State Route 62 on/off ramps and State Street. This location is found on the west side of Alliance in Stark County Ohio. The information regarding these crashes came from the Stark County Crash Report from 2020 and Ramp Cam Tool 2017-2021, Provided by the Ohio Department of Transportation (ODOT). Combined, these sources indicate the number of crashes, the type of crash, and whether there was a fatality or injury. The goal of this project is to identify likely causes, propose, and evaluate potential alternatives to reduce the number of crashes and their severity. The intersection was analyzed, and alternatives were determined by using the engineering design process. First, research was conducted over the existing roadway. This means collecting data, quantifying, evaluating crashes, and other data to identify the nature of the problem and possible causes. Examples to improve the intersection are putting in a roundabout, improving signage, added turn lanes or lights, and much more. To determine what is best for this intersection, we visited the site and collected data on the crashes. This is important for determining where the problems are and what could be improved to reduce the number of crashes at this location. The initial short-term fix, a lower cost alternative that can be rapidly implemented, would be new striping in the lanes going East and West on State Street with possible signage leading to the on and off ramps to get on State Route 62. The ideas for a long-term fix, require more time and funding implement, would be adding in turn lanes to redirect traffic, the idea of a potential round about, and even putting in a traffic light. These ideas have been tested through the methodology processes.

Poster 13

Gabriella Diturno

Physician Assistant Studies

Prof. Vanessa Worley

More Than Skin Deep: Which Tools are Most Effective at Detecting Mental Illness in Adolescent and Young Adults with Chronic Skin Conditions?

Have you ever thought about the psychosocial impact that having a long-term dermatologic diagnosis could have on adolescents and young adults? Although skin conditions are quite common during this developmental stage of life, there is a well-known increase in risk of mental illnesses among these patients. Despite understanding this, it can be difficult for healthcare professionals to succinctly assess such risk and currently there is no consensus on a formal approach to screening pediatric patients. Tools have been developed and researched extensively to screen adults with skin conditions, however, these tools could be both inappropriate and ineffective in children. A systematic review of literature was conducted to propose evidence-based practice guidelines for the use of effective mental health screening tools in adolescents and young adults with chronic skin conditions. For these young patients, it goes far deeper than just skin deep; above all, early detection of mental illness could save a life.

Poster 14

Maximus Betscakos

Exercise Science

Dr. Ronald Mendel

Taylor Catlett

Exercise Science

Correlations Between Advanced Glycation End-Products and Cardiorespiratory Fitness

Cardiovascular Disease (CVD) is the leading cause of death worldwide and is driven by risk-factors such as sedentary lifestyles and/or nutritionally poor diets. Advanced glycation end-products (AGEs) are sugars that bind to lipoproteins within the body over a lifetime of eating a highly processed diet, while Cardio-respiratory-fitness (CRF) is a measure of one's aerobic capacity. Literature has shown AGEs and CRF can be utilized to evaluate risk of CVD.[1,2] The purpose of our study was to determine a correlation between AGEs and CRF. If a correlation exists, then high levels of AGEs within a patient may indicate a low level of CRF based on the shared use for determining levels of CVD risk that both AGEs and CRF possess. This study tested forty adult (18+) general population participants using the Bod-Pod, AGE, and Cooper 12-minute aerobic assessments. Data collection and analysis was not completed at the time of abstract submission.

Poster 15

Breanne Welsh

Biomedical Engineering

Dr. Lynn Dudash

Jessie Kasper

Biomedical Engineering

Carley Boring

Biomedical Engineering

Alginate Wound Healing Scaffold for Diabetic Foot Ulcers

Diabetic foot ulcers are a frequent and widespread issue among people with diabetes that can lead to hospitalization and amputation. The aim of this work is to develop a tissue engineered scaffold using alginate hydrogels to aid in the healing of diabetic foot ulcers. Alginate is a non-toxic polymer that has been used for wound healing bandages, however it lacks the mechanical strength to support a patient's weight. To improve the mechanical properties of alginate, a new formulation that can be crosslinked using UV light was developed to compare with normal alginate. The Bio X 3D printer was used to print scaffolds of normal and UV alginate for testing, which was dual crosslinked using UV light and CaCl₂ solution. Mechanical testing, cell viability, and degradation tests will be performed to investigate the properties of the new material.

