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Jacobs School of Medicine and Biomedical Sciences
University at Buffalo

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University at Buffalo

Medical Student Annual Research Forum

Introduction

Progress in medicine is directly related to the research activities of the medical community. The Jacobs School of Medicine and Biomedical Sciences recognizes the importance of research in the task of providing the best medical care to patients. It also recognizes the importance of integrating research experience into the training of future physicians. Whether the ultimate career choice of today's student is primary care, a medical surgical specialty, or a position in academic medicine, there is a need to understand and interpret the results of research as they relate to medical practice. This can best be learned by active participation in research.

To this end, the School maintains formal and informal programs to encourage and support research training for medical students. Today's Forum presents the results of research projects conducted by students both here and at other institutions. We hope that all participants will enjoy the presentations and that there will be a renewed stimulation to takepart in research.

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DESCRIPTIVE EPIDEMIOLOGY OF OBESITY, DIABETES, AND HYPERTENSION IN THE WA MUNICIPAL AREA OF GHANA

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Introduction: Ghana has undergone an epidemiological transition, with the disease burden shifting from infectious diseases to non-communicable diseases (NCDs) such as obesity, diabetes, and hypertension. Over 70% of NCD-related mortalities occur in low- and middle-income countries, highlighting the disproportionate burden in these communities. The Wa Municipal area, a regional capital with limited access to specialized healthcare services, faces rising NCD prevalence amid urbanization and lifestyle changes, emphasizing the need for community-level data to guide public health interventions.
Objective: To determine the prevalence of NCDs among adults in the Wa Municipal area of Ghana using data from a community health screening program.
Methods: A cross-sectional study of 459 participants from the Wa Municipal area of Ghana was conducted using data from a community health screening program held in July 2019. Demographic and health information were obtained from participants, while biometric measurements, including blood pressure, random blood glucose, and total cholesterol levels, were collected. Data were analyzed using the Statistical Package for the Social Sciences (SPSS).
Results: More than two-thirds of participants (68.41%) reported never having undergone an annual health assessment. Women exhibited a higher prevalence of obesity (30.58%), hyperlipidemia (19.75%), and hypertension (22.34%) compared to men (7.19%, 1.27%, and 11.98%, respectively). While diabetes prevalence was similar between genders, elevated random blood glucose levels indicating hyperglycemia were more common among men (13.77%) than women (8.25%). Although rates of non-communicable diseases were relatively higher among women, they were also more likely to be on treatment.
Conclusion: In contrast to trends observed in many high-income settings, these findings reveal a substantial burden of undiagnosed non-communicable diseases, particularly among women, with prevalence rates comparable to or exceeding national, regional, and global estimates. Targeted interventions that encourage routine health checkups, early detection, and long-term disease management are critical to reducing NCD-related complications in underserved communities such as the Wa Municipal area which has limited access to essential healthcare services.

The Right Drug for the Bug: Evaluating Monotherapy Antifungals Against Drug-Resistant Candida auris

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Hypothesis: We hypothesize that, within echinocandins, Caspofungin will be a more effective agent due to its fatty acid side chain and known clinical guidelines, within the azoles, Posaconazole will be the most effective agent due to its inhibitory profile against ERG11 in previous in vitro studies as well as its highly lipophilic side chain.

Background: *Candida auris* (*C. Auris)* is an emerging, multidrug-resistant yeast that poses a significant global health threat. Unlike most other *Candida* species, *C. auris* is often resistant to multiple classes of antifungal drugs, making treatment challenging and contributing to high mortality rates, particularly in critically ill patients. The Centers for Disease Control and Prevention (CDC) has classified *C. auris* as an urgent threat, emphasizing the critical need for rapid diagnostic methods and effective infection prevention.

Methods: This study investigated a *Candida auris* strain 931, containing an *ERG11* Y132F mutation conferring high azole resistance. The strain's susceptibility was evaluated by exposing it to azoles and echinocandins at varying concentrations. Time-kill assays were performed to quantify each drugs fungicidal activity against *C. auris* using a starting inoculum of $1x10^5$ CFU/mL and sampling was done at time-points 0, 2, 4, 6, and 24 hours of drug exposure for colony counting. Lastly, *C. auris* morphology after drug exposure was visualized by staining.

Results: Echinocandins demonstrated potent fungicidal activity against strain 931, while the azoles were largely ineffective. Micafungin proved to be the most potent agent. Among the azoles, only posaconazole exhibited modest fungicidal activity. Fluorescence microscopy revealed a paradoxical dose-response effect for both posaconazole and all three echinocandins, where lower concentrations caused greater inhibition.

Conclusion: Echinocandins are superior to azoles for treating the *C. auris* strain 931, with micafungin demonstrating the most potent fungicidal activity. While the strain's *ERG11* Y132F mutation conferred resistance to most azoles, posaconazole retained partial effectiveness.

Title: Shoes or No Shoes at the Robotic Console: Surgeon Preferences and Cultural Quirks

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Introduction: Since the introduction of robotic surgery, surgeons from diverse specialties have progressively adopted this technology. However, behavioral practices at the robotic console—such as shoe wearing or removal vary considerably. Currently, no evidence supports the superiority of one behavior over another in terms of clinical outcomes, hygiene, or ergonomics. To address this gap, we conducted a cross-sectional survey on a Facebook surgery collaboration group to examine surgeons' habitual behaviors at the console and to characterize associated demographic and professional factors.

Objective: To evaluate patterns of shoe use among surgeons from different specialties during robotic surgery and to explore potential associations with demographic characteristics (age, gender), professional background (specialty, years in practice), and fellowship training.

Methods: This cross-sectional survey was conducted on a Facebook surgery collaboration group at three different time points (May 2018, June 2020, December 2021). Questions were asked to understand trends and reasoning in shoe use/removal and preferred footwear. The free-text structure allowed qualitative tones and themes to emerge from each post. Demographic and professional characteristics were collected for analysis.

Results: The cross-sectional study involved multi-disciplinary surgeons engaging with a Facebook post aimed to understand shoe use trends at the robotic console. In May 2018, of 214 voters, the majority (75%) did not wear shoes at the console, mainly for comfort and control. In June 2020, the majority of 407 voters kept their shoes on because of hygiene anxiety related to COVID-19. In December 2021, 60% once again leaned toward shoes off (vote count unspecified), citing identity, personal style, and ergonomics. The majority of participants were from the fields of urology, general surgery, colorectal surgery.

Conclusion: This study aims to characterize variation in surgeons' shoe use at the robotic console and to determine whether demographic or professional factors influence these patterns.

Title: Mouth Closure During Drug Induced Sleep Endoscopy Improves the Airway in Children

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Introduction/Background: Obstructive sleep apnea (OSA) in children is commonly caused by adenotonsillar hypertrophy and, although adenotonsillectomy is frequently performed, many patients have persistent symptoms. Drug-induced sleep endoscopy (DISE) allows dynamic evaluation of airway collapse, and specifically evaluation of the retro-lingual airway as a contributor to obstruction. Mouth position during DISE may influence the degree of collapse in this region.

Objective: To evaluate the effect of mouth closure in children with OSA during DISE on the retro-lingual airway.

Methods: Consecutive patients aged 8 months to 19 years with a diagnosis of OSA via polysomnogram underwent DISE between October 2023 and July 2024. During the DISE, patients initially slept with the molar teeth slightly apart. At the end of DISE, the molar teeth were placed into occlusion and vocal fold visibility was recorded as a percentage both before and after this maneuver. Vocal fold visibility was chosen arbitrarily as a marker of airway change since landmarks were obvious.

Results:

40 patients (mean age= 5 years, 95% CI 3.63-6.37) were included. 28 (70%) were male and 33 (82.5%) were Caucasian. The mean percentage of vocal fold visibility was significantly higher when the mouth was closed (mean=53.8% of total glottic opening, 95% CI=41.1-66.4) compared to when the mouth was open in its natural sleep position (mean=23.5%, 95% CI=12.1-34.9); $t(39)=-6.5$, $p<.001$). 27 (67.5%) patients had an improvement in vocal fold visibility following mouth closure, while 13 (32.5%) had no change. Of those with a change, the mean change was 44.8% (95% CI 34.9-54.7).

Conclusions:

Improvements in vocal fold visibility and presumably the retro-lingual airway with mouth closure suggests decreased airway obstruction. This supports the potential benefits of appliances that promote mouth closure during sleep in children with OSA.

Title of Project: Outcomes of Bilateral Femur Fractures

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Introduction/Background: Although intramedullary nailing is standard for unilateral femur fractures, optimal management of bilateral femur fractures (BFFx) remains unclear, as these patients often present with polytrauma and physiologic instability. Early definitive fixation may benefit select patients, while damage control orthopedics is used to reduce the risk of a harmful "second hit." Shock index (SI), a validated marker of hemodynamic instability, has not been specifically studied in this population.

Objective: This study evaluated patient risk after BFFx based on injury severity scores (ISS) and SI.

Methods: Adults (≥18 years) treated surgically for BFFx from 2000-2024 were retrospectively reviewed. Data included demographics, operative characteristics, transfusion, and complications. SI was calculated considering heart rate and systolic blood pressure at presentation and surgery, analyzed as continuous (per 0.1-unit increase) and dichotomous variables (>0.7, ≥0.9, ≥1.0) using logistic regression. Predictive ability of SI for ICU admission, mechanical ventilation, and a composite outcome (ICU admission, ventilation, or death), and of ISS for ICU admission, ventilation, and death, were evaluated using receiver operating characteristic analysis (ROC), reporting area under the curve (AUC).

