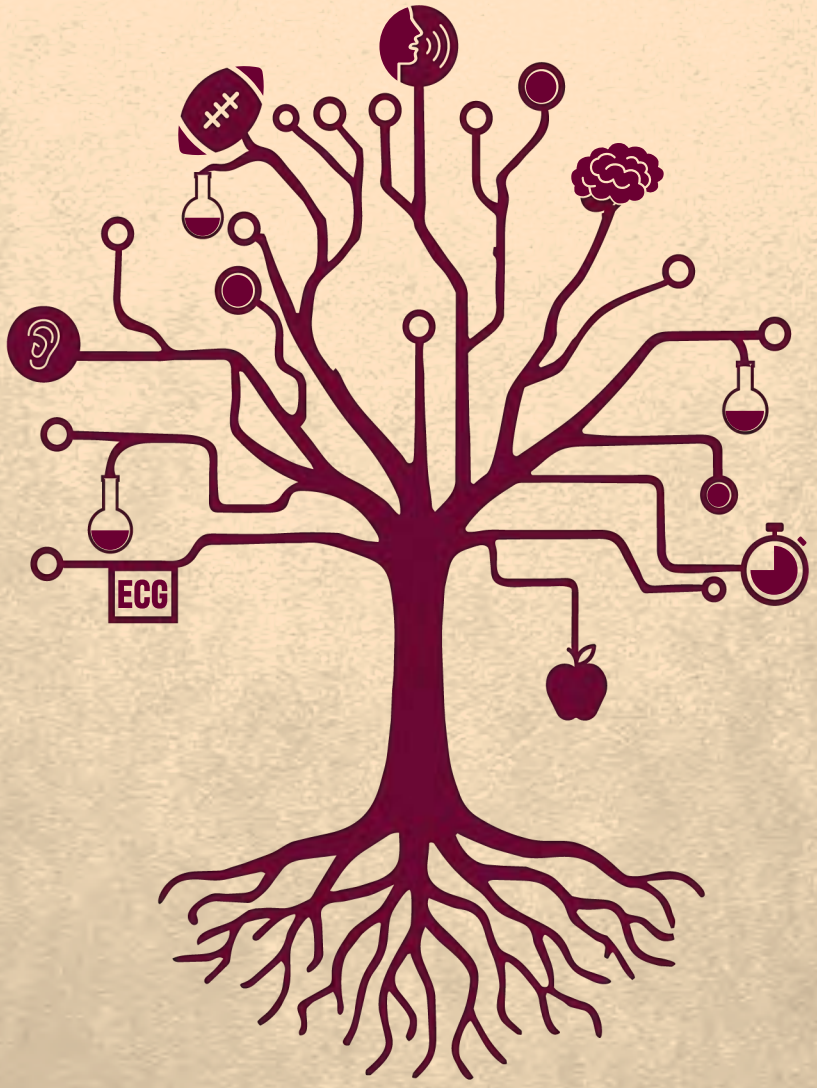
HEALTH RESEARCH
AND EDUCATION INNOVATION



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Two sides of the same coin: clinical management and recovery of a patient with bilateral ischemic stroke

Aidan Reath, Rochelle Kopka

Background and Purpose. Unlike typical strokes, which typically affect one hemisphere, a bilateral stroke involves damage to both sides of the brain, making it a rare and complex condition. Bilateral strokes can result in severe and widespread deficits, impacting motor function, cognition, communication, and emotional regulation. The treatment of bilateral strokes involves two primary phases: acute management to stop the stroke and rehabilitation through therapies such as physical, occupational, and speech therapy. Despite the critical nature of this condition, research on rehabilitation interventions for bilateral stroke survivors remains limited, with most studies focusing on unilateral stroke rehabilitation. This case report aims to highlight the rehabilitation outcomes of a patient with a bilateral stroke, focusing on the effectiveness of physical therapy interventions in improving motor function and overall quality of life. This report is to contribute to the growing understanding of rehabilitation strategies specifically tailored to the needs of bilateral stroke patients and provide insights into potential approaches for improving recovery in this unique patient population.

Case Description. A 77-year-old Caucasian male was admitted to the ER after being found slumped over a four-wheeler. An MRI revealed bi-hemispheric ischemia, mainly in the watershed territories, with more lesions on the left side. Areas of infarction included the bilateral ACA-MCA and MCA-PCA border zones, as well as the left basal ganglia, thalamus, and hippocampus. The patient presented with stroke symptoms and a National Institutes of Health Stroke Scale (NIHSS) score of 10. His medical history included hypertension, diabetes, right knee arthroplasty, and a left foot toe amputation. He showed right-sided weakness, neglect, fluent speech with word-finding difficulties, and impaired comprehension. The patient was placed on a high fall-risk protocol and referred to physical therapy (PT), occupational therapy (OT), and speech-language pathology (SLP). Medications included amitriptyline, aspirin, atorvastatin, and metformin, among others.

Outcomes. At discharge, the patient showed significant improvements in mobility, strength, and balance. He was able to ambulate 150’ with supervision using a 4WW, complete bed mobility independently, and ascend 3 steps with supervision using 1 rail. His right hip flexion and knee extension strength improved from 2+/5 to 4/5, his right DF improved from 4-/5 to 4+/5, and his ROM increased to full active range. In terms of balance, he progressed from "fair" dynamic sitting and "zero" standing to "good" dynamic sitting, with standing ability improving to "good" with the support of the walker. Overall, the patient exceeded his short- and long-term rehabilitation goals, demonstrating substantial progress in functional mobility and postural control at the time of discharge.

Discussion. This case report highlights the rehabilitation outcomes of a patient with a bilateral stroke, focusing on the role of physical therapy in improving strength, mobility, and balance. While positive factors like pre-stroke health, family support, and access to multidisciplinary care contributed to progress, limitations such as using visual inspection for measuring range of motion and the confounding effects of left knee osteoarthritis were noted. The rarity of bilateral strokes also made it difficult to compare the case with existing research. However, findings aligned with studies on unilateral stroke rehabilitation, particularly regarding the benefits of muscle strengthening exercises. Future research should explore neuroplasticity and recovery mechanisms in bilateral stroke patients,

investigate underlying risk factors and etiologies, and examine the cognitive and psychological impacts to develop more effective, holistic rehabilitation strategies**.**

Repetitive therapeutic activities and exercises in acute stroke patient recovery: a case report

Jacob Wentworth, Kristin VanderArk, Rochelle Kopka

Background and Purpose. Each year, over 16.9 million people globally experience their first stroke, with approximately 11 million surviving. By 2030, the number of stroke survivors is expected to reach 77 million. Strokes, categorized as ischemic or hemorrhagic, result from modifiable risk factors such as hypertension and diabetes, and non-modifiable factors like age and genetics. Stroke-related impairments depend on the affected brain region, with right-brain, left-brain, and brainstem strokes leading to distinct motor, sensory, and cognitive deficits. Physical therapy is important to stroke recovery, focusing on improving range of motion, strength, balance, endurance, and gait to restore independence. Techniques like proprioceptive neuromuscular facilitation (PNF) and repetitive exercises have demonstrated effectiveness in acute stroke rehabilitation. This case report explores the application of repeated therapeutic activities and exercises to enhance functional mobility in a post-stroke patient in a rehabilitation center.

Case Description. The patient, a 73-year-old male, was admitted to a rehabilitation center after undergoing a right-sided craniotomy for middle cerebral artery aneurysm clipping and vascular bypass. His medical history include dementia, hemorrhagic stroke, diabetes mellitus, hypertension, and hypothyroidism. Before surgery, he lived independently, managing daily tasks, mobility, and cognitive functions. However, during the procedure, he suffered an ischemic stroke, leaving him below his functional baseline. Following a 6-day hospital stay, he was transferred to rehabilitation for further care. At his initial examination, the patient was alert but lethargic, oriented only to person, and struggled to answer questions. The therapy team relied on hospital records and family input to fill in gaps. A retired police officer and Halloween enthusiast, he lived alone with support from his brother, friends, and children. His primary rehabilitation goals were to regain strength, balance, and overall functional mobility. The patient's examination findings were as provided: with normal limits (WNL) of bilateral lower extremity range of motion (ROM), 3/5 bilateral lower extremity strength, intact bilateral lower extremity light touch sensation, and ability to ambulate 40 feet with a gait belt and 2 wheeled walkers. The patient's strength and ambulation were the main concerns discovered by the therapist and were to be worked on with therapeutic interventions. The interventions that were used were therapeutic exercise, therapeutic activity, gait training, and neuromuscular re-education for this patient.

Outcomes. The patient showed significant improvements in balance, trunk stability, and mobility over 3 weeks. The postural assessment scale for stroke patients (PASS) score improved by 23 points (8/36 to 32/36) and the trunk impairment scale (TIS) score by 13 points (2/23 to 15/23), both exceeding minimal detectable changes for acute stroke. Mobility improved with increased independence in walking, stairs, and bed mobility, though car transfers remained challenging. The patient was transferred to a skilled nursing facility (SNF) for continued therapy to further progress toward returning home independently.

Discussion. This case report describes the outcomes of repeated therapeutic activities and exercises for a patient with an acute stroke during inpatient rehabilitation. The patient demonstrated notable improvements in gait, balance, strength, and endurance, consistent with findings from prior research on activity-dependent plasticity and learning. Despite these gains, left-side neglect remained a

persistent challenge, requiring compensatory techniques to promote functional recovery and prevent regression. The results highlight the benefits of early therapy in improving key functional areas following acute stroke while emphasizing the need for targeted interventions for neglect. Future research should explore repetitive therapeutic activities in stroke patients without neglect and across various clinical settings to optimize recovery outcomes**.**

The effects of transcutaneous electrical nerve stimulation on delayed onset muscle soreness following eccentric exercise.

John Andraka, Carson Dole, Nathan Furst, Jaiden Schulte, Frances Wenzel

Background. Post-exercise muscle soreness is a frequently observed responses that individuals may experience when performing physical activity beyond their normal routine. When that soreness manifests as delayed-onset muscle soreness (DOMS), it can prolong a person's return to their preferred activity. The scientific literature offers a wide array of recommendations for how to treat DOMS, including cryotherapy, thermotherapy, and electrical stimulation. However, despite the variety of modalities explored, there is a lack of consensus regarding optimal treatment parameters, particularly concerning the application of electrical stimulation.

Objective. The purpose of this experiment was to determine the efficacy of low frequency transcutaneous electrical nerve stimulation (TENS) on DOMS following eccentric hamstring exercise.

Methods. Participants were included if they were college-aged and participated in resistance exercise for at least 60 minutes per week; they were excluded if they had a recent hamstring injury. The study protocol consisted of two visits. During the first visit, baseline data was collected before the participants performed eccentric hamstring curls on each leg using the HUMAC®NORMTM isokinetic machine. This was followed by a 20-minute treatment session of low-frequency TENS on a randomly assigned leg, the opposing leg serving as the control and received no treatment. After 24-72 hours, participants were invited back for their second visit, at which time outcome variables (hamstring muscle length, hamstring muscle strength and pain rating) were reassessed and compared to baseline.

Results. The results of this study showed that of the three primary outcome variables, hamstring muscle length showed a statistically significant improvement on the treatment leg after application of low-frequency TENS (2.50 ±6.43 degrees), when compared to the control leg (2 ± 6.33 degrees), (95% CI, -7.924 to -1.08), $t(19) = -2.75$, $p = .013$, $d = -0.62$. No statistically significant differences were observed between conditions for muscle strength or pain ratings, although pain scores showed a trend towards the decrease in the treated leg.

Conclusion. The findings indicate that low-frequency TENS can be used to reduce the impact that DOMS has on the flexibility of a muscle after eccentric exercise. Some limitations to consider for this study include the small sample size, duration of TENS treatment, and whether leg dominance of the treatment leg impacted results.

Feasibility and long-term effects of implementing a walking program while wearing the NewGait rehabilitative device for individuals with gait impairment due to Parkinson's Disease

Adam Landis, Joseph Langenderfer, Ksenia Ustinova

Background: Parkinson's disease (PD) is a progressive neurological disorder characterized by motor impairments that negatively impact gait and balance. Many assistive devices fail to address the unique gait deviations caused by PD. The NewGait rehabilitative device offers joint-specific elastic assistance designed to support functional movement without limiting mobility.

Objective: To assess the feasibility and preliminary effects of a 60,000-step, home-based walking program using the NewGait device in individuals with PD-related gait impairments.

Methods: Two community-dwelling adults with stage II–III PD participated in this study. They underwent 2 baseline assessments and one post-intervention assessment. Clinical outcome measures included the ABC Scale, the 3-Meter Backward Walk Test, the PD Non-Motor Symptoms Questionnaire, and the MDS-UPDRS. Gait performance was analyzed using a Vicon motion capture system. Participants completed the walking program independently while monitored remotely via the OneStep mobile application.

Results: No significant changes were found in clinical outcome measures. However, both participants showed trends toward improved gait performance, including increased cadence, step width, and step length, particularly during post-test trials while wearing the NewGait. Improvements were also observed in limp index and gait symmetry, more so in the participant with more advanced PD motor symptoms.

Conclusion: This study supports the feasibility of using the NewGait device in a self-directed, home-based gait training program for individuals with PD. Even though statistical significance was not seen, positive trends in gait performance suggests that the NewGait device may have meaningful therapeutic value. Further research with a larger sample and broader PD severity is warranted.

Reliability of musculoskeletal ultrasound for identifying myofascial trigger points

Makayla Ardis, Chloe Remnar, Kassidy Zuchnik, Emily Schubbe, John Andraka

Objectives. To assess inter- and intra-rater reliability of musculoskeletal ultrasound (MSK US) on myofascial trigger points (MTrP) in the upper trapezius. We hypothesized that MSK US would show good reliability for identifying and measuring MTrPs in the upper trapezius muscle.
Design: Within group, repeated measures design.

Methods. Thirty-three healthy adults (mean age ± SD years) participated. A MSK US measurement was taken of a MTrP in the upper trapezius identified by palpation. MSK US images were taken twice by two investigators and repeated 24-48 hours later. The transducer was placed in the vertical plane over the identified MTrP and was adjusted until the muscle fibers appeared parallel. Measures of MTrP length, width, and surface area were calculated based on images collected.

Results. The ICC showed excellent inter-rater reliability (ICC = 0.903–0.936) and good-to-excellent intra-rater reliability (ICC = 0.883–0.980), with all values significant at $p < 0.001$, demonstrating high measurement repeatability. The SEM showed inter-rater reliability to be between 0.801 and 0.942 and the MDC to be between 2.220 and 2.612 surface area in cm. The SEM showed intra-rater reliability to be between 0.460 and 1.123 and the MDC for surface area to be between 1.277 and 3.112 cm.