Poster 16

Sweta Patel

Physician Assistant Studies

Prof. Vanessa Worley

How Physical Activity During Pregnancy Can Impact the Baby Blues After Pregnancy

Desperation, overwhelming tears of sadness, sleep deprivation, anxiety, and feeling like your body isn't your own are all symptoms of what new mothers may experience after birth. About 1 in 5 mothers will have postpartum depression (PPD) or baby blues, and it can be serious. Because the postpartum period is expected to be filled with the excitement of a newborn, people who are suffering may not feel comfortable seeking help or talking about such symptoms. A systematic review identified five research articles evaluating how exercise during pregnancy affects PPD after delivery. As long as physical activity is not contraindicated due to pregnancy complications, it can be extremely beneficial. These results are not only important for new mothers, but their partners, family members, and obstetrician-gynecologists can use them to encourage and assist in the adoption of this positive habit to decrease the chance of PPD in their loved one or patient.

Poster 17

David Patton

Biology

Dr. Lin Wu

Analysis of Indoor Air Pollution in the University Of Mount Union's Academic Buildings

Ever since the COVID-19 pandemic, the indoor air quality of academic buildings has been deeply investigated by various research groups and universities to help protect those that live and work at their universities. In recent literature, it has been highlighted that the COVID-19 pandemic caused research of an array of air pollutants to be studied to observe their impacts on health (Saini et al., 2020). In my research, I used a Dylos 1100 Air Quality Monitor to observe large and small particle counts in the buildings of this campus. I have observed various buildings on campus ranging in different sizes, age, and the amount of traffic passing through the buildings. I predict that Chapman Hall and The Hoover-Price Campus center will have the worst air quality, and Bracy Hall to have the best. I hope the University will use the data I gather to improve the air quality on campus.

Jakob Yarosh

Exercise Science

Dr. Ronald Mendel

Sydney Nikolevski

Exercise Science

Chronic Red Beet Powder Supplementation and its Effects on Lower Body Strength & Power

In a culture where peak athletic performance is a marketable ability, supplementation has become popular. Red beetroot powder is a relatively new supplement being consumed and evaluated as an ergogenic aid. Past research has primarily investigated beetroot and aerobic sports, with findings such as an improved ability to exercise at higher intensities (1,4). Research on muscular strength, endurance, and power has been evaluated to a lesser degree, but demonstrates increased one-rep maximums (1-RM) (3) and power output (2,5,6). These findings could benefit athletes of all disciplines that demand a higher exercise capacity. Thus, the purpose of this research is to further examine muscular strength and power with 1-RM squat and countermovement jump assessments, as well as four weeks of red beetroot powder supplementation. Data collection is not complete at the time of writing, but it is hypothesized that increases in both assessments will be observed as a result of supplementation.

References:

1. Fiddler, R., Fiddler, J., Ashton, N., Lind, E., Kravitz, L., Laskin, J., Lim, Y. A., Lowery, L., Marks, D., Mermier, C., Robergs, R., Vella, C., Wagner, D., Wyatt, F., Zhou, B., (2018). The Effects of Beetroot Juice Supplementation on Oxygen Cost of Vigorous Intensity Aerobic Exercise in Trained Endurance Athletes. *Journal of Exercise Physiology Online* December, 21.
2. Jonvik, K. L., Hoogervorst, D., Peelen, H. B., de Niet, M., Verdijk, L. B., van Loon, L. J. C., & van Dijk, J. W. (2020). The impact of beetroot juice supplementation on muscular endurance, maximal strength and countermovement jump performance. *European Journal of Sport Science*, 1–8. <https://doi.org/10.1080/17461391.2020.1788649>
3. Mosher, S. L., Andy Sparks, S., Williams, E. L., Bentley, D. J., & Naughton, L. R. M. (2016). Ingestion of a nitric oxide enhancing supplement improves resistance exercise performance. *Journal of Strength and Conditioning Research*, 30(12), 3520–3524. <https://doi.org/10.1519/JSC.0000000000001437>
4. Totzeck, M., Hendgen-Cotta, U. B., Rammos, C., Frommke, L. M., Knackstedt, C., Predel, H. G., Kelm, M., & Rassaf, T. (2012). Higher endogenous nitrite levels are associated with superior exercise capacity in highly trained athletes. *Nitric Oxide - Biology and Chemistry*, 27(2), 75–81. doi: 10.1016/j.niox.2012.05.003
5. Williams, T. D., Martin, M. P., Mintz, J. A., Rogers, R. R., & Ballmann, C. G. (2020). Effect of Acute Beetroot Juice Supplementation on Bench Press Power, Velocity, and Repetition Volume. *Journal of Strength and Conditioning Research*, 924–928. www.nsc.com
6. Wylie, L. J., Bailey, S. J., Kelly, J., Blackwell, J. R., Vanhatalo, A., & Jones, A. M. (2016). Influence of beetroot juice supplementation on intermittent exercise performance. *European Journal of Applied Physiology*, 116(2), 415–425. doi: 10.1007/s00421-015-3296-4

Poster 19

Scarlett Fryer

Physician Assistant Studies

Prof. Vanessa Worley

Can Disease Exacerbations and Adverse Events in Systemic Lupus Erythematosus Be Impacted by Hormonal Contraception?