Results: 29 patients were included (mean age 53.1 years; 72.4% female; 62.1% simultaneous fixation). Median SI at presentation was 0.85 (IQR 0.66–0.99), 67.9% had SI >0.7. Higher SI at presentation was associated with ICU admission, mechanical ventilation, and transfusion. ROC analysis confirmed good discrimination for ICU admission (AUC 0.81) and moderate for ventilation (AUC 0.73). At SI ≥0.9, odds of ICU admission (OR 18.9, 95% CI 1.8–1016, p = 0.004) and ventilation (OR 9.4, 95% CI 1.3–122, p = 0.016) increased. SI at surgery was not associated with outcomes. At presentation ISS outperformed SI for predicting ventilation (AUC 0.83 vs 0.73); SI better predicted ICU admission (AUC 0.81 vs 0.79).

Conclusion: SI at presentation and ISS may inform patient risk in BFFx.

Title: Enhancing Engagement and Understanding of Clinical Research in Children: Observational Insights from the *Sofia Learns About Research* Interactive Simulation

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Background: Age-appropriate and interactive digital learning tools make complex topics like clinical research more accessible to children. *Sofia Learns About Research*, originally developed as an activity book, was adapted into a video game installment at a children's museum to teach about clinical trials, consent, assent, and participant rights. The game has been played over 200,000 times since 2021. This project analyzes children's interactions with this digital game to identify engagement patterns and areas for improvement.

Objective: To evaluate how children engage with and understand the *Sofia Learns About Research* simulation in a museum setting by observing completion patterns, attention to content, and engagement. We also aim to identify factors (e.g., interactivity, text burden, adult accompaniment) to inform improvements for a mobile app version.

Methods: Observations were conducted at the *Ralph C. Wilson Explore & More Children's Museum* in Buffalo, NY. Estimated age, gender, accompaniment status, progression through the simulation, whether they read on-screen text, and qualitative indicators of engagement were recorded.

Results: Data collection is ongoing. Thus far, 80 children have been observed, most between approximate ages 2–9 years (range 1–13). About three-quarters were accompanied by adults or peers. Accompanied users progressed farther and engaged longer, with adults often redirecting focus or helping interpret content, compared to unaccompanied users. Pages featuring bright colors, movement, and interactive elements held attention better than static or text-heavy pages. Older children (approximately ages 8–14) were more likely to read and demonstrate comprehension compared to younger users (approximately ages 2-7).

Conclusions: Sustained engagement increased with visual appeal, interactivity, age-appropriate literacy, and adult guidance. Future design refinements should emphasize color, simplified text, and encouragement of adult-assisted engagement. These insights will guide the development of a mobile app version of *Sofia Learns About Research* to enhance accessibility and deepen children's understanding of clinical research.

Title: The Potential Role of Immune Pathways in Fuchs Endothelial Corneal Dystrophy

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Introduction: Fuchs endothelial corneal dystrophy (FECD) is a progressive, degenerative disease characterized by corneal endothelial cell loss and pathological protein deposition within Descemet's membrane, the basement membrane of the corneal endothelium. FECD can result in corneal edema, scarring, and blindness. Preliminary proteomic analysis of Descemet's membrane identified significantly altered abundances of several immune-related proteins in Descemet's membrane from FECD patients compared to control specimens; however, FECD is not considered an inflammatory disease.

Objective: The objective of this study was to evaluate the expression and localization of select immune-related proteins in FECD human corneal tissue compared to controls, with the aim of determining whether the observed proteomic differences are reflective of true immune pathway dysregulation within Descemet's membrane.

Methods: Data from proteomics analyses of FECD and control Descemet's membrane and RNA sequencing data from corneal endothelial cells were analyzed to identify immune-related proteins with altered expression in FECD. Selected targets, including complement proteins (Complement C3, Complement Factor D, Complement Factor B) and antimicrobial peptides (Hepcidin and Lysozyme), were analyzed in frozen sections of corneal tissue from FECD and control specimens using immunofluorescence localization. Fluorescence microscopy was used to qualitatively assess protein localization within the corneal Descemet's membrane-endothelium complex.

Results: For both FECD and control samples, all targeted immune-related proteins were localized to corneal endothelial cells and were not found in Descemet's membrane.
Conclusion: The observed downregulation in immune pathway proteins in proteomics analyses of Descemet's membrane in FECD is likely the result of lower corneal endothelial cell density in FECD compared to control, rather than decreased deposition of these proteins in FECD Descemet's membrane compared to controls. Immune-related pathways may contribute to corneal endothelial function or dysfunction, but do not appear to impact the Descemet's membrane.

Understanding Urologists' Perceptions of Prostate Artery Embolization in the Management of Benign Prostatic Hyperplasia.

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Introduction: Prostate artery embolization (PAE) is a minimally invasive treatment for benign prostatic hyperplasia (BPH) performed by interventional radiologists (IR). As an alternative to traditional surgical interventions for BPH, PAE represents a unique intersection between urology and IR. Current guidelines state that PAE may be offered but acknowledge the need for further interdisciplinary investigation of its utility. This study explored how urologists perceive PAE as a BPH treatment option, how they view the role they play in patients undergoing PAE, and what changes in interdisciplinary collaboration they deem important.

Methods: A 22-question survey was distributed to practicing urologists across the U.S. and Canada. Questions addressed urologists' familiarity with PAE, including safety and efficacy, their views regarding the role of the urologist in referral for PAE and their opinions surrounding interdisciplinary collaboration. Urologists were stratified by years of experience in practice (<5 years, 6–15 years, and >15 years). Responses were collected using a five-point Likert scale.

Results: Fifty-six responses were analyzed. Nearly all (98%) urologists who provided a response reported familiarity with PAE. While the majority endorsed both the safety and efficacy of PAE (64% and 55%, respectively), only 41% of responders discuss PAE with their patients as a treatment option. Almost half (49%) of the surveyed urologists indicated a reluctance to discuss PAE with their patients due to concerns surrounding ischemic or infectious adverse events, with a considerable proportion (42%) believing the adverse events may be more severe than those associated with traditional procedures for BPH. With respect to the role of the urologist, 69% of responders believe patients are more likely to undergo PAE if they have not received formal urologic evaluation. Concern that patients are being treated for BPH prior to urologic input was most pronounced among urologists with fewer than five years of experience. Finally, although a clear majority (63%) of the urologists reported having adequate resources for referral to and collaboration with IR, nearly four out of five (89%) called for more clear guidelines surrounding patient selection for PAE.

Conclusions: The findings of this study, while confirming urologists' general familiarity with PAE, suggest a hesitancy in recommending it for their patients with BPH. Moreover, the results of this survey signal a call for patients to receive formal urologic workup prior to treatment with PAE and clearer guidelines surrounding patient selection.

Title: Defining the relationship between papule size and histopathological outcomes in the SKH-1 mouse model of UV photocarcinogenesis

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Background: The SKH-1 albino hairless mouse is the most commonly used model for examining UV-driven skin photocarcinogenesis; however, standardized criteria for distinguishing benign and cancerous papules are poorly defined. Previous studies predominately relied on lesion diameter, producing inconsistent size thresholds and heterogeneity in dermatopathological classification.

Objective: To characterize the associations between papule diameter, height, and volume and their corresponding histopathological outcomes in SKH-1 mice.

Methods: Forty-four SKH-1 mice received solar simulated UV (290-400nm; 90mJ/cm2 UVB; 5 days/week for 10-18 weeks). A total of 323 papules were measured in vivo, and volume calculated from caliper dimensions. At necropsy, lesions were harvested, processed, and independently scored by three expert dermatopathologists with final diagnoses assigned by a two-of-three consensus as papilloma, actinic keratoses, SCC in situ (SCCis), or invasive squamous cell carcinoma (iSCC).

Results: Across 323 papules, most occur at the lowest diameter (≤2.5mm) and height (≤2mm) with progressively fewer papules in larger size groups. Volume shows the same trend, with most lesions < 5mm^3. As papule diameter increases, there is a progressive shift from papilloma, actinic keratoses, and SCCis, toward iSCC, with 100% iSCC at >8mm (largest group). Height (>4mm 100% iSCC) and volume (>500mm^3 100% iSCC) demonstrate concordant size-dependent shifts.

Conclusions: In the SKH-1 mouse model, papule size is strongly associated with histopathologic progression during UV-induced photocarcinogenesis. While most lesions remain small and are predominantly benign or pre-invasive, increasing diameter, height, and volume are associated with a shift toward iSCC. Papules with a diameter >8 mm, height >4 mm, or volume >500 mm³ were 100% iSCC papules, supporting the use of quantitative size metrics as pathology-anchored criteria for identifying invasive disease and informing study design.

1. Title of Project
Dynamic Changes in Frailty as Predictors of Outcomes After Transcatheter Aortic Valve Replacement

2. Authors and Affiliations
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3. Introduction / Background
Frailty is increasingly recognized as a critical determinant of outcomes in patients undergoing transcatheter aortic valve replacement (TAVR). Traditional pre-procedural risk stratification tools often fail to capture dynamic physiologic changes following intervention, limiting prognostic accuracy and individualized patient counseling.

4. Objective
To evaluate whether early post-procedural changes in frailty predict mortality and long-term survival outcomes following TAVR.

