UNE COM Research and Scholarship Fall Forum

Friday, October 30, 2026

Innovation Hall, UNE Portland Campus

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12 p.m. **SIGN-IN AND LUNCH**

12:40 p.m. **WELCOME REMARKS**
Jane E. Carreiro, D.O. '88, *Vice President for Health Affairs; Dean, College of Osteopathic Medicine*

12:50 p.m. **POSTER PRESENTATIONS / JUDGING SESSION #1,** *Odd-numbered posters will present*

2:00 p.m. **BREAK**

2:10 p.m. **KEYNOTE ADDRESS**

SMALL COMMUNITIES, BIG QUESTIONS: FINDING A PLACE FOR RURAL HEALTH RESEARCH IN ACADEMIC MEDICINE



Samantha A. House, D.O. '11, M.P.H.
Section Chief of Pediatric Hospital Medicine, Dartmouth Health
Associate Professor, Dartmouth Institute for Health Policy and Clinical Practice

A graduate of the University of New England College of Osteopathic Medicine, Samantha A. House, D.O., M.P.H., completed her pediatric residency at Dartmouth-Hitchcock Medical Center and has built a career dedicated to improving the quality, safety, and value of pediatric healthcare delivery. House serves as a Research Project Leader within Dartmouth's Center for Rural Health Care Delivery Science, where she investigates hospital-based care utilization and opportunities to improve value in pediatric medicine. Her work bridges clinical practice, population health, and health policy, contributing to broader efforts to strengthen healthcare systems serving children and families in rural communities.

3:10 p.m. **POSTER PRESENTATIONS / JUDGING SESSION #2,** *Even-numbered posters will present*

4:15 p.m. **BREAK,** *Tea, coffee, and cookies will be available*

4:30 p.m. **ORAL PRESENTATIONS**

Student Doctor Alexandra Dunstan OMS II
Basic Science Research: *NAMPT Inhibition Blocks Macropinocytosis in TSC2-Deficient Kidney Cysts: A Novel Therapeutic Target for Tuberous Sclerosis Complex*

Student Doctors Brittany-Lee Smith OMS II and Emmanuelle Oliveira OMS IV
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Student Doctors Brianna Flood OMS III and Lauren Headley OMS III
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Case Study: *Breastfeeding Reintroduction After Prolonged Separation in a Patient Receiving High-Dose Methadone and Oxycodone*

5:30 p.m. **AWARDS PRESENTATION AND CLOSING REMARKS**
Matt Havrda, Ph.D., *Associate Dean of Research and Scholarship*

Please park in Bishop Street lot.
Shuttle will bring you to campus.

UNE UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

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1.

Differential Protective Effects of Social Support Across Adolescent Risk Behaviors: A Rural-Urban Comparison in Maine

Ansart[1], S, OMS III, Goudreau[1], K, OMS III, Redway[1], T, Ph.D.
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Introduction: Previous studies have observed parental support as a protective factor against sexual intercourse and substance use. However, substance use is typically referred to in composite terms, leaving open whether this protection is uniform or varies across substances. It also remains unclear whether this protection is further modified by rurality. We hypothesize that support will be differentially protective across risk behaviors, with the largest effect being on substance use behaviors rather than sexual intercourse. Secondly, we hypothesize that the protective effect of support against sexual intercourse will vary by rurality, given known disparities in rural adolescents' access to sexual health resources. By understanding these discrepancies, we can help guide policymakers to support initiatives that provide protection for the more vulnerable adolescents in both urban and rural locations.

Methods: RStudio was used to conduct a secondary data analysis based on cross-sectional data from the Maine Integrated Youth Health Survey (MIYHS), administered by the Maine Department of Health and Human Services (DHHS) biennially to high school students. We used prevalence ratios and interaction models to analyze closed-ended items pertaining to demographics and sexual health, and various questions identifying risk behaviors from survey years 2019, 2021, 2023, and 2025.

Results: Compared to students reporting low home support (n=8,501), adolescents with high home support (n=89,660) showed a 57% lower prevalence of current vaping, 54% lower prevalence of current marijuana use, 46% lower prevalence of current alcohol use, and 39% lower prevalence of ever having sexual intercourse. Rurality significantly modified the association between home support and ever having sex ($p<.001$). Prevalence of ever having sex in high-support homes was greater among rural (33.9%) than urban (29.7%) students, but similar among students reporting low home support (54.1% rural vs. 53.5% urban).

Conclusion: Home support was found to be a moderator against risk behaviors among Maine adolescents, with high home support reducing the prevalence of vaping the most followed by marijuana use, alcohol use, and sexual intercourse. High home support was more protective against the prevalence of sexual intercourse among urban students compared to their rural peers. Further analysis includes examining additional risk behaviors and protective factors by rurality.

Acknowledgements: This research was conducted at the University of New England College of Osteopathic Medicine. We gratefully acknowledge the Maine DHHS for providing access to the MIYHS dataset and to the Maine high schoolers who completed the surveys. This work has been supported by the Peter Morgane Student Research Fellowship. Institutional Review Board exemption for this study was granted by the UNE's Office of Integrity (IRB # 0426-21).

2.

Sex Differences in the Development of Cardiovascular Disease

Athipathy1, N, OMS I, DuPont2,3, JJ, Ph.D.
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2Molecular Cardiology Research Institute, Tufts Medical Center, Boston, Massachusetts
3Tufts University School of Medicine, Boston, Massachusetts

Introduction: Cardiovascular disease (CVD) is the leading cause of morbidity and mortality worldwide. Despite decades of advancements in prevention and therapy, sex-based disparities in the diagnosis, treatment, and clinical outcomes of CVD persist. This literature review examines how biological sex shapes CVD development across the lifespan, with a focus on the role of sex hormones in vascular physiology.

Methods: This review consolidates evidence across hormonal, vascular, and pharmacologic research to examine sex-specific mechanisms underlying CVD development, clinical presentation, and treatment outcomes.

Results: Estrogen-mediated vascular protection in women and the complex effects of androgens in men contribute to sex-specific patterns of CVD onset, progression, and presentation. Mechanisms through which estrogen protects the vasculature have been identified at the preclinical level, including promotion of endothelial nitric oxide production, suppression of oxidative stress and inflammation, and favorable regulation of lipid metabolism. Following menopause, however, declining estrogen levels accelerate vascular aging, arterial stiffening, and endothelial dysfunction. In men, the absence of estrogen-mediated protection and androgen-driven effects on vascular remodeling and inflammation contribute to earlier development of atherosclerotic and ischemic disease. Mineralocorticoid receptor signaling drives vascular stiffening in both sexes, although its onset is delayed in females. Clinically, these differing mechanisms lead to lower CVD rates in premenopausal women than age-matched men, while CVD rates in post-menopausal women exceed those in men. Clinical presentation of CVD varies between the sexes, with women more frequently presenting with coronary microvascular dysfunction and atypical ischemic symptoms, contributing to underdiagnosis. Pregnancy complications such as preeclampsia and gestational diabetes emerged as sex-specific CVD risk enhancers. Sex-based pharmacokinetic differences, including body composition and cytochrome P450 enzyme activity, influence drug metabolism and risk of adverse events, impacting outcomes of CVD treatment.

Conclusion: This review highlights the need to incorporate sex-specific considerations into cardiovascular risk models, diagnostic criteria, and treatment guidelines to advance equitable cardiovascular care.

No human subjects were used in this study.

3.

Medicare Value-Based Care and Fee-for-Service Models in Total Joint Arthroplasty: Costs, Clinical Outcomes, and Patient-Reported Outcomes

Atif, H, OMSII, Usman, S, OMSI, McCullen, G, MD, MS, FAAOS
University of New England College of Osteopathic Medicine, Portland Maine

Introduction: Medicare has increasingly adopted value-based care (VBC) and bundled payment models to reduce costs while maintaining quality. The aim of this review was to evaluate evidence comparing fee-for-service (FFS) and VBC approaches in Medicare total hip arthroplasty (THA) and total knee arthroplasty (TKA), with emphasis on episode spending, postacute care use, complications, readmissions, mortality, and patient-reported outcome measures (PROMs).

Methods: PubMed was searched on August 19, 2026, using terms related to FFS, VBC, Medicare, joint replacement, and orthopedics. English-language studies published within the previous 10 years and involving Medicare arthroplasty populations were included. Systematic reviews, meta-analyses, and narrative reviews were excluded. Fourteen eligible studies were qualitatively synthesized.

Results: VBC and bundled-payment models were generally associated with lower episode spending and reduced post-acute care utilization without consistent evidence of worse clinical outcomes. The CMS Bundled Payments for Care Improvement initiative reduced 90-day payments by 4.44% without increased readmissions or mortality. Extended-care facility use decreased from 27.5% to 18.1%, and post-acute payments decreased from $4,999 to $3,832 without a significant increase in readmissions. Perioperative optimization programs reduced 30- and 90-day readmissions. In selected THA patients, elimination of routine home health services maintained comparable PROMs and reduced episode costs by approximately $4,100. Overall, bundled-payment participation was not associated with clinically meaningful declines in postoperative function, health status, or pain.

Conclusion: In Medicare total joint arthroplasty, VBC models were associated with lower costs and post-acute resource utilization while maintaining comparable readmissions, mortality, and PROMs. However, heterogeneity among studies and limited direct FFS-versus-VBC comparisons preclude definitive conclusions. Prospective studies with standardized PROMs, robust medical and social risk adjustment, and assessment of long-term access are needed, particularly for higher-risk patients.

4.

Vitamin D Supplementation Protocols in Total Joint Arthroplasty: A Narrative Review

Benson, E, OMS II, McCullen, G, M.D., M.S., FAAOS
University of New England College of Osteopathic Medicine, Portland Maine

Introduction: Low serum vitamin D levels are common among patients undergoing total joint arthroplasty (TJA). In orthopaedic populations, low serum 25-hydroxyvitamin D levels have been associated with impaired bone and muscle health, poorer functional recovery, and higher postoperative complication rates. The optimal timing and dosing strategy for perioperative vitamin D supplementation remain uncertain. The aim of this literature review was to evaluate preoperative, perioperative bolus, and postoperative vitamin D3 supplementation protocols in vitamin D-deficient adults undergoing total joint arthroplasty, with particular attention to achieving vitamin D repletion and reducing postoperative infection-related complications.

Methods: A narrative literature review was conducted using PubMed, ScienceDirect, UpToDate, and Consensus AI. Search terms included “vitamin D,” “supplementation,” “protocol,” “total joint arthroplasty,” and “infection rates.” Studies published from January 1, 2016, through June 1, 2026, were reviewed. Eligible studies included randomized controlled trials, observational studies, cohort studies, and case-control studies evaluating vitamin D supplementation in adults undergoing TJA. Systematic reviews, meta-analyses, and literature reviews were excluded.

Results: Eight studies were included. Two evaluated preoperative supplementation, three evaluated bolus dosing, and three evaluated postoperative supplementation. Studies variably defined low vitamin D levels, most commonly as serum 25-hydroxyvitamin D below 30 ng/mL. Loading-dose or bolus protocols most consistently increased serum vitamin D levels, with one study reporting correction in 73.3% of patients receiving 50,000 IU weekly for 4 weeks followed by 2,000 IU daily, compared with 42.4% receiving lower daily doses. Clinical outcomes, including function and postoperative complications, were inconsistent across studies.

Conclusion: Loading-dose vitamin D protocols appear more effective than lower daily-dose regimens for correction of low serum vitamin D levels before TJA. Evidence that supplementation improves postoperative functional outcomes, infection rates, or other complications remains limited and heterogeneous. Prospective studies using standardized definitions, dosing protocols, and outcome measures are needed.

5.

When a Major Orthopaedic Device Manufacturer Does Not Offer Replacement Components for Revision Surgeries

McGrory[1], B., M.D., Blau[2], S., OMS III., Graham[3], M., R.N., Tower[4], S., M.D.
[1]Department of Orthopaedics, MaineHealth, Portland, ME, USA
[2]University of New England College of Osteopathic Medicine, Portland, ME, USA
[3]MaineHealth Institute for Research, Portland, ME, USA
[4]Anchorage Fracture and Orthopedic Clinic, Anchorage, AK, USA

Background: Total hip arthroplasty (THA) is a common operation that may require revision surgery decades after the index procedure. Revision components are essential to safely manage failed implants, and some orthopaedic device manufacturers (ODMs) do not provide replacement components for their systems. This issue can leave surgeons with costlier, higher-risk treatment options. Mechanically assisted crevice corrosion (MACC) is one important example in which access to appropriate revision components may reduce surgical morbidity.

Methods: We reviewed the clinical and regulatory considerations surrounding revision of modular THA components when ODM-specific replacement parts are unavailable. We describe our clinical experience with the DePuy Synthes S-ROM femoral stem, including its use in primary and revision THA and cases of MACC, and examine alternative treatment strategies, specifically international modular systems, and the FDA Expanded Access pathway.

Results: The S-ROM femoral stem is a modular implant with extensive clinical use and durable fixation. In one surgeon's experience, 181 of 7,219 primary THAs (2.5%) utilized an S-ROM stem, with 4 patients (2.2%) presenting with symptomatic MACC. For selected patients with MACC and a well-fixed femoral stem, revision may be done by changing the femoral head and retaining the stem. However, DePuy Synthes does not currently offer an FDA-approved titanium-sleeved revision femoral head compatible with the S-ROM 11/13 taper. Consequently, surgeons may be forced to consider potentially unnecessary, higher-risk options such as complete removal, or obtain an alternative modular system through FDA Expanded Access. These approaches increase operative complexity, cost, and potential patient morbidity. Expanded Access may additionally require institutional, manufacturer, FDA, and IRB approvals, potentially delaying clinically appropriate treatment.

Conclusion: The absence of approved revision parts for commonly implanted orthopaedic devices creates avoidable clinical and financial burdens for patients and surgeons. ODMs should consider the anticipated revision needs of their implants when seeking FDA approval and should provide compatible revision components for systems they market. Regulatory policies requiring manufacturers to support revision pathways could reduce unnecessary surgical morbidity, improve equitable access to revision arthroplasty, and better uphold the principle of nonmaleficence.

Acknowledgement: Maine Medical Center Department of Orthopaedics; Special thanks to Dr. Brian McGrory for inviting me to join this excellent and immensely important project. This work did not require funding.

6.

Association Between Endometriosis and Migraine in Reproductive-Age Women: A Scoping Review

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Introduction: Endometriosis is a chronic inflammatory gynecologic condition associated with pelvic pain, dysmenorrhea, and infertility. Although endometriosis frequently co-occurs with migraine, the association remains unclear. The aim of this study was to evaluate whether migraine prevalence, frequency, or severity is increased in reproductive-age women with endometriosis compared to women without endometriosis.

Methods: Following PRISMA-ScR guidance, PubMed, Embase, Scopus, and the Cochrane Library were searched from database inception through August 31, 2026. Original studies evaluating endometriosis and migraine in reproductive-age women were eligible. Two reviewers independently screened titles, abstracts, and full texts; discrepancies were resolved by consensus. Of 53 full-text articles assessed, 12 met inclusion criteria.

Results: Twelve studies including 13,685 participants were analyzed. Designs included cross-sectional, case-control, retrospective cohort, and other observational studies. Endometriosis was identified by surgery/laparoscopy (n=8), histology (n=2), ESHRE criteria (n=1), or clinical diagnosis (n=1). Migraine was identified using ICHD criteria (n=6), ID Migraine screening (n=2), ICD records (n=1), self-report (n=1), or unstated criteria (n=2). Outcomes included migraine prevalence, frequency, and pain severity; seven studies adjusted for confounders. Most studies reported a positive association between endometriosis and migraine prevalence, frequency, or severity. One cohort study found a higher hazard of incident migraine among women with endometriosis (HR, 2.49; 95% CI, 2.13–2.92). One adolescent cross-sectional study found that each 1-point increase in migraine pain severity was associated with higher odds of endometriosis (adjusted OR, 1.22; 95% CI, 1.03–1.44). Heterogeneity precluded quantitative pooling.

Conclusion: Evidence suggests an association between endometriosis and increased migraine prevalence, frequency and severity in reproductive-age women. Heterogeneity in diagnostic criteria, outcome measures, comparison groups, and confounder adjustment limits causal inference. Future prospective studies clarifying the roles of hormonal factors, chronic pain sensitization, and health-care utilization are needed.

Acknowledgement: The University of New England College of Osteopathic Medicine.

IACUC, IRB, Case Study Registration: Institutional review board approval was not required because this study was a literature review that did not involve human subjects nor identifiable patient data.

7.

Gilgamesh (Casein Kinase 1-gamma) Level Modulates Nociceptive Sensitivity

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Introduction: Nociceptors are specialized primary sensory neurons responsible for detecting harmful stimuli. Significant advances have been made in characterizing neural pain pathways, however the genetic and intracellular signaling mechanisms that determine nociceptive sensitivity remain undefined. The *Drosophila melanogaster* larval model, offering conservation of many pain-relevant signaling pathways, has been used to test sensitivity of nociception. Gilgamesh, a homolog of Casein Kinase 1-gamma, is involved in signal transduction in pathways such as Wingless/Wnt. Previous work from the lab demonstrated that nociceptive sensitivity is altered in experimental *Drosophila* genotypes intended to over- or under-express Gilgamesh in the nociceptor. Here we quantitatively confirm the levels of Gilgamesh in these genotypes.

Methods: Animals with normal Gilgamesh levels in their nociceptors, represented by the genotype ppk1.9-Gal4, UAS-mCD8-tdTomato > y^1v^1, were compared with those under-expressing Gilgamesh; ppk1.9-Gal4, UAS-mCD8-tdTomato > UAS-Gilgamesh-IR-1, and those over-expressing Gilgamesh; ppk1.9-Gal4, UAS-mCD8-tdTomato > UAS-Gilgamesh-OE. The tdTomato element allows identification of the nociceptor by detection with tdTomato-specific probe, using the RNA Scope method on fixed frozen larval body wall tissue sections. Resulting fluorescent Gilgamesh signal was quantitated via confocal microscopy and analyzed by Imaris software.

Results: Normal control nociceptors had an average Gilgamesh fluorescence-to-volume ratio of $7.39 * 10^4$. In comparison, Gilgamesh over-expressing nociceptors had significantly higher average Gilgamesh fluorescence ratio of $1.45 * 10^6$, p-value 0.036 (t-test). Gilgamesh under-expressing nociceptors had significantly lower average ratio of $3.87 * 10^4$, p-value 0.047 (t-test).

Conclusion: The results of this experiment support the hypothesis:
Gilgamesh was significantly over- and under-expressed in these genotypes. This observation adds validity to the conclusion that Gilgamesh levels in the nociceptor are directly correlated with the nociceptive sensitivity levels measured in previous experiments. These results indicate that Gilgamesh exerts control over the sensitivity of the nociceptor and suggests that future medications that target the human counterpart of Gilgamesh may treat abnormal pain.

Acknowledgements: This research was supported by the Kahn Family Foundation (to KB), and by NINDS award 1R15NS095195-01 (to GG). No human subjects were used in this study.

8.

Screens, Streams, and Snacks: A Narrative Review of the Digital Shift in Unhealthy Food Marketing to Pediatric Populations

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Introduction: Traditional television advertising has been associated with unhealthy dietary patterns among children, including increased exposure to sugary cereals, fast food, and other energy-dense products. Children and adolescents now encounter food marketing through digital platforms, including social media, influencer content, advergames, livestreaming, and mobile devices. This narrative review aimed to examine the shift from traditional to digital food marketing and its potential effects on pediatric dietary behaviors.

Methods: A PubMed search used the terms “child,” “pediatric,” “adolescent,” “food advertising,” “food marketing,” “unhealthy food,” “digital media,” “social media,” “influencer,” “advergame,” “smartphone,” “YouTube,” “TikTok,” and “Instagram.” Meta-analyses, narrative reviews, systematic reviews, duplicate reports, and studies published before 2016 were excluded. Included studies were assessed for sample size, participant age range, dietary outcome, media exposure type, and study design. Findings were compared by digital media format.

Results: Of 45 studies evaluated, 10 met inclusion criteria and were included in the narrative synthesis. Studies assessed acute caloric intake, engagement with marketing content, snack preferences, brand preferences, and purchase intention. Study designs varied, with sample sizes up to 832 participants and 2,480 participants overall. Digital marketing formats included social media influencers, advergames, and livestreaming, with substantial variation in exposure protocols. Across included studies, digital marketing exposure was associated with increased short-term caloric intake, stronger brand and snack preferences, and greater purchase intention. In several studies, advertising disclosures did not mitigate these effects and were occasionally associated with increased consumption of the marketed product.

Conclusion: Digital food marketing reaches children and adolescents through embedded, interactive, and gamified formats that may reduce recognition of advertising and influence short-term caloric intake and food preferences. Because disclosures alone may not mitigate these effects, the findings support consideration of policies to reduce pediatric exposure to unhealthy digital food marketing. Heterogeneity in media formats and study designs limits direct comparison and underscores the need for further research on long-term outcomes and effective protective strategies.

Acknowledgements: IRB approval was not required, as this study reviewed previously published data. Consensus AI was used for initial source identification

9.

Breastfeeding Reintroduction After Prolonged Separation in a Patient Receiving High-Dose Methadone and Oxycodone: A Case Report

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Introduction: Breastfeeding is recommended for patients receiving methadone treatment for opioid use disorder regardless of dose. However, published data at doses greater than 200 mg/day and with prolonged concurrent short-acting opioid use is limited. Guidance is also limited regarding breast milk reintroduction after parent-infant separation. We describe a postpartum patient with sickle cell disease and opioid use disorder who maintained lactation during a 10-week separation and reintroduced breastfeeding while receiving methadone 290 mg/day and as-needed oxycodone.

Case: A Black and Native American woman with sickle cell disease and opioid use disorder treated with methadone experienced escalating opioid requirements for vaso-occlusive pain during pregnancy. During the infant's neonatal intensive care unit admission, the infant received expressed breast milk while the patient received methadone 250 mg/day and a single 30 mg dose of oxycodone. During this period, the infant had no reported apnea, bradycardia, desaturation events, sedation, or respiratory depression attributed to breast milk exposure.