Systemic lupus erythematosus (SLE) is an autoimmune disease that has peak incidence during childbearing years, therefore, family planning is an important topic that needs to be addressed. Many available birth control methods contain the hormones estrogen and progesterone which can contribute to an increased risk of blood clots. Additionally, individuals who were assigned female at birth and are diagnosed with SLE have an increased risk of developing blood clots or thrombosis just because of the SLE. With this in mind, you may be wondering if it is safe for this group of individuals to use hormonal birth control; the goal of this research was to find out. This systematic review of literature focuses on the safety and effects of hormonal contraceptives in individuals assigned female at birth diagnosed with SLE. Can birth control be detrimental to these individuals' health or cause SLE disease exacerbations? Come learn what the evidence shows!

Poster 20

Megan Reihl

Biochemistry

Dr. Debra Boyd-Kimball

Treating a Disease of Aging through Exercise: Induction of BDNF and CREB as a Treatment for Alzheimer's Disease

Alzheimer's Disease (AD) is a progressive neurodegenerative disorder associated with aging and cognitive decline; however, beneficial proteins exist that may protect against AD and promote neurogenesis. Brain derived neurotrophic factor (BDNF) is a neurotrophin that protects neurons through an array of intracellular signaling pathways that converge on a transcriptional regulator, cyclic-AMP responsive-element binding protein (CREB). Exercise has been correlated with higher levels of BDNF protein expression; however, the effect of age on this correlation is not well known. This study examines the effects of voluntary exercise and age in wild type mice on the protein expression levels of BDNF and CREB. 2-dimensional (2-D) polyacrylamide gel electrophoresis (PAGE) was also used to further determine the effect of voluntary exercise on protein expression as a function of age. The results of this study will be presented in the context of what is currently known about aging, exercise, neurogenesis, and protection against AD.

Poster 21

Cheyenne Bosse

Physician Assistant Studies

Prof. Vanessa Worley

Working Through Depression Without Additional Side Effects

Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday. This is what we see each day when we head to the pill box to take our medications, adding more to the collection with each visit to our provider. When we think about the laundry list of side effects that come along with these drugs, why are

we not taking another approach? For individuals suffering from the significant burden of depression, improving nutrition in the form of magnesium (Mg) supplementation could be the answer. A systematic review of twelve articles explored the effects of Mg supplementation and its ability to improve symptoms of depression while producing little to no side effects. This research aims to decipher if providers should be taking Mg supplementation into consideration when treating their patients with depression. Is it possible that we could improve mental health without adding another prescription medication?

Poster 22

Jarek Leonard

Exercise Science

Dr. Ronald Mendel

Chase Angotti

Exercise Science

The Effects of Carbohydrate Mouth Rinsing During Aerobic Exercise in Recreational Athletes

Carbohydrate consumption during exercise is practiced to maintain intensity of exercise and reduce fatigue but can cause GI distress causing decreased performance. This distress has led to carbohydrate mouth rinsing: the oral rinsing of high-carbohydrate liquids during exercise to achieve similar results as consumption. There are 63 million recreationally active Americans, but mouth rinsing research on this population is limited. The purpose was to examine the effects of carbohydrate mouth rinsing on power, rate of perceived exertion (RPE), and heart rate in recreational athletes during aerobic exercise. Fifteen college-aged recreationally active male and female subjects participated in the 2-day blind cross-over study. Each subject pedaled on a Velotron Cycle Ergometer for 20 minutes, controlling their own resistance. Subjects were given a 6.4% maltodextrin carbohydrate solution throughout the test to either mouth rinse or consume while heart rate, RPE, and power were observed. Data collection incomplete upon time of abstract submission.

Poster 23

Courtney Williams

Physician Assistant Studies

Prof. Vanessa Worley

A Systematic Review to Evaluate the Use of Blinatumomab for Pediatric Relapsed Acute Lymphoblastic Leukemia

Acute lymphoblastic leukemia (ALL) is one of the most common childhood cancers, representing almost a quarter of pediatric cancer diagnoses every year. The good news is that ALL has a high cure rate with chemotherapy, but what happens when the patient relapses? Traditionally, the child would undergo more chemotherapy and the prognosis becomes poorer. Chemotherapy also comes with a variety of side effects that can negatively impact the child during their treatment. Fortunately, the world of immunotherapy is opening up, offering alternatives and maybe even replacements for chemotherapy. One specific immunotherapy that is being studied for relapsed ALL is blinatumomab, a bi-specific T-cell engaging (BiTE) monoclonal antibody. To investigate the efficacy of blinatumomab, a systematic review of literature was performed, exploring the possibility of implementing blinatumomab as a preferred treatment in relapsed acute lymphoblastic leukemia. Could blinatumomab bring new hope to pediatric patients with relapsed ALL and their families?