5. Methods
A retrospective cohort analysis was performed on patients undergoing TAVR (n = 272). Frailty was assessed using the Risk Assessment Index (RAI) prior to TAVR (RAI_0), and at 30 days post-procedure change (ΔRAI30D). ROC analysis evaluated predictive performance for mortality. Patients were categorized into frailty trajectory groups: deteriorated (RAI increase ≥2), no change, and improved (RAI decrease ≥2). Survival outcomes were analyzed using Kaplan–Meier methods with log-rank testing.

6. Results
Change in frailty at 30 days (ΔRAI30D) was predictive of mortality (AUC = 0.621, 95% CI 0.553–0.689; $p<0.001$). Survival analysis showed significant differences between frailty trajectory groups (log-rank $\chi^2 = 19.913$, $p < 0.001$). Survival analysis showed significant differences between frailty trajectory groups (log-rank $\chi^2 = 19.913$, $p < 0.001$). Patients with frailty deterioration had markedly worse survival (mean survival 34.1 months), compared to no change (52.2 months) and improved frailty groups (60.5 months). Median survival was lowest in the deteriorated group (26 months) and highest in the improved group (64 months).

7. Conclusion
Early post-TAVR changes in frailty are significant predictors of mortality and long-term survival. Dynamic frailty assessment provides clinically meaningful prognostic information beyond pre-procedural risk stratification alone. Incorporating longitudinal frailty monitoring into TAVR follow-up may improve outcome prediction, patient counseling, and individualized post-procedural care planning.

A New Approach To Overcome Echinocandin Resistance in Candida auris: It takes two to tango

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Background: The emergence of *Candida auris* which has been characterized as a 'nightmare' pathogen which is resistant to all available commercial anti-fungals is a cause for significant concern. Certain strains with *FKS1* mutations represent a critical clinical challenge with mortality rates approaching 50%. This resistance renders stand-alone echinocandin therapies ineffective, necessitating the development of novel synergistic drug combinations to combat these pathogens.

Objective: This study aims to assess the fungistatic and fungicidal effects of combining echinocandins with amphotericin B to simultaneously inhibit beta-(1,3)-glucan and ergosterol synthesis. The primary goal is to determine if this dual-target approach can overcome *FKS1*-mediated resistance and suppress filamentation in pan-resistant strains.

Methods: Two *C. auris* isolates harboring *FKS1* mutations were exposed to monotherapies and varying combinations of posaconazole (POS) and echinocandins (caspofungin, micafungin, anidulafungin) in time-kill assays over 48 hours. Viable cell counts were monitored via serial plating on Sabouraud Dextrose Agar, while structural changes were analyzed using microscopy.

Results: Across all treatment arms, monotherapy consistently demonstrated higher log-fold killing by 24h compared to respective combination arms with POS (0.5 µg/mL). Within combination arms, echinocandin dose escalation had little effect. Caspofungin (CAS) treatments were merely fungistatic; notably, the lowest dose (0.25 µg/mL) was most effective (1.63-log reduction), indicating a paradoxical trend of reduced effectiveness at higher concentrations. Micafungin (MIC) and anidulafungin (ANI) monotherapies exhibited greater killing effects (2.64-log and 2.16-log reductions, respectively) compared to CAS (0.5 µg/mL). No significant morphological changes were observed between growth control and combinations.

Conclusions: The addition of echinocandins to posaconazole was inferior to posaconazole alone, consistent with antagonism in dual therapy. Notably, CAS monotherapy displayed a paradoxical effect where efficacy decreased at higher concentrations. These findings suggest such combination therapies could be clinically detrimental for strains with *ERG11* mutations, underscoring the critical need for synergy testing to guide treatment.

Title of Project
"The most incredible privilege of my life" - The shared motivations of abortion and gender-affirming care providers

Authors & Affiliations
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Introduction/Background
Abortion and gender-affirming care are both centered around bodily autonomy and a patient's ability to make decisions about their health and well-being. They are also both subject to societal stigmatization and targets of political interference.

Objective
Explore factors that attract and motivate providers of this uniquely demanding care.

Methods
We conducted semi-structured focus groups and individual interviews with 15 providers of abortion care, gender-affirming care, or both, in the US from December 2024 to February 2025. Recruitment was conducted using convenience and snowball sampling. Focus groups and interviews were conducted online, recorded, and transcribed. Data were analyzed using deductive and inductive coding, and thematic analysis. This study was approved by the University at Buffalo IRB (ID: STUDY00008840).

Results
Fifteen providers participated (7 abortion providers, 4 gender-affirming care providers, and 4 who provide both). Participants identified as cis, trans, and nonbinary, and represented every region of the United States. Most participants were actively pursuing or had recently completed subspecialty training. The major motivational themes that emerged were that this care was fundamental to participants' careers and a way to participate in advocacy or healthcare change. Additional motivational factors included the immediate impact on patients, a desire to improve health equity, and pariticipant's personal experiences receiving marginalized care.

Conclusions
Abortion and gender-affirming care are grounded in similar values, and providers of these types of care share several motivating factors. As this care becomes increasingly stigmatized and politicized, we must cultivate motivation among all capable providers to provide this care, thereby improving the landscape for patients.

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Psoas Muscle Index as a Risk Stratification Tool in Autologous Breast Reconstruction

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Introduction/Background: Sarcopenia, traditionally diagnosed using skeletal muscle index (SMI), is associated with worse postoperative outcomes in cancer patients. Psoas muscle index (PMI) has been investigated as a substitute for SMI given its rapid measurability and has been studied for accuracy in other fields, but not for the population of patients with breast cancer undergoing reconstruction.

Objective: To assess if PMI can be used to predict postoperative outcomes in patients undergoing free-flap autologous breast reconstruction to provide a more facile measurement than SMI.

Methods: A literature review was performed using PubMed databases. A retrospective analysis of patients with breast cancer who underwent autologous breast reconstruction at the authors' institution was performed. The relationships between PMI and postoperative complications as well as psoas muscle index and length of hospital stay were analyzed. Complication subgroup analyses were performed for donor site and recipient site wound dehiscence, flap loss, seroma, hematoma, reversible flap perfusion compromise, and flap skin and fat necrosis. Demographic and clinical data were collected via retrospective chart review and PMI was measured on preoperative CT imaging.

Results: 187 free flaps in 113 patients were included in the study. The most common free flap was the deep inferior epigastric perforator (DIEP) flap (92%). Overall, 72 patients (64%) experienced at least one complication. The most common complications were donor site wound dehiscence (64%) and flap loss (10%). Welch's t-tests demonstrated no significant difference in PMI between groups with and without complications. Subgroup analyses demonstrated no significant differences in PMI. Linear regression demonstrated no correlation between length of hospital stay and PMI.

Conclusion: PMI, despite being recognized as a risk stratification tool in some disciplines, has no significant effect on postoperative outcomes or length of hospital stay in patients with a history of breast cancer undergoing autologous breast reconstruction.

JUVENILE-ONSET RECURRENT RESPIRATORY PAPILLOMATOSIS AND HUMAN PAPILLOMAVIRUS VACCINE UPTAKE: A 19-YEAR RETROSPECTIVE STUDY

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Juvenile-onset recurrent respiratory papillomatosis (JORRP) is a rare, morbid pediatric airway disease caused by vertical transmission of human papillomavirus (HPV) types 6 and 11. Although population-level declines in JORRP have been observed following routine HPV vaccination, contemporary United States (US) data linking long-term incidence trends with treatment utilization remain limited. In this study, we evaluated 19-year trends in JORRP incidence and treatment patterns in the context of increasing HPV vaccine uptake. This retrospective cohort study utilized the TriNetX US Collaborative Network to identify children 18 years of age or younger with JORRP diagnosed between January 1, 2006, and December 31, 2024, using International Classification of Diseases codes. Annual encounter-based incidence per 100,000 patients was calculated for JORRP and documented HPV vaccination encounters. Within the pediatric JORRP cohort, annual utilization of major treatment modalities, including bevacizumab, cidofovir, lesion excision, and tracheostomy, was assessed. A total of 1,854 children met inclusion criteria (mean age 7.9 ± 5.7 years). Over the 19-year study period, JORRP incidence declined by 65.2%, from 3.1 cases per 100,000 in 2006 to 1.1 cases per 100,000 in 2024 ($P < .001$). HPV vaccine incidence increased by 1,448.1%, from 45.5 to 704.4 cases per 100,000 patients over the same period ($P < .001$). Annual JORRP incidence was inversely correlated with HPV vaccine incidence ($r = -0.892$, $P < .001$). Within the pediatric JORRP cohort, utilization of bevacizumab and cidofovir increased significantly, while rates of lesion excision and tracheostomy remained stable. Rising HPV vaccine uptake is associated with a significant reduction in encounter-based JORRP incidence at the population level. Surgical excision remains the predominant management approach for JORRP, with relatively limited adoption of adjuvant therapies despite recent increases.

1. **Title of project**

Development of an HIV vaccine based on 2C6, an antibody targeting a conformational gp41 epitope with cross-clade recognition and robust antibody-dependent cell cytotoxicity

2. **Authors and affiliations**

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3. **Introduction/background**

Since the Human Immunodeficiency Virus (HIV) pandemic began, roughly 80 million people have been infected, resulting in over 40 million deaths. HIV is a blood-borne disease that causes immunodeficiency by targeting CD4 T-cells, and to date, there has not been a successful vaccine against HIV. In our prior studies, we have described novel epitopes on gp41 that are potential targets of future vaccine development. One such antibody, 2C6, binds to a conformational epitope pocket between gp41 protomers and recognizes trimeric HIV Envelope including SOSIP constructs. 2C6 has robust cross-clade antibody-dependent cell cytotoxicity (ADCC) activity and readily recognizes HIV clades A-E. Initial studies suggest that a 25-mer peptide represents enough of the structure of the 2C6 epitope to be recognized.