After recurrence of non-prescribed fentanyl use, the child protection system assumed custody and breast milk was withheld. During the separation, the patient continued pumping every three hours, including overnight, to maintain lactation. After 67 days, she was reunified with her daughter at a family residential treatment program and sought to resume breastfeeding. At reunification, she was receiving methadone 290 mg/day and oxycodone 30 mg every four hours as needed. Following interdisciplinary consultation, breast milk was gradually reintroduced, beginning with 25% breast milk and 75% formula. The infant tolerated the stepwise reintroduction without adverse effects attributed to breast milk exposure. At peak, breast milk comprised approximately 50% of feeds, and mixed feeding continued until six months postpartum.

Discussion: This case is notable for breast milk reintroduction after a prolonged mother-infant separation during high-dose methadone and concurrent oxycodone treatment, a scenario with limited published guidance. It demonstrates the feasibility of individualized, stepwise reintroduction and highlights the importance of sustained lactation support, shared decision-making, and close infant monitoring. While a single case does not establish safety, it contributes to the evidence informing medically complex breastfeeding decisions in opioid-exposed dyads.

Acknowledgement: This work was conducted through the Perinatal Substance Use Research and Advocacy Program at Mass General Hospital. The authors would like to acknowledge the patient in this report for sharing her story and for allowing us the opportunity to learn from her. Funding & Sources of Support: None/ Case Study Registration: In Process (IRB #0926-03)

10.

Frequency Analysis of Barriers to Care Among People Who Use Drugs in the United States

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Introduction: Despite growing recognition of the healthcare challenges faced by people who use drugs (PWUD), this population remains underrepresented in healthcare access and outcomes research. PWUD experience numerous barriers to healthcare access, including transportation limitations, financial constraints, lack of insurance coverage, stigma, racial inequities, and concerns about legal or social repercussions associated with substance use. The aim of this study was to identify and quantify self reported barriers to healthcare access among PWUD and to characterize factors that contribute to difficulties following recommended treatment plans.

Methods: A literature review was conducted using PubMed and Google Scholar. Searches employed the terms "stigma," "barriers to care," "addiction," "syringe service program," and "people who use drugs." Studies were included if they were conducted in the United States, published within the last 10 years and reported direct perspectives of PWUD on motivations to access, delay or avoid healthcare through interviews or surveys. Ten studies representing 815 people met the inclusion criteria. Eleven reported barriers were extracted, categorized into thematic groups, and analyzed descriptively by frequency of occurrence across studies**.**

Results: Six major themes emerged: stigma, medical mistreatment, treatment feasibility, competing survival priorities, pain and withdrawal management, and fear of retribution. Stigma, including enacted, anticipated, or internalized, was identified in 10 of 10 included studies. Medical mistreatment, defined as not addressing the patient's primary complaint or attribution of symptoms to ongoing drug use, was reported in 6 of 10 studies. Treatment feasibility, which includes logistical, financial, and resource-related barriers that may limit access to healthcare were identified in 4 of 10 studies.

Conclusions: This review highlights the predominance of stigma, medical mistreatment, and treatment feasibility barriers in limiting healthcare access among PWUD. Findings emphasize the importance of incorporating lived experiences into the design of interventions intended to improve healthcare engagement among PWUD. Future research should evaluate whether these national themes reflect the experiences of PWUD in southern Maine and examine potential discrepancies between provider perceptions and patient-reported barriers to care.

11.

Healthcare Access and Demographic Factor Influences on Colorectal Cancer Screening Rates

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Introduction: Despite effective screening methods and the decrease of recommended screening age from 50 to 45 years old, colorectal cancer (CRC) remains the 4th most commonly diagnosed cancer in the United States. The national screening rates remain below the 80% target, particularly in younger age groups. In rural America, access to healthcare barriers and lack of resources may contribute to disparities in preventative care; but factors contributing to age-related disparities have not been fully elucidated. This study aims to evaluate the contribution of healthcare access and demographic factors to CRC screening rates.

Methods: Data from the 2023 United States Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System (BRFSS) were analyzed among adults aged $\geq$ 45 years. CRC screening data were available for New Jersey (NJ), Oregon (OR), and Virgin Islands (VI). CRC screening was coded as a binomial variable ("Yes" vs. not "yes" response to "ever had colonoscopy or sigmoidoscopy") for multivariable logistic regression with both demographic factors (sex, race, and income) and healthcare access factors (provider availability, affordability, and income level). All analyses were conducted using SPSS, $p<0.05$ is considered as significant.

Results: When the overall screening rates were compared among the three regions analyzed, a significant difference was observed between NJ (64.9%) and OR (64.8%) or VI (56.9%) respectively. When analysis was conducted within each region, age group, healthcare provider availability, and income were consistent predictors for screening rates for all three regions regardless of whether demographic factors were being analyzed in combination with the health access factors. When all factors were included, race was a significant predictor in OR and NJ, while sex was predictive in VI. Sex was significant in NJ when only demographic factors were included. In OR and NJ, affordability was significant when healthcare access factors were analyzed separately from demographic factors.

Conclusions: None of the analyzed regions met the recommended screening rate of 80% with younger age groups demonstrating lower screen rates. Results suggest that various demographic and healthcare access factors contribute to the low CRC screening rate and its geographic differences. Further investigation is needed to identify additional factors and understand how some of these factors can be modified to improve CRC screening rates.

Acknowledgements: This work is supported by the UNE COM Peter Morgane Research Fellowship (Canonico). No human subjects were used in this study.

12.

Mitochondrial DNA Damage and Heteroplasmy in Sepsis: Mechanisms and Clinical Implications

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Background: Sepsis is a life-threatening condition characterized by multi-organ dysfunction resulting from a dysregulated host response to infection, with substantial morbidity and mortality worldwide. Mitochondrial dysfunction, particularly mitochondrial DNA (mtDNA) damage and mutations, may contribute to impaired organ function during sepsis. We hypothesize that sepsis-associated oxidative stress leads to mtDNA damage and mutations, resulting in mitochondrial heteroplasmy, a condition where mtDNA variants coexist within the same cell. This heteroplasmy may contribute to organ dysfunction and failure both during sepsis and in the post-septic period.

Methods: We used a polymicrobial sepsis model with cecal slurry (CS) collected from the cecum of young mice. Sepsis was induced in wild-type male mice by intraperitoneal injection of CS at 0.5 mg/kg body weight. Samples from the heart, lung, liver, kidney, spleen, and plasma were collected at 24 hours and 7 days after sepsis induction. We assessed inflammatory cytokine expression by quantitative real-time PCR, and evaluated mtDNA damage and heteroplasmy by mtDNA PCR amplification and nanopore sequencing.

Results: CS induces a robust systemic inflammatory response, as evidenced by increased IL6, TNFα, and IL1β expression across multiple organs, including the heart, lung, kidney, spleen, and liver. This inflammatory state is accompanied by marked mitochondrial abnormalities, characterized by mtDNA damage, fragmentation, and reduced mitochondrial copy number. Importantly, septic mice also displayed mtDNA heteroplasmy, with both wild-type and mutant genomes present, including a large 8,538-bp deletion spanning the Cox1 to ND6 regions.

Conclusion: These findings link sepsis-associated inflammation and mitochondrial dysfunction to organ failure, highlighting mtDNA damage and heteroplasmy as potential biomarkers and therapeutic targets.

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13.

Quantifying the Vision Care Gap in Dajabón, Dominican Republic: A Needs Assessment at a Short-Term Medical Mission

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Background: Uncorrected refractive error remains a leading cause of preventable visual impairment worldwide, yet short-term medical missions (STMMs) inconsistently include vision services and rarely quantify the need they address. Structured as Phase 2 of a formal needs assessment, this study measured the gap between current vision care access in Dajabón, Dominican Republic, and a desired state in which all adults with clinically significant refractive error can obtain examination and correction.

Methods: An anonymous nine-item cross-sectional survey (English and Spanish) was administered to 190 adults presenting to a Waves of Health STMM. Items assessed exam history, provider proximity, barriers to care, near and distance difficulty, functional impairment, and glasses ownership and adequacy. Analyses in Python included descriptive statistics, chi-square with Fisher's exact tests, and binary logistic regression ($\alpha = .05$).

Results: 35.8% had never had an eye exam and 88.4% reported no eye doctor near home; cost was the leading barrier (50%). Near vision difficulty was reported by 90.0%, distance difficulty by 63.2%, and 84.2% reported that vision made daily tasks hard. 73.7% owned no glasses, and of the 49 who did, 59.2% said their glasses did not help, leaving approximately 89% with unmet or inadequately met correction needs. Distance and near difficulty co-occurred in 53.7% ($\chi^2 = 9.05$, $p = .003$). Ever having had an exam was the strongest independent predictor of pre-mission glasses ownership ($\chi^2 = 16.18$, $p < .001$; OR = 5.99, 95% CI 2.38–15.13), as was near difficulty (OR = 8.73, $p = .041$). Ceiling and floor effects for functional impairment and provider access reflect near-universal burden rather than null findings. All 190 participants received individually matched correction, and the entire sunglasses supply was distributed before demand was met.

Conclusion: Need in this community is structurally rather than symptomatically determined: the eye exam functions as a gatekeeping step that cost and distance render inaccessible, and STMMs that bundle examination with same-visit correction dismantle it. Because most participants had co-occurring near and distance difficulty, individualized refraction is warranted over generic reading-glasses distribution. At 19°N, an exhausted sunglasses supply signals a second, UV-related gap that STMMs at tropical latitudes should plan for.

This study was reviewed by the University of New England Institutional Review Board and granted exempt determination, UNE IRB #0226-28.

14.

Mutant p53 Promotes Resistance to PD-1 Blockade through mTORC1 Suppression and Autophagy

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Introduction: TP53 mutations are common across human cancers, but their effects on immune checkpoint blockade vary. We hypothesized that specific mutant p53 proteins retain functions that promote resistance to programmed cell death protein 1 (PD-1) blockade through regulation of mechanistic target of rapamycin complex 1 (mTORC1) and autophagy.

Methods: Previously generated data from MC38 colorectal tumors with mutant Trp53 or CRISPR-mediated Trp53 deletion were analyzed. Anti-PD-1 response was assessed in immunocompetent and immunodeficient mice. Tumor immune composition and T-cell clonality were characterized by single-cell RNA and T-cell receptor sequencing and flow cytometry. Cytokine-induced death, caspase activation, mTORC1 signaling, autophagy, and mTORC1 regulatory genes were assessed by viability assays, Western blotting, quantitative polymerase chain reaction, and transcriptomic analysis. Statistical analyses used two-tailed Student's t tests, one-way ANOVA, or log-rank analysis as appropriate, with $P < 0.05$ considered significant.

Results: Trp53 deletion enhanced anti-PD-1 response and produced complete regression in a subset of tumors. This advantage was absent in RAG1-deficient and NSG mice, supporting an immune-dependent mechanism. Trp53-deficient tumors showed increased CD8+ T-cell infiltration and clonal expansion, reduced regulatory T cells, and greater effector activity. Trp53 deletion also increased sensitivity to interferon gamma and tumor necrosis factor alpha-induced apoptosis with greater caspase-3 and caspase-8 activation. Mechanistically, Trp53 loss increased mTORC1 activity, reduced autophagy, and decreased Ddit4, Sesn2, Sesn3, Castor1, and Castor2 expression. Human TP53-mutant colorectal cancer cells showed mutation-specific preservation of this program.

Conclusion: Certain p53 mutants may promote PD-1 blockade resistance by maintaining mTORC1 suppression and autophagy, thereby protecting tumor cells from cytokine-induced apoptosis. These findings support functional stratification of TP53 mutations and identify the p53-mTORC1-autophagy axis as a potential determinant of immunotherapy response.

Acknowledgements: Research was conducted at Hackensack Meridian Health Center for Discovery and Innovation. Funding was provided by National Institutes of Health/National Cancer Institute grant R01CA239716-01A1.

IACUC Approval: Animal studies were approved by the Hackensack Meridian Health Center for Discovery and Innovation Institutional Animal Care and Use Committee (protocol AUP-25-17)

15.

Bone Stimulation in Foot and Ankle Fracture Healing: A Systematic Review of Efficacy, Safety, and Clinical Application

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Background: Fracture nonunion and delayed healing, more commonly seen in weight-bearing joints like the foot and ankle, can significantly impact a patient's mobility and quality of life. Currently, surgical intervention is the mainstay treatment, and limited nonoperative options exist. Bone stimulation, including low-intensity pulsed ultrasound (LIPUS), combined magnetic fields (CMF), and pulsed electromagnetic fields (PEMF), serve as potential alternatives or adjuncts for nonunion; although their efficacy is still debated.

Methods: PubMed, Google Scholar, and Embase were searched for studies published between 2009-2025 examining the use of bone stimulators for foot and ankle fracture nonunion. Eligible randomized controlled trials, prospective and retrospective cohort studies, registry analyses, and case series were screened and reviewed by two independent reviewers, with data extracted on demographics, stimulation regimen, and clinical, radiographic, and safety outcomes.

Results: Thirteen studies comprising 13,656 analyzed patients met inclusion criteria (10 LIPUS, 2 CMF, 1 PEMF). The mean age was 44.3 years. Overall, bone stimulation was associated with both clinical and radiographic union across studies. Mean union rate across the 11 studies reporting it was 81.6% (range 58–100%). Pain and function scores improved in the two studies reporting them (VAS, MOXFQ). Treatment failure, defined as persistent nonunion, occurred in approximately 20% (range 0–42%) of patients pooled across studies reporting failure data.. There were no major complications, and one study reported a minor, self-resolving complication.

Conclusion: Bone stimulation appears to be a safe and potentially effective nonoperative option for foot and ankle fracture nonunion. However, substantial differences in study design, outcome definitions, and reporting limits the strength of these conclusions. Larger, standardized randomized trials are needed to establish clinical guidelines for its use.

16.

Non-inferiority Trial Between Manual Ventilation with a Flow Limiting Device Versus Mechanical Ventilation Alone

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Introduction: Mechanical ventilators provide controlled delivery of airway pressure, flow, and tidal volume; however, manual ventilation using self-inflating resuscitator bag (SIRB) remains essential in many perioperative and emergency settings. Manual ventilation frequently results in excessive tidal volumes, high inspiratory flow rates, and elevated peak airway pressures, even among experienced providers. Education and simulation-based training alone have limited effectiveness, whereas device-based approaches that regulate flow can reduce hyperventilation and excessive pressures. The Sotair® device is a single-use, inline flow-limiting device (FLD) positioned between the SIRB and the patient that transiently occludes flow when inspiratory rates exceed approximately 55 L/min. The objective of this study was to conduct a non-inferiority trial comparing peak inspiratory pressures during manual SIRB ventilation with the FLD versus mechanical ventilation in patients undergoing non-emergent surgery under general anesthesia.

Methods: In this single center, prospective, paired, non-inferiority trial, 310 adult patients (ASA I-II) undergoing general anesthesia received manual SIRB ventilation with FLD for 3 min, followed by mechanical ventilation without the FLD for 3 min. All anesthesia providers received standardized FLD training. Mechanical ventilation was delivered in volume-controlled mode: tidal volume 500 mL, respiratory rate 12 bpm, positive end-expiratory pressure 5 cm H_2O, and 100% FiO_2 at 5L/min. The primary outcome was mean peak inspiratory pressure (cm H_2O).

Results: The mean peak inspiratory pressure during manual ventilation with the FLD was 16.63±3.78 cm H_2O versus 20.72±4.02 cm H_2O during mechanical ventilation (mean difference -4.09 cm H_2O ([95%CI, -4.79 to -3.38], $p<0.001$), which was below the prespecified non-inferiority margin of +4.0 cm H_2O. Peak inspiratory flow was significantly lower with manual FLD ventilation (mean difference -8.12 L/min, ([95%CI, -9.43 to -6.81], $p<0.001$), whereas tidal volumes were similar (mean difference 8.47 mL, [95%CI, -5.26 to 22.21]). No FLD related malfunctions occurred.

Conclusions: Manual SIRB ventilation with the FLD was non-inferior to mechanical ventilation for peak inspiratory pressures and associated with lower peak flows, with tidal volumes within clinically acceptable ranges. When manual ventilation is required, the FLD may help maintain airway pressures and tidal volumes within acceptable limits.

This study received full committee review and approval from the Institutional Review Board of Rhode Island Hospital (IRB# 1963885). The trial was prospectively registered at ClinicalTrials.gov (NCT06117683; December 20, 2023) prior to patient enrollment. This study was conducted and reported following the Consolidated Standards of Reporting Trials guidelines, with specific adherence to the extension for non-inferiority trials.

17.

Lipidomic and Proteomic Characterization of Perivascular Adipose Tissue Surrounding Abdominal Aortic Aneurysms

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Introduction: Abdominal aortic aneurysm (AAA) is a progressive disease marked by inflammation, extracellular matrix (ECM) breakdown, and aortic wall weakening, with no medical therapy to limit growth or rupture. Perivascular adipose tissue (PVAT) surrounds the aorta and regulates vascular inflammation, redox balance, and endothelial remodeling. Yet, PVAT response to AAA stress remains incompletely characterized. We hypothesize that stressed PVAT undergoes coordinated lipid and protein changes that alter the integrity of the endothelium via increased inflammatory mechanisms. This study compares PVAT lipidomics and proteomics at dilated AAA sites versus paired proximal nondilated sites in patients undergoing AAA repair.

Methods: PVAT was collected from five patients undergoing AAA repair at aneurysmal sites and paired proximal, nondilated sites as internal controls. Lipids were extracted, analyzed by flow injection analysis and MS/MS-ALL, identified in LipidView, and quantified in MSstats ($p\text{-adj} < 0.05$). Proteins were extracted, digested, analyzed by liquid chromatography–mass spectrometry, identified with open-source pipelines; differential abundance was quantified in MSstats.

Results: Compared with paired nondilated PVAT, AAA-associated PVAT showed differential abundance in 12 lipid species, with increased phosphatidylcholine, phosphatidylserine, and phosphatidylethanolamine classes and decreased phosphoinositides. Peroxidation prone polyunsaturated fatty acid (PUFA)–containing phospholipids were enriched, consistent with a pro-oxidative profile. Proteomics identified 67 upregulated and 4 downregulated proteins at the AAA site. Integrated analysis revealed two convergent patterns: (1) enriched peroxidation-prone PUFAs alongside increased detoxification proteins MGST1 and PRDX4, and (2) altered lipid profiles alongside increased HLA-DRA and MMP9, a mediator of ECM degradation.

Conclusion: AAA-associated PVAT reveals two coordinated lipid and protein remodeling patterns that define a pro-oxidative, pro-inflammatory phenotype. The convergence of peroxidation-prone phospholipids with upregulated MGST1 and PRDX4 suggests a compensatory antioxidant response, while altered lipid profiles with elevated MMP9 indicate coordinated inflammatory and ECM-remodeling activity in AAA-associated PVAT. Together, these findings support PVAT as an active component in the AAA microenvironment and nominate candidate pathways and targets for further study in AAA progression.

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IRB: Human de-identified samples were obtained under MaineHealth IRB protocols 1396116-11 and 1295440-28 (Malka and Liaw). The analyses performed by Dikener and Doufesh, OMSII were quantitative only and had no contact with human samples.

18.

Evaluating the Feasibility of a Ketamine-Assisted, Community-Based Intervention for Individuals with Substance Use Disorder

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Introduction: The current standard of care for substance use disorder (SUD) addresses symptoms but often does not address the underlying cause of patients' disorders, causing dissatisfaction for healthcare providers and ongoing suffering for patients. Ketamine therapy is an emergent treatment with a robust safety profile and low cost that is at the forefront of psychedelic-assisted psychotherapy. Practitioners of ketamine-assisted therapy (KAT) combine medically supervised ketamine use with interactive therapeutic sessions, with early evidence suggesting KAT treats SUD in individual settings. There is currently no evidence about group KAT's effectiveness for SUD. This pilot study aims to assess the feasibility of a nine-week group KAT program in the community for individuals with SUD. Secondary outcomes include changes in recovery capital, symptoms of depression, anxiety, and post-traumatic stress, with additional exploratory outcomes assessing substance use-related problems, and self-compassion.

Methods: 7 participants enrolled in a 9-week program, that included weekly meetings, breathwork, and two group KAT sessions with subsequent integrations. All encounters were supported by a therapeutic team that included prescribers. To assess the program's impact, the following questionnaires were conducted at baseline and after the course completion: PHQ9, GAD7, PCL5, SIP-AD, BARC-10, and the 26-point Self-Compassion Scale.

Results: Of 13 individuals screened, 8 were eligible and 7 enrolled (Recruitment yield, 87.5%). Participants attended 57/63 scheduled sessions (Attendance Rate, 90.5%), and 6 of 7 enrolled participants (85.7%) completed the program and were retained through the end. No serious adverse events were reported. Outcome data is available from 2 participants; secondary outcome analysis is ongoing.

Conclusion: Preliminary results support the feasibility of implementing a group of KAT program for individuals with SUD, as reflected by recruitment, attendance, program completion, and retention. Further analysis of secondary outcomes to assess changes in recovery capital and associated symptoms of depression, anxiety, and PTSD is planned after completing collection.

Acknowledgements: Thank you to the Riverbird Clinic and University of New England College of Osteopathic Medicine for allowing this crucial research to be conducted, and a big thank you to the Peter Morgane Research Fellowship, awarded to OE, for funding and supporting this work. This study was granted IRB exemption by the University of New England Office of Research Integrity (IRB #0425-15).

19.

NAMPT Inhibition Blocks Macropinocytosis in TSC2-Deficient Kidney Cysts: A Novel Therapeutic Target for Tuberous Sclerosis Complex

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Introduction: Tuberous Sclerosis Complex (TSC) is an autosomal dominant condition caused by a TSC1 or TSC2 gene mutation, causing benign kidney tumors (angiomyolipomas). TSC1/2 inactivation leads to upregulation of the mechanistic target of rapamycin complex 1 (mTORC1) and a highly anabolic state, which requires enhanced nutrient uptake. We have shown that nutrient scavenging via macropinocytosis is strongly elevated in TSC2-deficient cells. We identified the NAD^+ salvage pathway as a key metabolic driver of macropinocytosis that supports TSC2-deficient cell growth. Our central hypothesis is that targeting the NAD+ synthesis pathway will decrease kidney cysts in mice *in vivo*.

Methods: Tsc2f/f:Cre+ mice (m=4) were treated with the NAMPT inhibitor OT-82 (60mg/kg) for 20 days. Dextran (0.5mg/ml) was injected retro-orbitally 24hrs before sacrifice. Kidneys were perfused, fixed in 4% paraformaldehyde, and embedded in OCT. Cryosections (10μm) were DAPI-stained and imaged by immunofluorescence. In vitro, macropinocytosis was quantified using dextran-FITC (70kDa, 0.5mg/ml, 60min) after 24hrs OT-82 treatment. Proliferation was assessed by crystal violet staining; apoptosis by Annexin V fluorescence and cleaved caspase 3 immunoblotting after 24hrs of treatment. qRT-PCR assessed expression of key NAD+ synthesis enzymes.