Conclusions. Our musculoskeletal ultrasound measurement methodology had good-to-excellent intra-rater and inter-rater reliability when using standardized imaging parameters. Specific training and image collection procedures may ensure reliability of MTrP imaging for the purposes of tracking tissue health and quality changes pre- and post-intervention.

Effects of preferred music on rating of perceived exertion and enjoyment of physical activity during moderate-intensity aerobic exercise

Madalynn Lefler, Brandon Zink, Jessica Sullivan

Background. Motivation to perform physical activity has been shown to influence the rating of perceived exertion (RPE) reported during exercise. Various methods exist to enhance motivation, with music being notably effective. Previous research indicates that music can facilitate the production of dopamine, a neurotransmitter that positively influences motivation. An increase in motivation for exercise may decrease the perception of the effort required to complete the activity. This study aimed to determine if music's influence on motivation would directly impact RPE and enjoyment of the physical activity during moderate-intensity aerobic exercise.

Method. Thirty-six participants were recruited using convenience sampling. Participants were randomly assigned to one of two groups, self-selected music first or second, with each group completing two 10-minute moderate-intensity interval cycling bouts using a Monark 939 E Cycle Ergometer with a 10-minute break between each bout of exercise. RPE was measured every 2 minutes during each exercise bout using the Borg Rating of Perceived Exertion Scale. The Physical Activity Enjoyment Scale (PACES) was completed after each bout of exercise.

Results. Statistically significant differences between RPE with and without music were found across all participants, regardless of which group participants were in. RPE increased when music was absent during moderate-intensity aerobic interval exercise. Greater statistical significance was noted in Group 1 (music present during the first bout of exercise) compared to Group 2 (music present during the second bout of exercise). Results also showed that music significantly improved the enjoyment of the exercise among all participants.

Conclusion. Listening to preferred music during moderate-intensity aerobic activity can decrease the perception of exercise demand and increase enjoyment of the activity, thereby increasing an individual's ability to consistently engage in this activity. This increased adherence to regular exercise can positively influence the biopsychosocial aspects of health of the individual. Decreasing the perception of exercise difficulty can serve as a powerful catalyst for improving individual and societal health and well-being.

Parental physical activity impacts on 3-5-year-old children

Karli Gasta, Brooke Stemler, Jennifer Sansom

Motor development shows significant changes between 3-5 years old as children become more functionally independent and exploratory. Limited research has examined parental physical activity levels and their potential influence on a child's acquisition and performance of developmental skills. The purpose of the study is to examine whether parental physical activity levels potentially influence development of gross motor skills in children ages 3-5-years-old. This study plans to recruit 20 pre-school aged children (10 girls, 10 boys) between 3-5-years-old. Participants will complete the Test of Gross Motor Development, 3rd Edition (TGMD-3). The TGMD-3 assesses the motor processes children use for running, galloping, hopping, skipping, horizontal jumping, overhand/underhand throwing, kicking, sliding, hitting a ball off a tee, catching, dribbling, and paddling a tennis ball. To assess parental physical activity levels and attitudes, they will be administered the Physical Activity Parenting Practices (PAPP) and Godin Lesire-Time Exercise questionnaires. Currently, data have been collected for 3 child-parent dyads. Preliminary analyses suggest a trend for children with parents who engage in more physical activity to score higher on the TGMD-3, showing better performance on the gross motor skills assessed. Data collection, processing, and analysis are ongoing. While initial trends are promising, the findings will contribute to a better understanding of the potential influence that parental physical activity levels may have on the development of gross motor skills in children 3-5-years-old.

How many licks does it take to get to the center of the postural control?

Tiffany Fettig, Jenna Posky, Jennifer Sansom

Previous research has shown that oral stimulation and jaw clenching can positively affect postural stability in adults. However, this relationship has not yet been investigated in typically developing children. The purpose of the current study is to examine the effects of oral stimulation on postural control in children.

The study plans to recruit approximately 20 healthy school-aged children (10 boys and 10 girls) between 5 and 9 years of age. Participants will complete a series of 20-second trials in a Romberg stance under multiple conditions: on a firm surface and on a foam pad, with eyes open and eyes closed. Each condition is performed 3–5 times while the child holds a sucker in the mouth and then repeated without the sucker to evaluate the effect of oral stimulation on postural stability. Data is collected using a force plate to measure postural sway in the anterior–posterior and medial–lateral directions.

To date, data has been collected for 4 participants. A preliminary analysis suggests a trend toward improved postural control when a sucker is used. However, data collection is ongoing. Regardless of the final results, findings will contribute to a better understanding of the mechanisms underlying postural control and may inform the development of interventions to address balance impairments in children.

Quantifying glenohumeral accessory motion during varying inferior mobilization forces using ultrasound imaging

Katelyn Fair, Chloe Barnes, Kabryni Bruening, John Andraka

Objective. Inferiorly directed manual joint mobilizations (MJM) are commonly applied at the glenohumeral (GH) joint to address hypomobility. The purpose of this study was to measure GH joint accessory motion during varying inferior mobilization forces utilizing musculoskeletal ultrasound (MSKUS) imaging. Surface EMG (sEMG) was used to monitor shoulder muscle activation during various force applications.

Design. Within-subject, repeated measures design

Methods. Twenty-one healthy adults (mean age 23.4 ± 1.4 years) participated. Inferiorly directed, long-axis traction forces of 5% (7.91 ±1.49 lbs.), 10% (15.83 ± 2.99 lbs.), and 15% (23.74 ± 4.48 lbs.) bodyweight (BW) were applied with participants in supine and the scapula stabilized. Acromiohumeral distance (AHD) was measured via MSKUS at rest and during the three test conditions (2 trials each). The transducer was placed at the anterolateral border of the acromion, and the subacromial space was clearly visualized for AHD measurements. sEMG was used to monitor biceps brachii, middle deltoid and infraspinatus activity to ensure consistency between conditions. Data was analyzed using repeated measure ANOVA with Bonferroni pairwise comparisons ($p=0.05$).

Results. Increasing mobilization force resulted in significant, progressive increases in AHD ($F(1.40, 21) = 59.141$, $p<0.001$). Mean AHD increases from baseline were 1.49 ± .21 mm, 1.63 ± .22 mm, and 1.77 ±.23 mm, during traction forces of 5, 10, and 15% BW, respectively. Post hoc analysis revealed significant differences in AHD between all force levels ($p<0.001$). sEMG data is pending upon further statistical analyses and interpretation.

Conclusions. In healthy individuals, higher MJM force of (15% BW) resulted in significantly greater inferior humeral accessory motion when compared to 5% and 10% BW. These findings indicate that higher mobilization force levels do indeed produce increased inferior humeral accessory motion. Future research should investigate accessory motion during greater mobilization forces and include participants with pathologies such as adhesive capsulitis.

A critically appraised topic on the use of platelet-rich plasma for hamstring injuries

Alaina Parker, Christopher Hamlyn

Clinical Scenario. Hamstring tendinopathies are common in collegiate and professional athletes, particularly those involved in endurance or high speed running. Standard rehabilitation; typically emphasizing eccentric strengthening, neuromuscular control, and progressive return to activity; is generally effective but may be limited by prolonged recovery timelines. Platelet-rich plasma (PRP) has emerged as a potential adjunctive treatment due to its high concentration of growth factors and proposed ability to enhance tissue regeneration.

Clinical Question. In collegiate athletes with acute proximal hamstring tendinopathy, does platelet-rich plasma injection, compared with a standard rehabilitation program, lead to greater improvements in muscle strength and return to play outcomes?

Summary of Key Findings. A computerized search identified 53 studies, of which nine met inclusion criteria. Two randomized controlled trials demonstrated significantly shorter return to play timelines when PRP was combined with rehabilitation compared with rehabilitation alone. However, other studies; including cohort studies and case series; reported no significant differences in days or practices missed when PRP was compared with placebo injections or standard rehabilitation. Variability in PRP preparation methods, injection protocols, and study design likely contributed to inconsistent findings. No adverse effects associated with PRP were reported.

Clinical Bottom Line. The current evidence regarding PRP for acute hamstring tendinopathy is contradictory. While some high level studies suggest PRP may accelerate return to play when used alongside rehabilitation, other research shows no meaningful advantage over standard care or placebo. Given the limited and inconsistent evidence, PRP may be considered a safe adjunctive option but should not replace established rehabilitation protocols.

Contrast bath for post-injury recovery

Emily Gawel, Christopher Hamlyn

Objective/Purpose. The purpose of this critically appraised topic was to evaluate whether contrast bath therapy is more effective than no hydrotherapy in reducing pain and swelling among patients recovering from injury. Clinicians frequently rely on thermal modalities to enhance recovery, yet the specific benefits of contrast bath therapy remain inconsistently reported. Understanding its therapeutic value may help guide evidence-based rehabilitation decisions and support safe return-to-play progression.

Methods. A comprehensive literature search was conducted using CINAHL, MEDLINE, PubMed, and SPORTDiscus. Search terms were developed using the PICO framework and included "contrast therapy," "contrast bath therapy," "contrast water therapy," "swelling," "pain," and "edema." Filters applied were peer-reviewed, human subjects, full text, English language, and publication within the last 10 years. Fifty records were screened, with 15 full-text articles assessed and 5 studies meeting inclusion criteria. Eligible studies involved participants recovering from acute injury or exercise-induced muscle damage, used contrast bath therapy as the primary intervention, and compared outcomes to no hydrotherapy. Methodological quality was assessed using the PEDro scale, with included studies ranging from fair to good quality.

Results. Across all five studies, contrast bath therapy demonstrated greater reductions in pain and swelling compared to passive recovery or no hydrotherapy. Randomized controlled trials and crossover designs consistently reported improvements in perceived soreness, limb circumference, pain threshold, and subjective recovery. Evidence from ankle sprain and post-exercise recovery populations showed meaningful decreases in edema and pain following contrast immersion protocols. Although sample sizes were small and follow-up periods short, the collective findings indicate that alternating hot-cold immersion enhances vascular and neuromuscular responses that support recovery.

Discussion/Conclusion. The available evidence suggests that contrast bath therapy is more effective than no hydrotherapy for reducing pain and swelling in individuals recovering from injury. These improvements may facilitate earlier return to functional activity and sport participation. Despite methodological limitations—including small samples, inconsistent treatment parameters, and limited long-term outcomes—the overall strength of evidence supports a Grade B recommendation using the SORT framework. Clinicians may consider incorporating contrast bath therapy as part of a comprehensive rehabilitation plan, particularly when traditional RICE strategies provide insufficient relief. Future research should prioritize larger, well-controlled trials with standardized temperature and timing protocols, as well as long-term patient-reported outcomes, to better determine optimal application and clinical relevance.

Influence of temperature on cardiovascular dynamics in a microgravity model

Mitchell Hamilton, Nyah. Beavers, Brody Woods, Katherine Schmidt, Micah Zuhl, Rachael Nelson

Background. Prolonged microgravity exposure during space missions adversely affects astronauts' cardiovascular health. Variations in ambient temperature are known to cause changes in vascular resistance, altering hemodynamics and impacting cardiovascular health. The combined effect of microgravity and temperature on hemodynamics and cardiovascular function remains unclear.

Purpose. To evaluate hemodynamic responses to warm and cool environments in simulated weightlessness.

Methods. Twelve highly fit, healthy male (n=7) and female (n=5) adults (23.7 ± 3.8 years) participated in this investigation. Using a randomized crossover study design, participants completed two identical trials in a cool (18°C) vs. warm (27°C) environment. Trials were separated by 7 ± 3 days and were completed at the same time of day ± 2 hours. Weightlessness was simulated using a tilt table starting at a 45° head-up tilt and going to a -45° head-down tilt in 15° increments. Participants remained at each tilt angle for 6 minutes, where heart rate via ECG telemetry, manual blood pressure, skin temperature, and perceived thermal sensation (ASHRAE Thermal Scale) were recorded in the final minute of each tilt angle.

Results. There was a significant main effect of environment on higher skin temperature (35.5 ± 0.8 vs. 33.7 ± 1.5°C, $p<0.01$) and thermal sensation (1.2 ± 1.1 vs. -1.2 ±1.2, $p<0.01$) during the warm vs. cool trial. There was also a significant main effect of environment on higher heart rate during the warm vs. cool trial (67.6 ± 13.8 vs. 61.9 ± 11.4 bpm, <0.01). No significant differences were observed between environments or tilt angles in SBP. The incidence of ectopic beats was similar between the warm vs. cool trials (20 vs. 19, $p=0.89$).

Conclusion. Warm ambient temperature appears to help mitigate reductions in heart rate observed during simulated weightlessness. Understanding how temperature influences hemodynamics in a weightless environment may help improve space shuttle design to enhance astronauts' health while in space as well as upon returning to gravity on Earth.

A snapshot of dietary and exercise habits among college students

Reece Clark, Kayla Riley, Devyn Buchholz, Naveen Sharma

College students are often perceived as having poor dietary and exercise habits due to academic stress, time constraints, and irregular schedules. In order to determine the accuracy of these negative perceptions, a survey was designed to examine dietary habits surrounding exercise behaviors of college students. From November 2025-January 2026, a thirty-six-question survey was delivered online. We were able to recruit 293 current students to complete the survey. When the survey closed, data was collected on the Microsoft Forms platform and trends were analyzed. Participants of the survey were mostly female compared to male (3:1), and approximately a third identified themselves as Exercise Science Majors. Additionally, the average body mass index values (BMI) for female participants were 21.3 and for male participants were 25.3, putting our survey population in the normal and overweight categories, respectively. While exercise and nutrition knowledge were not directly assessed, reported behaviors suggest functional understanding of healthy habits. Many students in the survey reported exercising 3-4 times a week for 30 minutes to an hour per session. In regards to diet, the average caloric intake of the respondents was 1,870 kcal, and 20% of respondents reported not knowing their average caloric intake. Additionally, respondents typically chose carbohydrate-rich foods thirty minutes to an hour before exercising. After exercising, respondents typically chose mixed meals with a focus on protein within one hour afterward. These routines support energy levels and help with muscle recovery. Overall, this survey indicates that there is improvement to be made with dietary and physical activity practices based on general public health recommendations.

Exercise during pregnancy: What do patients hear from their physicians? A preliminary analysis.