4. **Objective**

In this study, we sought to assess if 2C6 would be a viable vaccine candidate by performing serum competition and initial murine vaccination.

5. **Methods**

Serum samples were obtained from HIV+ clinical groups: elite controllers (ECs), long-term non-progressors (LTNPs), stable CD4 counts on therapy, and those off therapy. Preliminary murine studies were performed using a His-tagged peptide that included the 25-amino acid peptide that formed the base of 2C6 epitope. Mice were immunized with various formulations including Cobalt-Porphyrin-Phospholipid (CoPoP or CP) formulation and a Saponin-based adjuvant.

6. **Results**

In antibody/serum competition ELISA, antibodies targeting the 2C6 epitope were enriched in LTNPs and in ECs in comparison to their control groups implying an effect on viral control by antibodies targeting the 2C6 epitope. Recognition of SOSIP trimers were particularly improved by CoPoP display of the 25-mer peptide. The results show that our vaccine can induce an immune response that replicates trimer binding, with Porphyrin-Phospholipids and Saponin-derived adjuvants being the best formulations.

7. **Conclusion**

Ongoing studies are addressing a panel of antigens to assess improved recognition and assessing if this vaccine can raise antibodies that have ADCC. Future research will explore interaction between our 2C6-based vaccine and serum from humanized mouse models.

1. **Title of Project**: Direct vs. Video Laryngoscopy and Its Impact on Postoperative Nausea and Vomiting: A Retrospective Review

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3. **Introduction**: Post-operative nausea and vomiting (PONV) is one of the most common yet complex complications of anesthesiology due to its multifactorial nature. Nausea, vomiting, and gag reflex are mediated in part by the glossopharyngeal and vagus nerves, which may be stimulated during airway instrumentation and the micro- or macro-trauma that may accompany it. Mechanical irritation of the oropharynx during intubation is a known complication from anesthesia.

4. **Objective**: We hypothesized that endotracheal intubation via DL is more stimulating to glottic structures, thus increasing the resulting rate of PONV compared to VL.

5. **Methods**: This is retrospective study analyzed 91,048 patients between 2018-2025, including patients 18 to 79 years old with a BMI of 15 to 40 who did not present in emergency/extremis condition (ASA 1-4) and underwent general anesthesia with endotracheal intubation. Exclusion criteria removed any record with missing critical data, preoperative antiemetics, use of a dual lumen tube, noted traumatic laryngoscopy, and documented recreational drug use. Basic descriptive statistics and chi-squared tests were performed to validate data sets for consistency and equivalence. A binary logistic and ordinal regression was performed to determine correlation of risk factors including the effect of DL versus VL and its independent effect on post-operative antiemetic use.

6. **Results**: In total, 14,828 cases qualified for analysis, 5,331 of which utilized VL. Chi-squared test was not significant for laryngoscopy method or smoker status; however, the p-value was <0.05 for ASA class, groups given opioids within 12 hours, gender, and calculated PONV risk score. Laryngoscopy method odds ratio (OR) was 1.004 (95% CI .895-1.126), smokers OR was 0.95, female gender OR was 1.745, and those who received opioids within 12 hours OR was 2.383. Gender, age, ETT size, duration of surgery, ASA class, and opiates within 12 hours of the end of surgery all were noted to be significant in binary logistic regression, while intubation method was not a significant cofactor in the use of antiemetics postoperatively ($p = 0.541$). BMI, age, duration of surgery, ETT size, PONV score, and ASA classification had significant effects on total anti emetic doses ($p <0.05$) in ordinal regression, but intubation method failed to show a significant effect on antiemetic does ($p = 0.524$).

7. **Conclusion**: PONV remains a significant contributor to morbidity in patients undergoing general anesthesia. DL vs VL did not appear to have a significant effect on the presence of antiemetic use post operatively.

Title of Project: Hearing Loss in Hyperthyroid Patients Treated with Tepezza

Authors and Affiliations:
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Introduction:
Hyperthyroidism impacts about 1.2% of the U.S. population, leading to complications that can affect the heart and eyes. Tepezza (teprotumumab-trbwa), a monoclonal antibody that targets insulin-like growth factor 1 receptor, has been used to treat Graves' ophthalmopathy (GED). While Tepezza is beneficial for GED, previous case reports and pharmacovigilance data suggest potential otologic side effects from this treatment.

Objective:
To evaluate the association between Teprotumumab use and hearing loss in hyperthyroid patients using real-world, population-level data.

Methods:
Patients diagnosed with hyperthyroidism (ICD-10 E05) between January 1, 2006, and December 31, 2024, were identified. Two cohorts were created: patients treated with Teprotumumab and matched controls not receiving the drug. Propensity score matching was performed for age and gender. Outcomes included sensorineural (ICD-10 H90.3, H90.4, H90.5, H90.A2), conductive (H90.0, H90.1, H90.2, H90.A1), mixed (H90.6, H90.7, H90.8, H90.A3), and unspecified hearing loss (H91.9).

Results:
A total of 2,164 patients were included (1,082 per cohort; mean age 55.9 years, SD = 14.6), with 793 (73.3%) female and 258 (23.8%) male in each group. Sensorineural hearing loss occurred in 154 (14.2%) of Teprotumumab users versus 51 (4.7%) of controls ($P < .001$), corresponding to a relative risk (RR) of 3.15 (95% CI: 2.31–4.27). Unspecified hearing loss was reported in 78 (7.2%) Teprotumumab patients versus 47 (4.3%) controls ($P = .006$; RR = 1.66; 95% CI: 1.17–2.36). Conductive and mixed hearing loss could not be reliably analyzed due to small sample sizes ($N < 10$ per group).

Conclusion:
Teprotumumab use is associated with a significantly increased risk of sensorineural and unspecified hearing loss in patients with hyperthyroidism. These findings support routine audiologic monitoring during treatment and highlight the need for prospective studies to investigate underlying mechanisms and preventative strategies.

Title: Intracapsular Tonsillectomy vs Extracapsular Tonsillectomy- Factors Influencing Decision Making in Parents

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Introduction: Extracapsular tonsillectomy (ECT) and intracapsular tonsillectomy (ICT) are widely performed pediatric surgeries used to treat recurrent tonsilitis and obstructive sleep apnea. Yet, little is known about the factors parents consider when choosing between these techniques.

Objective: This study aimed to identify decision-making priorities and advice sources influencing parental decision selection of ECT versus ICT.

Methods: This cross-sectional survey study was conducted from July-November 2025 at a children's hospital. Parents of children who underwent ECT or ICT completed surveys including demographics, decision-making factors, and advice sources. Responses on 5-point Likert scales (1=strongly disagree/not important; 5=strongly agree/very important) were compared between groups using Welch's t-tests and Chi-square or Fisher's exact tests.

Results: Among 241 respondents, 116 (48.1%) selected ECT and 125 (51.9%) selected ICT. Respondents were primarily mothers (n=187, 77.6%), predominantly White (n=185, 76.8%) and over half held at least a bachelor's degree (n=135, 56.0%). Children undergoing ICT were older than those undergoing ECT (6.95 ± 2.92 vs 5.54 ± 2.66 years, $p<.001$). Compared with ECT, parents selecting ICT rated bleeding risk (4.53 vs 3.59), length of healing time (4.34 vs 3.66), and expected postoperative pain (4.17 vs 3.58) as more important decision factors (all $p<.001$). Concern for tonsil regrowth was rated as more important among parents selecting ECT (4.01 vs 3.51, $p>.001$). Surgical choice was not associated with parent education, patient gender, or parent race (all $p>.05$). Advice sources were similar between groups, with the child's other parent, pediatricians, and otolaryngologists rated most influential.

Conclusion: Parents prioritized different surgical factors when selecting ICT versus ECT. Recognizing these priorities may streamline preoperative counseling and improve shared decision-making between parents and otolaryngologists.

Title: Agreement in Frequency of Asthma Symptoms between Provider Interviews and Electronic Surveys

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Background: Accurate assessment of asthma severity and control is essential for pediatric clinical care and research. We developed a caregiver survey modeled on the National Institutes of Health (NIH) asthma guidelines and conducted the first study comparing caregiver-reported asthma symptoms on electronic surveys with provider assessments. We hypothesized that responses would show agreement between modalities.

Objective: To assess agreement between caregiver-reported asthma symptom frequency on electronic surveys and caregiver responses to identical questions during clinical interviews, using severity and control categories from the NIH asthma guidelines.

Methods: Caregivers of children aged 4- to 13-years with persistent asthma completed electronic surveys on asthma symptom frequency at baseline and 1-, 3-, 5-, and 7-month follow-ups. Surveys were completed on tablets with a research assistant present at baseline and 7-months, and remotely via web links at 1-, 3-, and 5-months. Advanced practice providers (APPs) asked identical questions during assessments at corresponding time points. Baseline questions were categorized using NIH severity tables, while follow-up questions were categorized using NIH control tables. Bias-corrected and accelerated confidence intervals were estimated using nonparametric bootstrap resampling with 5,000 subject level resamples.