Results: We showed that treatment with OT-82 (5nM) or FK866 (5nM) selectively decreased the proliferation of TSC2-deficient cells by 90% and 80%, respectively ($p<0.0001$). TSC2-expressing cells were unaffected by the treatment. Additionally, dextran uptake via macropinocytosis decreased by nearly 80% ($p<0.001$) upon OT-82 treatment (5nM; 24hrs). Importantly, macropinocytosis was elevated in kidney cysts from TSC mouse models compared with adjacent normal tissue. We were also able to demonstrate that OT-82 treatment strongly inhibits macropinocytosis in the kidney cysts.

Conclusion: We have shown, for the first time, that TSC2-deficient cysts have increased macropinocytosis in vivo, and targeting NAMPT blocks this nutrient uptake. Immunohistochemistry is underway in kidney sections for proliferation (Ki67) and apoptosis (caspase 3) markers. We will then quantify the number and size of cysts, and the macropinocytic index using established protocols. We anticipate that OT-82 will decrease the size and number of kidney cysts in this mouse model, which identifies the NAD+ salvage pathway as a potential therapeutic approach for patients with TSC.

Acknowledgements: We would like to thank the University of New England College of Osteopathic Medicine and everyone in the Filippakis Lab for their unwavering support. This work has been supported by the Carmen Pettapiece Student Research Fellowship (to AD) and NIGMS-1P20GM152330-01 to HF. Animal work was approved by the University of New England Institutional Animal Care and Use Committee (IACUC Protocol #090623-019).

20.

Acceptability of a home-based proxy/self-administered quantitative sensory testing toolkit in youth with sickle cell disease

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Introduction: Laboratory-based quantitative sensory testing (L-QST) identifies altered peripheral and central pain processing in youth with sickle cell disease (SCD), but cost, training, portability, and testing time restrict repeated use. We evaluated the safety, feasibility, and acceptability of an approximately $85 reusable proxy/self-administered QST (P/SA-QST) toolkit designed for home use.

Methods:

Youth with SCD in steady-state health completed L-QST and P/SA-QST during a clinic-based virtual session simulating home administration. The toolkit assessed mechanical, vibration, pressure, pinprick, cold, and heat sensory and pain responses. Families completed a questionnaire based on the seven-domain theoretical framework of acceptability. Safety events, testing duration, correlations between corresponding measures, and Bland-Altman agreement were evaluated.

Results: Thirteen patients (7 male, 6 female; 8 HbSS, 5 HbSC), aged 8-18 years, completed testing. No toolkit related adverse events occurred, one family declined cold pain testing. Mean P/SA-QST duration was 23 ± 3 minutes, like L-QST at one body site (23 ± 6 minutes). Acceptability was high (median 47/50; range, 40-50), with families emphasizing ease of use and a favorable risk-benefit balance. Significant associations between L-QST and P/SA-QST were observed only for vibration detection threshold ($p = 0.00033$) and dynamic mechanical allodynia ($p < 0.0001$). Bland-Altman analyses showed acceptable agreement across comparable mechanical sensory modalities.

Conclusions: This low-cost P/SA-QST toolkit was safe, feasible, and highly acceptable to youth with SCD and their families. Its portability and brief administration may enable repeated home-based assessment of sensory changes during acute pain crises and chronic pain, supporting longitudinal research and potentially clinical monitoring.

21.

Developing Methods to Evaluate *Nlrp3* Function in Peripheral Monocyte Neuroinvasion in Parkinson's Disease

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Introduction: Parkinson's Disease (PD) is the second most common neurodegenerative disease in the world. Despite its prevalence, the underlying pathophysiology is not fully understood. NLRP3 inflammasome pro-inflammatory function is implicated in the pathogenesis of PD. Our research explored the role of NLRP3 in innate immune cells, identifying peripheral monocytes as potentiators of PD-related neuroinflammation. We are developing models to assess monocyte infiltration into the brain in the well characterized rotenone mouse model of PD.

Methods: Wild-type (WT) and *Nlrp3 -/-* were established. A rotenone stock was prepared in 100% DMSO, diluted in Miglyol 812 (MedLab Gear, Cortland, OH) and delivered to mice at 2.5mg/kg. Male and female WT and *Nlrp3*-/- mice received daily intraperitoneal injections of vehicle or rotenone for 14 consecutive days. Mice were terminally anesthetized, transcardially perfused with 4% paraformaldehyde, and brains were collected and preserved with 4% paraformaldehyde. Cryosections were prepared and utilized to evaluate immunostains targeting peripheral monocytes, including anti-CD45 and anti-CD16/CD32, and anti-CD31/PECAM for visualization of vasculature.

Results: Successful labeling of the vasculature using anti-CD31/PECAM antibodies allowed for visualization of the vasculature providing an anatomic context for identifying perivascular "border associated" monocytes. Several strategies for optimizing immunostains for monocytes were evaluated. Monocyte labeling continues to be impacted by high-background autofluorescence in brain tissues, moderate to poor labeling intensity, and concerns related to non-specific binding of the experimental antibodies.

Conclusion: Labeling of the neurovasculature using immunofluorescent staining is reasonably robust however the definitive labeling of peripheral monocytes using available reagents and imaging platforms remains a concern. Further optimization of monocyte immunostaining strategies or the development of genetic labeling platforms is required to quantitatively assess monocyte neuroinvasion in the rotenone model.

All mouse studies were conducted in accordance with federal guidelines and approved by the University of New England or Dartmouth Institutional Animal Care and Use Committee

(Protocol No. 041425-007 (Animal Models of Neurodegenerative Disease), MCH, Protocol No. 00002117, MCH)

22.

Force Characteristics and Physiological Outcomes in Osteopathic Manipulative Treatment

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Introduction: Osteopathic Manipulative Treatment (OMT) applies mechanical forces, including compression, shear, tension, torsion, and oscillation, to address somatic dysfunction. Although prior studies have reported physiologic and patient-reported outcomes following OMT, relationships between specific force characteristics and objective physiologic responses remain unclear. Interpretation is complicated by protocols that simultaneously use multiple force types and techniques. The aim of this study is to examine associations between force dynamics, magnitude, and direction in individual OMT techniques and objective physiologic outcomes.

Methods: A literature review was conducted using 10 Scopus searches, each targeting a specific OMT technique (e.g., “muscle energy” AND “OMT”). Peer-reviewed studies published from 1950–2026 were included if they evaluated a single OMT technique and reported objective, quantifiable outcomes. Studies reporting only subjective outcomes were excluded. Techniques were categorized by primary force type and, when reported, force dynamics, magnitude, and direction. Physiologic outcomes were assessed for patterns across force categories. A total of 2,398 publications were screened.

Results: Compressive, tensile, and shearing techniques showed changes in hemodynamic/autonomic measures, including heart rate variability (HRV), blood pressure, and skin temperature. Static tensile force and isometric contraction were associated with increases of pNN50 and Root Mean Square of Successive Differences (RMSSD), two key components of HRV. Shearing forces demonstrated acute hemodynamic changes, with one paper finding a 6.41% decrease in diastolic blood pressure. Traction and tension techniques affected range of motion (ROM) and measures of muscle performance, elasticity, or tone, with ROM increases up to 44%. Oscillatory techniques affected fluid movement and circulating biochemical/cytokine measures. Few studies quantified force magnitude, vector, rate, or duration, limiting comparisons across techniques and studies.

Conclusion: Preliminary findings suggest distinct OMT force characteristics may be associated with different objective physiologic outcomes. However, heterogeneity in techniques, outcome measures, and force reporting limits definitive conclusions. Further investigation using isolated, well-characterized OMT techniques and standardized reporting of force dynamics and magnitude may clarify mechanobiological responses to OMT.

Acknowledgements: University of New England College of Osteopathic Medicine

IRB: No human subjects were used in this study.

23.

Immediate Effects of Community Education on Human Papillomavirus Vaccine and Cervical Cancer Knowledge

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Introduction: Human papillomavirus (HPV) vaccination has been proven to effectively prevent HPV infection and associated cancers, yet misinformation and hesitancy continue to limit uptake. Evidence for brief community education is limited. This study evaluated whether a community intervention was associated with greater objective HPV and cervical cancer knowledge and favorable vaccine-related intentions.

With this study, we hope to center our investigation around 3 main categories: medical knowledge, emotional association, and action. Our research questions are as follows: What is the baseline level of knowledge about the HPV vaccine and cervical cancer risks in the community? What are people's general feelings toward the vaccine prior to being educated on the topic, and how does that change after being given one educational speech on the topic? Does increased knowledge about the vaccine prompt people to take action towards protecting themselves and their loved ones from cervical cancer?

Methods: Individuals registering for a 5K Walk 4 Wellness event completed an anonymous baseline survey before an educational presentation and materials about HPV vaccination and cervical cancer. Attendees then completed an immediate post-intervention survey. Five knowledge items common to both surveys were scored as correct or incorrect and summed into a 0-5 study-specific knowledge score. Because baseline responses were anonymous, the groups were analyzed independently. The primary outcome was the between-group difference in mean knowledge score, assessed using Welch's t-test. Secondary outcomes included item-level knowledge, self-perceived knowledge, hesitancy, and intentions. A sensitivity analysis adjusted for age and health-professional graduate-student status.

Results: Baseline and post-intervention surveys included 107 and 32 responses. Complete scores were available for 107 baseline and 31 post-intervention respondents. Mean scores were 3.85 ± 1.02 at baseline and 4.48 ± 0.81 post-intervention, a 0.63-point difference (95% confidence interval, 0.28-0.98; $p < 0.001$). The association remained significant after adjustment (adjusted difference = 0.51; 95% confidence interval, 0.16-0.85; $p = 0.005$). The largest increases in correct responses involved annual cervical cancer incidence (49.5% to 75.0%), recognition that males can acquire HPV (78.5% to 96.9%), and identification of all recommended recipient groups (76.6% to 93.5%). Post-intervention, 22 of 32 respondents (68.8%) reported greater understanding, 25 (78.1%) greater willingness to receive the vaccine if not previously vaccinated, and 20 (62.5%) greater willingness to encourage others to receive it.

Conclusion: Post-intervention respondents demonstrated higher HPV and cervical cancer knowledge and favorable vaccine-related intentions, indicating A one year follow-up survey will assess retention and subsequent vaccine-related actions, and will focus upon individual response change as well as general trends.

Acknowledgement: University of New England College of Osteopathic Medicine and the 5K Walk 4 Wellness event organizers.

IRB: Approved by the University of New England Office of Research Integrity, protocol #0725-18.

24.

Regulatory and Labeling Gaps in U.S. Dietary Supplements: Clinical Harms and Implications for Regulatory Reform

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Introduction: The U.S. dietary supplement industry generates approximately $70 billion annually, with over 50% of adults reporting supplement use. Supplements in the U.S are regulated as foods, rather than drugs, under the Dietary Supplement Health and Education Act (DSHEA) and generally do not require premarket safety testing or FDA approval. This framework may limit the FDA's ability to identify adulterated, mislabeled, or harmful products before they reach consumers. This literature review examines regulatory and labeling failures, associated adverse health outcomes, and the potential impact of the proposed Dietary Supplement Listing Act of 2026 (S.3677), which aims to improve transparency through mandatory product listing.

Methods: FDA recalls, safety alerts, regulatory documents, and peer-reviewed literature published between 2014 and 2025 were reviewed for labeling violations, undeclared ingredients, adulteration, safety concerns, and adverse outcomes. Cases were categorized and assessed for relevance to proposed S. 3677 requirements.

Results: Five recent FDA enforcement cases from 2025 were identified; all involved undeclared pharmaceutical ingredients, labeling deficiencies, and safety concerns. Undeclared FDA-approved medications included sildenafil, tadalafil, diclofenac, dexamethasone, and omeprazole, were present as adulterants without appropriate labeling. Separately, two additional cases involved disease-related or misleading claims. Clinical literature characterizes significant harm to the public. Among 16 Artri King cases, 12 (75%) were diagnosed with Cushing syndrome, with additional reports of adrenal insufficiency, hyperglycemia, and fragility fractures. OxyELITE Pro contained aegeline, a new dietary ingredient marketed without the required FDA notification and safety evidence. It was linked to a multistate liver-injury outbreak involving 55 cases, including 33 hospitalizations and 3 liver transplants. Several violations were relevant to proposed S. 3677 requirements.

Conclusion: FDA enforcement actions and clinical reports show that dietary supplement regulatory failures can result in clinically significant harm. Proposed mandatory product listing under S. 3677 could improve transparency and FDA visibility into the supplement market. Given the documented clinical and economic burden of unsafe or ineffective supplements, stronger evidence-based regulatory oversight may improve consumer protection and reduce avoidable healthcare costs.

25.

Flexible and Navigable Suction Sheaths (FANS) as disruptive technology: Does suction decrease staged procedures for ureteroscopy and laser lithotripsy and result in infection rates similar to mini-PCNL?

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Introduction: Nephrolithiasis, commonly known as kidney stones, is a common disease in the working-age population, affecting approximately 1 in 11 people in the United States[1]. The American Urologic Association (AUA) guidelines recommend PCNL as the first-line surgical modality for stones greater than 2 cm; however, some patients do not undergo PCNL due to comorbidities, anticoagulation status, or patient/surgeon preference[4]. Patients who cannot or will not undergo PCNL for larger stones in some cases can be treated successfully with ureteroscopy and laser lithotripsy (URSLL); however, the efficiency of stone treatment for URSLL is significantly lower[5]. Suction ureteroscopy using a flexible and navigable suction sheath (FANS) has been shown to decrease infections while increasing efficiency and overall stone-free rate[6]. We aim to create a broad longitudinal retrospective database of ureteroscopy cases performed at Maine Medical Center and integrate the existing IRB-approved miniPCNL and PCNL databases to answer a number of questions relating to suction ureteroscopy and PCNL.

Methods: This is a retrospective review of databases with procedure type, stone size, and other available patient demographics and comorbidities. Data aggregated from Epic will be used to examine case type (URSLL vs. PCNL) and primary outcomes of re-operation and residual stone volume. Study groups will be matched through propensity score matching, and descriptive statistics for all potential covariates listed above will be calculated via t-test, chi-square, or the non-parametric equivalent depending on appropriateness for the observed data distribution. The final analyses will consist of stepwise regression, with an alpha value of less than 0.1 being acceptable for inclusion in the final models. The final models will be assessed for significance with an alpha value of 0.05. Confidence intervals will be 95%.

Results: Database construction is ongoing. 329 patients have been identified for the URSLL database, and 263 patients have been identified for the PCNL database. Preliminary analysis is planned following completion of chart review.

Conclusions: This ongoing study aims to better characterize FANS utilization and address an important gap in the current literature regarding staged URSLL vs mini-PCNL. Preliminary work demonstrates the feasibility of database construction.

Acknowledgments: The University of New England College of Osteopathic Medicine and Maine Medical Center, Department of Urology. This work has been supported by the Peter Morgane Student Research Fellowship (to AG).

Note: No human subjects were used in this study. External IRB exemption.

26.

The Role of Palmitic Acid Ester of 9-hydroxy Stearic Acid (9-PAHSA) in Osteoclastogenesis

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Introduction: Bone homeostasis is maintained through continuous remodeling mediated by bone-forming osteoblasts and bone-resorbing osteoclasts. Disruption of this homeostasis results in osteoporosis and is influenced by caloric restriction. Calorie restriction increases bone marrow adiposity, suggesting that bioactive lipids such as fatty acid esters of hydroxy fatty acids (FAHFA) may link increased marrow lipid accumulation to alterations in bone remodeling. Previous work showed that a subclass of FAHFAs, palmitic acid ester of 9-hydroxy stearic acid (9-PAHSA), promotes osteoblast differentiation *in vitro*. However, the effects of 9-PAHSA on osteoclast differentiation have not been established. We performed a dose-response study to determine these effects. Based on previous findings of increased osteoblast activity, we hypothesized that 9-PAHSA would suppress osteoclast differentiation.

Methods: Bone marrow stromal cells were isolated from C57BL/6J male mice and plated in complete media (α-minimum essential medium + 10% fetal bovine serum + 1% penicillin streptomycin). After 48 hours, cells were assigned into 9 groups: cell only, dimethyl sulfoxide, or 9-PAHSA (2.5μM – 100μM: 7 concentrations). Cells were seeded at 250,000 cells/96-well in osteoclast differentiation media (complete media + 30 ng/mL macrophage colony-stimulating factor + 100 ng/mL receptor activator of nuclear factor κB ligand). Osteoclasts were observed after 4-5 days of differentiation. Cultures were terminated and stained for tartrate-resistant acid phosphatase (TRAP). Cells were imaged and stitched using the Keyence microscope. Mature osteoclasts, defined as cells that have 3 or more nuclei, were quantified using NOISe, a deep learning-based algorithm that automates detection of osteoclasts *in vitro* (https://github.com/michaelwwan/noise).

Results: Treatment with 9-PAHSA reduced osteoclast numbers, with the most pronounced decreases observed at the higher concentrations of 50μM and 100μM. Notably, 50μM 9-PAHSA produced the greatest reduction in osteoclast numbers.

Conclusion: Our data demonstrates that 9-PAHSA suppresses osteoclast differentiation *in vitro*. Together with previous findings showing 9-PAHSA promotes osteoblast differentiation, these results suggest 9-PAHSA may play a regulatory role in bone remodeling. Further characterization of FAHFA signaling may provide insight into the mechanisms linking bone marrow adiposity, skeletal remodeling, and osteoporosis.

Acknowledgments: This research was conducted in the laboratory of Dr. Clifford J. Rosen at the Center for Molecular Medicine, MaineHealth Institute for Research, Scarborough, Maine. I would like to thank Dr. Rosen and Phuong Le for their mentorship and support, and the Rosen Lab members for creating such a supportive environment.

27.

Risk Factors of Recurrent Urinary Tract Infections in Overactive Bladder Treatment: Do They Matter?

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Introduction: Overactive bladder (OAB) treatments with antimuscarinics and beta-3 agonists have a risk of urinary tract infection (UTI) with variable significance, recurrent UTIs have not been evaluated. This study examined the odds of patients with OAB, treated or untreated, and risk factors for recurrent UTIs.

Methods: A retrospective cohort study in a New England hospital over 34-months used ICD-10 codes to identify patients with OAB for the difference in culture positive recurrent UTIs comparing two study cohorts; antimuscarinics; beta-3 agonists; to control untreated cohort. Gender, modifiable risk factors: smoking, alcohol use, BMI, and chronic conditions: hypertension, diabetes mellitus, bladder outlet obstruction, and recurrent kidney stones were recorded. One way ANOVA, chi-square, and binary logistic regression were performed for statistical analysis.

Results: Adjusting all risk factors, antimuscarinics had 9% increased odds of recurrent UTIs compared to untreated; beta 3-agonists 234% increased odds: males 18% decreased odds, beta-3 agonists 152% increased; adjusting for modifiable risk factors antimuscarinics had 39% decrease odds, beta-3 agonist, 84% increase, adjusting for modifiable risk factors and any one chronic condition antimuscarinics had 3% decreased odds, beta-3 agonists 185% increased, controlling for any one chronic condition, antimuscarinics had 22% decreased odds, beta-3 agonists 122% increased.

Conclusions: Antimuscarinics had consistently lower, reduced or near-neutral odds of recurrent UTIs, beta-3 agonists had increased odds compared to untreated and antimuscarinics.

BMC IRB#: 2025-008 UNE IRB# 0326-12

28.

mTORC1-Dependent Regulation of the Niacin Receptor HCAR2 in Tuberous Sclerosis Complex

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Introduction: Tuberous sclerosis complex (TSC) arises from loss-of-function mutations in TSC1/TSC2, causing constitutive mTORC1 activation and metabolic reprogramming. Maintaining this growth-biased state requires adequate NAD^+, an essential cofactor for redox homeostasis and biosynthesis. Although NAD^+ salvage has been extensively studied, the Preiss-Handler pathway, which generates NAD^+ from nicotinic acid (niacin), remains poorly characterized in mTORC1-hyperactive states. HCAR2/GPR109A is a niacin-responsive receptor that may provide a regulated interface between extracellular niacin availability and intracellular NAD^+ metabolism. We hypothesize that HCAR2 expression is regulated by mTORC1 and contributes to altered niacin metabolism in TSC.

Methods: TSC2-normal 621-102 cells were treated with vehicle or rapamycin (20 nM) for 24 hrs. HCAR2 abundance was assessed by immunofluorescence. DAPI-stained nuclei were segmented in CellProfiler, and each nucleus was expanded by 26 pixels (~5 μm) to define a standardized per-cell region. HCAR2 integrated fluorescence was quantified across five image fields per condition and summarized as the median per field. Previously generated spatial transcriptomic data (Nanostring) were analyzed for differential HCAR2 expression between TSC2-deficient mouse kidney cysts and adjacent normal tissue.

Results: Immunofluorescence images from 102-normal cells were quantified using CellProfiler. DAPI-defined nuclei were expanded by ~5 μm to generate standardized per-cell regions, and HCAR2 integrated fluorescence was measured across five image fields per condition. Rapamycin reduced the mean field-level median HCAR2 fluorescence from 427.8 in vehicle-treated cells to 222.9, a 47.9% decrease across five image fields per condition ($p<0.05$). HCAR2 expression was increased in TSC2-deficient kidney cysts by 2.5 fold ($p<0.05$) compared to normal kidney tissue.

Conclusion: Rapamycin markedly reduced HCAR2 fluorescence, supporting a relationship between mTORC1 activity and the niacin-responsive HCAR2 receptor. Together with NanoString evidence of differential HCAR2 expression in both TSC cell lines and tissue, these findings identify HCAR2 as a candidate link between mTORC1 signaling and niacin-dependent NAD+ metabolism. Further studies are needed to determine the functional consequences of HCAR2 modulation in TSC.

Acknowledgement: University of New England College of Osteopathic Medicine. This work was supported by the Carmen Pettapiece Fellowship to SJ and NIGMS-1P20GM152330-01 to HF.

IRB/IACUC: This study used in vitro cell lines only and did not involve human participants or live vertebrate animals.

29.