Poster 24

Easton Hitchens

Geology

Dr. Andrew Hutsky

Characteristics for Soil Compaction Quality

The stability of soil is a very important topic when it comes to construction and our infrastructure. Without solid ground to work on, all of our construction projects would not be successful. As of now, there is not a 100% method to analyze present soils' ability to be used as a quality material to use to build a proper construction site. This project aims to begin the development of a means to have 100% confidence in our evaluation of these soils. Using geotechnical reports from a variety of construction projects across Ohio as means of comparison a connection began to be made. Using soil characteristics such as blows, grain size, grain sorting, moisture content, and bedrock material a connection was made to gain the confidence of analyzing soils for construction needs.

Poster 25

Brenden Meikle

Exercise Science

Dr. Ronald Mendel

Abdul Alsuwayyid

Exercise Science

The Effects of Creatine Monohydrate Supplementation on Sprint Performance in Male Collegiate Soccer Players

The study described the protocol for testing the effects of creatine supplementation on repeated sprint ability in soccer players. Soccer is characterized by intermittent high-intensity sprints, which relied on the phosphocreatine system to provide ATP for up to 30 seconds. Previous studies had shown that creatine supplementation increased overall creatine and creatine phosphate in the skeletal muscles, leading to enhanced performance in short-burst, high-intensity movements. The study included a placebo and creatine group, with testing occurring before and after the supplementation period. The repeated sprint ability test consisted of six 40m shuttle sprints with 20s of passive recovery between each sprint. Athletes needed to meet a preliminary sprint time criterion before they could participate in the full test. The testing occurred at the beginning, middle, and end of the Mount Union soccer team's 2023 spring season. The creatine group underwent a week-long overload period of 20g/day, followed by a maintenance period of 5g/day, while the placebo group went through the same loading protocol. The study aimed to determine whether creatine supplementation enhanced repeated sprint ability in soccer players, and GPS tracking and Gametraka software were used to analyze changes in sprinting ability during practice and competition.

Poster 26

Rylan Wikle

Physician Assistant Studies

Prof. Vanessa Worley

The Effectiveness of Neck Collars in Reducing Concussion Risk: A Systematic Review

From youth leagues to professional sports, concussion prevention is a critical concern among athletes, coaches, and parents alike. While efforts to mitigate the risk of concussions have focused primarily on

improving rules and playing techniques, there is growing interest in the potential of protective equipment to reduce the incidence and severity of head injuries – and not just helmets. Jugular venous compression (JVC) neck collars have emerged as a promising tool for preventing concussions, with studies suggesting that by putting pressure on the JVC, the acceleration forces on the brain during impact can be reduced. This systematic review of literature aims to evaluate the evidence surrounding the effectiveness of JVC neck collars for concussion prevention in athletes of all ages and levels. The findings provide valuable insights into the efficacy and safety of JVC neck collars as risk-reducing devices in sports and will inform recommendations for their use in athletic settings.

Poster 27

Emily Becker

Environmental Science

Dr. Amy McElhinney

Herbarium collection and curation: The Visual Diversity of Foliage

The sheer diversity of plants is astonishing no matter where one decides to look, with Ohio being no exception. To better understand and familiarize myself with the flora of the region, I systematically collected, pressed, identified, mounted, and labeled over 200 plant species found in northeast Ohio, including native, introduced, invasive, and ornamental varieties. Specimens were gathered, identified, and preserved according to standard museum procedures over the last eleven months to create a research-quality personal herbarium for the future benefit of myself and other university students. With the changing state of our climate, the future of many plants may be uncertain, making well documented and preserved specimens a potentially invaluable resources in the years to come. A digital version of the herbarium will be provided to the Department of Biological and Environmental Sciences, as well as two interpretive posters regarding seasonal wildflowers and an informative pamphlet on how to properly press and mount plant specimens. These materials will hopefully inspire future students and community members to pursue their flora-related interests and provide a starting point of how one goes about enjoying, preserving, and conserving the natural beauty of floral diversity.