Results: Twenty caregivers participated. At baseline, agreement was substantial for nighttime awakenings ($\kappa=0.61$, $p<0.001$), moderate for daytime symptoms ($\kappa=0.43$, $p=0.004$), and fair for rescue medication use ($\kappa=0.33$, $p=0.042$). During follow-up, agreement was fair for nighttime awakenings ($\kappa=0.37$, $p=0.014$), and not significant for daytime symptoms or rescue medication use. Across all timepoints, activity limitation showed moderate agreement ($\kappa=0.53$, $p<0.001$), while medication adherence showed low agreement ($\kappa=0.15$, $p=0.007$).

Conclusions: Agreement between caregiver surveys and APP assessments varied across domains, with the strongest agreement for nighttime awakenings and activity limitation, and weakest for medication adherence. Findings are limited by the small sample, and future work with larger cohorts is needed to inform electronic survey design in pediatric asthma research.

Title of Project - Nonsurgical versus Surgical Facial Feminization Procedures: A Scoping Review

Authors and Affiliations –

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Introduction/Background – Facial feminization surgery involves facial reconstruction techniques with the intent of producing a more traditionally feminine facial appearance. Reviewed in this study are both surgical and non-surgical facial feminizing procedures, outcomes of these interventions, and guidelines surgeons follow when determining what makes a face appear more feminine.

Objective – Describe surgical and nonsurgical facial feminization interventions in cis- and transgender individuals. Investigate patient's motivating factors in selecting these procedures and describe post-operative outcomes.

Methods – A systemic review was conducted using PubMed, ScienceDirect, and Medline. Articles were sorted following PRISMA guidelines. Primary and secondary endpoints were collected from obtained studies. Primary endpoints included cosmetic outcomes and rate of recovery post-operatively. Secondary endpoints included cost efficiency, insurance coverage, role of hormone therapy, and surgeon decision making regarding feminine features.

Results – Commonly performed surgical interventions included frontonasal angle widening, frontal bossing reduction, and feminizing rhinoplasties. Popular non-surgical interventions included hormone therapy to achieve male pattern hair growth reduction and fillers to modify facial fat distribution and create cheek widening. Economically disadvantaged patients showed predilection towards non-surgical interventions due to lower cost and prominent insurance barriers associated with surgical procedures.

Conclusion – This systemic review provides a comprehensive understanding of surgical and nonsurgical facial feminization interventions. Further research is needed to identify the key contributors to post-operative outcomes for the intervention described. This includes the role of pre-operative hormone replacement therapy, differences in performing facial feminization techniques in transgender versus cisgender patients, and potential long-term complications of surgical and non-surgical interventions.

Title: Diagnostic Accuracy of CT/CTA versus CT/LP for Detecting Subarachnoid Hemorrhage in Emergency Department Patients with Headache

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Background: Aneurysmal subarachnoid hemorrhage (aSAH) affects approximately 700,000 patients worldwide annually with devastating consequences including prehospital mortality rates as high as 22-26% [1,2]. While the traditional gold standard diagnostic approach combines non-contrast computed tomography (CT) followed by lumbar puncture (LP) when CT is negative, contemporary clinical practice has increasingly adopted CT combined with CT angiography (CTA) as the primary diagnostic strategy, with LP often deferred or omitted.

Objective: To determine whether the combined diagnostic strategy of CT/CTA has comparable sensitivity and specificity to the traditional CT/LP approach for detecting subarachnoid hemorrhage in alert, neurologically intact emergency department (ED) patients presenting with acute headache.

Methods: This retrospective cohort study of patients who underwent CT/CTA for headache evaluation between 2021-2022. Patients discharged from the ED with negative imaging and no major diagnoses were included. Exclusion criteria were trauma, neurologic deficits, or prior intracranial hemorrhage/aneurysm. A 6-month follow-up query of medical records was used to identify missed aSAH cases, defined as subsequent aSAH diagnosis within 90 days.

Results: The initial export included 8396 medical records with a CT scan. 7364 cases were excluded upon review due to not having a headache, existing neurological deficits, trauma, prior diagnosis of aneurysm, prior diagnosis of intercranial hemorrhage, transfer of care with nondeterminate initial workup, patients less than 18 years of age, and prisoners. The remaining 1032 cases were queried for subsequent indicators of possible aSAH in the following 6-months from the index visit. Of those cases reviewed, 11 were flagged. These 11 cases were reviewed by an emergency medicine physician. Only one case was determined to have a aSAH during the follow-up period.

Conclusion: CT combined with CTA resulted in a similar sensitivity and specificity to CT/LP when ruling out possible aSAH in patients reporting to the ED with a complaint of headache.

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Training the Next Generation of Clinician Scientists-Abstract for Nnaeto Emechebe
Title: Use of RIG-I agonist as a potential treatment for influenza

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Background:
Influenza is a disease caused by a virus infection of the lungs' upper airways (trachea and bronchi). For elderly, young (infants and children), and immunocompromised people, influenza virus infection is potentially fatal. Currently, the best way we have of combating influenza virus epidemics/pandemics is through annual vaccination of the accepting population. Unfortunately, the vast majority of the annual influenza vaccines are produced in eggs and takes 6-8 months to be designed, manufactured and distributed which often results in less than desired efficacy due to vaccine mismatch with the ultimate circulating strains. We are pursuing development of a nanoliposome-recombinant antigens-adjuvant treatment strategy that will greatly reduce the amount of time required to design and produce the seasonal influenza vaccine leading to more effective and successful protection of the population. This project will focus on assessing a novel adjuvant, double-stranded RNA that stimulates the host anti-viral response through the RIG-I-Type 1 interferon (IFN-I) pathway, in an effort to optimize the immunogenicity of the treatment.

Hypothesis or Goal:
We hypothesize that the RIG-I ligand incorporated into the cobalt-porphyrin-phospholipid-influenza antigens nanoliposome treatment will serve as an adjuvant to increase the formulation's immunogenicity and protection against influenza challenge in mice. Also, when combined with the current adjuvants, monophosphoryl lipid A (MPLA) and QS-21 (saponin extract), a potential synergistic increase in effectiveness may occur.

Objective(s):
1. To develop a nanoliposome fabrication strategy that will incorporate the hydrophilic double-stranded RNA RIG-I ligand into the lumen of the Co-PoP nanoliposome treatment formulation.
2. To test the effectiveness of this novel treatment adjuvant formulation to stimulate the host's innate RIG-I/IFN-I anti-viral pathway.
3. To compare the protection of this treatment formulation vs MPLA and QS-21 adjuvanted formulations in a virus challenge model in mice.

Methods:
1. Treatment nanoliposomes will be fabricated by combining cobalt porphyrin-phospholipid, DOPC, and cholesterol ± MPLA ± QS-21 in ethanol and combining with aqueous double-stranded RNA (sequence from A/PR/8/34 NS-1 gene segment) in a microfluidic device designed by the laboratory. Following removal of the organic solvent by dialysis the solution will be combined with aqueous recombinant influenza hemagglutinin and neuraminidase antigens.
2. Treatment formulations will be added to HEK-Dual RNA hRIG-I cells, incubated, and the resultant supernatant will be analyzed for interferon-stimulating response element and NF-kB activation by measuring luciferase activity in a luminometer and secreted embryonic alkaline phosphatase activity in a spectrophotometer.
3. BALB/c mice will be primed by injecting the treatment formulation into the thigh and boosted 21 days later. Mice will be challenged with 2.5X LD50 of A/California/04/2009pdm09 influenza and monitored for body weight loss and clinical score for 14 days. A subset will be sacrificed at 4 days post-infection to access the lungs' viral load (4 days is time of maximum virus load for the infection) by virus titration of the lung homogenate on MDCK cells with agar overlay.

The Mental and Behavioral Health Benefits of Strabismus Surgery in Children and Adolescents

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Introduction/Background: Strabismus in childhood is associated with impairments in functional performance, psychosocial development, and overall quality of life. Altered social perception begins early, and children with strabismus have been reported to experience higher rates of mental and behavioral health conditions.

Objective: To evaluate the association between strabismus surgery and subsequent mental and behavioral health outcomes in pediatric patients.

Methods: This retrospective cohort study utilized the TriNetX U.S. Collaborative Network, a large multi-institutional database comprising academic and community healthcare systems across the United States. Pediatric patients with diagnoses of exotropia or esotropia who underwent strabismus surgery were identified and propensity score–matched 1:1 to patients with the same diagnoses managed nonsurgically. Matching accounted for demographic variables and clinical factors associated with increased risk of mental and behavioral health conditions. Incidence rates of multiple mental and behavioral health diagnoses over a 10-year period were compared using relative risks (RR) with 95% confidence intervals (CI).

Results: Each cohort included 9,565 patients. Surgical management was associated with significantly lower incidence of pervasive and specific developmental disorders (RR 0.733, 95% CI 0.677–0.794, $p < 0.0001$), behavioral and emotional disorders with childhood or adolescent onset (RR 0.879, 95% CI 0.815–0.948, $p = 0.0009$), anxiety-related and other nonpsychotic disorders (RR 0.903, 95% CI 0.833–0.978, $p = 0.0121$), mood disorders (RR 0.852, 95% CI 0.753–0.964, $p = 0.0108$), and intellectual disabilities (RR 0.819, 95% CI 0.716–0.937, $p = 0.0036$). No significant differences were observed for substance-related disorders or behavioral syndromes associated with physiological disturbances.