Temperature-Dependent Changes in Lymphatic Pumping and Forward Transport with Aging and TRPV4 Involvement

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Introduction: Collecting lymphatic vessels maintain fluid balance, immune-cell trafficking, and waste clearance through coordinated smooth-muscle contractions. Although temperature strongly affects smooth-muscle function, its effects on lymphatic pumping are unknown. Because aging increases susceptibility to heat-associated lower-extremity swelling, we hypothesized that temperature alters lymphatic contractility and forward transport and that these responses become maladaptive with aging. We therefore assessed temperature-dependent lymphatic pumping in young and aged mice and investigated TRPV4 as a potential mediator.

Methods: Young and aged mice were anesthetized with ketamine–xylazine (100/10 mg/kg). FITC–dextran (3 µL, 2%) and red carboxylate FluoSpheres (4 µL, 1.0 µM; 580/605 nm) were injected into the dorsal hindfoot to visualize lymphatic structure and flow. Exposed hindlimb collecting lymphatics were superfused with saline and assessed during controlled temperature transitions (30, 37, 40, and 45°C). Epifluorescence images were acquired at 7.5 frames/s for 60–120 s using an Olympus IX70 microscope and Hamamatsu camera. Custom MATLAB algorithms quantified vessel diameter, contraction frequency, systolic and diastolic diameters, and ejection fraction. Fluorescent microsphere movement assessed lymph transport directionality and velocity. To evaluate TRPV4 involvement, young mice received topical GSK2193874 (100 nM) for 30 min before testing.

Results: In young mice (N=6), contraction frequency decreased from 10.5 min^{-1} at 37 °C to 4.3 min^{-1} at 30 °C, recovered to 9.8 min^{-1} with rewarming, and increased to 22.6 min^{-1} at 45 °C. However, at 45 °C contractions became irregular, ejection fraction fell (0.26 vs 0.56 at 30 °C; $P<0.05$), and microsphere movement was oscillatory. In aged mice (N=6), distinct contraction frequency phenotypes appeared at 45 °C, clustering either at 0 or >20 min^{-1} with ejection fraction from 0–0.18, suggesting lymphatic pump decompensation. GSK2193874 treatment in young mice significantly reduced contraction frequency at 45 °C from 22.6 min^{-1} to 14.2 min^{-1}($N=5$, $p<0.02$).

Conclusion: Temperature impacts lymphatic contraction frequency and lymph transport: cooling suppresses contraction frequency, whereas extreme heating produces rapid, disorganized activity with ineffective forward lymph movement. Altered thermal regulation of lymphatic pumping with aging may contribute to heat-associated lower-extremity swelling. TRPV4-inhibition studies in aged mice will test this mechanism.

Approved by MGH IACUC

No human subjects were used in this study

30.

Assessing Barriers and Provider Perceptions of Pediatric ICU Telehealth Consultation to Improve Care for Critically Ill Children in Maine Community Hospitals

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Introduction: Maine community emergency departments frequently lack immediate access to pediatric critical care expertise, contributing to challenges in the stabilization and transfer of critically ill children. MaineHealth has developed a Tele-PICU program that is expanding across the state and provides real-time access to pediatric intensivists. Tele-PICU consultation has been associated with improved clinical decision-making, stabilization and transfer outcomes. However, utilization remains inconsistent, with hypothesized barriers including workflow disruption, technological limitations and limited program awareness. This study aims to characterize providers' experiences and perceptions of Tele-PICU and identify modifiable barriers and facilitators to its integration into pediatric emergency care.

Methods: Interview questions were developed using the Consolidated Framework for Implementation Research (CFIR) to identify barriers and facilitators to Tele-PICU implementation and reimplementation. Interviews will explore implementation and training, clinical indications for use, workflow integration, communication, transfer decision-making, provider confidence, barriers to utilization, technical support and opportunities for improvement. Consented interviews will be audio recorded, transcribed, de-identified, and thematically analyzed to identify common patterns across participant groups.

Results: Data collection and qualitative analysis are ongoing and will yield characterization of reported experiences with Tele-PICU across user groups. Identified needs and recurring barriers will inform opportunities to improve the program, guide the development of user centered infographics, enhance consultation and troubleshooting resources, and identify future training opportunities.

Conclusion: Understanding the perspectives of referring and consulting clinicians, nurses, One Call staff, and telehealth leadership may identify modifiable factors contributing to inconsistent Tele-PICU utilization in community EDs. Applying these findings within the CFIR implementation and reimplementation framework will inform targeted educational and workflow resources, including user centered infographics placed directly on Tele-PICU carts. These interventions may improve program accessibility and usability, support more efficient consultation, and strengthen access to pediatric critical care expertise for critically ill children in Maine communities.

Acknowledgement: MaineHealth Institute for Research and the University of New England College of Osteopathic Medicine. This work has been supported by the Peter Morgane Student Research Fellowship.

Work is approved by the MaineHealth IRB and the University of New England IRB#0826-16

31.

Derivation and Validation of a Novel Prehospital Trauma Score: a Retrospective Analysis

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Objectives: Current trauma triage scoring systems utilized in the prehospital setting accurately predict longitudinal mortality in high risk patients. These scoring systems have not been shown to predict patient decompensation prior to hospital arrival. Prehospital clinicians face unique challenges in high risk patient management due to the complex considerations of personnel management and transport destination decisions which require decisive treatment planning. This study proposes a novel, points-based scoring system to better predict prehospital decompensation in the trauma patient population and support prehospital clinician decision making.
Methods: American prehospital patient care data was obtained from the National Emergency Medical Services Information System 2024 dataset. Patients with traumatic injuries (n = 544,149) were selected and assigned into treatment and control groups based on whether they required airway management or resuscitative care during prehospital treatment. K-means undersampling was performed to create a 50% treatment and control sample (n = 5024). Training and testing cohorts were analyzed using regression modeling to create a novel scoring criterion. This score was compared to the Glasgow Coma Score, Age, and Pressure score (GAP), Mechanism, Glasgow Coma Score, Age, and Pressure score (MGAP), and the Triage Revised Trauma Score (T-RTS).

Results: Area under the receiver operating characteristic curve analysis showed an area under the curve of 0.90 (95% CI: 0.88-0.92) in the novel prehospital trauma score compared to 0.86 (95% CI: 0.84-0.88) in GAP, 0.85 (95% CI: 0.83-0.87) in MGAP, and 0.83 (95% CI: 0.81-0.85) in T-RTS. Sensitivity of the novel score was found to be 0.90 (95% CI: 0.88-0.92) at a cut-off below 20, compared to a sensitivity of 0.85 (95% CI: 0.83-0.88) in GAP at a cut-off below 22, 0.85 (95% CI: 0.83-0.88) in MGAP at a cut-off below 23, and 0.68 (95% CI: 0.65-0.72) in T-RTS at a cut-off below 12. Specificity was found to be 0.67 (95% CI: 0.64-0.70) in the prehospital trauma score, 0.54 (95% CI: 0.51-0.58) in GAP, 0.54 (95% CI: 0.51-0.58) in MGAP and 0.97 (95% CI: 0.96-0.98) in T-RTS.

Conclusions: The proposed prehospital trauma score shows a promising improvement in predictive value and reduction of undertriage compared to known benchmarks.

Acknowledgements: This work has been supported by the Carmen Pettapiece Student Research Fellowship (to PK). The methods were determined to be exempt by the University of New Hampshire Institutional Review Board for the Protection of Human Subjects. The UNE IRB was made aware of the determination (UNE IRB #0426-23).

32.

Dysbaric Osteonecrosis in Divers: A Scoping Review of Risk Factors, Disease Burden, and Screening Strategies

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Introduction: Dysbaric osteonecrosis (DON) is a form of avascular necrosis caused by impaired blood supply to bone following hyperbaric exposure and decompression-related injury. Nitrogen bubble formation and associated vascular obstruction may produce ischemic death of bone, particularly within. Although many lesions remain asymptomatic, subchondral disease may progress to pain, articular collapse, degenerative joint disease, and functional impairment. The aim of this study was to evaluate the disease burden, early detection screening strategies, and exposure-related risk factors for DON across high-risk groups: occupational, recreational, and military divers.

Methods: A scoping review was conducted in accordance with PRISMA-ScR guidelines. Using PubMed and Google Scholar, studies evaluating DON in divers and compressed-air workers were selected and analyzed. Eligible studies reported prevalence, diving exposures, risk factors, clinical characteristics, or imaging/screening strategies. Of 41 records screened, 8 met criteria for the final synthesis.

Results: Quantitative prevalence data included 623 divers: 138 military, 334 recreational, 56 dive instructors, and 95 diving fishermen, with 83 DON cases identified. DON prevalence demonstrated: 0–3.1% in military divers, 2.1–2.2% in recreational divers, 25% in dive instructors, 55% in commercial diving fishermen, and 76.9% in artisanal diving fishermen. Risk was most consistently associated with repetitive/cumulative hyperbaric exposure, inadequate or rapid decompression, prior decompression sickness, prolonged diving careers, and greater depth. Dive depth >50 m was reported as significantly associated with DON. Military cohorts demonstrated substantially lower DON prevalence than high-exposure occupational diving populations. Additionally, approximately 29% of DON lesions were reported to be symptomatic, emphasizing the importance of imaging-based detection. MRI was favored for early and asymptomatic lesions because of its high sensitivity, specificity, and lack of ionizing radiation.

Conclusion: DON burden was greatest among divers with repetitive, deep, and poorly controlled hyperbaric exposure, while many lesions remained clinically silent and may not be detected early by radiography. These findings suggest potential benefit of incorporation of MRI-based screening of high-risk divers into surveillance programs to enable earlier detection and potentially reduce progression to symptomatic joint disease.

Acknowledgment: The University of New England College of Osteopathic Medicine

33.

Fibroid Location and Risk Factors: A Retrospective Analysis

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Background: Uterine fibroids are common benign tumors. Demographic and metabolic risk factors have been linked to uterine fibroid development, less is known about their association with location. This study evaluated the association between fibroid location and risk factors of age, body mass index (BMI), race, and insurance status.

Methods: This retrospective cohort study included patients 18 to 50 years old with uterine fibroids at a teaching hospital between January 1, 2023, and December 31, 2025, using ICD-10 codes. Fibroids were classified as submucosal, intramural, subserosal, or unspecified. Associations between fibroid location and age, race, BMI, and insurance status were evaluated using descriptive statistics, chi-square tests, and age-adjusted logistic regression. Odds ratios with 95% confidence intervals were calculated, $p \leq 0.05$ determined significance.

Results: A total of 739 of 848 identified patients were included. The mean age was 40.3 ± 6.5. Submucosal category included 153 (20.7%), intramural 193 (26.1%), subserosal, 68 (9.2%), unspecified, 325 (44.0%), White had 511 (69.1%), Black 115 (15.6%), other races 113 (15.3%), normal weight 178 (24.1%), overweight 242 (32.8%), obese 319 (43.2%), public insurance 352 (47.6%), and private, 387 (52.4%). Fibroid location was not associated with race (p=0.546), BMI (p=0.409), or insurance (p=0.700); age-adjusted likelihood ratio was $\chi^2(18)=15.60$, p=0.62.

Conclusion: After adjustment for age, fibroid location was not independently associated with race, BMI, or insurance status. These risk factors may have limited utility in predicting fibroid location.

34.

An Exploration of Incorporating Disability Frameworks into Health Professions Education

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Introduction: One in four U.S. adults live with a disability. However, disability care content in health professions education (HPE) is inconsistent. Identifying this gap, the University of New England (UNE) Center to Advance Interprofessional Education and Practice (CAIEP) and the Maine Leadership Education in Neurodevelopmental and Related Disabilities (LEND) program developed four interprofessional (IP) Knowledge Exchange (KE) events on disability, accessibility, cultural bias, neurodevelopmental transitions, and inclusive care.

Methods: This retrospective, mixed-methods design used survey data to explore health professions students' knowledge attainment, perceptions, and critiques. Convenience sampling with post-event surveys resulted in a 665-sample size. Quantitative data were analyzed descriptively for student attendance and Interprofessional Education Collaborative Core Competencies. Iterative thematic analysis identified attendees' perceptions.

Results: The events addressed curricular gaps and communication skills in disability care, cultural responsiveness, and implicit stigma. The CAIEP Allies email listserv drove 79.3% of the final event's attendance, with 80.9% of respondents also sharing no prior instruction on neurodevelopmental transitions to adulthood. The *Navigating Cultural Disability Bias* event showed that 42.5% reported feeling "somewhat" biased. 96% of *Crip Tonight* respondents reported positive impact on communication skills. Interaction with individuals with lived experience and IP learning augmented disability care competencies, cultural responsiveness, and reduced internal stigmas. Improvement opportunities include: 1) distributing presentation and follow-up resources; 2) reducing pre-recorded videos to maximize live interactive time; and 3) offering tiered discussion groups for those with baseline subject knowledge.

Conclusion: Disability-informed education is crucial yet lacking in HPE curricula. The KE event series provided a blueprint for addressing curricular gaps in training while ensuring future providers have core competencies. Limitations include diminished external validity and statistical generalizability due to the study's context-specific nature at UNE.

Acknowledgement: UNE, CAIEP, and Maine LEND. This work was supported by the Peter Morgane Student Research Fellowship. The UNE Office of Research Integrity determined that the work is not human subjects research as defined by 45 CFR 46.102 (Project number: 0526-02).

35.

Renal Sensory Afferent Signaling in Chronic Kidney Disease: A Literature Review of the Potential Role of CELF4 in Neuronal Sensitization

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Introduction: Chronic kidney disease (CKD) affects approximately 14% of adults in the US and remains a major cause of morbidity and mortality. Growing evidence suggests that renal dorsal root ganglia neurons (RDNs) regulate renal sympathetic activity and may influence CKD progression. This highlights the need for mechanistic insight and potential therapeutic targets. *CUGBP Elav-like family member 4* (CELF4), an RNA-binding protein that regulates neuronal excitability, may be a molecular target for modulating this pathway in the kidney. This review evaluated renal sensory afferent signaling and the potential relevance of CELF4 in CKD progression.

Methods: A literature review was conducted using PubMed-indexed manuscripts investigating renal sensory afferent signaling in health and disease. Findings were synthesized to develop a novel working hypothesis integrating mediators of RDN excitation and their relevance to CKD progression.

Results: Chronic inflammation and upregulated efferent renal sympathetic nerve activation (ERSNA) are key features of CKD, but the role of renal afferent signaling is less well-characterized. Evidence suggests that renal sensory signaling impacts kidney function; *in vivo*, TRPV1 deletion improves glomerular filtration rate (GFR) and reduces sympatho-excitation in renovascular hypertension, whereas CGRP deletion exacerbates hypertension-associated kidney damage. Nerve Growth Factor (NGF), a neurotrophic factor and mediator of both ERSNA and sensory signaling, is upregulated in CKD patients, suggesting an overall state of heightened excitability. Previous research demonstrated CELF4's function as a tonic negative regulator of sensory-neuron excitability. Thus, loss of CELF4 may lower the threshold for neuronal firing and enhance hypersensitivity to NGF, further contributing to a state of pathogenic RDN sensitization.

Conclusion: We propose: 1) A working hypothesis in which the proximity of RDNs to glomeruli and extensive branching of their sensory fibers position these neurons to directly influence renal signaling and subsequent function; and 2) a working framework for CELF4 as a potential therapeutic target for pathological renal sensory signaling. Further investigation may establish CELF4 as a target for non-surgical modulation of renal sensory pathways in CKD-associated hypertension and renal injury.

Acknowledgement: This work was conducted at the University of New England College of Osteopathic Medicine, under the mentorship of Dr. Lindsey Avery Fitzsimons.

No human subjects were used in this study.

36.

Protein supplementation does not rescue calorie restriction induced bone loss in C57BL/6J female mice

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Introduction: Calorie restriction (CR) up to 30% without malnutrition promotes weight loss, extends lifespan, and improves metabolic health across species. However, 30% CR induces significant bone loss and increases the risk of surgical complications, including delayed healing and implant failure. CR reduces circulating insulin-like growth factor-1 (IGF-1), a key anabolic regulator of bone formation, and decreases cortical bone thickness. Dietary protein intake can increase circulating IGF-1 levels, suggesting that protein supplementation may mitigate CR-induced skeletal decline. We therefore hypothesized that protein supplementation during 30% CR would preserve bone mass by sustaining IGF-1 signaling.

Methods: We subjected eight-week-old female C57BL/6J mice to 30% calorie restriction (CR) relative to ad libitum (AL) intake, with diets containing 20%, 40% or 50% calories derived from protein. Carbohydrate content was adjusted to ensure that diets were isocaloric. Mice were single-housed and weighed weekly. After 4 weeks, body composition was assessed by composition nuclear magnetic resonance (NMR), and bones and sera were collected. Bone microarchitecture was evaluated by micro-computed tomography (mCT) and circulating IGF-1 levels in serum were quantified.

Results: CR significantly reduced body weight, which was attenuated with higher protein intake. However, this attenuation was not due to preserved lean mass but was associated with increased fluid mass. CR significantly reduced circulating IGF-1, with only modest, non-significant increases observed with higher protein intake. mCT analysis showed that CR significantly reduced cortical thickness, which was not rescued by protein supplementation. Bulk RNA sequencing of tibial cortical bone revealed 5,427 differentially expressed genes and 114 enriched pathways under CR, including upregulation of adipogenic programs and enrichment of PPAR signaling and energy metabolism

Conclusion: Together, these findings demonstrate that CR induces cortical thinning and a shift towards adipogenesis in bone. Protein supplementation attenuates weight loss but does not prevent bone loss, indicating that skeletal deterioration during CR is not solely due to reduced body weight. These findings suggest that increasing dietary protein alone, without an anabolic stimulus, is not sufficient to preserve bone during CR.

Acknowledgement: Animal work was approved by MaineHealth Institutional Animal Care and Use Committee (Dr. Rosen's Lab IACUC protocol #2514).

37.

Reframing Death and Dying: Lessons from a 48-Hour Hospice Home Immersion

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Introduction: Preclinical medical education largely focuses on developing the knowledge and skills necessary to diagnose and treat disease, with limited opportunities to engage directly with hospice, death, and end-of-life care prior to clinical rotations. The University of New England College of Osteopathic Medicine's 48-Hour Hospice Home Immersion Project provides students with an experiential opportunity to develop comfort with death and dying, understand end-of-life care, and explore the physician's role beyond curative treatment.

Methods: Using qualitative ethnographic and autobiographical research methods, two second-year medical students participated in a 48-hour immersion at Gosnell Memorial Hospice House, an 18-bed inpatient setting, from January 9-11, 2026. Students worked alongside interprofessional staff providing patient care, family support, and post-mortem care. This study focuses on the experience of one of the students, a 24-year-old female with prior work in nursing homes and assisted living settings. Journal entries collected before, during, and after the immersion documented experiences, observations, and reflections. Data were analyzed using content and thematic analysis, with representative quotes identified.

Results: Analysis identified four major themes: (1) *Reframing Death and Dying*: perceptions shifted from fear and avoidance toward recognizing dying as a natural and meaningful part of life; (2) *Finding Life within Hospice*: encounters with patients, families, and staff revealed joy, comfort, laughter, and meaningful connection alongside loss; (3) *The Power of Presence*: listening, companionship, acts of comfort, and mere presence demonstrated that meaningful care extends beyond medical treatment; (4) *Developing Comfort with Discussions of Death*: observing honest, compassionate end-of-life conversations increased comfort with direct language and highlighted the importance of clear communication in promoting understanding, trust, and informed decision making.

Conclusion: The Hospice Immersion broadened this student's understanding of care when quality of life, rather than cure, is the goal. Meaningful care does not always require changing a patient's health trajectory but can involve accompanying patients along their chosen path with dignity, compassion, and support. This perspective has informed the student's future clinical practice goal, which is to ascertain what matters most to patients and their families at the end of life.

Acknowledgements: Thank you to the patients, families, and staff of Gosnell Memorial Hospice House for their openness, trust, and willingness to share their experiences. Thank you to my Hospice Immersion partner, Suzanne Ellis, whose support and companionship were invaluable throughout this experience. IRB (# 19.05.08-007) exemption was obtained through the University of New England Institutional Review Board.

38.

What Matters Most: Voices from Residents in a Long-Term Care Living Environment

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Introduction: Residents in long-term care settings often experience limited social interaction leading to poor health outcomes and increased comorbidities. While prior research focused on medical care and physical outcomes, studies show that personal connection, autonomy, and emotional well-being significantly affect quality of life for older adults. The aim of this study was to collect and thematically analyze resident narratives associated with Age-Friendly Health Care to ascertain the first “M”, what “Matters most” to individuals living in long-term care.

Methods: This qualitative phenomenological study was conducted at an 81-bed nursing home in Biddeford, ME (St. Andre Healthcare). Residents with good cognition, English proficiency, and agreement to participate were recruited by the nurse manager. The first phase of this study included 8 residents. Each session involved reviewing the informed consent and conducting a ~45-minute interview. Researchers had 4 structured questions with prompts exploring residents’ self-perceptions, life experiences, advice to their younger selves, and what matters most to them. Responses were recorded, verified with residents for accuracy, and analyzed qualitatively. Data were coded into primary themes and subthemes, with representative quotes selected to illustrate key findings.

Results: Resident narratives were coded into four themes: Values, Life Events, Life Advice, and Matters Most. Despite unique life stories, commonalities emerged. ‘Values’ included faith, respect and understanding from staff, and autonomy. ‘Life Events’ reflected varied life trajectories. ‘Life Advice’ emphasized staying true to oneself, pursuing goals and dreams, and resisting societal pressures. ‘Matters Most’ included family and friends, hobbies, finances, and meaningful locations. Understanding each resident’s priorities requires individualized attention and open communication, essential in promoting wellbeing and quality of life. Focusing on what matters most highlights the importance of person-centered care, allowing staff to tailor interventions and activities to individual preferences while supporting autonomy, engagement, and mental and physical health.

Conclusion: Residents in long-term care maintain rich personal identities and distinct values shaped by their own life experiences. Findings provided insights that contribute to the growing emphasis on person-centered care, guiding future programming, and care approaches in these settings.

Acknowledgement: Thank you to St. Andre Healthcare Facility in Biddeford, ME for hosting this project and to the residents who shared their time and experiences. This study was conducted with approval from the University of New England IRB: IRB # 0725-03

39.