Alina Vaiz, H Ewing, William Satarelli, Rachael Nelson

Approximately 10-15% of pregnancies result in adverse cardiometabolic conditions, impacting maternal and fetal health. Regular exercise during pregnancy improves health outcomes and postpartum recovery. Despite these benefits, it remains unclear what exercise advice patients receive from physicians, highlighting the need for clearer guidance on physical activity during pregnancy. Purpose: To describe the advice patients receive from their OB/GYNs regarding exercise during pregnancy. Methods: Using a survey-based study design, postpartum women (within 12 months of delivery) were recruited via social media, word-of-mouth, and through OB/GYN offices to complete an online questionnaire. The survey included 21 questions related to participant demographics, attitudes toward exercise, advice they received from their physician regarding exercise during pregnancy. Results: A total of 76 adult (30 ± 4 years), postpartum (5.6 ± 3.1 months), predominantly Caucasian (94.7%) women with 1.7 ± 0.7 children responded to our survey. Most reported being encouraged to exercise during pregnancy (64.9%), discussing the benefits of exercise (72.4%), and receiving at least one exercise prescription detail (64.4%) from their OB/GYN. At least half of respondents also acknowledged the benefits of exercise or that benefits outweigh risks (69.7%), discussed potential exercise risks (50%), and felt supported during pregnancy (64.5%). Discussion: Although the majority of women were encouraged to exercise during pregnancy, differences remain in the type and extent of the exercise advice given. Maternal and fetal health outcomes may be improved by filling in these gaps with standardized recommendations and better patient education.

The effect of heat acclimation on intestinal barrier integrity and damage: a meta analysis

Reshad Ahmed, Isaac Tiguridaane, Micah Zuhl

Exertional heat stress (ExHS) elevates core body temperature, redistributes blood flow, and reduces splanchnic perfusion, resulting in compromised gastrointestinal integrity. This is often accompanied by translocation of bacterial endotoxins, such as lipopolysaccharide (LPS), from the intestinal lumen into systemic circulation, termed intestinal permeability. In addition, damage to the intestinal wall can occur leading to a rise in intestinal fatty acid–binding protein (I-FABP), which is an indicator of intestinal endothelial insult. Heat acclimation improves thermoregulation and promotes cellular protective responses, including increased heat shock protein expression, which may help preserve intestinal tight junctions and regulate inflammatory signaling. While heat acclimation offers systemic adaptation and thermal tolerance, there is limited information on the degree to which heat acclimation protects against heat-induced gastrointestinal injury in humans. Purpose. This meta-analysis/ systematic review aimed to examine if heat acclimation attenuates intestinal epithelial injury during exertional heat stress. Methods. A random effects single arm meta-analsis was performed to examine the effect of heat acclimation on circulating LPS, endotoxin, and I-FABP. Following PRSMA guidelines, Web of science, sports discuss and PubMed databases were searched for studies measuring I-FABP and LPS, after heat acclimation Result. 7 studies (N=135) were included. Heat acclimation reduced intestinal damage in response to ExHS ($g=-0.45$, $p<0.0001$). No effect was observed for LPS ($p=0.23$). Conclusion. Heat acclimation reduced markers of intestinal damaged caused by exertional heat stress, but did not alter gastrointestinal integrity.

Accuracy of resting metabolic rate prediction equations compared to indirect calorimetry

Kylie Moskal, Kaylee Sharrer, Veronique Chapman, Madison Travis, Rachael Nelson, Paul O'Connor

Background. Obesity is a global health crisis linked to metabolic dysfunction. Weight loss can improve metabolic health but is difficult to achieve without accurate assessment of energy needs. Precise methods for determining resting metabolic rate (RMR) are available through body composition analysis via Dual-Energy X-ray Absorptiometry (DXA) or indirect calorimetry (IC) but are often limited by cost and accessibility. While several predictive equations can provide an estimate of RMR, their accuracy varies. Therefore, identifying the most reliable predictive methods is a vital step in weight loss efforts and metabolic health.

Purpose. To examine the relationship between two commonly used predictive equations for RMR vs. the gold standard for determining RMR, indirect calorimetry.

Methods. 51 male (n=14) and female (n=37) young, healthy adults (age: 18-24) participated in this study. Participants arrived after an overnight fast for assessment of height, weight, and RMR by IC using a ventilated hood system. A DXA scan was performed to determine lean body mass (LBM). Age, sex, height, and weight was used to predict RMR using the Harris-Benedict equation. LBM was used to predict RMR using the Cunningham equation. A Pearson correlation was used to determine the relationship between RMR determined via IC vs. predictive values. The effect of age and sex were assessed using a multilinear regression.

Results. We observed a significant relationship between RMR determined by IC vs. RMR determined via the Cunningham ($R2 = 0.562$, $p<0.001$) and Harris-Benedict ($R2 = 0.523$, $p<0.001$) equations. In a multilinear regression model age had no significant effect on RMR values. However, sex was a significant predictor of RMR and resulted in an improved R2 value with the Cunningham equation ($R2 = 0.777$, $p<0.001$). Similarly for the Harris-Benedict equation, sex was also a significant predictor of RMR and improved the R2 value in this model ($R2 = 0.719$, $p<0.001$).

Conclusion. Both models showed positive correlations, indicating similar predictive strength. Both equations can be accurately utilized to determine weight-loss prescriptions. The Cunningham equation, which incorporates LBM, showed a stronger correlation with measured RMR in males, suggesting it may better account for sex-specific differences in metabolically active tissue. Further investigation is required to understand whether this applies to other age groups, racial and ethnic populations, and clinical settings.

The Effects of Acute Caffeine Supplementation on Pitching Accuracy and Velocity

Jared Hanson, Cole Prout, Brady Kollen, Paul O'Connor

Introduction. Caffeine is one of the most used ergogenic aids in the world. Caffeine has been reported to act as a CNS stimulant to aid in enhancing muscle fiber contractions, reducing fatigue, and improving focus and alertness. However, its direct effects on specific sports performance measures are not well understood.

Objective. This study aimed to investigate the acute effects of different doses of caffeine supplementation on pitching velocity and accuracy in collegiate baseball players.

Methods. Twelve NCAA Division I collegiate baseball pitchers (20.3 ± 1.0 years, 90.2kg ± 6.5 kg) volunteered to participate in a randomized double-blind crossover study. Before the caffeine doses were administrated, participants provided informed consent, as well as medical history, and details surrounding habitual caffeine consumption. Caffeine was administered in the form of caffeine powder mixed with water and an artificial sweetener and delivered in three different doses; a placebo (P), moderate dose - 2.5 mg/kg (M), and high dose - 5 mg/kg (H). Following caffeine consumption, participants performed their standard warm up before the start of each trial. 1 hour following caffeine supplementation, subjects completed a pitching velocity and accuracy test that consisted of delivering 16 fastballs from the mound to a catcher behind home plate. These pitches were delivered into the same chosen quadrant of the strike zone. All six subjects completed 3 trials of this test on separate occasions, each trial with a different dose of caffeine. Each trial mimicked one inning with the pitcher throwing 16 pitches with a 20 second pitch clock. Speed and accuracy were measured with a Trackman portable B1 unit. Speed was measured in miles per hour and a strike was accurate if it was in the intended quadrant of the strike zone.

Results. An ANOVA with repeated measures was performed indicating no significant difference in mean velocity times across the three groups (P: 86.8 ± 2.4 mph, M: 87.3 ± 2.7 mph, H: 87.4 ± 3.1 mph, $F = 0.781$, $p = 0.396$) Similarly, for accuracy, there was no significant difference within subjects (P: 5.2 ± 2.0 hits, M: 5.8 ± 2.1 hits, H: 5.3 ± 3.6 hits, $F= 0.019$, $p = 0.894$).

Conclusion. Caffeine had no effect on velocity or accuracy, but despite the lack of significance the results may be of interest to coaches and athletes. Research suggests that caffeine's effect on individuals varies immensely, and it might be best to look at individual results when comparing caffeine effects on pitching velocity and accuracy.

Short term hot water immersion on markers of heat acclimation

Peyton Thibodeau, Isaac Tiguridaane, Christiana Donkor, Carly Raymo, Gabriel Russell, Kennedy Tidwell, Shane Fitzpatrick, Ambria Nagel, Micah Zuhl.

Background. Athletes who live in temperate areas are advised to heat acclimate before competing in hot environments. Traditional recommendations suggest that 60-100 minutes of daily heat exposure over 1-2 weeks is adequate to elicit physiological adaptations such as a enhanced sweat response, lower heart rate and core temperature during exercise in heat. The time requirement and physical demands of traditional heat acclimation protocols have historically made it challenging to implement into training schedules. There has been a surge of recent evidence to suggest that short-term (3-5 days) of heat exposure via hot water immersion (HWI) supports heat acclimation. Submersion in hot water limits the body's thermoregulatory response due to uncompensable heat stress (e.g., lack of heat removal). One approach that has yet to be explored is combining exercise with HWI across a short-term acclimation protocol. Exercise would enact thermoregulatory mechanisms such as sweating and evaporation while HWI would provide added thermal stress.

Purpose. This study aimed to determine if a short-term heat acclimation protocol consisting of exercise and hot water immersion will promote heat acclimation adaptations.

Methods. Using a randomized controlled study, 10 (23±2 years, 7 male, 3 female) non-heat acclimated participants were randomized into 2 groups, including 40 minutes of HWI (40°C water); or 20 minutes of exercise (65% VO2max) in a heated environmental chamber (36°C, 40% RH) followed by 20 minutes HWI (E+HWI). Both HWI and E+HWI were completed on five consecutive days. A heat tolerance test (HTT) consisting of 45 minutes treadmill exercise at 50% VO2max (36°C, 40% RH) was performed before (HTT1) and after (HTT2) heat acclimation. Primary outcome measure was core temperature measured during the HTTs.

Results. Findings are preliminary with data collection ongoing. Core temperature was similar at the end of HTT1 for both HWI and E+HWI (38.30±0.18 vs.38.42±0.10°C respectively). A decrease in core temperature was observed in HTT2 versus HTT1 in the HWI trial only (38.00±0.18 vs. 38.30 ±0.18°C, respectively, p=0.03). Core temperature did not change in HTT2 versus HTT1 in the E+HWI trial (38.48±0.49 vs. 38.42±0.10°C respectively).

Conclusions. Preliminary results suggest that the addition of exercise to HWI does not lead to a thermoregulatory adaptation to heat. Hot water immersion alone may be a viable option to induce acclimation.

Impacts of high fat diet and krill oil on inflammatory signaling in cardiac and skeletal muscle

John Jolly III, Martina Chaulk, Meradith Anderson, Naveen Sharma

Purpose. Obesity and high-fat diets have also been strongly linked to the growing prevalence of pathologies that lead to inflammation. Chronic inflammation is the body's immune response characterized by heat, pain, swelling, and loss of function. From a molecular perspective, inflammatory cytokines, proteins that are released from injured tissues, signal to downstream targets including members of the mitogen-activated protein kinase (MAPK) signaling pathway that work to regulate the inflammatory response. In addition to interventions that reduce obesity, such as dietary modification and exercise, dietary supplements are often used to improve overall health.
Once such dietary intervention is the consumption of unsaturated fats. Marine derived omega-3 fatty acids, long-chain polyunsaturated fatty acids (LC-PUFA) eicosatetraenoic acids (EPA) and docosahexaenoic acid (DHA) are purported to reduce inflammation. Fish oil has been the most commonly consumed delivery method of LC-PUFA, but an alternative to this could be krill oil, a shrimp-like crustacean, to further reduce negative symptoms. The hypothesis is that rats consuming high fat diets will exhibit increased values in
metabolic/inflammatory mediators within cardiac and skeletal tissue, and that dietary krill oil will provide significant reductions in these harmful factors.

Methods. Rat experiments have been approved by CMU's Institutional Animal Care and Use Committee, protocol #19-08.
Thirty, male Sprague-Dawley rats were housed in individual cages. The rats were then grouped into three randomly assigned dietary categories consisting of (n=10 each group): low-fat lard-based diet (CON);high-fat lard-based diet (HF); and high-fat krill oil-based diet (HFKO). All three groups consumed their prescribed diet for a 12-week duration. All animals had free access to food and water. Body mass and the amount of food consumption were recorded on a weekly basis. At the approximate age of 18 months, the rats were sacrificed under anesthesia. The heart and soleus muscles were extracted and immediately frozen in liquid nitrogen then stored at -80 C. These tissues were processed to determine protein concentrations, and subsequently used to detect markers of inflammation including IL-6 and members of the MAPK pathway via Western immunoblotting. Student's t-test and one-way ANOVA was used for for descriptive statistics, and a $p<0.05$ was deemed statistically significant.

Results. Food consumption was not different between groups and rats on high-fat diets expectedly gained more weight than CON rats. Analysis of inflammatory markers revealed tissue-specific differences and suggested that krill oil supplementation had limited potential therapeutic benefit in cardiac and skeletal muscle.

Conclusion. It is possible that the dose of krill oil supplementation could be altered in future studies to reveal a therapeutic benefit in these high-fat dietary model. Additionally, investigating the impact of the current intervention on other tissue or other members of the MAPK signaling pathways should be looked at in future analysis.

The effect of acute exercise combined with heat stress on circulating markers of inflammation: a meta-analysis

Albertas Klugas, Christiana Donkor, Rachael Nelson, Micah Zuhl

Exertional heat stress (ExHS) has a significant impact on human health and performance in various occupational and athletic sectors. While exercise is known to affect cytokine levels, there is limited information quantifying the specific circulating inflammatory profile following acute exercise in the heat.

Purpose. This meta-analysis aims to quantify acute changes in circulating pro- and anti-inflammatory markers in response to ExHS among non-acclimatized humans, and to determine if these responses are moderated by peak core temperature, heat exposure duration, or exercise intensity.

Methods. Following PRSMA guidelines, five databases were searched for studies measuring cytokines IL-1beta, L-6, TNF-alpha, IL-10, IL-1ra, and IFN-gamma after exercise in temperatures greater than 26 degrees Celsius. Random-effects meta-analysis and meta-regressions were performed.

Results. 35 studies (N=521) were included. Acute ExHS induced significant immediate increase in IL-6 (g=1.48), TNF-alpha (g=0.63), IL-10 (g= 0.80), and IL-1ra (g=1.45) (all $p<0.05$), while IL-8 trended toward significance (g= 0.49; p= 0.050). IL-6 remained significantly elevated 1-hour post-exposure (g=1.25). Peak core temperature was a significant moderator for IL-6, TNF-alpha, IL-10, and IL-1ra. No significant effects were observed for IL-1beta or IFN-gamma.

Conclusion. Thermal strain during ExHS causes an abrupt disruption of immune homeostasis. The response shifts towards an anti-inflammatory state in early recovery, mirroring the cytokine profile of exertional heat stroke but at a lower magnitude.