Conclusion: Strabismus surgery in pediatric patients is associated with reduced incidence of several mental and behavioral health disorders. These findings suggest that the benefits of surgical correction may extend beyond ocular alignment and support the importance of timely intervention.

Title: Investigating Migratory Mechanisms of Dendritic Cells in Myelodysplastic Neoplasms

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Background: Myelodysplastic neoplasms (MDS) are a class of hematologic malignancies characterized by the accumulation of clonal hematopoietic stem cells, leading to progressive bone marrow dysplasia and dysfunction. Bone marrow failure results in pancytopenia, increased susceptibility to infection, and in ~1/3 of cases, transformation to acute myeloid leukemia (AML). Hypomethylating agents such as decitabine are first-line therapies, but responses are often limited and transient. Improving the efficacy of treatment regimens is crucial to reduce complications and mortality. Dendritic cells (DCs) are antigen presenting cells that drive T-cell activation and have been found to be reduced in number and function in MDS. Reintroducing ex vivo reprogramed DCs holds promise as a therapeutic approach, however, deficits in the ability of MDS DCs to home to lymph nodes and activate immune responses have presented significant barriers to development.

Objective: The purpose of this study was to investigate mechanisms of DC activation and migration utilizing the NUP98-HOXD13 (NHD13) transgenic mouse model of MDS.

Methods: Wild type and NHD13 mice underwent decitabine or vehicle injections prior to collecting spleen and bone marrow samples. Flow cytometry was used to assess expression of CCR7 and other co-stimulatory factors. Bone marrow-derived DCs were cultured to assess DC homing to CCL21 and pro-inflammatory cytokine production.

Results: Spleen DCs displayed a shift towards the CD24+ cDC1 lineage in NHD13 mice treated with decitabine, suggesting HMAs may promote a pro-inflammatory and anti-tumor environment. Bone marrow DCs showed trends of increased MHC I and decreased MHC II expression in NHD13 mice, suggesting a preference towards activating CD8+ cytotoxic T-cells. Bone marrow DCs also displayed impaired homing to CCL21 that was restored with decitabine treatment.

Conclusion: Overall, we hypothesize that defective homing of MDS DCs is mediated by the CCR7/CCL21 axis and that standard-of-care HMA therapy restores DC homing while promoting anti-MDS immune responses.

Authors: Nathaniel Foster
Co-authors: Andrew Kroemer; Faizan Munir; Kaswana Phiri; John J Leddy, MD; Mohammad N Haider, MD, PhD

Title: Recovery Outcomes in Athletes with Sport-related Concussion who Reported Loss of Consciousness or Altered Mental State

Background
Loss of consciousness (LOC) and altered mental state (AMS) are commonly associated with sport-related concussion (SRC) and often raise concern for more significant traumatic brain injury. This study examined whether reported LOC or AMS at the time of injury influences recovery outcomes following SRC.

Methods
We conducted a retrospective review of electronic medical records from athletes evaluated within two weeks of SRC. Participants were followed weekly during the first month post-injury and then subsequently managed by an interdisciplinary team for up to six months, using internationally recommended SRC management guidelines. Return-to-play clearance required symptom resolution and a normal concussion-focused physical examination.

Results
Over an eight-month enrollment period, 190 athletes presented within 14 days of SRC. Of these, 171 reported no LOC (17.8 ± 5 years, 38.6% female, 5.1 ± 3 days post-injury) and 19 reported LOC (19.9 ± 10 years, 26% female, 6.5 ± 3 days post-injury). Mean recovery time was 26.3 days without LOC versus 31.4 days with LOC. Persisting Symptoms after Concussion (PSaC; recovery >28 days) occurred in 22.0% without LOC and 27.8% with LOC. For AMS, 78 athletes reported no AMS (18.3 ± 6 years, 34.0% female, 5.6 ± 3 days post-injury), whereas 107 reported AMS (17.9 ± 5 years, 32.7% female, 4.8 ± 3 days post-injury). Mean recovery time was 25.9 days in the no-AMS group compared with 27.8 days in the AMS group. PSaC occurred in 21.4% without AMS and 23.4% with AMS.

Conclusion
In this cohort of patients with sport-related concussion, neither reported loss of consciousness nor altered mental state was associated with significantly longer recovery times or higher rates of PSaC. These findings challenge the common assumption that LOC or AMS necessarily indicate a higher level of care. The results also highlight a current gap in the current literature- a lack of standardized definition for AMS- which limits consistency across concussion research and demonstrates the need for clearer diagnostic criteria.

Significance
Although LOC and AMS often increase clinical concern for more severe brain injury, our data demonstrates that these acute signs do not significantly influence long-term recovery in SRC. This provides reassuring and evidence-based prognostic information for clinicians, allowing for more informed counseling of patients and families in early SRC management.

High-Precision AI Segmentation and Laser Map Generation for Standardized Panretinal Photocoagulation

Brendan Fox BS, Nicholas Kemmis BS

Objective:

To develop and evaluate a physician-in-the-loop AI system (*RetinaAIM*) for automated panretinal photocoagulation (PRP) planning using ultrawidefield (UWF) fundus images. The system is designed to improve consistency and safety in PRP delivery, particularly in settings with limited access to experienced retinal specialists, by integrating instance segmentation, patient-specific geometric modeling, and automated power modulation to generate reproducible, safety-aware laser treatment patterns.

Methods:

The training dataset consisted of 300 manually annotated UWF images, expanded to 700 images through structured augmentation. A Roboflow 3.0 Instance Segmentation (Fast) model was trained using a 70%/20%/10% train/validation/test split. Images were normalized to 640×640 resolution, and annotations included retinal field (RF), optic disc (OD), and posterior pole (PP). The model first identified the treatable RF, after which anatomical no-go regions (PP, OD) were geometrically subtracted. Remaining regions underwent Poisson-disc sampling with an adjustable pixel radius to generate evenly spaced laser coordinates. Real-time optic disc diameter measurements produced standardized, patient-specific safety margins, which could be further customized by physicians based on pathology and clinical gestalt. Physicians retained full control over spacing, burn density, and power presets.

Results:

The model achieved high segmentation performance (mAP@50 98.0%; mAP@50–95 73.0%; precision 98.7%; recall 98.3%; F1 98.5%). Two PP false negatives were observed at the optimal threshold (68%); however, applying the system's 5% operating confidence level preserved all PP and OD territories, yielding 100% protection of no-go anatomical structures with no unsafe exposures. The planner generated ~700–2,500 evenly spaced candidate burns per image while maintaining full physician oversight. Average planning time was 8.4 seconds on local M-series hardware.

Conclusion:

This prototype demonstrates a high-accuracy, geometry-aware PRP planning system capable of producing standardized, safety-preserving laser maps in near–real time. By unifying robust segmentation, anatomical subtraction, spatial optimization, and physician supervision, RetinaAIM provides a foundation for consistent, patient-specific PRP planning. Such tools may help reduce provider-to-provider variability and expand access to high-quality diabetic retinopathy care in settings with limited retinal specialist availability, including rural and underserved regions globally.

Interpreting *Cutibacterium acnes* in Shoulder Periprosthetic Joint Infection: Phenotype Testing and Classification

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Introduction: *Cutibacterium acnes* (*C. acnes*) is the most common pathogen in shoulder periprosthetic joint infection (PJI) but remains difficult to distinguish from contamination due to its low virulence and presence as a skin commensal. Diagnostic ambiguity and variable antibiotic resistance further complicate management.

Objective: To evaluate whether *C. acnes* phenotypic traits and antimicrobial susceptibility profiles correlate with infection classification under the 2018 International Consensus Meeting (ICM) criteria for shoulder PJI.

Methods: We analyzed 87 *C. acnes* isolates from patients undergoing evaluation for suspected shoulder PJI. Isolates were assessed for hemolysis, aerotolerance, growth rate, and antimicrobial susceptibility using minimum inhibitor concentrations against five antibiotics. Clinical infection status was classified by 2018 ICM criteria, and associations were evaluated using univariate and multivariable analyses.

Results: Only 12.6% (n = 11) of cases met criteria for definite infection, while the majority (48.3%) were classified as probable. Hemolysis and aerotolerance were observed in 51.7% and 54.0% of isolates, respectively, and were strongly associated with one another ($P < .001$); however, neither phenotype was associated with infection classification in univariate or multivariable analysis. Clindamycin resistance was observed in a minority of isolates but varied by standard, with 12.6% classified as resistant by EUCAST and 6.9% as non-susceptible by CLSI. All isolates remained susceptible to vancomycin, doxycycline, and rifampin.

Conclusion: Neither hemolysis nor aerotolerance reliably distinguished definite PJI from non-definite cases, limiting their diagnostic utility in this cohort. Clindamycin resistance was uncommon, yet classification differed based on the interpretive criteria used (CLSI vs. EUCAST), highlighting potential inconsistencies in clinical reporting. Moreover, the predominance of "probable" infections illustrates a critical limitation of current consensus criteria, which may underestimate the true burden of disease caused by low-virulence pathogens. More precise diagnostic frameworks may help address current classification challenges and better support clinical decision-making in shoulder arthroplasty.