Poster 28

Samuel Nucерino

Biomedical Engineering and Physics

Dr. Colin Campbell

A Fan-tastic Exploration of LRC and RC Circuits

The study of circuits is an essential part of general physics education, and understanding the behavior of how resistor circuits work is crucial for students to grasp the basics. This project proposes using computer fans as a tool for educational labs to demonstrate these circuit behaviors. By recording slow-motion videos that can then be utilized using an online simulation software. The main question is how the different components effect the fan's speed. Using the fans allows multiple observational of magnitude. Allowing for both visual and tactile senses to determine the differences. The proposed circuits with fans are both easy to understand and accessible for first- and second-year college students. The experimental results of the research will show a significant correlation between the fan's speed and circuit components, confirming its potential as a valuable teaching tool for circuit theory education. The proposed approach

encourages hands-on learning and provides an interactive experience, enhancing student engagement and knowledge retention.

Poster 29

Jason Luck

Physician Assistant Studies

Prof. Vanessa Worley

Choosing the Right Wireless Implantable Monitoring Device for Heart Failure: A Systematic Review

According to the US Agency on Healthcare Research and Quality, approximately 900,000 heart failure (HF) hospitalizations occur annually. This equates to one hospitalization every 30 seconds putting a massive strain on hospital resources. With the mean cost per inpatient stay being \$10,900, this may also put a significant financial strain on patients. Maybe it does not need to be this way. Recent technological advancements allow medical providers to determine when HF patients need treatment even before they show symptoms and without seeing them face to face. This systematic review of literature looks at two implantable devices: the CardioMEMs pulmonary pressure monitoring device, and the HeartLogic system. The goal of the study is to determine whether one should be recommended over the other or if it is more effective to use both. If we can determine the best plan for these devices, we could dramatically reduce hospitalizations, costs, and patient suffering.

Poster 30

Brent Paulus II

Exercise Science

Dr. Ronald Mendel

Jeff Dunfee

Exercise Science

Best Possible Recovery for Wrestlers During Same-Day Competition When Dehydrated

Wrestlers typically dehydrate themselves to make a weight class through fluid restriction and exercise induced dehydration (Casa et al. 2010). Dehydration can lead to many effects such as a decrease in skeletal muscle activation during exercise (Wall et al. 2015) and hypernatremia (high blood sodium) which causes further dehydration. Many studies have shown that a decrease in aerobic and anaerobic performance is associated with dehydration (Chycki et al. 2018, Penkman et al. 2008). Gatorade and Pedalyte, which contain electrolytes that are lost while cutting weight, are mostly used by wrestlers post weigh in (Snell et al. 2010). This study compares the effectiveness of the two drinks by simulating a two-hour weigh-in. Using dehydrated college wrestlers, a 30-second lower body anaerobic Wingate and an upper body muscular endurance test were performed. The testing protocol was then repeated with the supplements. Data collection was not completed at the time of abstract submission.

Poster 31

Syd Parker

Biology

Dr. Lin Wu

Insect Diversity Study at the Huston-Brumbaugh Nature Center: A research project focused on catching and identifying insects with vane, pan and hand catching traps with inquires on trap color

Diversity of a habitat can tell you a lot about its health. Generally speaking, the more bountiful and diverse the fauna and flora are in a location, the more likely the ecosystem is to be stable and a to be a well-rounded (Cleland, 2011). The Huston-Brumbaugh Nature Center, a small nature center located in Stark County Ohio, is a free to the public oasis where nature can thrive. The HBNC has forested areas, areas with native grasses, pond ecosystems, pollinator attractive flora, and many other unique areas making this nature center the perfect area to conduct a diversity study. By sampling the biodiversity of the insects at this location you can start to paint a picture of how healthy their ecosystem is. Over the course of July through October (with a heavy focus during September), this study used three collection methods, vane traps, pan traps (in the insect attracting colors of yellow and blue) and hand collecting at various HBNC locations to procure a collection of nearly 2 thousand insects. These insects were then pinned and identified to find possible correlations regarding the colored traps used, as well as to paint a picture of the diversity that can be found at our local nature center. The data collection and correlation to trap colors has not been completed by the time of this abstract submission.

Poster 32

Nicholas Gill

Physician Assistant Studies

Prof. Vanessa Worley

Preventive Care and Symptom Reporting: Who Isn't Engaged?

Wouldn't it be ideal to stop diseases before they develop? Preventive care, which includes screenings, immunizations, and check-ups, is a valuable service that can detect, prevent, and ultimately reduce the risk of various diseases. However, lack of engagement in these measures, as well as the underreporting of symptoms, can delay medical care and lead to unfavorable health outcomes. This study looks to identify specific patient populations in the United States that underutilize preventive care services with the intention of creating evidence-based practice guidelines to help increase this utilization. A systematic review of literature was performed to answer the research question, and the findings identify that men significantly underutilize preventive care services, with toxic masculinity and traditional gender roles as potential explanations. This study hopes to provide suggestions to increase men's engagement in preventive care, which could decrease morbidity and mortality and thus improve health outcomes for these individuals.