"I want to tell the world about my condition - my story - to help other people": Identity reconstruction and advocacy through virtual story co-construction in adults with aphasia

Allison Strnad, Katie Strong

Objective/ Purpose Statement. Aphasia is a communication disability caused by brain damage (most commonly stroke) that affects speaking, listening, reading, and writing while leaving intellect intact. Approximately 2 million people in the United States live with aphasia. Beyond language impairments, aphasia profoundly disrupts identity as individuals navigate life with an acquired communication disability that affects relationships, life roles, and social participation.
This study examined the experiences of adults with chronic aphasia who participated in a virtual story co-construction program.

Method. Five adults with chronic aphasia (resulting from stroke or arteriovenous malformation) who had participated in a 10–12-week virtual story co-construction program. Each participant worked one-on-one with a graduate student story coach to develop a personal narrative exploring "who I was, who I am, and who I hope to be." Story coaches, trained in Life Participation Approach to Aphasia principles, provided multimodal supports while honoring participant voice and shared decision-making throughout the collaborative process.
Participants then shared their stories in a celebratory presentation within a virtual aphasia community. Stories were presented for approximately 15 minutes with coach support as needed, followed by audience engagement.
Semi-structured follow-up interviews explored participants' experiences with the story co-construction process and sharing. Interview data were analyzed using Braun and Clarke's reflexive thematic analysis.

Results. Five major themes emerged: Collaborative Relationship with Story Coaches, Evolution of Communication Confidence, Community Connection with Peer Support, Transformation of Identity and Self-Perception, and Empowerment Through Advocacy. These findings reflected the positive experiences of the program; participants grew their confidence in their identity with the encouragement of the story coach and storyteller community. Having the time set aside for self-reflection gave the participants empowerment in their story and growth in self-advocacy alike.

Discussion. The story co-construction process supported exploration and renegotiation of identity as participants integrated pre-stroke identities with post-stroke realities while constructing new identities grounded in lived experiences with aphasia. Notably, for most participants, the process catalyzed a shift from patient to advocate, with storytellers expressing desires to use their narratives to help others, reduce stigma, and educate communities about aphasia. Collaborative relationships with story coaches, characterized by emotional safety and shared decision-making, emerged as foundational. Connection to a global peer community provided validation and belonging that extended beyond the intervention.
Findings suggest virtual story co-construction programs support both communication goals and psychosocial well-being by providing structured opportunities for identity exploration and renegotiation. The emergence of advocacy identities highlights storytelling's potential to transform how individuals with aphasia see themselves and engage with their communities. Clinicians should consider incorporating narrative approaches that explicitly support identity exploration and create pathways for meaningful participation and advocacy.

A more sensitive question to screen for speech-in-noise deficit in typical hearing adults

Emma Ingalls, Sarah Grinn

Self-reported difficulty understanding speech-in-noise (SIN) is often collected as a case history screener question to flag potential subclinical deficits in populations with normal hearing. Lack of overt hearing loss challenges audiologists to consider lesions beyond the audiogram, such as central auditory processing disorder (CAPD), auditory neuropathy spectrum disorder (ANSD), or cochlear synaptopathy (hidden hearing loss), all of which may or may not contribute to SiN deficits. However, their collective prevalence is extraordinarily low compared to the quantity of normal-hearing individuals reporting SiN challenges; This vast discrepancy suggests that one of the most common case history questions in audiology, Do you have difficulty understanding speech in background noise?", may grossly overestimate the number of individuals with genuine pathology beyond the audiogram. This study aimed to evaluate the sensitivity of a new screening question that could more accurately identify normal-hearing individuals who genuinely believe that their degree of SiN difficulty is clinically abnormal. We hypothesized that a large majority of normal-hearing individuals would answer "Yes" to the screener question, "Do you have difficulty hearing in background noise?", yet would answer "No" to the more specific question, "Do you have more difficulty hearing in background noise than your peers?" Further, we hypothesized that responses to the revised screener question would be better correlated with objective performance on the Words-in-Noise (WIN) test. Thirty-one participants aged 1825 years with clinically normal hearing thresholds (020 dB HL), type A tympanograms, and <10% cerumen occlusion on otoscopy were recruited. Participants completed a brief self-report questionnaire assessing perceived SIN difficulties, including traditional and revised screener questions. Objective testing included tympanometry, pure-tone audiometry, and the WIN test, administered unilaterally and bilaterally using supra-aural headphones. WIN thresholds were calculated following Wilson et al. (2003), and performance was compared against self-reported SiN difficulty. Statistical analyses assessed the specificity and sensitivity of each screener question in relation to WIN outcomes. Results of this study revealed that of the 31 participants, 67.8% (21 participants) answered Yes or Sometimes to the traditional SiN question. However, when these 21 participants were asked to compare their listening difficulty to their peers, approximately half (10) reported having equal or less difficulty than their peers. Taken together, the traditional SiN screener question flagged 21/31 participants for subclinical auditory deficit, while the revised screener question far more accurately flagged only 11/31 for subclinical auditory deficit. Interestingly, those 11 participants (who reported greater SiN difficulty than their peers) exhibited equal WIN performance on average, compared to those who reported equal or less SiN difficulty than their peers.

Exploring Latin roots for increased vocabulary learning and understanding in Spanish and English

Zoey Breznik, Katie Squires

Purpose. The goal of this project was to create an educational workbook that helps learners of Spanish and English better understand the meanings of words by focusing on their shared Latin roots. Latin has heavily influenced both the English and Spanish languages, so exploring shared Latin-based vocabulary will create deeper understanding and retention of words in both languages. Methods: Using online etymology dictionaries and word lists, common Latin roots were identified and analyzed, observing how the Latin was changed over time into the modern Spanish and English vocabulary we have today. Using Spanish and English dictionaries, words were traced back to their origins to ensure they shared the same Latin root and carried the same meaning. Spanish and English bases were used to create word lists/examples for each Latin root.

Results. The analysis revealed various Latin roots shared by Spanish and English, which were compiled into a workbook to illustrate patterns and support increased vocabulary learning and understanding, particularly for students whose first language is Spanish.

Discussion/conclusion. There are numerous bilingual students in schools, but not many bilingual speech-language pathologists or teachers. This workbook can be used in the classroom/speech therapy settings to broaden language understanding and create more connections between languages.

Effects of hearing loss configuration on tinnitus program outputs

Kelly Kraemer, Yungfang Zheng, Olivia Miron

Objective. Tinnitus commonly co-occurs with hearing loss (HL) and may negatively affect an individual's quality of life. Studies have demonstrated a significant correlation between HL configuration and tinnitus perception. Hearing aids with integrated tinnitus sound therapy are widely used to reduce tinnitus perception and associated distress; however, limited evidence exists to guide optimal fitting strategies across different audiometric configurations. This study examined the acoustic outputs of tinnitus programs from seven manufacturers and three configurations of moderate sensorineural HL to inform evidence-based and clinically verified program selection.

Methods. Tinnitus program outputs were evaluated across seven major hearing aid manufactures using three moderate (50 dB HL) sensorineural HL audiometric configurations (flat, rising, and sloping). Software-predicted output levels from more than 40 tinnitus programs for each HL configuration were recorded across frequencies and verified using a 2cc coupler in an Audioscan Verifit 2 test box via Speechmap measurements. Statistical analyses quantified differences in output across HL configuration, manufacturer, and tinnitus program from both software and Verifit system, as well as differences between the two output sources. Outputs from the flat HL configuration were also compared to those from a simulated flat 20 dB HL hearing sensitivity to evaluate the effect of HL on tinnitus program output.

Results. HL configuration significantly affected output ($p < 0.05$) in both software and Verifit systems, with most manufacturers showing the highest output for flat-losses. Exceptions included Signia, ReSound, and Unitron. In Audiogram Based programs, Oticon, Phonak, and Unitron software followed HL configuration patterns, whereas other programs showed minimal configuration based changes, though flat-losses generally yielded the highest outputs. Verifit patterns were similar but less distinct. Across manufacturers, outputs differed significantly ($p < 0.0001$) in both software and Verifit measures. Unitron consistently produced the lowest outputs, while Oticon generated the highest for flat losses and ReSound for rising and sloping-losses. Noise based programs showed additional manufacturer differences, with Oticon or ReSound usually producing the highest outputs and Unitron the lowest. Clear output differences were observed across tinnitus programs for all manufacturers. While programs showed similar patterns for flat-losses, Audiogram Based programs uniquely produced the highest or relatively higher outputs at low frequencies for rising-losses and at high frequencies for sloping-losses compared with other programs. Hearing threshold level significantly affected outputs ($p < 0.05$), with increases of up to 31 dB (software) and 24 dB (Verifit) from 20 to 50 dB HL, with minimal effects observed in some ReSound and Signia programs. Overall, software outputs were consistently higher than Verifit outputs.

Discussion and Conclusion. Tinnitus program output showed clear sensitivity to HL configuration, variability across manufactures, and output sources. These findings indicate that verification is vital to ensure clinicians fit appropriate hearing aids and tinnitus programs to patients with different HL configurations.

“Use the Microphone!”: d/Deaf and hard of hearing (DHH) academics' experiences with inclusion and accessibility at conferences and institutional professional development workshops

Kemeny Ridley, Stacey Lim, Anthony Feig

Academic conferences and professional development (PD) workshops often lack adequate accessibility for individuals who are d/Deaf or hard of hearing (DHH). How this negatively impacts the careers of DHH individuals within academic and professional communities has not been well studied. A Qualtrics survey approved by (CMU IRB #2025-114) was disseminated through social media platforms and professional networks serving DHH academics and research/clinical professionals. Participants reported the types of accommodations they used at conferences and PD, and their experiences with accessibility—or lack thereof—at these events. A total of 91 respondents across a range of disciplines (e.g., allied health fields, medicine, accounting, legal studies, humanities, and natural sciences) participated in the study. Participants reported utilizing a range of accessibility accommodations such as microphones, real-time captioning, sign language interpreters, FM or assistive listening systems, and optimized lighting conditions. Respondents reported the most frequent types of marginalization being presenters/facilitators who refused to use microphones (e.g., “I don't need a microphone; I have a loud voice.”), and not being invited to (or being disinvited from) networking opportunities or other social functions. Respondents reported that often presenters/facilitators made decisions about accommodations without directly consulting the individuals being accommodated. Participants reported that accommodations were intended to be in place but frequently ineffective in real-world implementation (e.g., missing interpreters, broken technology, and confusion surrounding access), resulting in emotional distress. Almost half of the respondents reported needing to self-advocate at conferences and PD “often” (28.75%) or “almost always” (18.75%). The most reported self-advocacy strategy was asking publicly (i.e., in front of the group), followed closely by asking the presenter or officiant privately. Twenty-six percent of respondents reported needing to self-identify as DHH “frequently” or “most of the time” in order to receive accommodations, and ~10% report having been challenged by someone at an event about whether their hearing loss was “legitimate.” Anecdotally, disability and accessibility studies conferences are often considered the “gold standard” for inclusion. Surprisingly, the American Academy of Audiology (AAA) and American Speech and Language Association (ASHA), which serve practitioners working with individuals with communication disorders, often do not follow these standards. In fact, the responses from the survey showed that AAA and ASHA were repeatedly mentioned as among the least accommodating, the Modern Language Association and Geological Society of America are inconsistent. Other professional societies (e.g., Association for Research in Otolaryngology and the American Educational Research Association), were perceived to fall along a spectrum of accessibility; although some provided targeted accommodations, the majority reported experiencing accessibility challenges or limitations. Recommendations for fostering inclusive environments for d/DHH participants will also be highlighted.

The effects of music appreciation on cochlear implant users undergoing auditory skills training

Jillian Cregger, Stacey Lim, Karen McIver-Lux

Cochlear implants (CIs) provide essential auditory input for individuals with severe to profound sensorineural hearing loss; however, limitations in sound quality and music perception may negatively affect quality of life. Auditory skills training (AST) is a form of aural rehabilitation designed to improve listening, communication, and functional outcomes for CI users, yet the potential benefit of incorporating music appreciation into AST has not been well established. This study investigated the effects of music appreciation–based activities on quality of life in adult CI users undergoing auditory skills training therapy.

Seven post-lingually deafened adults who have used a CI for at least six months have participated in eight weeks of AST. Participants were randomly assigned to one of two groups: standard AST or AST with an integrated music appreciation component. Quality of life, auditory competencies, listening self-efficacy, and music enjoyment were assessed using the Cochlear Implant Quality of Life (CIQOL), Auditory Competency Checklist in Everyday Settings and Situations (ACCESS), Listening Self-Efficacy Questionnaire (LSEQ), and music-related items from the University of Canterbury Music Listening Questionnaire (UCMLQ). Assessments were conducted at baseline, midpoint, and completion of therapy. As of this conference abstract submission date, five participants have completed all their AST sessions. One additional participant is in process of completing their series of AST. Preliminary data analysis from the five participants who completed the study show the following results:

The average age of onset of postlingual hearing loss was 37.8 years. The five participants received their cochlear implants between 2022-2024. Prior to starting the auditory skills training program, the average pre-CIQOL (overall quality of life) score for the control group (n=3) was 50.19, while the score for the experimental group (n=2) was 48.68. After the 8 weeks of AST, the average score for the control group (n=3) was 51.16 and the average score for the experimental group was 59.71, which showed an increase in average QOL scores of 11.03 points. Additionally, the LESQ, which measures the amount of confidence that individuals have in listening, showed that as a whole, all participants showed improved self-efficacy and self-confidence in their listening skills. Pre-test measures of the entire group were 58.33% and post-test measures were 65.43%. The ACCESS checklist was used to determine the level of auditory skills that were improved, and overall, participants experienced a range of improvement (ranging from 0.5 to 2 levels improvement on their auditory skills). While this sample size is small, and data collection and analysis are ongoing, the findings from this study have different implications for post-cochlear implant aural rehabilitation.

Impact of Auditory Skills Training on Cochlear Implant Users as Observed by Communication Partners

Erika Doetkott, Stacey Lim

The impact of untreated hearing loss has long been studied, revealing concerns such as an impacted quality of life (Schulz et al., 2017), increased anxiety and depression (Manchaiah, Stephens, & Lunner, 2013), and even cognitive decline (Lin et al., 2011). While these facts are well-known, only an estimated 25% of people who could benefit from hearing aids or cochlear implants use them, leaving a wide number of people without anyform of intervention such as aural rehabilitation (Schulz et al., 2017.) There may be ways to increase the satisfaction with intervention, specifically through the involvement of communication partners. They often provide support to this person in many ways, such as emotional caretaking in addition to physical caretaking (Schulz et al., 2017). In terms of treatment available for cochlear implant users, auditory skills training and aural rehabilitation has increasingly become more favorable (Glade, 2018). As more people make use of hearing aids and assistive technology, reported patient outcomes and patient satisfaction has become more varied (Sweetow & Sabes, 2006). Essentially, Sweetow and Sabes (2006) argue that while audiologists can restore hearing to some extent, listening is a skill that needs practice.