Real-World Patient Experience of Valeda Photobiomodulation Therapy in Patients with Dry Age-Related Macular Degeneration

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Introduction: Age-related macular degeneration (AMD) is the leading cause of irreversible blindness in older adults. The FDA approved of Valeda photobiomodulation (PBM) therapy for early to intermediate dry AMD in November 2024 following the LIGHTSITE III trial which demonstrated a 5-letter ETDRS gain in the PMB-treated over sham group. Multiwavelength PBM aims to regenerate retinal pigment epithelium (RPE) mitochondrial function and promote the removal of lipid deposits (drusen). This real-world clinical series evaluates the anatomical and functional outcomes and patient-reported feedback following treatment in our Retina practice.

Methods: A retrospective cohort study was conducted on patients receiving Valeda PBM therapy for dry AMD between October 2025 and June 2026. Each treatment cycle consists of 9 sessions of multiwavelength PBM spread over 3 to 5 weeks. Analysis was performed on 75 eyes that finished at least 1 cycle and with one-month follow-up. Best-Corrected Visual Acuity (BCVA) was converted to LogMAR units and analyzed via paired t-tests. Retinal anatomical architecture and drusen volume were evaluated using optical coherence tomography (OCT). Subjective patient feedback was recorded and categorized into 5 parameters: color perception, contrast sensitivity, reading speed, dark adaptation, and metamorphopsia.

Results: There was a statistically significant though not clinically meaningful BCVA improvement (0.260 LogMAR, or 20/36 Snellen to 0.243 LogMAR, or 20/35 Snellen; $p=0.0083$). In contrast, subjective feedback revealed improvement applicable to real-world living: color perception (35%), contrast sensitivity (16%), dark adaptation (13%), reading speed (9%), and metamorphopsia (5%). Only 1 patient complained of worse metamorphopsia following PBM but there was no discernible anatomical change on fundus exam or OCT.

Conclusion: Valeda PBM therapy in patients with early-to-intermediate dry AMD produced a small BCVA improvement but significant functional improvements across several subjective parameters. There was no significant adverse event.

Acknowledgement: This work was supported by the Kahn Family Foundation Student Research Fellowship.

IRB approval received.

40.

Effectiveness of Artificial Intelligence in Improving the Diagnostic Accuracy and Clinical Outcomes in Patients with Melasma

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Introduction: Artificial intelligence (AI) has advanced in dermatology, especially for image-based diagnosis. Despite its prevalence, the diagnosis of melasma is limited. Current subjective scoring systems such as the Melasma Area and Severity Index (MASI) have been developed based on less melanated skin tones classified as Fitzpatrick Skin types I-III, despite melasma being most common and presenting differently in Fitzpatrick skin types IV-VI, which are more melanated skin tones. This systematic review evaluates the effectiveness of current AI-based models for diagnosing and managing treatment of melasma, with attention to its accuracy across all skin types and comparison to clinician diagnosis.

Methods: The selected studies for the review developed AI machine learning and deep learning models created for melasma diagnosis using either clinical photographs, dermoscopy images, VISIA which is images skin under light wavelengths, or optical coherence tomography which images skin microstructures. AI models were compared to clinician diagnosis, MASI scoring, and Wood's lamp, which is a UV blacklight that classifies depth of melasma pigment in skin. The primary outcomes were diagnostic accuracy, and secondary outcomes were the models' ability to accurately grade the severity, classify skin-segmentation, and monitor treatment outcomes in comparison to clinical decisions. QUADAS-2 and PROBAST are separate analytic systems that were used to assess risk of bias and applicability of primary diagnostic accuracy in the current melasma diagnostic and treatment models.

Results: Although current evidence suggests that most AI models for melasma can achieve high diagnostic performance of up to 97%, QUADAS-2 and PROBAST results suggest a significant overestimation of results. Many of the studies relied on curated datasets, provided limited detail on diagnostic verification, lacked external validation, and had data sets that do not include any or a significant amount of patients with Fitzpatrick skin types IV-VI, leading to some concern of high risk of bias.

Conclusion: AI-based models for melasma diagnosis, severity assessment, and treatment monitoring appear promising; however, current evidence remains limited and has uncertain generalizability to all patient populations. Demographically representative and externally validated studies will be needed before AI models can be considered clinically reliable for equitable melasma diagnosis and treatment.

41.

TNAP Deficiency Is Associated with Altered Thermogenic Gene Expression in Brown Adipose Tissue of Alpl Null Mice

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Introduction: Tissue-nonspecific alkaline phosphatase (TNAP), encoded by *ALPL*, promotes skeletal mineralization. Its loss of function causes hypophosphatasia (HPP), a spectrum of mineralization defects ranging from perinatal skeletal failure to adult-onset muscle weakness and chronic fatigue. Beyond its role in skeletal mineralization, mitochondrial TNAP drives the futile creatine cycle (FCC), a UCP1-independent thermogenic pathway in brown adipose tissue (BAT). Whether TNAP deficiency alters this pathway has not been examined. Here, we investigated thermogenic gene expression in brown adipose tissue of *Alpl-/-* mice, which recapitulate the severe, perinatal form of HPP and survive only to postnatal day 21.

Methods: Brown adipose tissue was harvested from PN D9 male and female *Alpl-/-* and +/+ pups. RNA was extracted, reverse transcribed, and analyzed by qPCR for a panel of thermogenic and mitochondrial genes: *Ucp1*, *Ckb*, *Pgc1a*, *Prdm16*, *Ppara*, *Gatm*, *Enpp1*, *Mt-Rnr1*, *Tfam*, *Fis1*, *Ebf2*, *Dio2*, *Bmp7*, and *Mff*. Expression was normalized to *Hprt* and compared between genotypes for each sex separately using Welch's t-test (n = 6–7/sex/genotype).

Results: BAT *Dio2* expression was markedly reduced in male *Alpl-/-* pups ($p = 0.0005$), with a similar non-significant trend in females ($p = 0.377$). *Ucp1* expression was significantly lower in male *Alpl-/-* pups than in +/+ controls ($p = 0.0058$); a similar trend was observed in females but did not reach statistical significance ($p = 0.094$). *Ckb* gene expression was significantly reduced in both male ($p = 0.032$) and female ($p = 0.046$) *Alpl-/-* pups. In contrast, *Bmp7* expression was significantly increased in male *Alpl-/-* pups ($p = 0.018$), with no change in females ($p = 0.206$). No significant genotype differences were detected for *Pgc1a*, *Prdm16*, *Ppara*, *Gatm*, *Enpp1*, *Mt-Rnr1*, *Tfam*, *Fis1*, *Ebf2*, or *Mff*.

Conclusion: *Dio2*, *Ucp1*, and *Ckb* gene expression were significantly downregulated in BAT of *Alpl-/-* pups, alongside increased *Bmp7*, while no significant differences were detected for the other thermogenic and mitochondrial genes examined. This contrasts with the UCP1 protein upregulation reported without a corresponding mRNA increase in adipocyte-specific models of TNAP loss, suggesting that global TNAP loss yields a distinct thermogenic gene expression profile. These findings raise the possibility that reduced BAT thermogenic gene expression contributes to reduced energy expenditure phenotypes noted with TNAP deficiency.

Acknowledgement: The University of New England College of Osteopathic Medicine and the Rosen Lab at Maine Health Institute for Research. A special thanks to Clifford Rosen and Victoria DeMambro for their support and guidance on this work. Animal work was approved under IACUC protocol #2209.

42.

Lifestyle factors impacting the progression of Parkinson's disease in a rural population

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Background: Parkinson's disease (PD) is a progressive neurodegenerative disorder influenced by genetic, environmental, and lifestyle factors. Identifying factors associated with earlier diagnosis and greater treatment requirements may help characterize differences in disease presentation and progression.

Methods: We analyzed an existing survey-based cohort of 144 participants with PD who completed a detailed questionnaire containing approximately 600 variables pertaining to demographic, clinical, lifestyle, medication, and environmental exposure. Because the survey included primary questions followed by conditional subquestions, candidate predictors were restricted to primary survey questions with **<**30% missing data. Age at PD diagnosis was evaluated as a continuous outcome using unadjusted and sex-adjusted linear regression. Levodopa dose was categorized as 0, 1–100, 101–200, or ≥201 mg/day and combined with disease duration (<5, 5–10, or >10 years) to create a three-level categorical variable to create a three-level ordered measure of levodopa treatment intensity relative to disease duration, as a measurement of disease progression. Survey-derived predictors were evaluated using sex-adjusted ordinal logistic regression models, with higher outcome categories representing higher levodopa requirements relative to disease duration. Statistical significance was defined as $p<0.05$ without multiple testing corrections due to the exploratory nature of the study.

Results: Among 144 participants, the median age at PD diagnosis was 65 years (IQR [57, 70])**.** In sex-adjusted analyses**,** military service was associated with a later age at diagnosis (aβ=5.30 years, 95% CI [0.85 to 9.76]), while heavy metal testing was associated with an earlier diagnosis (aβ=-5.80 years, 95% CI [-10.59 to -1.00], p=0.0182).

Among 138 patients with complete outcome data, 18 (13.0%), 99 (71.7%), and 21 (15.2%) were classified into progression categories 1, 2, and 3, respectively. Hunting or shooting 2 times a year was associated with greater odds of being in a higher progression category (OR=3.15, 95% CI [1.11–8.96]), indicating greater levodopa requirements earlier in the disease course.

Conclusions: Survey-derived clinical, lifestyle, and exposure factors demonstrated descriptive differences in both age at PD diagnosis and levodopa treatment intensity. Military service demonstrated the strongest association with later age of PD diagnosis, potentially reflecting sociocultural differences in healthcare-seeking behavior and delayed presentation for medical evaluation. Additionally, hunting and shooting may be associated with faster PD progression due to heavy metal exposure in repeatedly handling ammunition. These findings highlight potential factors contributing to heterogeneity in PD presentation and treatment requirements and warrant further evaluation in larger cohorts.

43.

Characterization of Genes Differentially Expressed in Parkinson's Disease Monocytes

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Introduction: Parkinson's Disease (PD) is a progressive, age-related neurodegenerative disorder characterized by motor and non-motor symptoms. Increasing evidence implicates peripheral immune dysregulation in PD pathogenesis, highlighting circulating immune cells as a source of disease-relevant pathology, biomarkers and therapeutic targets. This work expands on previously generated single-cell RNA sequencing data profiling peripheral blood mononuclear cells (PBMCs) from PD patients and healthy controls to characterize genes differentially expressed in PD peripheral monocytes.

Methods: Analysis of single-cell RNA sequencing data from CD14+ and CD16+ monocyte populations identified gene expression changes in PD including CD52, SERF2, and GABARAP, all of which were significantly downregulated in PD patients. We cultured THP-1 monocytes and challenged six groups with different concentrations of rotenone, a mitochondrial complex I inhibitor associated with PD, induction of oxidative stress, and monocyte activation. We then isolated RNA, converted this to cDNA, and utilized uniquely designed primers, two for each gene of interest and three housekeeping primers, ß-Actin, EIF2α, and GAPDH, to conduct qRT-PCR and gel electrophoresis studies to identify changes in the genes.

Results: After treatment with rotenone, we observed decreases in cell viability in the THP-1 cells treated with increasing concentrations of rotenone. THP-1 cells treated with 1000nm concentration demonstrated 74% viability while those treated with 62.5nm concentration showed a 78% viability. RNA extraction was within optimal parameters, with an average A260/A280 of 2.08. GABARAP primers amplified earlier than primers for SERF2 and CD52 on qRT-PCR, with cq values of 26.33 (GABARAP A) and 26.46 (GABARAP B).

Conclusion: THP-1 cells appear to be a reasonable in vitro model to study the biology of CD52, SERF2, and GABARAP. GABARAP is of particular interest based on current literature, involvement in the CASM-STING pathway leading to LRRK2 activation, mutations of which are commonly influencing factors of PD. GABARAP is downregulated in PBMCs of PD patients and our preliminary results suggest that its expression may be influenced by oxidative stress. Future experiments are focused on verifying alterations in protein levels, GABARAP inactivation's impact on cellular viability, oxidative stress, and inflammatory activity in varying concentrations of rotenone treated THP-1 cells.

Acknowledgements: The University of New England College of Osteopathic Medicine. This work has been supported by the Parkinson's Foundation Summer Student Fellowship (GM).

IRB: No human subjects were used in this study.

44.

Long-Term Outcomes of Periacetabular Osteotomy in a United States Cohort

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Introduction: Periacetabular osteotomy (PAO) is a common hip-preserving procedure used to treat symptomatic acetabular dysplasia of the hip. Evidence regarding long-term outcomes after PAO is limited and may be important for both patients and surgeons to facilitate effective therapeutic decision-making. The purposes of this study were: (1) to determine the likelihood of long-term hip preservation and the level of pain at a minimum of 25 years of follow-up after PAO; (2) to identify clinical and radiographic factors associated with poor results, defined as either conversion to total hip arthroplasty (THA) or a WOMAC pain score of ≥10 points at the most-recent survey; and (3) to compare outcome scores of patients who underwent THA after PAO to those with preserved hips and to age-related norms.

Methods: We retrospectively evaluated the cohort of the first 142 patients (171 hips) who underwent PAO performed by one surgeon to treat symptomatic dysplasia between 1991 and 1998. Seventy-seven percent of eligible patients returned complete questionnaires at a median of 27 years after PAO. The cohort included 87% females and 13% males, with a median age at surgery of 25 years. Kaplan-Meier analysis was used to assess survivorship free from conversion to THA. Hips were evaluated postoperatively using the pain subscale of the WOMAC index.

Results: Of the 134 hips analyzed, 60% remained preserved while 40% underwent THA at average of 18 years after PAO. The survivorship free from conversion to THA at 25 years after PAO was 70%. Preoperative joint space width <2mm, labral tear noted intraoperatively, and age at surgery >35 years were significantly associated with increased odds of poor outcome. Preserved hips demonstrated a median WOMAC pain score of 1 (range 0-20). Outcome scores did not differ by clinically important margins when compared between preserved and converted hips or to age-related normative data.

Conclusion: While a majority of hips can be preserved with good function at mean 27 years after PAO, findings suggest that surgery should be considered as soon as symptomatic dysplasia is diagnosed, given that older age at surgery was independently associated with later THA or WOMAC pain score ≥10. If a patient develops painful arthrosis following PAO, THA should be offered and expected to provide function comparable to age-related norms. Prospective registry-based multicenter studies of patients treated for symptomatic hip dysplasia are indicated to improve outcomes.

Acknowledgement: Boston Children's Hospital, Department of Orthopaedic Surgery.

IRB: This study was approved by the Institutional Review Board of Boston Children's Hospital (Protocol #IRB-P00041965).

45.

A Case Report of Abdominal Wall Metastasis of Endometrial Cancer

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Introduction: Endometrial cancer recurs in approximately 10–20% of patients, with most recurrences occurring within two to three years of hysterectomy and involving locoregional or distant sites. Abdominal wall involvement is rare and may result from true metastatic dissemination or iatrogenic tumor implantation. Distinguishing between these mechanisms can be challenging. We present a case of an isolated abdominal wall lesion arising approximately three years after surgical treatment of endometrial adenocarcinoma and examine the clinical, operative, radiologic, and pathologic findings that may inform its etiology.

Case: A 48-year-old G0P0 postmenopausal woman with a history of endometrial hyperplasia without atypia presented in 2022 with three months of daily heavy vaginal bleeding. CT demonstrated a 7 x 7.5 x 6.5 cm multilocular cystic and solid right adnexal mass with abnormal endometrial thickening and heterogeneity. Serum CA-125 was elevated at 61 U/mL. She underwent robotic-assisted total laparoscopic hysterectomy with bilateral salpingo-oophorectomy and omentectomy, with transvaginal extraction of the intact uterine specimen. Pathology demonstrated endometrioid endometrial adenocarcinoma, FIGO grade 2, arising in the uterus and metastatic to the right ovary and fallopian tube, FIGO stage IIIA. Immunohistochemical stains were positive for CK7, PAX8, and ER, while negative for CK20. In 2024, she developed progressive lower abdominal pain with approximately 6-lb unintentional weight loss. A repeat CA-125 level was 4.0 U/mL. CT findings were suggestive of diverticulitis, and a subsequent colonoscopy was negative. Persistent symptoms prompted repeat imaging in 2025, which revealed a 2.2 x 2.5 x 1.9 cm mass involving the left rectus abdominis without compromising the anterior or posterior rectus sheath. Excisional biopsy of the mass revealed an endometrioid-type adenocarcinoma with the same immunohistochemical staining as previously reported.

Discussion: Given that the lesion was confined to the rectus abdominis, had direct correspondence with a trocar site, and had immunohistochemical stains consistent with the original tumor, these findings are highly suggestive of a port-site metastasis. However, true metastatic recurrence or other routes of tumor dissemination cannot be excluded. Although the mechanism remains uncertain, this case highlights the importance of considering recurrent malignancy when an abdominal wall mass develops at a prior port site.

Acknowledgments: We would like to acknowledge our gratitude to the patient, University of New England College of Osteopathic Medicine, Maine General Medical Center, and the Maine-Dartmouth Family Medicine Residency, without which, this study could not have been possible. Case Study Registration approval for this project was granted by the University of New England IRB (IRB # 0926-08).

46.

Longitudinal Imaging in Bipolar Disorder

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Introduction: Identifying neural circuits associated with pathological mood states is crucial for advancing psychiatric neuroimaging and developing targeted therapeutic interventions. Our previous work (Nye et al., SOBP 2024) demonstrated significant differences in orbitofrontal cortex (OFC) circuit connectivity between bipolar mania and euthymia. This study expands on those findings by including bipolar depression to determine whether OFC circuit connectivity follows a continuum across mood states or is specific to mania.

Methods: Participants with Bipolar Disorder Type I were recruited from inpatient and outpatient units, and resting-state fMRI data were analyzed from scans collected in manic (n=37), depressed (n=38), and euthymic (n=32) states. Functional connectivity between the ventral striatum and OFC was examined across all three mood states.

Results: Connectivity differed significantly across mood states ($F = 10.35$, $p < 0.0001$). Connectivity in Bipolar mania was significantly higher compared to both euthymia ($p = 0.00087$) and depression ($p = 0.00026$), while no significant difference was found in the connectivity between euthymia and depression ($p = 0.986$) mood states.

Conclusion: These findings suggest that increased right OFC circuit connectivity is specific to manic states rather than representing a continuum across mood states. This builds upon previous work demonstrating that rTMS-induced antidepressant response engages OFC circuitry (Beermann et al., SOBP 2024). The specificity of OFC hyperconnectivity to mania provides new insights into the neural mechanisms of bipolar disorder and may inform the development of state-specific therapeutic interventions targeting OFC circuits.

UNE IRB #0526-18 Longitudinal Imaging in Bipolar Disorder (McLean Hospital Human Research Protection Program)

47.

Favorable Clinical Outcomes with Incretin Receptor Agonists in Hidradenitis Suppurativa

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Background: Obesity is strongly associated with hidradenitis suppurativa (HS) severity, and incretin receptor agonists (IRAs), including GLP-1 receptor agonists and dual GIP/GLP-1 receptor agonists, promote weight loss while exerting anti-inflammatory effects through suppression of TNF-α, NF-κB, and IL-17 pathways independently of weight reduction. Despite growing interest, clinical evidence supporting IRA use in HS remains limited to observational data, with no randomized controlled trials to date.

Objective: To evaluate clinician-assessed and patient-reported outcomes among patients with HS treated with IRAs at a single academic center.

Methods: This retrospective case series included 21 adult patients with HS who received IRA therapy at the University of Vermont Medical Center. Demographics, disease characteristics, IRA treatment details, concomitant HS therapies, weight changes, clinician-assessed disease activity (improvement, no change, or worsening), and patient-reported outcomes (PROs) including flare frequency and pain were collected from clinical records.

Results: The cohort was predominantly female (95%) with a mean age of 39.3 years and mean pre-treatment BMI of 44.2kg/m2. Hurley stage distribution was stage I (29%), stage II (57%), and stage III (14%). Tirzepatide was used by 91% of patients. Mean IRA treatment duration was 17.7 months, with a mean weight change of -16.7 kg (-14.7%). Clinician-assessed improvement occurred in 18/20 evaluable patients (90%). All 19 patients providing PROs reported reduced flare frequency, and 79% reported reduced pain. Most patients (86%) received concomitant HS therapies, including biologics (72%). Two patients without concomitant therapy also improved.

Discussion: These findings suggest IRAs may serve as effective adjunctive therapy for HS, particularly in patients with obesity. The high improvement rate, favorable PROs, and safe co-administration with biologics support further investigation through prospective, randomized controlled trials with standardized endpoints and diverse populations.

48.

Beyond Administrative Databases: A Multi-Source Search of Patch Testing Availability in Rural Northern New England

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Background: Patch testing is the gold standard for diagnosing allergic contact dermatitis, yet its geographic availability is poorly characterized. Prior work using Medicare billing data suggests testing is concentrated in metropolitan areas, with roughly 1% of providers in rural counties (Cheraghlou et al., Journal of the American Academy of Dermatology, 2021). Vermont, New Hampshire, and Maine are among the most rural US states, raising concern for limited and difficult-to-locate access.

Objective: To identify and characterize patch testing availability across Vermont, New Hampshire, and Maine using a systematic multi-source search, and to compare provider ascertainment across data sources.

Methods: Adapting the systematic online search methodology of Cartwright et al. (Journal of Medical Internet Research, 2018), practices were identified through three sources: (1) the American Contact Dermatitis Society (ACDS) "Find a Provider" directory; (2) the CMS Medicare database (CPT 95044, 2016-2024); and (3) the NPPES National Provider Identifier (NPI) registry, filtered by dermatology and allergy specialties, with patch testing status verified by direct telephone contact and practice-website review. Practices were cross-referenced, deduplicated, and mapped.

Results: The ACDS directory and the Medicare database each identified fewer than 10 practices. In contrast, the verified NPI-based search—still ongoing—has already identified substantially more practices confirmed to offer patch testing across the three states, including major referral centers in Vermont (e.g., an academic medical center and a multispecialty group) that were absent from both administrative databases. Confirmed sites remain concentrated in southern and urbanized areas, but verification has also revealed availability in several northern and rural communities not captured by database methods. Ascertainment frequently required multiple telephone calls, and some practices listed testing only on their websites. Verification is continuing, and final counts are pending.

Conclusions: Administrative databases substantially underestimate patch testing availability in rural northern New England, and no single source captures the true provider landscape. Although access is broader than billing data suggest, it is difficult to ascertain and unevenly distributed, posing a real barrier for patients and referring clinicians. A multi-source search with direct verification is essential to accurately map access to specialized dermatologic services.