Poster 33

Jace Kohl

Chemistry

Dr. Robert Woodward

A Multi-Step Synthesis of N-Methyl-Bacillithiol: A Synthetic Route to a Natural Occurring Antibiotic Defense Molecule

While antibiotics are commonly used to treat bacterial infections, the rapid emergence of resistant bacteria has endangered their effectiveness. One antibiotic to which bacteria have developed resistance is fosfomycin, a drug used to treat bladder infections. While fosfomycin works by preventing bacteria from producing their protective barrier, the cell wall, specific pathogens use small molecules such as bacillithiol (BSH) to modify and inactive fosfomycin. This inactivation allows cell wall production to proceed as

normal, allowing the bacteria to survive. Recent studies have shown certain bacteria produce a molecule similar to BSH known as N-methyl-bacillithiol (N-Me-BSH) which is also speculated to act as an antibiotic defense molecule. In this research, we performed a multi-step chemical synthesis to produce N-Me-BSH to allow researchers to confirm the involvement of this molecule in antibiotic resistance. Following each chemical reaction, molecules were separated and purified using column chromatography, and their structures confirmed using spectroscopic techniques.

Poster 34

Josie Miller

Exercise Science

Dr. Ronald Mendel

Megan Wertz

Exercise Science

Iron Supplementation Effects on Exercise-Induced Iron Loss in Nonanemic Untrained Females

Iron is an essential mineral needed for major bodily functions, especially during exercise. Iron is bound to hemoglobin to aid in the transport of oxygen to actively working muscles. Females often have low iron stores due, in part to the menstrual cycle. Research also suggests that aerobic exercise has the potential to decrease iron levels. Therefore, exercising women with a regular menstrual cycle may be at increased risk of iron-deficiency. The purpose of this study is to determine if iron supplementation can decrease the chances of iron-deficiency in females starting aerobic training. Eight sedentary/moderately active females with regular menstrual cycles were part of an eight-week study where they ran or biked five days a week, while supplementing 28 mg of iron or a placebo. Supplementation was used to determine a difference in iron levels occurred between groups following exercise. Data collection was not completed at the time of abstract submission.

Poster 35

Molly Muckleroy

Physician Assistant Studies

Prof. Vanessa Worley

“The Talk”: Should It Include More Than Just Anatomy and Abstinence?

The birds and the bees: sounds simple, right? Sex education is an uncomfortable topic, particularly when it involves more than just anatomy. What’s even more uncomfortable to discuss is unplanned teenage pregnancy. While abstinence-only education emphasizes refraining from sex completely, comprehensive sex education is a rights-based approach that teaches knowledge, skills, and attitudes including prevention of infection and LGBTQ+ education. Does research about teenage pregnancy support the efficacy of one of these types of education over the other? This systematic review of literature seeks to identify risk factors for teenage pregnancy and whether its prevalence is affected by the type of sex education received. High-quality publications from the last 11 years were included. This research will impact adolescents because if there is a relationship between the information received in comprehensive education and reduced teen pregnancy, schools may start to implement it and teenagers will be better protected when it comes time for “the first time.” Should the birds and the bees be more than that? Come find out!

Poster 36

Rita Pollock

Marketing and Art

Prof. Margo Miller

The Things We Don't Talk About

Mental health awareness is the focus of my artist series titled, "The Things We Don't Talk About". I have created this series focusing on broad topics that affect people every day. Those being anxiety, depression, and grief. My poster presentation showcases my creative process to develop my artwork. The main method of creating these pieces is through graphic design software. My work is unique in that I use my own handwriting and drawings that I physically make and then put onto the computer. Each element of the artwork has been thoroughly reworked and manipulated to reach the best version of the concept idea. I hope through this series to connect with the viewers and raise awareness for mental health.

Poster 37

Brett Kayser

Exercise Science

Dr. Ronald Mendel

Matthew Berner

Exercise Science

Is There a Difference Between the Ergogenic Effects of Caffeinated Gum and a Caffeinated Beverage?