This study aimed to examine the effects of auditory skills training a communication partner sees in their partner, a cochlear implant user, as well as their ability as a communication partner to utilize self-advocacy skills and other various techniques to support their partner with hearing loss. This study utilized qualitative study techniques in the form of interviewing, transcription, and qualitative analysis using NVivo. To date, participants have undergone pre-interviews, pre-AST questionnaires, and are currently enrolled in 8 weeks of 1-hour long sessions of auditory skills training (AST) with a licensed auditory verbal therapist. A total of 3 dyads have been enrolled in this study. After completing their 8 weeks of AST, participants will complete post-interviews and post-AST questionnaires.

Data is still being collected, but preliminary results indicate marked differences between the cochlear implant user's beliefs compared to their communication partner. Communication partners often perceive the cochlear implant user to be strong and confident in their self-advocacy skills, while cochlear implant users perceive themselves to be struggling and feel that they have to rely on others more. These early results indicate the impact belief systems have on a person's perception of their hearing loss, and demonstrate the value auditory skills training sessions have on confidence of one's own communication strategies and the development of improved communication strategies. More complete data will be presented at the CHP symposium.

Acoustic Differences Across Tinnitus Programs

Olivia Miron, Yunfang Zheng, Matthew Klinzing

Objective. Tinnitus sound therapy delivered through hearing aids is frequently used in clinical management; however, the acoustic design, adjustment flexibility, and perceptual qualities of tinnitus programs vary considerably across manufacturers. These differences have not been systematically evaluated, leaving clinicians without clear guidance on how program type, bandwidth, modulation, and output behavior may influence sound quality or patient comfort. This study investigated acoustic variability in tinnitus programs across seven major hearing aid manufacturers to support evidence-based program selection and emphasize the importance of clinical verification.

Methods. Over 40 tinnitus programs from seven hearing aid manufacturers were evaluated. Acoustic characteristics, including noise type, bandwidth, modulation, spectral shaping, and user adjustability, were documented using each manufacturer's fitting software based on a flat 20 dB HL audiogram. Frequency-specific output levels were obtained from manufacturer software and verified using Audioscan Verifit 2 Speechmap measures in a test-box condition. Statistical analyses examined output differences across frequency, output source, manufacturer, and tinnitus program.

Results. Substantial variability was observed across manufacturers in acoustic design and output behavior. Noise-type offerings ranged from broadband-only to manufacturers offering speech-shaped, nature-based, and notched-based options. Program bandwidth typically ranged from 250-10,00 Hz, while some manufacturers extended to 12,000 Hz. Spectral-shaping strategies differed even among similarly labeled programs. Modulation was present in certain systems but absent in others, and user adjustability ranged from overall gain to frequency-specific adjustments. Significant differences were found between software-predicted and verified outputs across manufacturers, with discrepancies varying by frequency. Output differences between comparable program types exceeded 25 dB and approached 39 dB at certain frequencies. Minimum and maximum output limits also varied substantially, with some systems imposing restrictive upper output ceilings. Preliminary perceptual ratings demonstrated variability in noticeability, naturalness, bothersomeness, and stability across programs and manufacturers.

Discussion and Conclusion. Substantial acoustic variability exists among tinnitus programs across manufacturers, and software-predicted outputs frequently differ from verification measures. These findings highlight the importance of clinical verification and individualized program selection when fitting tinnitus sound therapy. Clinicians should consider both program design and verified output behavior rather than relying on software displays alone to optimize tinnitus management outcomes.

Fitting formula effect and aided outcome correlation for listeners with different degrees of hearing loss

Adler Kolb, Yunfang Zheng, Sam Bujak, Jingjing Xu

Objective/Purpose. This study aims to understand how different hearing aid fitting formulas (DSL, NAL-NL1, and NAL-NL2) influence loudness perception, comfort, own-voice occlusion, and speech understanding in adults with varying degrees of sensorineural hearing loss (SNHL), using both behavioral and subjective outcome measures. Hearing aid fitting formulas guide amplification by balancing audibility and loudness. DSL prioritizes maximizing audibility, providing near one-to-one gain between input and output, whereas NAL formulas aim to optimize speech intelligibility while keeping loudness within the range experienced by normal-hearing listeners. Despite the clinical importance of these differences, limited research has examined how DSL and NAL fitting strategies affect loudness perception and aided outcomes in adults.

Methods. Adults with mild to profound SNHL are recruited through the CMU Carls Center. They will undergo audiometric screening to confirm eligibility. A within-subject, repeated-measures design is used in which each participant completes testing under three fitting formulas (DSL, NAL-NL1, NAL-NL2) and three gain conditions: fit-to-target (prescribed gain based on audiogram), +10 dB above target, and −10 dB below target. Real-ear measurements verify appropriate fitting across conditions. Outcome measures include Speech Intelligibility Index (SII), Word Recognition Scores (WRS), QuickSIN, loudness perception ratings, comfort and clarity ratings, own-voice occlusion reports, and listening tolerance.

Results. The fitting formula affected both self-perceived voice quality and perception of others' voices. Overall, DSL produced more echoing across amplification levels, especially for mild and moderate losses. NAL formulas were preferred over DSL for listening to others' speech. The formulas did not significantly change QuickSIN SNR scores, though NAL-NL2 showed slightly better SNRs at the 10 dB and target levels, likely due to its lower low frequency and higher high frequency amplification. DSL also showed lower SNRs for mild loss and for moderate loss at −10 dB, likely because of its higher overall gain. For word recognition in noise, NAL-NL1 yielded higher scores across levels, likely due to prioritizing the speech region without over amplifying noise. Participants generally preferred the NAL formulas and were more willing to wear those settings longer. Mild loss favored NAL-NL2, while moderate loss preferred the sound of NAL-NL2 but were more willing to wear NAL-NL1. NAL-NL1 produced the highest SII overall. Data collection is still ongoing.

Discussion/Conclusion. Current findings suggest meaningful perceptual and performance differences across fitting formulas. NAL-NL1 may provide improved speech recognition and listening tolerance, while the NAL formulas in general may reduce own-voice occlusion. DSL was generally less preferred for conversational listening in this limited sample. Continued analysis across a broader range of SNHL will be completed to better understand these trends, the participants' preferences and performance across fitting formulas and gain conditions, thereby providing valuable information to professionals to improved fitting outcomes.

Effects of RECD and fitting formula on hearing aid gain and output targets across simulated and age-based conditions

Rawad Wehbe, Yunfang Zheng, Jungsywan Sepanski

Objective/Purpose: Pediatric hearing aid fitting requires consideration of ear canal acoustics, as smaller ear canal volumes significantly influence sound pressure level (SPL) and prescribed amplification targets. The Real-Ear-to-Coupler Difference (RECD) accounts for acoustic differences between a 2-cc coupler and an individual ear canal and is essential for accurate gain prediction. Although RECD and pediatric fitting formulas such as DSL and NAL have been independently studied, limited research has examined how simulated and age-based RECD variations interact with prescriptive formulas to influence prescribed gain, output targets, and compression behavior. The purpose of this study was to examine how changes in RECD affect gain, output targets, and compression ratios across hearing loss configurations using DSL Pediatric, NAL-NL1, and NAL-NL2, and to compare software-generated prescriptions from Phonak Target with verification-based targets from Verifit2. Methods:This study consisted of two stages. In Stage 1, simulated RECD values were used to examine their effects on prescribed gain, maximum power output (MPO), and compression ratios across three hearing loss configurations (flat, rising, sloping) and four degrees of severity (mild, moderate, moderately-severe, severe). RECD values were set to adult average and increased by +5, +10, +15, and +20 dB. Each condition was fitted using DSL Pediatric, NAL-NL1, and NAL-NL2 at 100% adaptation in Phonak Target. Prescribed gain values for soft (50 dB), average (65 dB), and loud (80 dB) inputs were recorded, and corresponding output targets were measured using Verifit2. In Stage 2, age-based RECD categories (infant through adult) provided by Verifit2 were applied to the same hearing loss configurations and fitting formulas. Output targets were recorded across frequencies to evaluate developmental changes in amplification requirements and their interaction with prescription type and hearing loss severity.

Results: Findings aligned with the anticipated influence of RECD magnitude on amplification parameters. Increases in simulated RECD were associated with corresponding increases in prescribed gain and MPO within the fitting software across hearing loss configurations and input levels. Variations were observed across fitting formulas, with DSL generally producing higher gain targets compared to NAL prescriptions, particularly for lower input levels. Age-based RECD analyses demonstrated decreasing output targets with increasing age, consistent with increasing ear canal volume. Differences between software-generated prescriptions and verification-based targets were observed across conditions, indicating that RECD magnitude and prescription method influence predicted amplification outcomes.

Discussion/Conclusion: RECD magnitude, fitting formula, degree of hearing loss, and input level influence prescribed gain and output targets. Differences between software-based prescriptions and verification-based targets underscore the importance of individualized RECD measurement and real-ear verification in pediatric amplification. These findings support best-practice recommendations for incorporating RECD into pediatric fittings to ensure accurate, safe, and developmentally appropriate amplification.

Loudness perception and aided outcome correlation for different degrees of hearing loss

Sam Bujak, Yunfang Zheng, Adler Kolb, Jingjing Xu

The present study investigated the effects of variations in hearing-aid amplification on loudness perception, speech understanding, and user preference in adults with sensorineural hearing loss (SNHL). Thirty-five participants aged 18 to 75 years with mild to profound SNHL, defined by high-frequency pure-tone averages of 2 kHz or greater, completed assessments under three amplification conditions: prescriptive target, 10 dB above target, and 10 dB below target. Hearing aids were fitted and verified using DSL, NAL-NL1, or NAL-NL2 algorithms within a repeated-measures design. The analysis presented here emphasizes the results obtained with the NAL-NL2 algorithm. Outcome measures included ratings of own-voice and recorded-voice loudness, quality, and comfort; QuickSIN scores; NU-6 word-recognition performance in quiet and in babble; subjective ranking of fittings; and estimates of daily listening hours.

Amplification level had a pronounced impact on subjective outcomes. Across all algorithms, the 10 dB below-target condition was consistently rated as providing the greatest own-voice comfort and the highest perceived quality, while the 10 dB above-target condition was most often judged as the loudest and least comfortable. Among NAL-NL2 users, the 10 dB below-target setting was preferred for recorded speech, indicating that prescription-specific gain strategies interact with perceived speech quality. The degree of hearing loss also influenced preferences; participants with milder SNHL demonstrated greater sensitivity to loudness differences and reported occlusion more frequently at higher gain levels.

In contrast, objective speech measures remained relatively stable across different amplification settings. QuickSIN performance did not differ significantly among the three gain conditions, which aligns with the established importance of signal-to-noise ratio rather than absolute level in determining speech-in-noise outcomes. Similarly, NU-6 word recognition was unaffected by changes in gain, although scores decreased as anticipated in the presence of background noise. These results suggest that moderate variations from prescriptive gain targets do not substantially affect measured speech understanding within the tested parameters.

Daily listening hours and overall user rankings favored the prescriptive target condition, indicating that standard fittings provide an effective baseline for routine use. However, consistent improvements in own-voice comfort at 10 dB below target and occasional clarity benefits at 10 dB above target demonstrate the clinical importance of individualized fine-tuning around the prescriptive target. The current findings support a fitting strategy in which the target gain serves as an initial reference, followed by user-specific adjustments based on comfort, perceived clarity, and prescription characteristics. Collectively, these results emphasize that while prescriptive targets optimize overall outcomes, modest reductions in gain frequently enhance user comfort without compromising speech performance, underscoring the need for individualized hearing-aid optimization.

Burden of underrepresentation: professional identity construction in nursing academia

Kechi Iheduru-Anderson, Jay Thieme-Whitlow

Background/Purpose. Underrepresentation of nurses of color in nursing academia poses a significant barrier to the advancement of Black women faculty and leaders. While much research has explored the experiences of Black women in nursing, the specific burden of their underrepresentation in academic spaces has not been extensively studied. This study explores how Black women navigate this underrepresentation in predominantly white academic environments and construct their professional identities amid the associated challenges.

Methods. Using a narrative inquiry design, we conducted in-depth interviews with Black women faculty and academic leaders in nursing, analyzing their experiences through reflexive thematic analysis. This study was grounded in Critical Race Theory and Intersectionality, allowing for an exploration of the interwoven effects of race and gender on professional identity formation.

Results. Key findings highlight several burdens of underrepresentation, including navigating undervaluation in academia, managing racial stereotypes and microaggressions, experiencing institutional isolation and lack of support, and negotiating cultural assimilation and identity. Participants also emphasized the importance of advocacy, mentorship, and cultural understanding. Black women faculty face complex intersections of race, gender, and professional expectations, often serving as de facto role models and mentors. They experience heightened scrutiny and pressure to represent their entire communities. Black women academics adaptively construct professional identities amid cultural and institutional pressures.

Discussion. Findings underscore the need for nursing academia to move beyond individual-level fixes and implement structural supports that dismantle systemic barriers. Priority strategies include structured mentorship and sponsorship, transparent workload and evaluation processes, and inclusive leadership development that redistributes opportunity and reduces racialized labor. Institutional policies that address pay equity, faculty retention, and advancement pathways for Black women are essential to building an equitable academic environment.

Implications for Nursing and Higher Education Leadership. Nursing and higher education leaders are positioned to address underrepresentation by changing the structures that shape faculty recruitment, belonging, evaluation, and advancement. Equity-centered reforms—such as transparent workload and promotion criteria, resourced mentorship and sponsorship pathways, and routine equity audits tied to decision-making—can reduce gatekeeping and strengthen retention. Leaders should also attend to the unequal distribution of service and "diversity labor," ensure equitable access to leadership opportunities, and implement accountability mechanisms that connect departmental climate and equity outcomes to leadership evaluation. Collectively, these actions can improve faculty representation, strengthen mentoring capacity, and create more sustainable pathways into academic and administrative leadership for historically excluded groups.

Conclusions. Addressing the burdens of underrepresentation in academic nursing requires institutional transformation, not performative initiatives. Advancing equity will depend on sustained leadership accountability, policy reform, and intentionally resourced mentorship/sponsorship structures that

reduce barriers to retention and promotion. Strengthening these systems is central to building a more inclusive and representative academic nursing workforce and to supporting long-term excellence in nursing education.