Signet Ring Cell Adenocarcinoma Masquerading as Esophageal Achalasia: A Case Report

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Background: Pseudoachalasia is a rare clinical entity that accounts for fewer than 5% of patients presenting with achalasia-like symptoms, often with clinical and radiographic findings that are indistinguishable from primary achalasia. Majority of pseudoachalasia cases are caused by malignancy, most commonly adenocarcinoma of the gastroesophageal junction (GEJ) or gastric cardia. Signet ring cell carcinoma (SRCC) is a particularly aggressive gastric cancer subtype characterized by poor differentiation, diffuse infiltration, and chemoresistance. Here, we present a case of SRCC as the underlying cause of a patient's pseudoachalasia.

Objective: This case report aims to encourage investigation to exclude malignancy in atypical presentations of achalasia-like symptoms, as well as document the uncommon finding of signet ring cell carcinoma as the culprit of pseudoachalasia.

Methods: Data sourced from Buffalo VA Medical Center

Results/Discussion: We report a 76-year-old female with a 3-month history of dysphagia initially attributed to esophageal achalasia based on barium swallow findings demonstrating moderate achalasia. Progressive inability to tolerate any solid and fluid intake prompted inpatient evaluation. Upper endoscopy revealed a circumferential GEJ mass creating near-complete obstruction requiring downsizing from adult to neonatal endoscope for traversal. The stricture was located at 38 cm with extension into the gastric cardia and abnormal antral mucosa. Histopathology confirmed signet ring cell adenocarcinoma.
SRCC's infiltrative growth pattern may potentially delay diagnosis by mimicking achalasia both radiographically and endoscopically. However, several of the patient's clinical red flag features pointed towards pseudoachalasia: her presentation at an older age, shorter duration of symptoms, greater weight loss, and difficulty passing the GEJ during endoscopy. Ultimately, investigation with esophagogastroduodenoscopy (EGD) is necessary to differentiate from primary achalasia and confirm malignancy.

Conclusion: This case underscores the importance of early EGD to detect malignancy in patients with presumed achalasia, especially as early detection of cancers such as SRCC may significantly improve outcomes.

Binge Drinking Disparities Among Sexual Identity Groups in U.S. Adolescents
An Analysis of the 2021 YRBS

James Galligan, MS3, Jacobs School of Medicine and Biomedical Sciences, Apurva Bhatt, MD, Stanford University School of Medicine

Background:
Adolescent binge drinking continues to be a significant public health concern in the U.S. and is associated with increased risk of both immediate injury and long-term substance use disorders. Sexual minority youth (SMY) demonstrate higher rates of substance use relative to their heterosexual peers. Understanding the current patterns of binge drinking among SMY can inform targeted and inclusive public health interventions.

Methods:
Data from the Centers for Disease Control and Prevention's 2021 national Youth Risk Behavior Survey (YRBS) were used in these statistical analyses. The YRBS uses a three-stage cluster sampling design to obtain a nationally representative survey of U.S. high school students ranging from grades 9-12. The final analytic sample included 11,659 respondents with complete data on binge drinking (Q43) and sexual identity (Q65). Binge drinking was dichotomized as any episodes of binge drinking versus no binge drinking in the past 30 days. Sexual identity was categorized as heterosexual, gay/lesbian, bisexual, or other/questioning. Weighted prevalence estimates and 95% confidence intervals (CIs) were calculated using survey-adjusted means. Logistic regression models assessed associations between sexual identity and binge drinking while accounting for sampling weights, stratification, and primary sampling units.

Results:
Bisexual adolescents had the highest weighted prevalence (29.2%; 95% CI: 24.7–33.7) and significantly higher odds of binge drinking (OR = 1.65; 95% CI: 1.35–2.01) when compared with heterosexual youth. Heterosexual adolescents only reported a prevalence of binge drinking of 20.0% (95% CI: 18.7–21.4; n = 8,914). Gay/lesbian and other/questioning groups did not differ significantly from heterosexual students. In sex-stratified analyses, this elevated risk persisted among both male and female students, suggesting that disparities in binge drinking among bisexual youth are not driven by sex differences alone. The final analytic sample included 11,659 adolescents who responded to both the binge drinking and sexual identity items.

Conclusions:
These findings indicate an increased risk of binge drinking among bisexual adolescents. Efforts in both public health and school sectors that specifically address needs of bisexual youth may help reduce substance use disparities and promote equitable behavioral health outcomes.

Title: Data-Driven Characterization of Corneal Endothelial Guttae to Identify Early Risk of Fuchs Endothelial Corneal Dystrophy

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Introduction/Background: Fuchs Endothelial Corneal Dystrophy (FECD) is the most common corneal endothelial dystrophy and a leading indication for corneal transplantation worldwide. Corneal endothelial guttae are a hallmark of FECD, however, their presence does not always indicate progression to clinically significant disease. Distinguishing stable guttae from those associated with progressive endothelial dysfunction remains a major clinical and eye bank challenge.

Objective: To determine whether morphometric features derived from a single specular microscopy image can be used to identify corneal guttae associated with early or preclinical stages of FECD progression.

Methods: We established an IRB-approved, standardized analytic and regulatory framework, including data use agreements, strict inclusion and exclusion criteria, and predefined endothelial morphometric metrics. Specular microscopy images of donor corneas obtained through the Minnesota Lions Gift of Sight eye bank will be analyzed. Corneas with guttae will be compared to age-matched phakic controls without guttae. Endothelial metrics will include cell density, polymegathism, percent hexagonality, and guttae characteristics. Unsupervised clustering will be used to identify natural phenotypic groupings. We will then incorporate a semi-supervised clustering approach by defining three categories: corneas without guttae, at-risk corneas with few guttae, and corneas with likely FECD. If clusters do not separate meaningfully, logistic regression models will be developed to predict guttae progression risk using morphometric features and donor characteristics.

Results: This study will characterize phenotypic subgroups of corneal guttae based on endothelial morphometric features. We anticipate being able to subclassify guttae into groups that are likely or unlikely to progress to FECD.

Conclusion: Improved characterization of early guttae may enhance FECD risk stratification, optimize donor cornea utilization, and reduce unnecessary tissue discard. This data-driven approach supports earlier identification of corneas and patients at risk for FECD progression.

INTRODUCTION: Women remain underrepresented in surgical specialties and continue to experience gender-based disparities in compensation and academic advancement. Although prior studies have examined compensation differences within orthopedic surgery, few have evaluated how these disparities vary by subspecialty and academic rank.

METHODS: This study analyzed faculty compensation data from the 2023–2024 AAMC Faculty Salary Report, restricted to surgical specialties. Data are reported in aggregate form by gender, academic rank, and subspecialty, and include the number of individuals (n), mean salary, and median salary for each group. Because the dataset is provided at the summary level rather than at the level of individual faculty, analyses were limited to descriptive comparisons.

RESULTS: Across all surgical specialties, women earned 36.3% less than men on average. Orthopedic surgery exhibited the third-largest absolute gender pay gap ($187,181; 34.1%), trailing only Thoracic Surgery and Neurosurgery. Within orthopedics, men earned significantly more than women at every academic rank from Instructor through Chief. At the Chair level, statistical parity was observed, with women earning nominally higher mean compensation than men ($1.15M vs $1.11M). Subspecialty analyses demonstrated that compensation disparities correlated with male predominance, with the largest gap observed in spine surgery ($211,318) and a narrower gap in sports medicine ($130,707).

Conclusion: Significant gender-based compensation disparities persist in orthopedic surgery and exceed those observed in most peer surgical specialties. These disparities vary by subspecialty and academic rank and are most pronounced in male-dominated fields. Statistical parity at the Chair level suggests that compensation disparities may narrow at the highest levels of academic leadership. Addressing structural factors that influence subspecialty distribution and academic advancement may be necessary to achieve broader equity within orthopedic surgery.

Title: Low Visibility, Limited Inclusion: Lactation Support and Language on U.S. Residency Websites

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Abstract:

While accreditation requirements include lactation accommodations for all residency programs, the extent of publicly available information on program websites has not been systematically evaluated. This study examined associations between gender composition and lactation policy visibility on residency program websites.

We analyzed 1,852 U.S. residency programs across 20 specialties (10 highest and 10 lowest female applicant representation). Two reviewers independently coded lactation mentions and gender-inclusive language use (e.g., lactating individuals vs nursing mothers). We collected data on program size, resident and attending gender composition, and region. Chi-square tests compared visibility rates between groups. Multivariable logistic regression examined predictors, adjusting for specialty, region, and program characteristics.

Lactation accommodations were mentioned on 2.4% of program websites. Programs in high female representation specialties were 3.2 times more likely to mention policies (4.1% vs 1.3%, $p<0.001$), with visibility ranging from 0% to 22.2% across specialties. Among programs with content, 44.4% used gender-inclusive language, which was 5.3 times more common in high female specialties (2.1% vs 0.4%, $p<0.001$). In multivariable models, program-level gender characteristics were not significant predictors. Western region programs had 61% lower odds of visibility compared to midwestern programs (OR=0.391, p=0.011). Program size was not associated with visibility.

Public visibility of lactation policies remains limited despite accreditation mandates. Specialty-level gender composition strongly predicts visibility while program-level characteristics do not, suggesting field-level culture influences transparency practices. Prospective applicants, particularly those entering specialties with lower female representation, may benefit from enhanced transparency through prominent website placement and inclusive language.

Health Sciences Scholarly Project 2026

Otologic sequelae of Turner Syndrome in pediatric patients

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Introduction:
Turner Syndrome (TS) is a common genetic condition frequently encountered in otolaryngology due to associated craniofacial anomalies. Despite this, data describing the prevalence and characteristics of otologic disorders remain limited.