Caffeine, a powerful ergogenic aid is consumed by a large portion of athletes around the world (Coso et al. 2011) to enhance sport performance (Paton et al. 2010, Apostolidis et al. 2022, Ellis et al. 2019, Pasmann et al. 1995). Available in a variety of forms and commonly consumed through energy drinks, it is now increasingly consumed through caffeinated gums which provides rapid absorption past the blood-brain barrier (BBB). The purpose of this study was to compare two commonly consumed caffeinated substances to determine which may provide the greatest ergogenic effect on an array of endurance and agility tests which mirror common movements of collegiate soccer players seen in games or practice. Sixteen men from the division III level of collegiate soccer were recruited to participate in a crossover fashion. Initially, subjects were provided with a caffeinated energy drink or placebo to perform a variety of soccer tests including: vertical jump, maximal 40m sprint, arrowhead agility test, and the level 2 Yo-yo Intermittent test for endurance. Following a weeklong wash out period, subjects returned to repeat the same battery of tests under the other treatment condition. Data collection was not completed at the time of abstract submission.

Poster 38

Lauren Blevins

Physician Assistant Studies

Prof. Vanessa Worley

Warning Shots of Suicide: Identifying Risk Factors Predictive of Active-Duty and Veteran Service Member Suicide

About 7% of U.S. military service members will be diagnosed with post-traumatic stress disorder (PTSD) during their lifetime, and those diagnosed with PTSD are 1.8-3.5 times more likely to commit suicide than their non-diagnosed counterparts. With this in mind, are healthcare providers missing these warning signs in routine mental health screening? A systematic review of literature was conducted to assess if there are

unique or sensitive risk factors that are more predictive of suicide in U.S. veteran and active-duty service members diagnosed with PTSD. The results showed that moral injury, major depressive disorder (MDD), substance use disorder (SUD), borderline personality disorder (BPD), and lack of dispositional gratitude were all highly correlated to an increased risk of suicide. Incorporating these risk factors into mental health screening for service members with a current diagnosis of PTSD could be the key to reducing suicide rates in this high-risk population. If asking a question could save a life, would you ask it?

Poster 39

Chyenne Brammer

Geology

Dr. Andrew Hutsky

A Sedimentological Analysis of Pennsylvanian (325 Mya) Sharon Sandstone in the Dundee Falls Area of Dundee, Ohio

Dundee Falls contains a series of rock outcrops that are located in the Beach City Wilderness Area of Dundee, Ohio. These outcrops are composed majorly of sandstones, siltstones, and conglomerates. The composition of the layers is predominately quartz with traces of feldspar and muscovite and have a common grain size occurrence of medium to coarse ($\sim 250\mu\text{m}$ - $\sim 1000\mu\text{m}$) with some layers containing conglomeritic pebbles ($>2000\mu\text{m}$) or being completely composed of such. There are also abundant sedimentary structures in areas such as scouring between deposition events, crossbedding and planar bedding, and some fossil preservations of log casts present. Using stratigraphic and facies analysis methods with the data, it is hypothesized that a braided stream system was present at the time of deposition. These factors combined are consistent with the accepted description of the Lower Pennsylvanian Sharon Formation, which helped to shape part of eastern Ohio into what we recognize today.

Poster 40

Samuel Nucerino

Biomedical Engineering and Physics

Dr. Lynn Dudash

Peyton Hines

Biomedical Engineering

Emma Whitsel

Biomedical Engineering

The Use of Synthetic Skin Grafts for Treating Burn Injuries

Injuries due to burns account for 60% of all acute hospitalizations. Third degree burns are especially problematic because the wound is too large to heal on its own. Furthermore, treating these burns often requires long hospitalizations and skin grafting, a surgical procedure where healthy skin is removed and used cover the burned area. This procedure introduces an additional wound site, which can increase the chance of infection, and has a moderate rate of failure. The aim of this study is to investigate tissue engineered scaffolds that could be used instead of skin grafts to aid in the healing of 3rd degree burns. A bioinspired polymer solution was developed and crosslinked under UV light, to form various patterns. The mechanical properties, such as tensile strength and degradation rate, and biocompatibility of these scaffolds will be examined. In the future, this type of scaffold would create a better healing environment for patients.

Poster 41

Brooke Dipasquale

Physician Assistant Studies

Prof. Vanessa Worley

Support for Dense Breasts: How Should People with Dense Breasts Be Screened for Breast Cancer?

Dense breasts have more fibrous and glandular tissue rather than a typical makeup of fatty tissue. There is a clear, yet uncharted demand for clinical breast support in those with dense breasts in screening for breast cancer since a standard mammogram may not be able to fully evaluate such dense tissue. To compound the problem, having dense breasts puts people at higher-than-average risk for developing breast cancer. A systematic review of literature was conducted to compare the efficacy of imaging techniques, including mammography, magnetic resonance imaging, and ultrasound, as breast cancer screening tools for this population. This review also explores a different type of mammogram, developed with technological advancements, known as 3-dimensional mammography. This research seeks to uncover what is the most sensitive imaging tool and how providers should proceed with screening recommendations. By learning about this research, you can help support your own or your loved ones' breast health.