49.

Emerging Musculoskeletal Considerations of GLP-1 Receptor Agonists and GIP/GLP-1 Dual Agonists: A Scoping Review

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Introduction: GLP-1 receptor agonists (GLP-1 RAs) and GIP/GLP-1 agonists have surged in use for obesity and type 2 diabetes. While providing cardiometabolic benefits, their effects on musculoskeletal (MSK) health during rapid weight loss remain incompletely characterized. The aim of this scoping review was to evaluate MSK outcomes, including potential benefits and harms, in adults receiving these agents.

Methods: A scoping review was conducted per PRISMA-ScR guidelines. A PubMed search using "GLP-1 agonist and orthopedics" yielded 341 results. Filters (English, human, 5 years) narrowed this to 62. Screening, supplemented by Google Scholar and CENTRAL, was executed with strict criteria. Inclusion required studies of adult populations (≥18 years with obesity, type 2 diabetes, or orthopedic trauma) on GLP-1/dual agonists reporting on bone mineral density (BMD), bone turnover (CTX/P1NP), tendon integrity, or nonunion. Exclusions eliminated non-MSK safety profiles, case reports, and editorials, yielding 8 final sources.

Results: In patients with obesity, large-scale data indicated GLP-1 RA use is associated with an increased 5-year hazard ratio (HR) for major tendon ruptures, specifically the rotator cuff (HR 1.48, $p < 0.0001$), Achilles (HR 1.403, $p = 0.004$), and pectoralis major (HR 1.34, $p = 0.0002$). Concurrently, rapid weight loss triggered bone remodeling favoring resorption, evidenced by a 54.8% greater increase in CTX versus placebo, leading to ~2.1–2.6% BMD reductions at the spine and hip. High-resolution imaging identified tibial cortical thinning (1.8%) often masked by stable trabecular measurements on DXA. In orthopedic trauma, perioperative use was linked to a statistically significant increase in 1-year nonunion rates (6.1% vs. 4.8%; RR 1.3) following fracture fixation, though users experience a 50% reduction in all-cause mortality.

Conclusions: GLP-1 and dual agonists demonstrate cardiometabolic benefits that may be accompanied by musculoskeletal adaptations requiring monitoring, particularly in older adults or those with baseline frailty. These findings necessitate heightened clinical vigilance, perioperative risk stratification, and implementation of resistance training and high-impact loading as recommended adjunctive therapies to preserve skeletal integrity during active weight loss.

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50.

HELP-ED: A Literature Review on the Feasibility of Implementing Delirium Prevention Programs in the Emergency Department

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Introduction: The emergency department (ED) is a stressful, stimulating environment that poses risks for delirium, an acute impairment in cognitive function and overall functional decline. ED risk factors include excessive light, noise, and alarms.[1] Patients discharged from the ED with unrecognized delirium are nearly 3 times more likely to die within 3 months than those whose delirium is recognized.[2] ED-recognized delirium also persists into hospitalization in 77% of cases, leading to further decline in function and cognition.[3] Early identification of and intervention for at-risk ED patients is therefore essential.

The Hospital Elder Life Program (HELP), created in 1993, addresses delirium risk factors through orientation and therapeutic activities, sleep enhancement, feeding assistance, vision/hearing augmentation, and management of polypharmacy/pain,[4] lowering fall risk and reducing length of stay.[5] As at most HELP sites, HELP at MaineHealth Maine Medical Center Portland currently serves patients 70 and older admitted to inpatient floors, but we recognize its potential benefit for older adults boarding in the ED. Given the ED's logistical complexity, a review of the need, challenges, and successes of expanding delirium prevention into the ED is warranted.

Methods: A PubMed literature search for studies published 1999-2026 on Modified HELP and ED delirium prevention initiatives yielded 12 relevant studies.

Results: Findings indicate caregiver training, educational materials, and delirium prevention carts can address gaps in volunteer availability; carts should be readily available to nursing staff to support at-risk patients when volunteers are absent. When available, volunteers should be experienced (ideally >104 hours) and given added ED-specific training.[6] They would work with ED nurses to confirm safety, violence, and dietary restrictions. Evidence-based activities successfully completed in the ED included patient orientation, transfer to chair, exercises, and provision of hearing/vision devices.[6]

Conclusion: Expanding HELP into the ED would enable more regular screening and interaction with at-risk patients, supporting compliance with the American College of Emergency Physicians ADEPT framework for managing delirium and agitation.[7] Identifying at-risk patients earlier, rather than after admission, would also increase access to evidence-based HELP interventions, improving safety and reducing costs.

Acknowledgement: The University of New England College of Osteopathic Medicine, the Department of Geriatric Medicine at Maine Medical Center, and the Hospital Elder Life Program at Maine Medical Center.

*No human subjects were used for this study.

51.

Genetic Loss of Adipsin Protects Against Bone Loss Induced by Metabolic and Hormonal Challenges

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Introduction: Bone loss is associated with metabolic and hormonal stressors, including weight loss, obesity, menopause, and glucocorticoid treatment, yet the mechanisms linking these conditions to skeletal deterioration remain incompletely understood. Bone marrow adipose tissue (BMAT) has emerged as a potential regulator of bone remodeling under metabolic stress. We previously showed that global deletion of adipsin/complement factor D (Cfd) attenuated bone loss and BMAT expansion induced by calorie restriction (CR) and high-fat diet (HFD).

Methods: Here, we investigated the marrow-specific role of adipsin by generating Prx1-Cre;Cfd flox/flox mice (pKO), which delete adipsin in Prx1-lineage mesenchymal cells while preserving circulating adipsin and peripheral white adipose expression. At 8 weeks of age, male and female Cfd flox/flox controls (WT) and pKO mice were subjected to 30% CR for 8 weeks or fed a 10% low-fat diet (LFD) or 60% HFD for 16 weeks. Additional cohorts were challenged with ovariectomy (OVX) or glucocorticoid treatment. To assess BMAT formation and cellular origin, we generated Prx1-Cre;Cfd flox/flox;tdTomato+ mice and exposed them to CR or HFD.

Results: Micro-CT showed that CR and HFD both impaired skeletal parameters despite opposite effects on body weight. Under CR, WT males and females showed reduced cortical bone volume fraction (Ct.Ar/Tt.Ar), whereas pKO mice had greater tibial length, Ct.Ar/Tt.Ar, and cortical thickness in both sexes. Under HFD, WT mice exhibited reduced trabecular bone volume fraction (BV/TV) and trabecular number (Tb.N), with increased trabecular separation

(Tb.Sp); these HFD-induced trabecular defects were attenuated in pKO mice. pKO mice were also protected from OVX- and glucocorticoid-induced bone loss. FABP4 immunostaining confirmed increased marrow adipocyte accumulation after CR and HFD, and all FABP4+ adipocytes were tdTomato+, indicating origin from Prx1-lineage mesenchymal cells. Compared with Prx1-Cre;tdTomato+ controls, Prx1-Cre;Cfd flox/flox;tdTomato+ mice had fewer tdTomato+/FABP4+ adipocytes and reduced BMAT accumulation after both challenges.

Conclusion: Together, these findings demonstrate that Prx1-lineage deletion of adipsin protects against bone loss induced by CR, HFD, OVX, and glucocorticoid treatment while suppressing BMAT expansion. These data suggest that marrow-derived adipsin contributes to skeletal deterioration during metabolic, hormonal, and pharmacologic stress and may represent a therapeutic target for preserving bone mass.

IACUC # 2514

No human subjects were used in this study.

52.

Loss of CELF4 in Sensory Neurons Leads to Glomerular Injury in Mice

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Introduction: CELF4 is an RNA-binding protein that regulates protein production in sensory neurons. Prior studies showed that *Celf4* loss increases sensory-neuron excitability and pain sensitivity. Kidney sensory nerves express the neuropeptide calcitonin gene-related peptide (CGRP) and the ion channel transient receptor potential vanilloid 1 (TRPV1) and contribute to the reno-renal reflex, a feedback pathway regulating kidney function. Excessive renal nerve activity may promote hypertension and kidney injury. Renal denervation has been studied as a treatment, but it disrupts multiple types of renal nerves and lacks cell-type specificity. This highlights the need for targeted approaches. Thus, we investigated whether *Celf4* loss from CGRP-expressing sensory neurons produces urinary and glomerular abnormalities.

Methods: We used tamoxifen-inducible Calca-CreER mice to delete *Celf4* from adult CGRP-expressing sensory neurons. Knockout (KO) and control mice were evaluated 10 days after tamoxifen injection. Kidneys were assessed grossly and by H&E, PAS, and PAS-silver histology. T11-L1 dorsal root ganglia (DRG) and kidneys were examined by immunofluorescence for CELF4, CGRP, and TRPV1. Urinary albumin and blood/heme were measured by semiquantitative urinalysis. Nephrin immunofluorescence was normalized to glomerular area to assess podocyte slit-diaphragm integrity.

Results: *Celf4* KO mice showed hydronephrosis, mesangial expansion, increased extracellular matrix, mesangial hypercellularity, glomerular sclerosis, 2-3+ proteinuria, and increased urinary blood/heme. These findings were consistent with a membranoproliferative glomerulonephritis-like pattern. Nephrin fluorescence per glomerular area was significantly lower in KO than control mice ($n=8$/group; $p<0.001$), with reductions in males and females analyzed separately ($n=4$/genotype/sex; $p<0.05$ each). This supports impaired nephrin expression or organization at the podocyte slit diaphragm.

Conclusion: CELF4 loss in CGRP-expressing sensory neurons was associated with urinary abnormalities and glomerular injury. We propose that CELF4 loss increases kidney-innervating DRG afferent activity, sensitizing the reno-renal reflex and promoting kidney injury. Ongoing experiments are testing whether increasing CELF4 activity can reduce reno-renal hyperreflexia and protect kidneys from injury. If successful, this approach may provide a more targeted alternative to renal denervation.

Acknowledgement: This research was conducted at the University of New England College of Osteopathic Medicine. This work was supported in part by the NIH National Institute of General Medical Sciences COBRE grant P20GM103642 supporting the UNE Behavior Core (P.I. Ian Meng) as well as NIGMS UNE COBRE #P30GM145497 (P.I. Ian Meng) *Center for Pain Research* PILOT Recipient, Grant #23107B. Animal work was approved by the University of New England Institutional Animal Care and Use Committee (Protocol #051724-008).

No human subjects were used in this study.

53.

Ceiling and Floor Effects Limit Five Preoperative Frailty and Comorbidity Instruments in Radical Cystectomy

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Introduction: Radical cystectomy (RC) carries 90-day complication rates of 50-70% in an older, comorbid population, making preoperative frailty assessment central to counseling and prehabilitation. Five instruments are used interchangeably despite measuring different constructs: the Charlson Comorbidity Index (CCI), ASA class, ECOG performance status, the modified Frailty Index-11 (mFI-11), and the Clinical Frailty Scale (CFS). Prior studies evaluated them in isolation. We compared all five head-to-head under identical outcome definitions and asked whether case-mix constrains the distributions they produce.

Methods: Retrospective cohort of 376 consecutive patients undergoing RC at a single tertiary center, January 2015 to January 2026. Instruments were scored from preoperative documentation and dichotomized at conventional thresholds. Primary outcome was any complication (Clavien-Dindo I-V) within 90 days; major complication (III-V) was secondary. Multivariable regression adjusted for age, sex, body mass index, neoadjuvant therapy, surgical approach, and diversion type; discrimination was assessed by area under the curve (AUC) with DeLong comparison.

Results: Median age 70 years; 60.6% received neoadjuvant therapy, 44.1% robotic RC. Any complication occurred in 74.2%, major in 21.3%. High-risk prevalence varied: CCI (98.9%) and ASA (84.0%) sat at the ceiling, ECOG (6.1%) at the floor, leaving only CFS (20.5%) and mFI-11 (20.2%) with usable distributions. CFS was the only instrument associated with major complications on univariate analysis (OR 1.81, 95% CI 1.01-3.16, p=0.041); none predicted either outcome independently. Robotic approach was the strongest predictor (51-53% lower odds of any complication; OR 0.47-0.49, p≤0.005). Adjusted discrimination was nearly identical across instruments (AUC 0.647-0.655; all DeLong p>0.50).

Conclusion: Five instruments performed equivalently, and that equivalence reflected measurement failure rather than interchangeable signal. CCI, ASA, and ECOG collapsed toward near-constants, so the tools already in the chart were the least able to separate patients; only the purpose-built measures, CFS and mFI-11, retained usable spread, and only CFS showed any association with morbidity. Robotic approach outperformed every instrument, though it was not randomized and remains hypothesis-generating. Frailty screening in RC requires instruments chosen for distributional spread, administered prospectively.

Acknowledgement: This work was conducted at Maine Medical Center, Department of Urology, Portland, Maine, in collaboration with the University of New England College of Osteopathic Medicine, Biddeford, Maine. This work was supported by the Carmen Pettapiece Student Research Fellowship (to EP).This study was approved by the MaineHealth Institutional Review Board (protocol 1728828-2). Approval letter submitted with this abstract.

54.

Narrative Competence: Learning by Listening During a 48-Hour Hospice Home Immersion

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Background: Before two male students conducted the UNECOM 48 Hour Hospice Immersion project, the term narrative competence was not in their lexicon. Narrative competence is an essential skill to acknowledge, interpret, and act on the stories and plights of others. Dr. Charon states: “narrative medicine [competence] offers fresh opportunities for respectful, empathic, and nourishing medical care…physicians can reach and join their patients…, recognize their own personal journeys through medicine, acknowledge kinship with and duties toward other health care professionals, and inaugurate consequential discourse with the public about health care”. This coming together with each patient and family requires the physician to listen with both heart and mind, focused on the person rather than the illness.

Narrative: The Gosnell Hospice Home was quiet 18 hours into our immersion. LR entered Gosnell, we were the first he encountered. He was emotional returning to Gosnell where his wife died one-year ago. Our fear doing this immersion was not knowing what to say. Medical training taught us to approach problems with a recipe-like mentality: gather information, form a differential, develop a plan, cure the patient. LR challenged that: no test to order or intervention to offer, he was experiencing loss and grief that we didn’t know how to cure. We brought LR outside to sit in the Remembrance Garden. We listened as he spoke about his wife. His voice was steady, his pauses long and thoughtful. We became aware that we had little to offer beyond our attention. LR told stories and shared small memories that held a deep importance for him; he would smile and laugh, then grow quiet; the urge to fill the silence and offer reassurance gnawed at us. As we couldn’t change the reality, we listened and shared in his emotions. It became less about finding the right response and more about supporting his feelings of loss, which turned out to be healing for us all.

Conclusion: As literary critic R.W.B. Lewis wrote, "Narrative deals with experiences, not with propositions." Medical students are trained to approach problems systematically, yet listening is not simply a diagnostic skill; it is a human one to augment understanding and validate suffering, preserve dignity, and allow one to be human rather than a diagnosis. We did this immersion believing care needed answers; we left understanding that being present and listening is healing for the person and by being present; for us as well.

55.

Patterns of Hospital Closure and Service Loss Following Private Equity Acquisition in U.S. Acute Care Hospitals

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Introduction: Private equity (PE) investment in U.S. hospitals has grown rapidly over the past two decades. PE firms acquire healthcare organizations to generate investor returns, often by restructuring finances, selling assets such as real estate or equipment, and reducing less profitable services before eventual resale. Concerns have emerged regarding its impact on patient access to care, particularly in vulnerable communities. This study examined patterns of hospital closure and service loss following PE acquisition and whether ownership is concentrated among a limited number of systems.

Methods: A retrospective descriptive analysis was conducted on 20 U.S. acute care hospitals acquired by PE firms or PE-backed systems between 2004 and 2021. Hospitals were selected based on documented acquisition and reliable public data, including acquisition records, bankruptcy filings, and regulatory documents. Variables included hospital location, Medicaid expansion status, community median income, duration of ownership, and availability of key clinical services before and after acquisition. Primary outcomes included hospital closure or loss of emergency care, obstetrics, behavioral health, pediatrics, and surgical services.

Results: Of 20 hospitals analyzed, 15 (75%) closed entirely, while 5 (25%) remained open but experienced substantial service reductions. Most served vulnerable populations, with 65% located in communities below the national median income and 70% in Medicaid expansion states. Time from acquisition to closure or service loss ranged from 2 to 9 years. Service loss included losses from hospital closures and service discontinuation at hospitals that remained operational. Obstetric services were lost in 60% of cases, behavioral health in 55%, emergency services in 40%, and pediatric services in 35%. Ownership was concentrated among a small number of recurring PE-backed systems.

Conclusion: In this sample, PE acquisition was frequently associated with hospital closure or significant reductions in essential services, raising concerns about access to care in lower-income communities. These findings demonstrate association rather than causation. Larger national studies are needed to further characterize these trends and inform policy discussions surrounding healthcare ownership and access.

56.

Intimate Partner Violence and Neuroimaging Markers of Brain Aging: A UK Biobank Analysis

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Introduction: Intimate partner violence (IPV) may adversely affect long-term brain aging through chronic stress, cardiovascular disease, and traumatic brain injury, but associations with neuroimaging markers of cerebrovascular injury and neurodegeneration are understudied.

Methods: We analyzed data from 36,097 UK Biobank participants aged ≥50 years who completed the 2016/2017 Mental Health Questionnaire and subsequently underwent brain MRI. Lifetime IPV (any vs none) was defined from survey items assessing emotional, physical, and sexual IPV. Outcomes included mean cortical thickness across Alzheimer's disease (AD)-signature regions, total white matter hyperintensity (WMH) volume, and total brain volume; outcomes were z-standardized and volumetric measures were adjusted for intracranial volume (ICV). Linear regression models included IPV as the exposure and sequentially adjusted for (M1) age, quadratic age, and sex; (M2) childhood socioeconomic and trauma exposures; (M3) adult sociodemographic and behavioral factors; and (M4) adult cardiovascular and metabolic health indicators. Effect modification (EMM) by sex was assessed.

Results: Participants were predominantly female (54.4%) and White (97.2%), with a mean baseline age of 65 years (SD=7.4); 27.6% reported lifetime IPV exposure. We found no evidence of associations between IPV and mean cortical thickness across an AD signature region or total brain volume. Adjusting for age and sex, IPV was associated with slightly higher WMH volume (β=0.025, 95% CI: 0.005, 0.045), but this association was attenuated after adjustment for childhood and adulthood factors (β=-0.002, 95% CI: -0.024, 0.020). We found no evidence of EMM by sex.

Conclusions: In a population-based cohort, lifetime IPV was not associated AD-signature cortical thickness or total brain volume. Associations with WMH were near null and attenuated with adjustment for adulthood factors that may lie on the pathway between IPV and brain aging. We found no evidence of EMM by sex. Next steps include normalizing total brain volume and AD signature regions for sex and anthropomorphic variation and examining IPV subtypes (physical, sexual, and emotional).

Acknowledgement: This work is supported by the Boston University School of Public Health Epidemiology department. This project is IRB-exempt under a "Not Human Subjects Research" determination, as it uses secondary, de-identified UK Biobank data that are publicly available.

57.

Refractory Trigeminal Neuralgia with Persistent Neuropathic Pain Following Gamma Knife Radiosurgery and Microvascular Decompression

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Introduction: Trigeminal neuralgia (TN) is characterized by severe, electric shock-like or stabbing facial pain in the trigeminal nerve distribution. The trigeminal nerve provides facial sensation and controls the muscles of mastication.TN is commonly associated with irritation or compression of the trigeminal nerve. Management typically involves pharmacologic therapy, with surgical interventions considered in refractory cases. This case highlights the challenges of managing persistent TN despite multiple treatment modalities.

Case: A 48-year-old male with type 1 TN presented with right-sided sharp, stabbing pain in the V1-V3 distributions. Diagnosed at age 44, his pain with triggered by wind exposure, talking, and brushing his teeth, with episodes lasting seconds to one minute. He had no focal neurologic deficits. Due to medication-refractory disease, he underwent microvascular decompression (MVD), achieving complete relief for nine before recurrence. Repeat MRI revealed an area concerning for persistent contact, although it was unclear if this was vascular contact or surgical padding. He then underwent CyberKnife radiosurgery with 60 Gy delivered to the pre-pontine cisternal region of the right trigeminal nerve, resulting in two months of relief. Following recurrence, he developed right-side facial neuropathy and decreased sensation around his right eye. His regimen of gabapentin, duloxetine, and cannabis provides suboptimal pain relief. Although he experiences occasional brief electric shock-like episodes, his predominant symptoms are severe right-sided numbness and burning across all three distributions. He has discussed physician-assisted suicide with his PCP should his pain persist.

Discussion: First-line TN treatment typically involves antiseizure medications, while procedural interventions are considered for inadequate pain control or medication intolerance. MVD may benefit patients with neurovascular compression, with initial success rates of 80-95% and recurrence rates of 10-30%. Stereotactic radiosurgery may provide early pain relief by disrupting pain signaling, although efficacy may decline over time and facial numbness may occur. This case illustrates the complexity of managing refractory TN and the burden of persistent neuropathic pain despite radiosurgery and MVD. Persistent or recurrent pain following sequential interventions remains challenging, with limited therapeutic options remaining.

Acknowledgement: The University of New England College of Osteopathic Medicine and Somerset County Partnership Health Center. This work was approved by the University of New England Office of Research Integrity (IRB #0726-1).

58.

Inhibition of acyl-CoA synthetase long-chain family member 4 in multiple myeloma

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Introduction: Multiple myeloma (MM) is an incurable hematological malignancy that develops in plasma cells within the bone marrow, with a 5-year survival rate of 59%. Cancer cells adapt to high energy demand by manipulating host cellular metabolism to support unchecked growth and evade apoptosis; thus understanding of these pathways is essential in identifying therapeutic targets. This study investigates acyl-CoA synthetase long-chain family member 4 (ACSL4) in MM cells, through treatment with a novel pharmaceutical inhibitor: PRGL493. Biochemically, ACSL4 catalyzes the addition of coenzyme A to long-chain fatty acids, a process integral to fatty acid metabolism, membrane-lipid remodeling and lipid peroxidation; we hypothesize that inhibition of ACSL4 will impact critical processes in myeloma cells.