Police officers perceptions of available mental wellbeing resources

Suzanne Hakeos, Tatiana Davidson, Sarah Miller, Megan Thoen, Michelle Nichols

Background. Police officers are repeatedly exposed to acts of violence, abuse, accidents, suicides, human suffering, and threats to their own safety during their workday. These exposures have been shown to increase the risk of developing mental health issues, yet officers are known to underutilize mental health services.

Objectives. To evaluate police officers' perceptions of a variety of mental wellbeing services, what services they would participate in or not, and reasons for both.

Methods. This qualitative study evaluated officers' perspectives and knowledge on mental health services through one-on-one interviews with 32 officers across 10 states.

Results. Four major theme categories were developed (mental wellbeing services, facilitators and barriers, recommendations and needs, and intrapersonal). The top six mental wellbeing services favored by officers were critical incident stress management, peer mentoring as a whole, professional counseling, departmental presentations and training, peer mentoring, and family and friends. The top six least favorable were peer support groups, chaplain or religious leader, professional counseling, departmental presentations and training, and self-help services. Recommendations and needs were provided by officers for training (officer and providers), author mentions (self-help), as well as the need for a variety of services to choose from. Facilitators and barriers were discussed, along with intrapersonal factors.

Conclusion. With the information the officers provided, departments and mental health providers can use the information to improve or initiate police-centric mental wellbeing services**.**

Nursing faculty- student interaction factors and intent to leave academia: an understudied null finding

Larissa Miller

Background. Emotionally complex nursing faculty-student interactions have increasingly been suggested as an additional driver of nursing faculty attrition. Nursing students experience high rates of anxiety, psychosocial distress, and academic stress, raising concern that repeated exposure to these encounters may contribute to faculty compassion fatigue and attrition.
Purpose: This study examined whether faculty-student interaction characteristics associated with compassion fatigue were directly related to nursing faculty intent to leave academia.

Methods. A national mixed-methods, cross-sectional exploratory correlational design was used. Nursing faculty from associate and baccalaureate programs completed an anonymous electronic survey (N = 89). Quantitative measures included the Professional Quality of Life Scale (ProQOL-5) and the Price Scale on Intent to Stay (PSIS). Two open-ended questions elicited narrative descriptions of nursing faculty-student interactions associated with compassion fatigue and compassion satisfaction. Qualitative data were analyzed inductively through open coding and thematic development, producing three domains: student coping-related stressors, student learning-related stressors, and institutional situations that intensified emotional labor. Thematic domains were transformed into categorical variables and analyzed using chi-square, Fisher's Exact tests, and logistic regression to examine associations with intent to leave.

Results. Although faculty frequently described emotionally demanding student encounters including psychosocial crises, boundary strain, disengagement, and academic gatekeeping, no statistically significant relationships were identified between any student-related thematic domain and intent to leave academia. In contrast, compassion fatigue itself demonstrated a statistically significant association with faculty intent to leave, indicating that compassion fatigue, rather than student interaction characteristics alone, was the primary predictor of attrition intent.

Discussion. These findings challenge prevailing assumptions that interactions with nursing students are a direct driver of faculty attrition. While emotionally intensive student interactions contribute meaningfully to compassion fatigue and secondary traumatic stress in nursing faculty, they do not independently predict faculty plans to exit academic roles. Instead, results suggest strongly that broader institutional and structural conditions coupled with emotional labor translate into departure intentions. Faculty narratives reflected resilience and sustained commitment to student success even amid high emotional and organizational demands. Retention strategies should therefore prioritize identified organizational and systemic resources such as workload equity, leadership responsiveness, and institutional recognition of emotional labor in student instruction and support.

Impact of a health equity workshop on nursing students' knowledge of social determinants of health and perceived application to practice

Emily McIntire, Gretchen Dubes, Lenna, Westerkamp, Larissa Miller, Cheng-Ching Liu

Background. Poverty is a social determinant of health (SDH) that creates barriers to healthcare. Nursing students may have limited exposure to caring for underserved people and communities.

Aim. This study examined the impact of a health equity workshop on nursing students' SDH knowledge, attitudes toward poverty, and perceptions of how learning could be applied in practice.

Methods. A quasi-experimental, one-group repeated-measures design with an embedded qualitative component was used.

Results. Mean attitude toward poverty scores shifted from 75.66 (SD = 6.89) pre-workshop to 71.33 (SD = 8.07) post-workshop, and 72.79 (SD = 5.06), seven weeks later. SDH knowledge improved from 62.88 (SD = 13.27) pre-workshop to 80.68 (SD = 10.20) post-workshop, and 78.57 (SD = 9.49) seven weeks later. The results indicated a significant effect of time, with a Wilks' Lambda value of 0.508, and a p-value <.001 demonstrating a significant improvement in knowledge across the three time points. Content analysis showed deeper empathy, greater awareness, and clearer recognition of nurses' advocacy toward poverty and SDH.

Conclusion. The study provides insight of both measurable and perceived impacts of a health equity workshop. Findings demonstrate the value of mixed methods for evaluating strategies that support the application of SDH learning in practice.

Acute diffuse erythema and skin desquamation in a two-year-old female: a case of staphylococcal scalded skin syndrome

Kelsey Landra, Lixin Li

Introduction. Staphylococcal scalded skin syndrome (SSSS) is a rare exfoliative dermatosis, with 7.67 cases per million U.S. children, with 45.1 cases per million U.S. infants age less than 2 years. SSSS is caused by toxin-producing Staphylococcus aureus, predominantly affecting neonates and young children due to their immature immune systems and low ability to clear exfoliating toxins. Early recognition is critical to prevent morbidity.

Case Report. A previously healthy two-year-old female presented to the emergency department with 4-day history of fever, irritability, and a rapidly progressive erythematous rash. Physical examination revealed diffuse erythema with superficial desquamation and a positive Nikolsky sign, sparing the mucous membranes. Laboratory investigations demonstrated elevated inflammatory markers, while blood cultures remained negative. A clinical diagnosis of SSSS was made. The patient was admitted to the Pediatric Intensive Care Unit (PICU) for inpatient care and commenced on intravenous anti-staphylococcal antibiotics along with supportive management, including fluid resuscitation and analgesia. She showed rapid clinical improvement with resolution of fever and skin findings and was subsequently transitioned to oral antibiotics. Nearly complete recovery occurred without complications.

Conclusion. This case highlights the importance of considering SSSS in young children presenting with acute diffuse erythema and skin desquamation. Prompt diagnosis, appropriate antimicrobial therapy and wound care results in excellent outcomes.

A rare endocrine immune-related adverse event: Keytruda-induced latent autoimmune diabetes presenting as diabetic ketoacidosis in a patient with Li-Fraumeni Syndrome

Taylor Schneider, Lixin Li

Introduction. Immune checkpoint inhibitors have transformed cancer treatment but are associated with a widening array of immune-related adverse events (irAEs), including rare but potentially life-threatening endocrine complications. Pembrolizumab (Keytruda), a programmed cell death protein 1 (PD-1) inhibitor, has been implicated in the development of autoimmune diabetes, often presenting abruptly as diabetic ketoacidosis (DKA). This case report showcases the first reported case of pembrolizumab-induced latent autoimmune diabetes in adults (LADA) in a patient with Li-Fraumeni Syndrome.

Case Presentation. We report a 76-year-old male with Li-Fraumeni syndrome who developed new-onset LADA presenting as diabetic ketoacidosis following pembrolizumab therapy for metastatic squamous cell lung carcinoma. The patient underwent right lower lobe lobectomy for stage IA3 squamous cell carcinoma in 2022 and in 2024 developed metastatic recurrence, and was treated with pembrolizumab, paclitaxel, and carboplatin, followed by ongoing pembrolizumab maintenance. He had no prior history of diabetes. In January 2026, he presented to the emergency department with fatigue, polyuria, polydipsia, xerostomia, and weight loss. Laboratory evaluation confirmed the diagnosis of DKA. Autoimmune evaluation revealed positive anti–glutamic acid decarboxylase antibodies, consistent with immune-mediated beta-cell destruction. He was treated with intravenous insulin, dextrose, and fluid resuscitation with rapid clinical improvement. Pembrolizumab was discontinued. The patient received diabetes education and was discharged on basal-bolus insulin therapy.

Conclusion. This case highlights a rare endocrine irAE associated with PD-1 inhibitor therapy and highlights the diagnostic challenges of distinguishing immune checkpoint inhibitor–induced diabetes from other causes of hyperglycemia in older adults. Early recognition of this condition is critical, as prompt insulin therapy and lifelong glycemic management are paramount. Clinicians should maintain a high index of suspicion for autoimmune diabetes in patients receiving immune checkpoint inhibitors who present with acute metabolic decompensation.

Revolutionizing surgical recovery by reducing readmissions and postoperative complications with hyaluronic acid based adhesion barriers

Olivia Iavasile, Lixin Li

Introduction. Postoperative intra-abdominal adhesions are recognized as the leading cause of small bowel obstructions (SBO). In addition, they are a major contributor to surgical readmissions and postoperative complications. The estimated annual cost of readmissions secondary to postoperative intraabdominal adhesion complications is roughly $3 billion in the US. Since adhesions are reported in up to 90% of all patients after abdominal surgery, they represent a significant clinical, economical, and emotional burden. Currently the only preventive measures are precise surgical techniques and minimally invasive surgeries such as laparoscopic and robotic techniques. However, these strategies alone often fail, even more so in high risk patients, resulting in complications.

Aim. This case study evaluates intraoperative hyaluronic acid based barriers to reduce adhesion formation, recurrent SBO, and postoperative complications.

Case Presentation. A 59-year-old female with extensive surgical and medical history, including multiple abdominal surgeries and a prior small bowel resection secondary to SBO, presented with a functional SBO at a prior anastomotic site with dense adhesive disease. She underwent two exploratory laparotomies during her most recent hospital course. The first operation addressed stabilization and adhesion lysis, and the second involved two bowel resections with re-anastomosis. Given her history of recurrent and extensive adhesions, multiple prior abdominal operations, and risk factors including oxygen dependent chronic obstructive pulmonary disease (COPD) and Type 2 Diabetes, a hyaluronic acid adhesion barrier sheet was applied during both laparotomies. The barrier was applied to provide a physical separation of the bowel and abdominal wall during the peritoneal healing window of postoperative days 3 through 7. This was achieved by not only providing a physical barrier but also increasing tissue hydration and reducing fibrin bridge formation. After the second procedure, the patient's bowel function returned on postoperative day 5 without further obstructive symptoms or need for imaging. Scheduled two week follow up outcomes are pending.

Conclusion. This case strongly suggests intraoperative use of hyaluronic acid–based adhesion barriers reduce adhesion-related small bowel obstruction, the need for reoperation, and overall postoperative adhesion-related complications. The incorporation of hyaluronic acid adhesion barriers has the potential to significantly improve surgical recovery, postoperative complications, and readmissions.

Evaluating the impact of a comprehensive research curriculum within evidence-based medicine courses in physician assistant education

Sergey Soshnikov, Najat Yahia, Lixin Li

Introduction. Evidence-based medicine (EBM) is a fundamental component of practice-based learning. As medical education evolves, the need for EBM curricula is clear. How to implement EBM into curriculum and measure its efficacy is far less clear.

Aim. This study aims to identify the gaps and explore opportunities to improve EBM curriculum in physician assistant (PA) education. This study also aims to evaluate the impact of a comprehensive research curriculum into EBM courses on enhancing learners' confidence levels across various research-related domains.

Methods. Survey questions were administered through Qualtrics to PA students before and after their EBM course. A total of ninety-six students participated in the survey. A paired t-test assessed pre- and post-course differences in student competencies.

Results. Learners initially have low confidence (1.58 ± 0.75) in their ability to identify and search relevant databases and reported low levels of familiarity with the structure of research articles and components of research presentations. Following completion of the course, confidence in evaluating research articles (1.98±0.63 to 3.08±1.04) and selecting statistical tests (2.40±0.83 to 3.67±0.90) . Additionally, learners reported significantly improved after the course. Furthermore, there was a significant enhancement in confidence with study designs, ethical considerations, and engagement in research projects involving human subjects after the course.

Conclusions. Findings indicated a clear need for well-structured EBM intervention to address gaps among learners. Implementation of a comprehensive research curriculum in EBM course will effectively enhance core research competencies relevant to evidence-based practice

Body image concerns and its association with physical activity and disordered eating among university students

Anna Moore, Chin-I Cheng, Lixin Li, Md Mahmudul Mamun

Objective. This study examined the relationship between body image concerns, physical activity levels, and eating disorders among a sample of undergraduate university students at CMU.

Methods. A total of 220 students (55 males, 158 females; mean age= 20 years) voluntarily participated. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ), body image concerns with the Body Shape Questionnaire (BSQ-34), and eating disorder symptoms with the Eating Disorder Examination Survey (EDES). Data were collected during Fall 2025 and Spring 2026. Data were analyzed using SAS 9.4. Chi-square test of independence was used to find the association among physical activity levels and body shape concerns. One-way ANOVA was used to examine eating disorder severity across levels of body shape concerns, while two-way ANOVA was performed to assess joint effect of physical activity and body shape concern groups on eating disorder severity.

Results. Most students reported no body image concerns (33.18%) or mild concerns (32.73%), while 14.09% reported marked concerns. Over half of the participants (58.94%) reported high physical activity levels; 26.09% had moderate levels, and 14.98% had low levels. Physical activity was not significantly associated with body shape concerns ($P = 0.5963$). Eating disorder severity differed significantly across levels of body shape concerns ($P < 0.0001$), with higher body shape concerns associated with greater symptom severity. Low physical activity levels did not increase eating disorder risk beyond the effect of body shape concerns alone ($P = 0.8781$). Gender differences were observed: 15% of females versus 5% of males reported marked body shape concerns ($P = 0.0002$), and low physical activity was more prevalent among females ($P = 0.0479$).

Conclusion. Body image concerns were strongly associated with eating disorder severity, while physical activity showed no independent relationship. Findings highlight the importance of promoting positive body image and supporting adequate physical activity among students within university settings to reduce risk of disordered eating and enhance student well-being.

Understanding workplace well-being among health professions faculty, staff, and students in academic institutions: implications for organizational policy and practice

Preshit Ambade, Neil MacKinnon, Kathleen Hodgkins, Frances Wenzel

Background. In 2023 and 2023, the Office of the United States Surgeon General (OSG) published an advisory on health worker burnout, a framework on workplace mental health and well-being, and a report on loneliness and isolation. These publications reinforce the organizational approach to reducing burnout and improving the well-being for healthcare professionals. Additionally, the American College Health Association found that nearly 60% of health professions students reported high levels of stress, and 45% experiencing symptoms of burnout.