Poster 42

Alyssa Kasaris

Exercise Science

Dr. Ronald Mendel

Jeremy Sassano

Exercise Science

The Effect of Fish Oil Supplementation on Heart Rate Recovery and Heart Rate Variability in Older Adults

Literature has shown Fish Oil supplementation to improve heart rate recovery (HRR) and heart rate variability (HRV) in an elderly, sedentary population (Hill et al 2007, Holguin et al. 2005, and Ninio et al. 2008). HRR is the difference between maximal heart rate (HR) and HR after the cessation of exercise. The bigger the HRR value is, the better that individual's cardiovascular health is (Jouven et al. 2005). HRV is used to assess the direct function of autonomic nervous system (ANS) in the heart and is an accurate indicator of ANS dysfunction, which is associated with an increased mortality and coronary artery disease. The purpose of this study is to determine the effect that fish oil supplementation has on heart rate recovery and heart rate variability in an elderly population. Ten men and women aged 50+ were randomly assigned to fish-oil or safflower-oil, which served as the placebo for six weeks of supplementation. Pre- and post- testing of HRV and HRR after a walking treadmill exercise session was completed. Data collection was not complete at the time of abstract submission.

Poster 43

Julia Bates

Biology and Neuroscience

Dr. Phillip LaScola

High Fat Diet and Stress: Effects on Blood Composition and Related Physiological Measures in Musculus

It is a known quantity that both a healthy diet and controlled stress levels promote overall health and wellness, and a lack of balance in these aspects can produce negative health outcomes. However, the

specific physiological changes may occur because of the combined effects of specific diet types and stress are less known. To investigate this, *Mus musculus* diet and light exposure were altered to investigate the effects of a high fat diet (HFD) and altered stress levels on blood composition and cardiovascular function. There was a total of n=20 *Mus musculus* mice in the study, split into four different (n=5) groups, with varied diet type and light cycles. [n=5 for each condition: Control diet/control light (12hr light/12hr dark), HFD/Control light, Control diet/Altered light (24/7 light exposure), and HFD/Altered light]. A fasted baseline measurement of weight, HR, O₂, and blood glucose were recorded at day 0 for all subjects. Blood smears were also created for the purpose of counting white blood cell (WBC) types. Fasted measurements were collected once weekly for a period of eight weeks, with blood smears created every fourth week. It was predicted that the groups consuming the HFD and those that are exposed to stress would display higher WBC counts, blood glucose, and HR, as well as lower oxygen saturation and increased weight. Data collection was not complete at the time of abstract submission.

Poster 44

Maggie Oswald

Physician Assistant Studies

Prof. Vanessa Worley

Integrating Chinese Medicine: Acupuncture to Manage Chemotherapy-Induced Side Effects in Breast Cancer Patients

Have you or a loved one been diagnosed with breast cancer and are facing the burden of chemotherapy and its various medication-induced side effects? Breast cancer is the most common type of cancer in women, so the experience is shared by many. Although chemotherapy is often a key piece of the battle and research shows its benefits, the side effects can be wide-ranging and problematic. This systematic review attempts to discover if acupuncture is an effective adjunct to help manage these side effects. Many desire to alleviate the burden without adding more medications and acupuncture has great potential. The evidence is derived from randomized trials that evaluate acupuncture's effect on chemotherapy-induced fatigue, depression, peripheral neuropathy, and cognitive impairment with many of the studies including a sham procedure control group. Results show that acupuncture works in this population suggesting that clinicians would be wise to discuss this exciting option with patients.

Poster 45

Jessica Knicely

Exercise Science and Biology

Dr. Ronald Mendel

Shiming Ruan

Exercise Science and Biology

Effects of Creatine Supplementation Combined with Aerobic Exercise on Short Term Memory

Age-related cognitive decline in healthy adults begins between the ages of 20-30 and continues to progress with age. Aerobic exercise and creatine, a naturally occurring amino acid, can be utilized to sustain memory and diminish risk factors associated with cognitive decline in aging populations. The purpose of this study was to investigate the effects of creatine supplementation combined with aerobic exercise on short term memory over a 6-week period on middle aged adults between 40-60 years old. Ten participants were recruited and randomly assigned to creatine supplementation and exercise, placebo

and exercise, creatine supplementation only, exercise only or control groups. Participants completed a baseline visual and auditory digit span memory assessment (Millisecond Software) to measure short term memory retention and was repeated during weeks 3 and 6. After the six-week protocol, the memory scores of each participant were compared to examine the effects of supplementation and exercise.