Methods: Human MM cell lines RPMI-8226, KMS-27 and mouse cell line 5TGMI1-TkLuc+ were treated with PRGL493 at various doses (0-50 μM) for 24, 48 and 72 hours. To assess cell viability, RealTime Glo MT Cell Viability assay (RTG; RPMI-8226, KMS-27) or sterile luciferin spike-in (5TGMI1-TkLuc+) was used and analyzed with a Promega Glow Max plate reader. Treated RPMI-8226 cells were assessed for apoptosis (Annexin V/DAPI), cell cycle (DAPI), and proliferation (anti-Ki67) using the MACSQuant flow cytometer and FlowJo v10 or later. All data were analyzed with GraphPad PRISM.

Results: Bioluminescence with RTG and luciferin showed a dose-dependent reduction in cell viability among all cells, most notable at hours 48 and 72, with PRGL493 doses of 25 and 50μM. A dose dependent increase in early and late apoptotic cell populations was detected in RPMI-8226 treated with 25 μM drug for 72 hours. Treatment of RPMI-8226 with 25 μM PRGL493 revealed potentially aberrant cell cycle profiles including a trend toward increase in sub-G0, decreases in G0-G1 and G2-M and an increase in S phase.

Conclusion: ACSL4 plays a significant role in MM cell fitness through processes tied to cell cycle and apoptosis and is a promising novel therapeutic target in multiple myeloma. PRGL493 treatments in vivo with myeloma murine preclinical models are necessary to move toward clinical application.

Acknowledgements: This work was supported by the Peter Morgane Student Fellowship, MHIR Flow Cytometry Core, and funding from the NIH (NCI), Arthur Gary Family Foundation, and Linda Tallen and David Paul Kane Educational and Research Foundation. MRR is a Scholar of Blood Cancer United. No human subjects were used in this study.

59.

Food Insecurity in University of New England Graduate Health Professional Students

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Introduction: Food insecurity can be defined as a household-level economic and social condition of limited or uncertain access to sufficient amounts of safe, nutritious foods that are needed for an active and healthy life. The graduate level of education presents students with significant stressors in addition to the burden of measurable food insecurity during the academic year. The aim of this project was to characterize the level of food insecurity experienced by University of New England students enrolled in a graduate level health professional program in order to guide policy decisions and serve as a stimulus to improve food security within the University, and in turn improve graduate student academic performance and well-being.

Methods: A secure electronic questionnaire that includes the USDA Household Food Security survey, modified to include questions specific to the experiences of UNE health professions graduate students, was sent to eligible students via email notification by the Dean or Program Director of their program. An optional self generated code was included in order to track responses longitudinally, as a second survey will be administered in 6 months to examine changes in food insecurity throughout an academic year.

Results: There were a total of 45 responses, including 33 COM, 4 pharmacy, 4 occupational therapy, 3 nurse anesthesia, 1 from physical therapy. Based on the USDA food insecurity scoring criteria 21 respondents (46.67%) experienced food insecurity. Among the food insecure respondents, 62% experienced high food insecurity. Frequently reported financial challenges leading to food insecurity were: housing (n=27), moving expenses (n=21), student loan debt (n=20), insurance costs (n=15), and clinical-rotation expenses (n=9). Other barriers included: housing or rent (n=10), groceries (n=9), and gas prices (n=9). Among the 11 participants currently completing clinical rotations, 55% of respondents attribute food insecurity to rotation related costs.

Conclusion: Significant food insecurity was identified among UNE graduate health professions students, with the majority of food insecure students experiencing high food insecurity per USDA scoring. Commonly reported financial challenges included cost of living, housing, student loan debt, insurance, and clinical rotation related expenses. These findings highlight a need for institutional intervention to aid in addressing the complex nature of this problem.

Acknowledgements: University of New England College of Osteopathic Medicine and the UNECOM Office of Research and Scholarship. This work has been supported by the Peter Morgane Student Fellowship. Exemptions were approved by the UNE IRB office (0726-16)

60.

Bidirectional Association Between Atrial Fibrillation and Cancer: A Narrative Review

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Introduction: A bidirectional association between atrial fibrillation (AF) and cancer has increasingly been recognized. The two conditions share inflammatory pathways and overlapping risk factors; however, their temporal relationship and potential causal mechanisms remain incompletely characterized. Better understanding of this association may improve risk stratification and inform the diagnostic evaluation of patients with new-onset AF. The aim of this study was to evaluate the temporal relationship between new-onset atrial fibrillation and cancer diagnosis, with particular attention to AF as a potential marker of occult malignancy.

Methods: PubMed and EMBASE were searched using the terms (“atrial fibrillation” OR AF) AND (“cancer” OR “malignancy” OR “neoplasm”) AND (“incident” OR “new diagnosis” OR “occult” OR “subsequent”). English-language, full-text studies involving adults with AF and cancer were included. Case reports and series, letters, narrative reviews, editorials, and commentaries were excluded. Two investigators independently reviewed eligible articles and extracted data; disagreements were resolved by consensus.

Results: Twelve studies met inclusion criteria. In pooled analysis, new-onset AF was associated with increased cancer diagnosis within 90 days (HR 2.4; 95% CI 2.28–2.53). The magnitude of association varied by cancer subtype; prostate, colorectal, lung, and breast cancers were most frequently observed. In a separate cohort study of anticoagulated patients with AF, site-specific bleeding events were strongly associated with concordant-site cancer diagnoses: gastrointestinal bleeding with gastrointestinal cancer (HR 13.4; 95% CI 9.1–19.8), genitourinary bleeding with genitourinary cancer (HR 18.1; 95% CI 12.5–26.2), and bronchopulmonary bleeding with lung cancer (HR 15.8; 95% CI 6.0–41.3).

Conclusions: New-onset AF is associated with increased short-term risk of cancer diagnosis, and bleeding events in anticoagulated AF patients may unmask occult malignancy. However, the available evidence does not establish causality or support routine cancer screening beyond standard age-and risk-appropriate screening practices. Limitations include the absence of standardized cancer-screening protocols in source studies and potential confounding by indication and detection bias in bleeding analyses. Prospective studies are needed to clarify causal pathways, identify higher-risk subgroups, and determine optimal evaluation strategies.

61.

Association Between TOLLIP Variants and Neuropathic Pain: Findings from the All of Us Research Program

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Introduction: Neuropathic pain (NP) is pain arising as a direct consequence of a lesion or disease affecting the somatosensory system. However, not everyone who experiences an injury to the nerve or disease of the nervous system develops NP. It is not known why some develop NP and not others, but being older, female, having poorer general health, or having a genetic susceptibility may increase the likelihood of someone developing NP. Recently, our preclinical model identified Toll-interaction protein (TOLLIP), a key regulator of Toll-like receptor (TLR) signaling, as a candidate gene implicated in neuropathy. Despite the known involvement of the TLR pathway in NP, the relationship between TOLLIP and NP remains elusive. This study investigates the role of TOLLIP SNPs in NP using data from the All of Us (AoU) Research Program, a NIH funded dataset involving US adults (age≥18).

Methods: AoU data version 9 was used. Single nucleotide variants (SNP) obtained through the short-read whole genome sequencing and diagnostic data were extracted. NP cohorts were defined by identifying nine common NP conditions and eligible individuals were captured using ICD-9, ICD-10, and SNOMED codes. The six most common missense mutations rs5744015, rs111986008, rs148253939, rs147873040, rs141097873, rs142928640 (allele frequency = 0.0349, 0.0121, 0.000738, 0.000637, 0.000460, 0.000415 respectively) were analyzed in conjunction with the presence of a NP diagnosis. Odds ratios (OR) were calculated to assess the association. $p<0.00417$ was considered to be statistically significant based on Bonferroni correction.

Results: rs5744015 (Ala222Ser) was associated with significantly higher odds of having a NP diagnosis regardless of sex (OR=1.15 in men, 1.09 in women, $p<0.0001$). In men, rs141097873 (Val143Met) was associated with significantly higher odds of NP diagnosis (OR=1.56, $p=0.0021$), while rs111986008 (Ile236Val) was found to have lower odds (OR=0.67, $p<0.0001$).

Conclusion: Association between TOLLIP SNPs and odds of a NP diagnosis varies greatly depending on the variant and gender. Notably, the effects of specific variants on having a NP diagnosis were sex-dependent, with significantly greater effect observed in men than in women. Further understanding of TOLLIP SNPs and the subsequent functional changes will help to delineate molecular/cellular pathways contributing to NP.

Acknowledgements: University of New England College of Osteopathic Medicine and the University of New England Center for Excellence in Neurosciences. We gratefully acknowledge All of Us participants for their contributions, without whom this research would not have been possible. We also thank the National Institutes of Health's All of Us Research Program for making available the participant data examined in this study. Lastly, a special thanks to the AoU student research interest group for their continued support. This research was supported in part by the Kahn Family Foundation Fellowship. This study was conducted under UNECOM's Institutional Review Board (IRB) oversight and was determined to be Non-Human Subject Research by the UNECOM IRB (protocol #0326-30).

62.

Private Wells, Public Risk: Linking Water Contamination and Amyotrophic Lateral Sclerosis

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Introduction: Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease with a complex, largely unknown etiology. Environmental exposures, including contaminants in drinking water, may contribute to ALS risk. Because drinking water systems vary in their source, regulation, and treatment, exposures may also differ across geographic and socioeconomic contexts. These questions are particularly relevant to Northern New England, where rural communities and reliance on groundwater and private wells make drinking water infrastructure an important environmental health consideration. This study investigated whether reliance on private wells or small unregulated water systems contributes to increased ALS risk across the United States and how these exposures are distributed across socioeconomic contexts.

Methods: De-identified participant data from pooled ALS research cohorts across the United States were used to evaluate associations between primary household drinking water source and ALS risk. Geographic distribution of participants and regional patterns of water source reliance were examined to identify potential clustering across the United States. Stratified analyses were conducted to compare exposure prevalence by water source type and socioeconomic indicators.

Results: Reliance on private wells or small unregulated water systems did not contribute significantly; however, public/city well water was associated with significantly higher odds of ALS [OR: 1.33, 95% CI (1.02,1.74)]. Other water systems also demonstrated insignificant associations. Focused Mapping revealed several participant clusters appear in areas with moderate to high private well reliance, particularly in parts of the Northeast and Midwest.

Conclusions: These findings suggest that while private well reliance alone may not significantly increase ALS risk, geographic clustering and variation in water infrastructure highlight the importance of considering environmental and structural determinants of exposure. Further research is needed to better understand how water system characteristics and environmental contaminants may contribute to ALS risk.

Acknowledgements: This research was conducted at Dartmouth-Hitchcock Medical Center, Department of Neurology, Hanover, New Hampshire. No external funding or grants supported this work. Informed consent was obtained from all participants. The Institutional Review Board at Dartmouth-Hitchcock Medical Center approved the study (STUDY00020332: Environmental Exposure and Neurological Diseases Questionnaire).

63.

Assessing Patients' Perception of Endometriosis Response: Comparing Medical, Alternative Treatments and Lifestyle Modifications

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Introduction: Endometriosis, a complex, chronic estrogen-dependent gynecologic condition, affects 10% of reproductive-age women globally. It is associated with pelvic pain and impaired quality of life. Numerous treatments exist with varying outcomes. An interdisciplinary patient-centered multi-interventional approach may be effective. This study evaluated three disciplines: medical and alternative treatments and lifestyle modifications, comparing eight subcategories to assess pain perception and quality of life responses.

Methods: A cross-sectional anonymous survey was conducted among individuals age 18-50 years with self-reported endometriosis. IRB exemption was obtained. Participants completed an online questionnaire using a Likert scale (0-5) to assess pain and quality of life changes after treatment. Medical treatments included 5 medications and 8 surgeries; alternative treatments were acupuncture, osteopathic manipulative therapy (OMT), and pelvic floor therapy (PT); and lifestyle modifications included dietary, exercise, and sleep changes. The survey was distributed on closed and public social media and institutional email over five weeks. Descriptive statistics were used.

Results:

There were 209 responses; 9 lacked eligibility criteria, leaving 200 of which 89 (44.5%) were 18-29 years, 66 (33%) were 30-39, and 45 (22.5%) were 40-49; 117 (58.5%) were non-Hispanic white, 76 (38%) other racial minorities, and 7 (3.5%) preferred not to answer. Symptom response was 97 (48.7%) improved. One participant only responded to demographics. Of 199 who tried medical treatments, 121 (60.8%) OCPs, 48 (39.6%) reported improvement; 99 (49.7%) tried NSAIDs, 32 (32.3%) improved. Of 165 (82.9%) who tried surgery, most commonly excision 149 (90.3%), 121 (73.3%) improved. Of 134 (67.3%) who tried alternative treatments, 71 (35.7%) tried acupuncture, 24 (33.8%) improved; 53 (26.6%) tried OMT, 47 (88.7%) improved; 101 (50.8%) tried PT, 42 (53%) improved. For lifestyle modifications, 107 (53.8%) tried dietary changes, 43 (40.5%) improved; 89 (44.7%) exercise, 21 (23.5%) improved; 70 (35.2%) sleep changes, 16 (22.9%) improved. Quality of life was unchanged or worse in 130 (65.3%).

Conclusion:

Medical treatment was most commonly tried, followed by lifestyle modifications and alternative treatments. Excision surgery, OMT, and exercise resulted in the greatest pain improvement; however, overall quality of life did not improve.

Acknowledgement: University of New England College of Osteopathic Medicine, Berkshire Medical Center, and Peter Morgane Student Research Fellowship. UNECOM IRB 0925-0.

64.

Characterizing and Enhancing Osteocyte Dendrite Growth Using Long-Term Observation

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Introduction: Osteocytes play a key role in skeletal homeostasis and adaptations to the physical demands of activity. Connected via dendrites to form a network, they sense mechanical stimuli and transduce them into intercellular signals that guide bone remodeling cells. To better understand the degradation in mechanosensitivity seen with osteocyte aging, we must look more closely at changes in the connectivity of the network, such as gap junction formation and use, and dendrite outgrowth. Some of this work can be done on plastic, but native dendritic processes depend on interactions with extracellular matrix. We will investigate both network connectivity and dendrite outgrowth *in vitro* while simultaneously developing our model to create a more physiologic environment.

Methods: We have established methods to assess osteocyte mechanosensitivity via fluorescence imaging to track calcium influx in response to fluid flow exposure. Monolayers at different stages of culture time and confluency were used to assess the effect of cell contact on responsivity. Preliminary experiments on micropatterned islands and collagen gels were conducted to assess the effect of contact restriction and matrix interaction.

Results: We have observed an increase in the percent of responding cells as confluency increases with culture time. Non-contact cultures of osteocytes on micropatterned substrates, on the other hand, demonstrated lower responses. Morphological changes have been identified in osteocytes cultured on collagen gels in comparison to plastic, including organization of dendrites, but imaging techniques will need to be refined for quantification of calcium responses in these pseudo-3D tissues.

Conclusion: We have begun to characterize a model system and methods to investigate variations in mechanosensitivity due to changes in the osteocyte network. We believe confluent monolayers represent self-organized, highly connected networks. This project aims to develop tissue engineering approaches to stimulate and control dendrite growth and connection, and methods to assess their relative contribution to mechanical response. Future work will assess the presence and contribution of native dendrite and gap junction structures and explore strategies to promote dendrite elongation such as treatment with growth factor FGF-2. Understanding network connectivity will provide insight on what functions diminish with age, and how to protect them.

Acknowledgement: The University of New England College of Osteopathic Medicine. This work has been supported by the Carmen Pettapiece Student Research Fellowship (to JS)

No human or animal subjects were used in this study.

65.

Beyond the Negative Workup: Clinical Recognition of Functional Dyspepsia After Persistent Epigastric Symptoms

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Introduction: Functional dyspepsia (FD) is a common disorder of gut-brain interaction that can be overlooked when management remains focused on excluding structural disease. Clinical recognition of FD after an appropriate unrevealing evaluation may allow a transition from repeated investigation to targeted therapy. We describe a patient with recurrent abdominal symptoms and later persistent epigastric discomfort in whom FD was not recognized until 2025, after years of cardiac and gastrointestinal evaluation and inadequate response to acid-directed therapy.

Case: A 77-year-old man had recurrent, poorly characterized abdominal discomfort documented since 2016, with later documentation of persistent localized epigastric discomfort. Over the ensuing years, evaluation addressed cardiac ischemia, structural upper gastrointestinal disease, reflux-related disease, and gastroparesis. Cardiac assessment included stress testing without evidence of ischemia. Gastrointestinal evaluation included multiple upper endoscopies, abdominal imaging, an upper gastrointestinal series, and a gastric emptying study. Findings included gastroesophageal reflux, moderate esophageal dysmotility, and mild chronic gastritis, but no ulceration, mass, Helicobacter pylori infection, delayed gastric emptying, or other finding sufficient to explain his persistent symptoms. Symptoms persisted despite proton pump inhibitor therapy. In October 2025, after nearly nine years of recurrent abdominal symptoms and intermittent evaluation, functional dyspepsia was diagnosed, and amitriptyline 10 mg daily was initiated. Symptomatic improvement was documented one month later and remained present at follow-up in February 2026.

Discussion: Appropriate exclusion of structural disease remains necessary, particularly in older adults, but management should not remain indefinitely anchored to further diagnostic testing once an adequate evaluation is unrevealing. In this patient, recognition of FD prompted a shift from continued acid-directed management to neuromodulator therapy, with symptomatic improvement documented thereafter. The transferable lesson is the need to transition from repeated exclusionary testing to clinical recognition of FD once age-appropriate evaluation is adequate and no finding sufficiently explains persistent symptoms.

Acknowledgement: University of New England College of Osteopathic Medicine and Columbia Memorial Hospital.

Case Study Registration: Approved by the University of New England Office of Research Integrity. IRB# 0526-13

66.

Post-Discharge Postoperative Pain Management: A Disconnect in Opioid Administration, Education, Continuity, and Quality Measurement

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Introduction: Remitting and chronic pain with persistent opioid use commonly stems from poorly controlled postoperative pain management. Despite an extensive breadth of research, post-discharge care remains suboptimally operationalized. This review examines the current practices in the realms of opioid prescribing, standardization of pain related patient outcomes and the tools to measure them.

Methods: The data considered for this narrative review was collected from peer-reviewed guidelines, consensus studies, and primary research published from 2009–2026 and inspects evidence across inpatient and outpatient surgery settings. Five themes were developed to focus the review including opioid stewardship, individualized patient education, transitional care, longer term risk in pharmacological intervention, and postoperative pain measurement tools.

Results: In review, several post-discharge gaps were identified among the five themes with education and continuity appearing most often. A meta-analysis of 47 randomized trials (6,607 patients) found no day one pain benefit from opioids over opioid free regimens, instead more vomiting and adverse events. With this, in 7,839 day surgery patients, 22.8% took no opioids despite prescription. Risk rose with higher doses, multiple opioids, and switching. In a study analyzing 23,238 surgical procedures, multimodal care was associated with 6.8 fewer inpatient equivalents of morphine and a one point scaled reduction in outpatient pain. Alternatives that produced the largest pain reductions included NSAIDs or regional anesthesia. Education had mixed efficacy. A 957-patient video trial with smartphone apps reported no improved pain or decreased opioid use. A 58-publication review suggested transitional pain services may bridge acute and long-term care but suggested the current state of handoffs is passive and assumes unclear ownership of the patients. A review of 3,164 studies found that only 45 of 330 anesthesia quality indicators (14%) had implementable evidence, with all of them lacking outcome indicators or benchmarks.

Conclusion: Distinguished problems include inconsistent and fragmented follow up along with non-standardized measurements in pain management. To ensure a more efficacious and standardized approach to pain, new regimens can consider combining patient and procedure specific opioid sparing treatments with clear responsibility for reassessment and tools to formalize pain related outcomes.

Acknowledgments: This research was conducted through University of New England College of Osteopathic Medicine. No external funding was received.

Regulatory Status: Institutional review board approval was not required for this literature review.

67.

SLAP Repair Versus Biceps Tenodesis for Type II SLAP Tears in Tactical Military Personnel and Overhead Athletes: A Scoping Review of Return-to-Activity and Revision Outcomes

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Introduction: Type II superior labrum anterior-to-posterior (SLAP) tears are a common source of shoulder pain and functional limitation among tactical military personnel and overhead athletes. These populations place substantial repetitive and high-demand stresses on the shoulder making restoration of function and return to activity critical treatment goals. Concerns regarding postoperative pain, stiffness, revision risk, and inconsistent return-to-sport outcomes from arthroscopic SLAP repair have led to increasing utilization of biceps tenodesis as an alternative treatment strategy. The aim of this study was to evaluate current evidence comparing SLAP repair and biceps tenodesis for Type II SLAP tears in tactical and overhead athletes, with emphasis on return-to-duty, return-to-sport, and revision outcomes.

Methods: A literature review was performed using PubMed and Google Scholar. A total of 40 records were identified through database searching; 37 underwent title and abstract screening, and 19 were included in the final synthesis. Eligible studies included adult patients with Type II SLAP tears who underwent SLAP repair or biceps tenodesis and reported return-to-duty (RTD), return-to-sport (RTS), and return-to-work outcomes.

Results: Across direct comparative studies, 274 patients were evaluated, including 169 (61.7%) who underwent SLAP repair and 105 (38.3%) biceps tenodesis. Both procedures resulted in substantial improvements in pain and functional outcomes. Comparative studies reported return-to-sport rates ranging from 63%–85% following biceps tenodesis compared with 50%–76% following SLAP repair. In the military cohorts, reported return-to-duty rates were 83.4% following SLAP repair and 82.4% following biceps tenodesis. Revision and failure outcomes consistently favored biceps tenodesis, with reoperation rates ranging from 0%–6% following biceps tenodesis compared with 3%–15% following SLAP repair.

Conclusion: Biceps tenodesis and SLAP repair both provide satisfactory functional outcomes for the treatment of Type II SLAP tears in young, active populations. However, current evidence demonstrates a consistent trend toward higher return-to-sport rates, lower reoperation and reinjury rates following biceps tenodesis. Military-specific return-to-duty outcomes remain limited, highlighting the need for prospective studies utilizing standardized occupational performance metrics and return-to-duty criteria.

Acknowledgment: The University of New England College of Osteopathic Medicine

68.

The Financial Burden of Pain: Insurance, Financial Barriers, and Patient-Reported Functioning

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Introduction: Chronic pain substantially impairs physical function and quality of life, while financial and insurance-related barriers may limit access to effective care. However, less is known about how insurance characteristics, overall financial difficulties, and specific barriers to pain care relate to patient-reported functioning, particularly for the state of Maine. This study examined PainRegistryforME, a recently established state-wide pain registry.