Aim. The overall purpose of this project is to understand the workplace mental health and well-being (WP-MH&WB) of Central Michigan University's College of Health Professions (CHP) faculty, staff, and students. The specific aims and objectives are: (1) to gain a baseline level understanding of the WP-MH&WB of faculty, staff, and students within the CHP ; (2) to examine intra-individual and inter-group changes in WP-MH&WB across periodic surveys and identify temporal patterns; and (3) to identify predictors of WP-MH&WB trajectories.

Methods. We have established a longitudinal prospective cohort study using repeated cross-sectional online surveys to collect responses from participants in the 2025 fall and 2026 spring semesters, thereby ensuring seasonal consistency and reducing measurement error from academic calendar variation. We are using the validated Augusta+ Scale for survey purposes, based on the OSG's WP-MH&WB Framework. The Augusta+ Scale includes 22 questions on WP-MH&WB, a single item on burnout, a single item on quality of life, seven items on job fulfillment, three items on loneliness, and student-life-related questions. Descriptive analysis was performed on this data.

Results. For the fall 2025 survey, out of 74 respondents, over half of the respondents were between the ages of 35 – 54 years (n = 36, 48.7%), females (n = 40, 54.1%), and white (n = 42, 56.8%). The majority of the respondents were faculty (n = 27, 36.5%) and staff (n = 19, 25.8%). Only 5 (6.8%) reported low quality of life. In contrast, more individuals reported feelings of burnout (n = 28, 37.8%) and feelings of loneliness (n = 25, 33.8%). The total average WP-MH&WB score was 83.6 (SD + 18.4). The average WP-MH&WB score for respondents who self-identified as faculty was 84.2 (SD + 19.2), and 87.6 (SD + 15.3) for staff , and 80.56 (SD + 19.2) for students. Most respondents reported that health, finances, and relationships were important to personal and professional fulfillment.

Conclusion. Staff had the best WP-MH&WB followed by faculty and then students. This baseline data will be followed by additional surveys in the future to determine trends over time and to help develop strategies to help improve WP-MH&WB in CHP.

The Great Divorce: when hospitals use economic grounds to deny or curtail medical staff privileges

Mark Cwiek, Vincent Maher, Emily McDonald, Elizabeth Hoff

Hospitals worldwide face ongoing challenges in determining whether individual physicians should be credentialed to practice medicine within hospitals or otherwise and to what extent clinical privileges should be granted. In the USA model, clinical privileges in a hospital can be lost due to poor clinical performance with patients, usually as determined in a peer-review process. In addition, clinical privileges can occasionally be lost due to non-clinical reasons, such as the physician's noncompliance with organizational rules or violating civil and/or criminal laws. Economic factors can bring the curtailment or denial of hospital privileges, such as with the completion of a contract term with a group practice or the facility, and where the hospital seeks to protect itself from unfair competition by medical staff with the hospital's business interests. These latter conditions are often referred to as "economic credentialing," something that the American Medical Association categorically condemns. Gaining and maintaining hospital clinical privileges are usually critical to the professional and economic well-being of the physician. As such, a physician who has lost privileges frequently challenges the adverse decision within the hospital medical staff's internal appeals process and then through the court system, if necessary. In countries with co-existing public and private insurance systems that pay providers more in the private model, including Germany, Switzerland, and the United States, a form of “cream skimming” occurs, leading to easier access for the more affluent patients. The authors employed qualitative legal research in this study, and recommendations are included herein to balance public policy and the rights, needs, and goals of the physician, the hospital, and the local communities whose medical needs are being served.

Between crisis and cost: public accounts of emergency healthcare billing

Brynn Carlson, Sara Boykin, Stormie Jacobs-Wakemup, Samantha Meyer, Lana Ivanitskaya

Objective. The purpose of this small-scale qualitative study is to synthesize how commenters describe medical bills related to emergency health care encounters. The primary research question for this study is: How do commenters describe medical bills related to emergency health care encounters? Three investigative questions support this research question: (a) What types of emergency billing situations, such as surprise billing or out-of-network emergency care, do commenters describe? (b) How do commenters describe what they knew, expected, or felt able to control at the time they received emergency care? (c) What health insurance terms, billing steps, or coverage rules do commenters say contributed to their emergency medical bills? These questions focus on shared patterns in how commenters make sense of emergency medical bills within the U.S. healthcare system. The analysis focuses on comments mentioning emergency or hospital care alongside billing or insurance issues, including surprise bills, out-of-network charges, insurance denials, ambulance costs, and situations where commenters felt they had little or no choice. Together, these comments represent the final sample from sequential screening steps, capturing how people reflect on emergency medical bills after care has occurred.

Data source and sampling. Data consisted of publicly available comments posted in response to the YouTube video "A Terrible Guide to the Terrible Terminology of U.S. Health Insurance." Selected based on the highest number of views and comments, the video elicited over 12,000 YouTube comments, which were exported to Microsoft Excel and screened using a multi-step process. It led to the identification of 1,794 comments for qualitative analysis — comments which were most relevant to the study purpose. Selected with the help of computational linguistics, the comments addressed both emergency care (or hospital care) and at least one of the following topics: 1) billing/cost or 2) healthcare insurance.

Analytical procedure. A structured inductive thematic analysis was conducted using a systematic coding process in Microsoft Excel. Coding decisions, keyword definitions, and inclusion rules were documented in a detailed codebook to support transparency, rigor, and replicability. Inter-coder reliability was assessed using data from two independent coders trained in the application of the codebook. The analysis revealed several themes that captured billing-related patterns, including surprise billing, ambulance costs, out-of-network care, insurance denial, and lack of choice. Empirical evidence for each research question was summarized, as well as insights on how well the U.S. health system meets health consumers' expectations when they seek emergency care.

Public concerns about U.S. health insurance terminology: a thematic analysis

Silva Boumjahed, Ella Kenworthy, Lana Ivanitskaya

Objective. This small-scale qualitative study examines commenters' concerns related to U.S. health insurance terminology and healthcare navigation. The primary research question guiding the study is: What concerns about U.S. health insurance terminology are expressed in YouTube comments that score below 50 on LIWC-22 emotional tone, indicating negative tone? The study focuses specifically on comments with negative emotional tone to identify recurring issues, frustrations, and perceived problems articulated by commenters.

Phenomenon of interest. The phenomenon of interest—public concern regarding health insurance terminology and the navigation of the U.S. healthcare system—reflects how individuals articulate worry, frustration, or dissatisfaction when discussing insurance structures and coverage processes. It is situated within a healthcare environment characterized by insurance terminology, administrative procedures, and cost-sharing mechanisms.

Data source and sampling. The data source consists of publicly available comments posted on a widely viewed YouTube video explaining U.S. health insurance terminology. The unit of analysis is the individual comment. Criterion-based purposive sampling is employed. Comments are first screened for relevance to insurance terminology as presented in the video. Emotional tone is assessed using LIWC-22, and comments scoring below 50 on the tone summary measure are classified as negative tone. Additional inclusion criteria require substantive length (greater than 15 words) to ensure meaningful content. A random sample of 250 eligible comments is then generated using Excel. Comments consisting solely of praise, emojis, spam, or content unrelated to the U.S. healthcare system (e.g., general discussions of other countries without reference to U.S. insurance) are excluded.

Analytical procedure. Data were analyzed using inductive thematic analysis. The primary researcher first familiarized herself with the comment data and generated inductive codes, which were iteratively refined and organized into broader themes addressing the research question. The second author independently coded a subset of comments using the developed codebook. Intercoder agreement was assessed using Cohen's kappa or percentage agreement, and discrepancies were discussed collaboratively to refine code definitions and improve consistency. Analytic decisions, code revisions, and theme development were documented through memo writing to create an audit trail and support transparency and replicability. RESULTS. At the time of submission, data analysis is ongoing. Final themes and illustrative excerpts will be presented. DISCUSSION AND CONCLUSION. The findings are expected to provide insight into how individuals articulate concerns about health insurance terminology and system navigation in public online discourse. This study contributes to understanding how members of the public express challenges related to insurance language and healthcare system processes.

Lead in the water: Flint, Michigan

Isabel Noguera, Rebecca Uzarski, Salma Haidar

The Flint Water Crisis of 2015 was due to the change of city municipal water source from Lake Huron to the Flint River. This switch exposed the population in Flint to old pipes that contained lead that leached into the water. This led to high lead levels in the communities blood, especially children. These exposures are linked to many health issues and will most likely cause many future consequences for the communities exposed. This environmental health events show the gaps in regulation and proactivity while simultaneously highlighting the environmental inequities that different communities have to face based on their socioeconomic status.

Objective/Purpose. The purpose of this research was to develop a scholarly, evidence-based overview of the 2015 Flint Water Crisis, designed to evaluate its public and environmental health implications in a case study framework. Along with this research, the further impacts and unintended consequences of this historical environmental event will also be examined to provide a clear view of how this event has changed environmental health. This presentation aims to inform the audience about why it happened, how it happened, and what the lasting effects are from the incident for a deeper look into a pre-existing class project that is being Honors Contracted.

Methods. The research gathered about the Flint Water Crisis was abstained from multiple sources and analyzed using a content analysis approach. Sources included articles from the Center of Disease and Control, the United States Environmental Protection Agency, the Shorenstein Center, along with peer-reviewed journals. These materials were reviewed and synthesized to provide a clear summary of the event, review the key environmental health determinants, while also examining the documented community health outcomes.

Results. The findings indicate that the decision to switch Flint's water source from Lake Huron to the Flint River without further investigation of possible impacts led to the leaching of lead from aging pipes into the municipal water supply. Lead causes many health risks within animals, which poses major concerns for the communities that were exposed. A notable outcome of this event was the elevated blood lead levels that were documented in children. These exposures increase the risk of cognitive impairment, developmental delays, and behavioral disorders. The crisis disproportionately affected low-income and predominantly Black communities, highlighting systemic inequities in environmental protection. Delays in acknowledging contamination and failure to act on resident complaints worsened health outcomes and eroded public trust which remains unstable.

Discussion/Conclusion. The Flint Water Crisis demonstrates how regulatory gaps and cost-driven decision-making can result in public health consequences. This event shows the importance of proactive environmental regulation and also transparent and proactive governance. The long-term impacts of the crisis continue to affect Flint residents, but understanding Flint's experience provides critical lessons for preventing future water infrastructure failures and addressing environmental injustice nationwide

Dating-app-related scams, sextortion, and suicide-related distress: a Reddit-based digital epidemiology study (2021–2025)

Simon Idiagbonya, Sergey Soshnikov

Objective / Purpose. Online dating applications are widely used for relationship formation but are increasingly associated with digital harms such as scams, sextortion, and suicide-related distress. While law-enforcement agencies report rapid growth in sextortion cases, dating-app–specific mental-health evidence remains limited. This study aimed to quantify and characterize online discussions linking dating apps with scams, sextortion, mental-health symptoms, and suicide-related distress, and to contextualize these patterns within the contemporary review-level scientific literature.

Methods. We conducted a mixed-methods digital epidemiology study using publicly available Reddit posts from January 1, 2021, through October 31, 2025. Data were collected from eight thematically relevant subreddits focused on dating/relationships, mental health, and scams/fraud. Keyword-based queries captured mentions of major dating apps, scam and sextortion terms, mental-health symptoms, and suicide-related language. After cleaning and de-duplication, the analytic dataset included 9,567 unique posts with valid text, reduced from approximately 36,000 raw records. A harm-focused subset was defined by posts containing scam, sextortion/blackmail, threat, or suicide-related terms (~2,000 posts; ~21% of all posts). Descriptive analyses summarized post frequencies by dating app, theme, subreddit category, and month/year. In parallel, we conducted a review-level PubMed evidence map using NBIB exports to assess the scope of existing literature.

Results. Dating-app–related harm discussions were present in every study year, with no evidence of decline from 2021 to 2025. Within the harm-focused subset, scams and sextortion accounted for the majority of posts, far exceeding suicide-related posts in absolute frequency. Tinder and Hinge were the most frequently mentioned platforms in scam/sextortion narratives, followed by Bumble, Grindr, and OkCupid, mirroring overall app popularity. Suicide- and suicidal-ideation–related posts were less common but persisted across all five years and appeared in both dating-focused and mental-health–support subreddits. These posts frequently co-occurred with financial loss, blackmail threats, and fear of image exposure, with users explicitly describing feelings of entrapment and humiliation. Beyond suicide-related language, mental-health symptom terms (e.g., depression, anxiety, loneliness, panic) appeared across a substantial proportion of posts in all subreddit categories and often overlapped with scam and sextortion narratives. Despite the predominance of harm-related content, positive and relationship-support posts were consistently observed, including narratives of recovery, peer reassurance, and successful relationships, indicating co-existing vulnerability and resilience within the same digital ecosystems. The PubMed mapping identified over 200 review-level publications on social media and mental health. However, only a small fraction addressed dating apps specifically, and virtually none synthesized evidence on dating-app–related scams, sextortion, and suicide outcomes, highlighting a major evidence gap.

Discussion / Conclusions. This large, multi-year analysis demonstrates that dating-app–related scams and sextortion are widespread, persistent, and systematically linked to mental-health and suicide-related distress in user-generated discussions, yet remain largely absent from the formal evidence base. These findings underscore the urgent need for targeted epidemiologic research, improved clinical screening for digital relationship harms, and coordinated prevention strategies involving digital platforms, public-health systems, and law-enforcement agencies.

Maternal and child health inequities in cesarean delivery: a racial disparities analysis using U.S. NVSS data, 2020-2022

Joseph Inungu, Jennifer Olofu, Chiatanya Emmadi, Chin-I Cheng, Racheal Adu, Niki Osakue, Sharvya Juluru, Srilekha Manchala

Background. Cesarean delivery (C-section) rates in the United States have exceeded 32%, which is twice the WHO-recommended maximum. Although often lifesaving, non-medically necessary C-sections increase maternal health issues and subsequent risks. Persistent racial disparities, especially the higher rates among Black and Asian women, have been documented; however, it is unclear how much of these gaps are due to clinical risk versus systemic bias.
Objective: Determine whether racial/ethnic disparities in C-section continue after thoroughly adjusting for medical and sociodemographic factors and explore whether marital status and maternal age influence these relationships.

Methods. Retrospective cross-sectional analysis of 2020–2022 National Vital Statistics System birth certificates (N = 3,075,893 singleton, vertex births ≥24 weeks after listwise deletion). Multivariable logistic regression estimated adjusted odds ratios (aOR) for C-section. Model 1 included race/ethnicity and 15 clinical and social covariates; Model 2 added interaction terms (Race × Marital Status; Race × Age).

Main Outcome. Mode of delivery (C-section, yes/no).

Results. The overall C-section rate was 32.35%. Crude racial gaps: Black 36.6%, Asian 33.0%, Hispanic 31.2%, White 30.9 %. After adjustment, Black women had 28.7 % higher odds of C-section than White women (aOR = 1.287; 95% CI [1.276, 1.298]); Asian women 17.0% higher (aOR = 1.170; 95% CI [1.155, 1.185]); Hispanic women 17.7 % higher (aOR = 1.177; 95 % CI [1.168, 1.186]); AIAN women 7.3% lower (aOR = 0.927; 95% CI [0.896, 0.960]). Interaction analyses showed the Black–White gap was amplified among married women (aOR = 1.416; 95% CI [1.396, 1.436]) versus unmarried women (aOR = 1.166; 95% CI [1.152, 1.179]); Wald χ^2 = 1,039.02, $p < .001$. Advanced maternal age widened racial disparities (Age × Race interaction Wald χ^2 = 156.19, $p < .001$).

Conclusions. Persistent racial/ethnic disparities in C-section remain after adjustment for clinical factors; marriage and older age magnify inequities. Inequities also persist and are amplified among socioeconomically advantaged groups, suggesting systemic racism and provider-level bias. Multi-level interventions are urgently needed to ensure equitable, evidence-based perinatal care.
Keywords: Cesarean section; racial disparities; maternal health equity; structural racism; National Vital Statistics System; Robson classification; provider bias; maternal age; marital status; United States.

Spokane regional health district workplace mental health and well-being assessment

Preshit Ambade, Caleb Zimmerman, Christya Haddad, Paige Weid, Neil MacKinnon

Objective/Purpose. This project was commissioned in response to the Spokane Regional Health District (SRHD)'s 2025–2030 Strategic Plan. The objective of this study was to understand the workplace mental health and well-being (WP-MH&WB) of SRHD employees.

Methods. An online survey comprising of 22 questions on WP-MH&WB and questions on burnout, loneliness, and personal and professional fulfillment, and demographic questions (hereafter referred to as the Augusta+ Scale) was distributed to SRHD employees in August and September 2025. A mixed-method approach was adopted to analyze the data and prepare the report. A total of 216 employees responded to the survey, of which 179 (82.9%) completed the entire survey.

Results. The average WP-MH&WB score was 83.4 (SD ± 20.7) (on a scale ranging from a minimum score of 22 to a maximum score of 110), suggesting good WP-MH&WB. Domain-specific analysis revealed departmental variation within the organization, with the Treatment Services and Environmental Public Health divisions performing relatively well across all five domains of WP&MH-WB, compared with other divisions. Sociodemographic characteristics were associated with differences in the WP-MH&WB mean score between those who reported feeling burned out and those who did not. The Disease Prevention & Response division had the highest percentage of respondents who reported burnout and loneliness, whereas Treatment Services had the lowest. Overall, 44.3% of respondents reported experiencing burnout, while 57.8% reported experiencing loneliness. A one-unit increase in the WP-MH&WB scale score was associated with an 8% decrease in odds of experiencing burnout (OR=0.92; 95% CI: 0.89-0.95; p-value<0.001). Most participants across the divisions reported that relationships, hobbies, health, and finances were substantial contributing factors to their personal and professional fulfillment.

Discussion/Conclusion. To address the issues identified in this survey, we recommend that the SRHD establish workplace initiatives that empower employees in decision-making and that the SRHD leadership team utilize available national and regional resources to strengthen the organizational culture.

Minority stress and LGBTQ health outcomes: addressing the research gap

Harper Walls, Salma Haidar

Objective/Purpose. The mental health crisis among LGBTQ individuals represents a profound public health concern, with this population experiencing disproportionately higher rates of depression, anxiety, and suicidal ideation compared to cisgender and heterosexual counterparts. This disparity is linked to minority stress—a result of historical, systemic, and interpersonal discrimination. The purpose of this pilot study is to collect location-specific data to distinguish potential correlations between Minority Stress Theory, Social Determinants of Health (SDOH), and LGBTQ+ mental health outcomes. Specifically, the research aims to identify how factors like housing instability, employment discrimination, and lack of affirming healthcare synergistically influence mental health within local neighborhoods.

Methods. This study utilizes Minority Stress Theory as the primary framework to move beyond broad national data and focus on regional insights. Data will be gathered via a confidential, anonymous survey distributed through campus-wide emails and registered student organizations. The survey assesses four key areas: outcome frequency (mental health status), causative factors (family and societal discrimination), SDOH intersectionality (housing, employment, and healthcare access), and the synergistic effects of these socioeconomic challenges. To protect participant privacy, IP address collection will be disabled, and no direct identifiers—such as names or exact birth dates—will be collected.

Results. As a pilot study, the expected results include identified data correlations between specific social determinants of health and mental health outcomes. The project intends to demonstrate whether a statistically significant link exists between local systemic discrimination and the frequency of poor mental health outcomes among the target population. These preliminary findings will serve as a foundation for a full-scale research study.

Discussion/Conclusion. The results of this study aim to address the current research gap regarding location-specific LGBTQ+ health data. By identifying how various SDOH work together to impact health, this research will inform local initiatives and help shape effective policy changes and targeted interventions. Ultimately, this pilot study seeks to provide a deeper understanding of how minority stress influences the well-being of the LGBTQ+ community, providing a necessary evidence base for improving public health outcomes at the neighborhood level.

Industrial negligence and public health: The 1973 Michigan PBB contamination case study

Tanisha Pokharel, Salma Haidar

This case study focuses on the chemical contamination incident experienced in 1973 by the Michigan Chemical Company, and how the company unintentionally released polybrominated biphenyls (PBB) into the food supply in Michigan. Widespread chemical contamination events like this highlight the vulnerability of food systems to industrial errors and the potential for significant public health crises. This research is aimed at examining the conditions of the mix-up, as well as studying its consequences on human health, agriculture, and the environment. Utilizing a qualitative approach, this study draws on archival records, governmental reports, and available interviews with affected stakeholders to provide a comprehensive analysis of the disaster. The main concern raised is the chemical handling and labeling failure which led to the extensive exposure of livestock and humans The case study also discusses the health hazards of PBB exposure in the long run, which includes environmental stability and chronic illness. The above analysis reveals that there were gaps in the regulation of chemical safety by conducting an analysis of the regulatory response, corporate accountability, and intervention. The findings underline the significance of strict chemical control, adequate labeling, and prompt reaction of the health authorities to avoid such cases. Altogether, this case study illustrates that industrial negligence, and the poor regulatory frameworks could contribute to long-term health impacts on the population.

Risky sexual behavior in adolescent victims of child maltreatment: a scoping review

Colin Marceau, Frank Snyder

Background. Risky sexual behavior (RSB) is a public health concern that is seen across multiple populations. Adolescents with a significant score on the Adverse Childhood Experiences (ACES) questionnaire (≥4) are at an increased risk of negative health outcomes, including those associated with RSB. Five out of the ten questions on the ACES questionnaire pertain to child maltreatment, establishing adolescent victims of child maltreatment as a priority population in RSB mitigation.

Objectives. Conduct a scoping review to identify the frequency and ways in which maltreated adolescents are included in the RSB prevention literature.

Methods. Four electronic databases (Cochrane Library, Digital Commons Network, Directory of Open Access Journals, and PubMed) were utilized to conduct a scoping review of publications relevant to the research objective. Inclusion criteria required publications to have been published between January 2000 and December 2025, involve adolescents (10-19 years old) as the primary age group, and discuss child maltreatment in the context of RSB. Search results were screened and assessed by title and abstract, resulting in 12 publications; a full analysis narrowed the selection to 5 publications. Exclusion criteria included literature not available in English, not related to child maltreatment in the context of RSB, or published outside of the established range.

Results. The representation of adolescent child maltreatment victims appeared minimal, with the bulk of inclusion being attributed to a different focus population. A history of child maltreatment, alongside various social determinants of health, is seen as a risk factor for engaging in RSB or as a predisposing factor for behaviors attributed to future RSB.

Discussion. In the context of RSB, adolescent victims of child maltreatment are often represented through research that focuses on adolescents involved in the justice or foster care systems. RSB interventions catered towards this priority population may benefit from being sensitive to the unique barriers and needs that adolescent victims of child maltreatment face. Future research on the methods utilized in identifying child maltreatment victims and the methods of intervention delivery for this population may be needed in order to effectively develop and initiate targeted RSB prevention measures.

Association of adolescent cannabis use with poor mental health and suicidality in young adulthood: a cross-sectional study using YRBS 2023 data

Joseph Inungu, Jennifer Olofu, Nirajan Budhathoki, Niki Osakue

Introduction. Cannabis is the second most widely used psychoactive substance worldwide, with rising use among U.S. adolescents amid evolving legalization and shifting social norms. Although often perceived as relatively harmless, emerging evidence links adolescent cannabis use to adverse mental health outcomes, including depression and suicidality.

Objective. This study aimed to examine the association between adolescent cannabis use and poor mental health and suicidal behavior among U.S. high school students.

Methods. This study used secondary data from the 2023 Youth Risk Behavior Survey (YRBS), a nationally representative, cross-sectional survey of U.S. high school students. The final analytic sample included 8,065 participants with complete data. Mental health outcomes included self-reported poor mental health within the past 30 days and suicide attempts within the past 12 months. The primary independent variable, cannabis use, was categorized as never, former, or current use. Multivariable logistic regression models were used to assess associations between cannabis use and mental health outcomes, adjusting for sociodemographic characteristics, adverse childhood experiences (ACEs), bullying, social media use, and sleep patterns.and sleep patterns.

Results. Current cannabis users had significantly higher odds of reporting poor mental health (AOR: 1.47, 95% CI: 1.26–1.72) and suicide attempts (AOR: 1.83, 95% CI: 1.34–2.49) compared to non-users. Former users also had elevated odds for suicide attempts (AOR: 1.80, 95% CI: 1.37–2.37). A dose–response relationship was observed for ACEs: students reporting four or more ACEs had nearly fivefold higher odds of poor mental health and tenfold higher odds of suicide attempts compared with those reporting none.

Conclusion. Adolescent cannabis use is significantly associated with a higher risk of poor mental health and increased suicidality. These findings underscore the need for targeted prevention, early interventions, and trauma-informed public health strategies to reduce cannabis-related mental health risks among youth.

The effects of prolonged use of ibuprofen

Jazmine Nguyen, Mya Ross, Kaylyn Sankey, Ava Waldron, Lily Szczembara, Rylen Jurecko, Elisabeth Boman

The purpose of this study is to examine the perceived effects of prolonged ibuprofen use on the digestive, nervous, cardiovascular, and musculoskeletal systems among college students. Students at Central Michigan University voluntarily completed an anonymous online survey assessing ibuprofen use patterns and perceived adverse effects. The survey collected participant characteristics, including age, sex, and physical activity level, as well as reasons for ibuprofen use, typical dosage, frequency of use, and any adverse side effects experienced. Data were analyzed using descriptive statistics to identify trends and potential associations between ibuprofen use, physical activity level, and reported side effects. Results conducted from 106 students at Central Michigan University indicated that respondents were aged 18-20 years old, with 77% identifying as female. Respondents broadly reported high levels of physical activity, including half of participants reporting four or more hours of exercise weekly, and a minority reporting less than one hour. The most commonly reported single dose was 400 milligrams, followed by 200 mg and 600 mg. Participants typically took ibuprofen 1-3 times a month, while fewer students used the medication on a weekly basis, and almost none reported daily consumption. The primary reasons for ibuprofen use included menstrual pain, headaches, injury-related pain, and chronic pain. A small portion of respondents had experienced any adverse side effects linked to the medication. The results suggest that ibuprofen use among Central Michigan University students is generally occasional and symptom-based rather than habitual. Most students reported using the medication one to three times per month, with the standard 400mg doses being the most common, indicating general adherence to recommended guidelines. Higher reported doses, such as 600mg, may reflect prescription use or limited awareness of dosing limits. Common results of use were menstrual pain, headaches, and injury-related pain, which align with typical over-the-counter purposes. However, the predominantly female, self-reported sample limits generalizability and may introduce reporting bias. Overall, it is known that out of the 106 college students surveyed, most everyone took a safe amount of ibuprofen for general pain purposes. The results show that college students are unremarkable in their dosage and reasons for consuming ibuprofen, and despite having busy and high-stress lifestyles, their ibuprofen consumption does not show any signs of being different from the directed usage.

The effects of fasting on moderate-intensity cardiovascular exercise

Jenna Maciejewski, Lyrik Ricketts, Katie Cookman, Xandar Holtrust, Elisabeth Boman

The effectiveness of fasting before exercise is a topic that is debated among physically active individuals. Many claim that it is beneficial, and others claim it is detrimental. This study aims to determine whether moderate-intensity cardiovascular exercise feels easier in a fasted or non-fasted state. Participants will be split into two groups; both groups will be running a mile on a treadmill, but one group will be fasting for two and a half hours prior, and the other group will be consuming some fruit twenty to thirty minutes before they run. At the end of the run, participants will be asked for their Rate of Perceived Exertion (RPE) using the Borg 6-20 scale. By comparing the RPE values between these two groups, the study seeks to understand the effects of pre-exercise nutrition on perceived effort. It is hypothesized that fasting before exercise will lead to an increased RPE compared to those that do not fast. These findings can provide an accessible and practical way to help people make more educated decisions about their pre-exercise nutritional habits.

Increasing hemorrhage awareness and bleeding control skills in Isabella County

Emily Jacobs, Stephanie Cronkright, Courtney Reisler, Gabe Marshall, Elisabeth Boman

Trauma is experienced daily through events such as motor vehicle accidents, gun-inflicted violence, and other injuries. Hemorrhage remains one of the leading causes of preventable death in the United States. According to the New England Journal of Medicine, approximately 60,000 Americans die each year from hemorrhage, though some of these deaths may be preventable through public education and early intervention. This research project aimed to increase awareness and knowledge of hemorrhage recognition and bleeding control within Isabella County. Our team, composed entirely of pre-health students with interests in public health and preventive medicine, conducted educational presentations at community locations, reaching individuals across a wide range of ages. Presentations focused on identifying life-threatening bleeding, appropriate steps to stop hemorrhage, and essential emergency response skills. Participants completed a pre-test prior to the presentation and a post-test afterward to assess changes in knowledge. Positive data demonstrated an overall increase of knowledge from the pre-test compared to the post-test. This increase of knowledge also suggests that community education can improve awareness and preparedness related to hemorrhage management. By educating the community, initiatives such as this may contribute to improved emergency response outcomes. Therefore, hoping for a decrease in preventable deaths due to hemorrhage as we progress in our healthcare careers.