Methods: A cross-sectional analysis of adults enrolled in PainRegistryforME (235 participants within 2023-2024) examined associations between insurance type, financial barriers, pain-specific coverage gaps, and PROPr pain and physical function scores (calculated from the NIH pain assessing PROMIS-29+2 profile). All analysis was conducted using SPSS. Unadjusted differences were assessed using ANOVA and *t*-tests. Multivariable models adjusted for age, sex, race/ethnicity, rurality, depression, and, when applicable, insurance type. Descriptive analyses evaluated barriers to pain management. $p<0.05$ is considered as significant.

Results: Insurance type was associated with pain-related functioning and physical function in unadjusted analyses, with better outcomes observed in privately over publicly insured participants; however, these associations were not significant after adjustment for demographic and clinical factors. Perceived financial burden was defined by participants reporting having trouble making ends paying for basic needs or essential bills. Perceived financial burden was significantly associated with worse pain-related functioning after adjustment for insurance type, demographic characteristics, rurality, and depression. Treatment cost was the most frequently reported barrier to pain management and was significantly more common among privately vs publicly insured participants. Additional barriers included limited work flexibility, provider availability, treatment effectiveness, scheduling, and care coordination.

Conclusion: Perceived financial burden but not insurance type was associated with pain-related outcomes after accounting for demographic and clinical factors. Treatment cost was also a prominent barrier to obtaining pain care. These findings suggest that insurance status alone may not fully capture financial barriers to pain management and highlight the importance of considering multiple measures to assess finance driven outcome disparities.

Acknowledgement: This work was supported by the Kahn Foundation Student Research Fellowship of the University of New England College of Osteopathic Medicine. A special thanks to all participants of the PainRegistryforME.

69.

Impacts of AORTA Program on High School Student Participants' Awareness and Interest in Anatomy and Osteopathic Medicine Careers and an Evaluation of Participants' Comfort with Body Donors

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Introduction: There is an enduring gap between the number of osteopathic and allopathic physicians, despite offering nearly identical medical education. Within both curricula, there remains a portion that relies on the use of body donors. However, in hands-on modalities like cadaveric dissection are declining in favor of virtual modalities, mirroring a decrease in U.S. doctoral graduates in anatomy. The Anatomy Outreach for Research and Teaching Advancement (AORTA) program through the University of New England College of Osteopathic Medicine (UNE COM) gives Maine high schoolers exposure to anatomy and osteopathic medicine while gauging comfort with using body donors for educational purposes.

Methods: This retrospective survey study assessed interest in anatomy or osteopathic medicine as a career and the impact of donor specimens on learning. Participants were recruited from 12 Maine high schools (N=261) who attended an AORTA session in the 25-26 academic year. Participants were asked to complete an online survey (Qualtrics XM) that incorporated a mix of items created by the listed authors of this study and previous research accomplished by the AORTA research group. The survey gathered demographics, academic plans, learning modalities, career awareness, and opinions about the program and body donors.

Results: Of the 261 program participants, 156 survey responses were collected, and 149 were analyzed. There was a significant increase in participants awareness of both anatomy and osteopathic medicine as a career following an AORTA session with $z = 4.60$, $p < .001$, $r = .39$ and $z = 7.90$, $p < .001$, $r = .67$, respectively. There was also a significant increase in the reported comfort level of participants regarding the use of body donors; median comfort scores increased from medium to high comfort, with Wilcoxon signed-rank testing demonstrating a significant pre- to post-session shift, $z = 6.22$, $p < .001$, $r = .53$. Among participants initially reporting low to medium comfort, 66.2% reported increased comfort following the session.

Conclusion: Following previous work by the AORTA group, the survey questions and analysis of a new participant cohort yielded significant results: increased awareness of osteopathic medicine and anatomy as a career, and greater comfort with using body donors for educational purposes. However, results don't support that AORTA preferentially generates interest in osteopathic medicine among students with little initial awareness.

Acknowledgements: A special thanks to the schools that participated in the AORTA programming and UNE COM. An extra special thanks to the body donors and their families. This work was approved by the University of New England IRB committee (Protocol #0226-05).

70.

An Osteopathic Approach to End of Life Care: Two Medical Students' Gosnell Memorial Hospice House 48-Hour Immersion

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Introduction: Osteopathic medical school philosophy differs from that of its allopathic counterpart in the four tenets; one of which is *a body is a unit of mind, body, and spirit*. Despite this holistic approach to patient care, curricula fall short in educating students on difficult conversations, as there is little education on palliative and hospice care. The University of New England College of Osteopathic Medicine and Hospice of Southern Maine offers a unique opportunity of a 48-hour immersion into palliative care.

Methods: This qualitative ethnographic and autobiographic research had two female second year medical students (ages 26 & 27) immersed in March 2026, at Gosnell Memorial Hospice House an 18-bed acute (ICU) care environment. The students worked with an interprofessional team and independently to assist with patient care, family support, and post-mortem care. Students wrote about their experiences, observations, and reflections during the pre-field (3 days prior), field work (immersion), and post-field (10 days after) phases of the research. Data were analyzed via content analysis and thematic coding. Inter-rater reliability for theme and quote selections was accomplished through researcher and PI communication. IRB (#19.05.08-007) exemption was obtained through the UNE IRB.

Results: During their time at Gosnell, students experienced two patient admissions, interacted with staff, families, and patients. They witnessed four deaths and conducted post-mortem care. By living on site and using the same spaces, food, and support staff as patients, students were able to empathize with the patient experience. Three key themes focused on the students' experiences: (1) journey in spirituality (death being a conduit for a spiritual journey while at Gosnell), (2) community (sharing of stories and emotions, due to death and within the hospice home), and (3) the humanity of death (maintaining compassion given to alive patients and to dead ones). Additionally, students experienced personal changes and developed skills to apply to future patient engagements. These include mindfulness of patients' autonomy and the importance of what matters most to each patient that contributes to their care plan.

Conclusion: In hospice care, the focus of a care plan is on quality, which may support added days of life. Conducting this immersion made clear how the osteopathic tenet of a *body is a unit of mind, body and spirit* is at the core of attaining quality of life.

Acknowledgements: We want to thank the staff at Gosnell Memorial Hospice Home, Dr. G, and UNE COM for this unique, life-changing opportunity. We want to extend our deepest gratitude to the patients that allowed us into their last moments; their legacy will continue through our future patient interactions.

71.

Beyond Pain and Biomechanics: Running Tolerance Outcomes in Gait Retraining for Patellofemoral Pain

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Introduction: Patellofemoral pain is a common running-related condition that can limit training and return to sport. Studies relevant to gait retraining commonly evaluate biomechanically focused strategies, including cadence modification, foot-strike modification, impact-focused feedback, metronome-guided retraining, and wearable sensor feedback; some also incorporate education, load management, exercise therapy, or mindfulness-based components. When choosing among possible approaches, runners and clinicians would benefit from understanding the real-world return-to-running outcomes associated with these interventions. The aim of this study was to evaluate reporting of runner-centered tolerance and return-to-running outcomes, including running volume, longest pain-free run, and return to unrestricted running.

Methods: PubMed/PMC searches and full-text review identified peer-reviewed primary studies published from January 1, 2018, through September 1, 2025. Studies were screened for relevance to adult novice or recreational runners; patellofemoral or anterior knee pain; gait retraining, cadence, or feedback-based interventions; and pain, function, loading, or running tolerance. One author performed screening and standardized data extraction.

Results: Sixteen primary studies were included. Biomechanical or loading outcomes were reported in 13 studies, cadence or step-rate outcomes in 9, pain or symptom outcomes in 8, and self-reported function outcomes in 8. In contrast, runner-centered tolerance and return-to-running outcomes were infrequently reported: weekly running volume or distance in 3 studies, longest pain-free run distance or duration in 1, return to prior or desired running volume in 0, return to unrestricted running in 0, and time to return to running in 0. In the study reporting longest pain-free running, weekly running volume increased by 13.78 km (95% CI 4.62–22.93) and longest pain-free run distance increased by 6.84 km (95% CI 3.05–10.62).

Conclusion: Gait retraining studies relevant to patellofemoral pain commonly report biomechanical, cadence, pain, and self-reported function outcomes but less consistently report standardized measures of running exposure and tolerance. Standardized reporting of weekly running volume, longest pain-free run, and return to prior or desired running capacity would likely better inform patient-centered expectations and decisions.

Ethical Approval: This project was reviewed by the University of New England Office of Research Integrity and determined not to be research involving human subjects as defined by 45 CFR 46.102. The project does not require IRB review and approval. IRB #0626-10.

72.

Optimizing Sevoflurane Emergence: A GasMan® Simulation Study of Factors Affecting Anesthetic Emergence and Time to MAC-Awake

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Introduction: The practice of anesthesia remains more of an art form than an algorithm, with different techniques for induction and maintenance leading to variability in management. Careful selection of anesthetic delivery settings allows for optimization of sevoflurane washout and promotion of rapid emergence. During anesthetic washout, patients reach MAC (minimal alveolar concentration) awake, a specific measurement indicating the level of consciousness at which a patient can respond to verbal commands, such as opening their mouth or raising a hand, despite being under the influence of anesthesia. It is expressed as a fraction of MAC, the standard measure of anesthetic potency preventing movement in response to surgical stimuli in 50% of patients. Simulation-based models like GasMan® could serve as a tool to provide insight into the pharmacokinetic and pharmacodynamic properties of anesthetics, which can vary between patients in clinical practice. This project sought to evaluate GasMan®'s ability to model anesthetic emergence and MAC awake, with the hope it could be used as a teaching tool in medical education.

Methods: GasMan® software was used to simulate 1-4 hour procedures in adult patients weighing 50, 70, and 100 kg. Optimal induction settings were calculated by varying delivered anesthetic concentration (DEL), and fresh gas flow (FGF). Following induction, DEL and FGF were titrated to achieve a maintenance concentration around 1MAC. To simulate emergence and washout, DEL was reduced to 0% while FGF was maximized at 10 L/min. Anesthetic washout was measured to evaluate effects of procedure duration and patient weight on time to MAC awake (0.3MAC).

Results: GasMan® simulations show that a longer surgical procedure and higher patient weight is associated with a longer washout and emergence period. Time to MAC awake increased by an average of 1.58 minutes as procedure duration increased from 1-4 hours, and from an average 9.16 minutes to 11.63 minutes as patient weight increased from 50 to 100 kg. The greatest modeled emergence time occurred in 100kg, 4 hour simulation (12.2 minutes), compared to the shortest time in the 50kg,1 hour simulation (8.28 minutes).

Conclusion: GasMan® simulations demonstrated predictable effects of procedure duration and patient weight on sevoflurane washout and time to MAC awake. Future studies plan to compare GasMan® calculations with intraoperative anesthetic data to validate the software in a clinical environment.

Acknowledgements: We would like to thank Chrisopher Abruzzese, D.O., Kyle Scully, PhD, the UNE Office of Research and Scholarship, Maine Medical Center Department of Anesthesia, and the Carmen Pettapiece Research Fellowship for supporting our research efforts.

73.

Distinct Cerebrovascular Autoregulatory Patterns Around Episodes of Ictal-interictal-injury Continuum Activity in Aneurysmal Subarachnoid Hemorrhage

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Introduction: Ictal-interictal-injury continuum (IIIC) activity encompasses electrophysiological patterns that may worsen outcomes in aneurysmal subarachnoid hemorrhage (aSAH). Cerebrovascular autoregulation monitoring using near-infrared spectroscopy enables real-time, non-invasive evaluation of the cerebral vasculature's ability to resist systemic hemodynamic changes. However, autoregulatory changes surrounding IIIC activity remain underexplored in aSAH.

Methods: We evaluated EEG recordings from 109 aSAH patients using an automated IIIC-activity detection algorithm. Episodes of prolonged (≥10 minutes) IIIC activity with at least one hour of non-IIIC activity before and after were isolated and classified as epileptiform abnormalities (EA) or generalized rhythmic delta activity (GRDA). Hemodynamic and autoregulatory parameters before, during, and after IIIC episodes were compared using linear mixed-effects models.

Results: We identified 25 EA episodes in 11 patients (median length: 66 minutes) and 220 GRDA episodes in 33 patients (median length: 82.5 minutes). Patients spent significantly more time above the upper limit of autoregulation before EA episodes than after ($z = -2.58$, $p < 0.01$), while the difference between mean arterial pressure (MAP) and autoregulation-based optimal MAP (MAPopt) decreased significantly before versus after EA episodes ($z = -2.30$, $p = 0.02$). Median regional tissue oxygenation was also higher after EA episodes than before ($z = 2.06$, $p = 0.04$) and during ($z = 2.29$, $p = 0.02$). During and after GRDA episodes, patients spent significantly more time below the lower limit of autoregulation compared to before (during: $z = 2.06$, $p = 0.04$; after: $z = 2.14$, $p = 0.03$), alongside increased intracranial pressure after versus before episodes ($z = 2.63$, $p < 0.01$).

Discussion: These findings suggest relative hyperemia preceding epileptiform abnormalities and relative ischemia during GRDA episodes. Together, they highlight underexplored relationships between neurophysiology and cerebrovascular autoregulatory function, supporting potential prognostic and management applications of non-invasive autoregulatory monitoring in aSAH.

IRB Approval: The UNE IRB acknowledged the notification of exemption (IRB #0926-02) by an external IRB (Yale Human Research Protection Program) on September 2, 2026.

74.

Anesthetic Considerations for Cesarean Delivery in Patients with Ehlers-Danlos Syndromes: A Narrative Review

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Introduction: Ehlers-Danlos syndromes (EDS) are heritable connective-tissue disorders with clinically heterogeneous manifestations. Classical EDS (cEDS), hypermobile EDS (hEDS), and vascular EDS (vEDS) may complicate obstetric anesthetic planning through joint instability, tissue fragility, vascular risk, autonomic dysfunction, and potential local anesthetic resistance. Evidence guiding anesthetic selection for cesarean delivery is limited. The aim of this study was to characterize the risks of anesthesia for EDS patients undergoing a cesarean section and review potential approaches to mitigate the adverse events.

Methods: PubMed and EMBASE were searched using terms “Ehlers-Danlos syndrome,” “cesarean section,” “pregnancy,” and “anesthesia.” Eligible publications were case reports published within the preceding 10 years involving patients with cEDS, hEDS, or vEDS who received anesthesia for cesarean delivery. Data extracted included EDS subtype, anesthetic technique, complications, maternal and fetal outcomes, and risk-mitigation strategies.

Results: Twelve reports describing 12 patients met inclusion criteria. Six patients received general anesthesia, five received neuraxial anesthesia, and one received both after inadequate neuraxial blockade. Three patients (25%) experienced reported anesthetic complications, including local anesthetic resistance (n=3) and dural puncture associated with postoperative headache and meralgia paresthetica (n=1). All affected patients were reported to have hEDS and had received neuraxial anesthesia. Reports describing general anesthesia emphasized multidisciplinary planning and neutral joint positioning during airway management. In neuraxial cases, sensory block was assessed with serial ice testing, and hypotension was managed with phenylephrine and/or intravenous fluid administration.

Conclusion: In this review, reported anesthetic complications occurred among patients with hEDS receiving neuraxial anesthesia; however, the small sample precludes causal or comparative conclusions. Preoperative EDS subtype characterization, assessment of prior local anesthetic response and spinal pathology, multidisciplinary planning, careful positioning, and individualized selection of neuraxial versus general anesthesia may help mitigate potential anesthesia risk in EDS patients.

Acknowledgements: University of New England College of Osteopathic Medicine.

Note: IRB approval was not required because this study involved only a review of previously published literature and no human subjects.

75.

Delayed Diagnosis of Dropped Head Syndrome 52 Years After Mantle Field Radiation for Hodgkin's Lymphoma

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Introduction: Dropped Head Syndrome (DHS) is a rare condition characterized by severe weakness of the cervical extensor muscles, resulting in a progressive chin-on-chest deformity and impaired horizontal gaze. While DHS has been associated with neuromuscular disorders and prior radiation therapy, delayed presentation following mantle field radiation for Hodgkin's lymphoma remains uncommon. Recognition of this association is important because symptoms are frequently attributed to more common degenerative cervical conditions, resulting in delayed diagnosis and management.

Case Presentation: A woman in her late sixties presented with progressive neck pain, weakness, and difficulty maintaining an upright head position. She had undergone mantle field radiation for Hodgkin's lymphoma in 1973. Symptoms began approximately 20 years after treatment and progressively worsened over subsequent decades. Previous evaluations attributed her condition to cervical spondylosis, arthropathy, and radiation-related fibrosis, and no definitive diagnosis had been established.

Physical examination demonstrated marked cervical extensor weakness, severe atrophy of the cervical and thoracic paraspinal muscles, trapezius muscles, and sternocleidomastoids, with a pronounced anterior cervical flexion deformity and right lateral head tilt. Passive correction of the deformity was possible, but the head immediately dropped forward when support was removed. Radiographs revealed reversal of cervical lordosis, multilevel degenerative changes, and progression of cervical deformity compared with prior imaging. Alternative neuromuscular and structural causes, including myasthenia gravis, amyotrophic lateral sclerosis, Parkinson's disease, polymyositis, and isolated cervical spondylosis, were considered less likely based on clinical findings and history. The patient was diagnosed with radiation-associated DHS and managed conservatively with cervical bracing, symptom-directed therapies, and ongoing follow-up.

Discussion: This case highlights DHS as a potential late complication of mantle field radiation and demonstrates an exceptionally prolonged interval between treatment and diagnosis. To our knowledge, this represents one of the longest reported latencies between radiation exposure and DHS diagnosis. Decades of symptom progression without recognition illustrate the risk of misattributing cervical extensor weakness and postural deformity to degenerative spinal disease alone. Careful review of remote radiation history, focused neuromuscular examination, and recognition of passively correctable cervical deformity are essential for accurate diagnosis. Increased awareness of radiation-associated DHS may facilitate earlier identification, implementation of supportive interventions, and improved long-term symptom management.

76.

Biomarkers for Breast Cancer-Related Lymphedema: A Scoping Review Toward Standardized Diagnostic Classification

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Introduction: Breast cancer-related lymphedema (BCRL) is a common, potentially debilitating complication of breast cancer treatment. Biomarkers may enable earlier detection and consistent staging, supporting timely risk-stratified intervention and improved long-term outcomes of BCRL. This study aims to examine BCRL objective diagnostic biomarkers and evaluate the potential of developing a standardized BCRL diagnostic classification.

Methods: This scoping review was conducted using PRISMA-ScR guidelines. PubMed and Cochrane were searched for studies published from 2021 through August 1, 2026. Search terms addressed BCRL, breast cancer treatment and radiation therapy, and objective molecular, imaging, physiologic, or tissue biomarkers. Eligible studies included female breast cancer survivors aged 18 years or older who underwent axillary lymph node dissection and/or radiation therapy and had BCRL evaluated using objective methods. Pediatric, nonhuman, and studies without objective biomarker data were excluded.

Results: Twenty articles comprising 2,274 patients were reviewed. BCRL diagnostic biomarkers were grouped into thermal, fluid/physiologic surveillance, circulating/molecular, lymphatic imaging, and tissue/structural categories. Thermal biomarkers were reproducible but had limited diagnostic discrimination. Bioimpedance spectroscopy identified BCRL earlier than limb circumference measurements, and L-Dex values correlated with tissue mechanical properties. Contrast-enhanced ultrasound abnormalities correlated with the International Society of Lymphology stage. Several pretreatment cytokines were associated with subsequent BCRL development, with IFN-α2A demonstrating the strongest signal. TGF-β1 and TIMP-2 differed from controls but lacked a convincing BCRL-specific association. Leptin and the adiponectin-to-leptin ratio differed between BCRL and control groups, whereas microRNA differences were not significant. VEGF-D and VEGFR-3 were elevated in patients with abnormal lymphatic morphology.

Conclusion: No single objective biomarker reliably addressed BCRL prediction, diagnosis, staging, and monitoring. Standardized multimodal protocols incorporating reproducible imaging or physiologic measures and validated molecular predictors are needed to improve classification and guide individualized care.

Acknowledgements: During the preparation of this work, the author(s) used Chat Generative Pre-Trained Transformer to aid in creation of Boolean string that was used to search databases, and to structure tables to organize data extraction/content. Rayaan was used to structure and execute data extraction. Claude AI was used as a sounding board for understanding and information synthesis. AI was not used for final analysis or generation of written content. After using this tool, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

77.

Exploration of the Mechanisms Underlying Pain Reduction After Noxious Electrical Stimulation in People with Knee Osteoarthritis

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Objectives: This study investigated the use of noxious electrical stimulation (NXES) as the conditioning stimulus (CS) during a test of pain inhibition called conditioned pain modulation (CPM). During CPM, a painful CS is applied to one location while pain responses to a test stimulus are assessed before and after the CS at another location. While CPM has been studied extensively, there are limited clinical trials assessing NXES as a therapeutic intervention. This is an area with growing interest in treating chronic pain.

Study Summary: In 10 participants with chronic pain from knee osteoarthritis, CPM was first tested by measuring pressure pain thresholds (PPT) before and after immersing the hand in cold water. After NXES, hypoalgesia was demonstrated by increased PPTs, reduced pain during the 5-times-sit-to-stand test (5xSTS) and 2-minute walk test (2MWT), and improved performance on the 5xSTS. The hypoalgesia was observed immediately after the NXES, and lasted for 1, 24, or 72 hours. The effect of CPM is short, under 20 minutes, so the new question emerged around why the hypoalgesia lasted this long. This poster presents the process of investigating pain mechanisms that would explain long term pain reduction which is described below.

Methods: The goal was to find papers discussing the endogenous mechanisms that could explain the immediate and long-lasting reduction in pain these participants experienced after NXES treatment. The discussion section pertaining to the reduction in pain over several days, was created by searching PubMed and ScienceDirect, including keywords like noxious electrical stimulation, acupuncture-like TENS, conditioned pain modulation, chronic pain, and pain habituation.

Results: Pain habituation explains pain relief that lasts over hours/days. Pain habituation is when the body is exposed to repeated painful stimuli, and the nervous system decreases pain responses. It is different from CPM where pain is reduced in different areas of the body. In habituation, pain is reduced at the site where the stimulus is applied. Both phenomena involve mechanisms that are centrally mediated, but the areas of the brain associated with both are different.

Conclusion: This study provides evidence that NXES reduces pain that lasts days, so its use as a therapeutic intervention is justified. The mechanisms involved in pain reduction go beyond the immediate effect of CPM.

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