Objective:
To compare the prevalence and characteristics of otologic disorders in patients with Turner Syndrome versus matched controls.

Methods:
Female patients aged 17 years or younger with Turner Syndrome who had an outpatient visit between 2010 and 2023 were identified using the TriNetX database. A propensity score–matched cohort of unaffected female patients was created. Otologic diagnoses and interventions were identified using ICD-10 and CPT codes, and outcomes were compared between cohorts.

Results:
Among 3,209,910 pediatric patients identified, 2,772 had Turner Syndrome and were matched to 2,772 unaffected controls; mean age was 4.1 years (SD 4.5). Patients with TS had significantly higher rates of conductive (13.7% vs. 2.1%; OR 7.5, 95% CI 5.6–9.9), sensorineural (5.9% vs. 1.0%; OR 6.4, 95% CI 4.2–9.6), and unspecified hearing loss (14.8% vs. 3.6%; OR 4.6, 95% CI 3.7–5.8; all $p<0.001$). Cholesteatoma was more common in the TS cohort (1.2% vs. 0.4%; OR 3.4, 95% CI 1.7–7.0, $p<0.001$). While overall otitis media incidence did not differ ($p=0.09$), TS patients experienced significantly more recurrent episodes ($p<0.001$). Ventilation tube placement was more frequent (10.5% vs. 2.4%; OR 4.8, 95% CI 3.7–6.3, $p<0.001$), with more repeat placements among TS patients ($p=0.006$).

Conclusion:
Pediatric patients with Turner Syndrome experience significantly higher rates of hearing loss, cholesteatoma, ventilation tube placement, and increased otitis media recurrence. These findings support the need for targeted surveillance and earlier otologic intervention in this high-risk population.

Does resident research matter in consideration for orthopaedic fellowship match?

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Disclosures: None

INTRODUCTION: Orthopaedic subspecialty training has reached an all-time high with over 90% of residents pursuing fellowship. Resident academic involvement, including research activities, are commonly encouraged and required; however, there exists little guidance into actual importance of this involvement with consideration for fellowship application.

OBJECTIVE: Evaluate the importance of resident research in the orthopaedic fellowship application process to advocate for support for pertinent research experiences.

METHODS: An IRB approved anonymous survey was disseminated via email to all orthopaedic surgery fellowship directors via REDCap, querying key areas of consideration for resident research that may be considered in a fellowship application. Answers were collected on a 5-point Likert scale and respondents ranked factors based on importance when considering residents. Survey data were analyzed using RStudio software (Posit, PBC; Boston, MA).

RESULTS: 607 programs were contacted via email (67 trauma, 93 sports medicine, 37 shoulder/elbow, 18 oncology, 93 hand, 125 arthroplasty, 76 spine, 46 pediatrics, and 52 foot and ankle). 164 responded to our survey, at a response rate of 27.02%. 44.51% of respondents reported that prior research experience overall of an applicant was very important. When asked to rank each of the more specific research considerations on a Likert scale, the overall cohort demonstrated that the academic reputation of a resident's training program was the most important (32.32% ranked as #1), followed by a resident's prior number of publications (32.32% as #2), and the reputation of the journal of publication (34.15% as #3). These same top 3 rankings were consistent with consideration for sub analysis specific to various subspecialties, except for Oncology.

CONCLUSION: Resident involvement in research is an important factor in consideration for fellowship, with academic reputation of a resident's training program and number of publications among the most important factors overall, as well as within the majority of fellowship subspecialties.

Title: The Oura Ring Versus Medical-Grade Sleep Studies: A Systematic Review and Meta-Analysis

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Objective: To evaluate the validity of the Oura Ring (OR; Oura Health Ltd.) in measuring sleep parameters compared to medical-grade sleep studies including polysomnography (PSG) or actigraphy (ACT).

Methods: A systematic review and meta-analysis of PubMed, Scopus, and CINAHL was conducted in accordance with PRISMA guidelines. Studies were included if they evaluated sleep parameters measured simultaneously by the OR and PSG or ACT. Outcomes assessed included Total Sleep Time (TST), Sleep Efficiency (SE), Wake After Sleep Onset (WASO), Sleep Onset Latency (SOL), Light Sleep Time (LST), Deep Sleep Time (DST), and Rapid Eye Movement (REM) sleep time. Mean differences with 95% confidence intervals were calculated using a random-effects model. A $P < .05$ was considered statistically significant.

Results: Out of 2104 articles, 6 studies (n = 388) were included. There were no statistically significant differences between the OR and PSG/ACT for TST (MD: −2.97 min; 95% confidence interval [CI]: −10.27 to 4.33), SE (MD: −1.32%; 95% CI: −2.76 to 0.12), WASO (MD: 1.64 min; 95% CI: −12.57 to 15.86), SOL (MD: 0.48 min; 95% CI: −2.93 to 3.89), LST (MD: −4.27 min; 95% CI: −24.68 to 16.13), DST (MD: 1.39 min; 95% CI: −10.45 to 13.23), and REM sleep time (MD: −3.89 min; 95% CI: −17.23 to 9.46).

Conclusion: The OR demonstrates comparable accuracy to PSG and ACT for commonly measured sleep parameters, supporting its utility as a self-monitoring tool. This could prompt earlier clinical evaluation in symptomatic individuals or support remote monitoring of sleep.

Cervical Pedicle Screws vs. Lateral Mass Screws in Postoperative Sagittal Alignment and Complications

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Introduction: Posterior cervical instrumentation can be achieved with either lateral mass screws (LMS) or cervical pedicle screws (CPS). LMS are widely used due to a lower complication risk, whereas CPS provide biomechanical advantages, including higher pullout strength and greater stability, but carry increased neurovascular risk. To date, no study has directly compared radiographic outcomes and complications between these fixation strategies.

Objective: To evaluate the impact of LMS versus CPS on cervical sagittal alignment and safety in posterior cervical fusion surgery.

Methods: 80 consecutive patients undergoing posterior cervical fusion with either LMS or CPS at a single academic center were included. Revision surgeries were excluded. Sagittal alignment parameters were measured preoperatively, postoperatively, and at late follow-up. Postoperative outcomes included complications, wound infection, length of stay, readmission, reoperation, and pseudoarthrosis. Group comparisons were performed using standard statistical tests, with significance defined as $p < 0.05$

Results: CPS patients had higher baseline T1 slope, C1–C2 angle, and T1–CL mismatch. Postoperatively, CPS maintained superior sagittal alignment with lower cSVA (30.0 mm vs 40.2 mm, p=0.042) and persisted at late follow-up (32.3 mm vs 45.0 mm, p=0.003), with improved subaxial alignment (C2–C7 angle −7.8° vs 1.3°, p=0.021) and T1–CL mismatch equalizing (p=0.205). CPS was associated with higher overall complication rates (46.9% vs 20.8%, p=0.044), including wound infection (25.0% vs 4.1%, p=0.018) and readmission (40.6% vs 6.3%, p<0.001), whereas LMS had more pseudoarthrosis (6.3% vs 0%, p<0.001). Length of stay and reoperation rates were similar.

Conclusion: CPS fixation provides superior maintenance of cervical sagittal alignment compared with LMS in global balance and subaxial alignment, but was associated with increased postoperative complications. LMS fixation demonstrates less durable alignment correction but lower early morbidity. These findings highlight the importance of individualized surgical planning, with fixation strategy tailored to alignment requirements and risk profile.

ABSTRACT

Title: A Cross-Ancestry Analysis Identifies Two Protective Loci for Glaucoma in the Timorese of Oceana

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Purpose: Glaucoma is the leading cause of irreversible blindness worldwide, the most common form being primary open-angle glaucoma (POAG). The population of Timor-Leste is comparatively protected from POAG, providing an opportunity to analyze known single nucleotide polymorphisms (SNPs) which confer risk or protection in this disease. This study explores such SNPs in a rigorously genotyped and phenotyped Timorese cohort to identify informative variants for POAG development.

Methods: A Timorese cohort of 535 subjects (267 male) was characterized as outlined by Morrison et al. (2015). 84 known POAG protective SNPs were obtained from the Million Veteran Program. SNPs in 127 POAG risk loci previously identified in a multi-ancestry GWAS meta-analysis were also collected (Gharahkhani et al., 2021). SNPs from each group that were present in the Timorese cohort were separately analyzed. For both SNP groups, occurrence of each allele was compared between the Timorese and European, African, and Amerindian cohorts of the NIH All of Us database. Chi-square tests with Bonferroni correction, odds ratios, and 95% confidence intervals were calculated to assess differences. Significant differences in the risk and protective groups ($p < 0.00167$ and $p < 0.00238$, respectively) were reported.

Results: Of the 127 initial risk loci, 10 SNPs were present in both the Timorese cohort and the All of Us database. Of these, 7 SNPs showed significantly lower risk allele frequency in the Timorese than at least one of the database populations. The risk allele of 3 SNPs had significantly lower frequency in the Timorese than all three database populations at the loci CDC7/TGFBR3, LOC105374754, and LHPP (rs1192415, rs6713914, and rs10430737). Of the 84 protective SNPs, 7 were present in both the Timorese cohort and the All of Us database. Of these, 5 SNPs showed significantly higher frequency of the protective allele in the Timorese than at least one of the database populations. The protective allele of 2 SNPs had significantly higher frequency in the Timorese than all three database populations, at the loci CDC7/TGFBR3 and TRIB2/MIR3125 (rs1192415 and rs2113818).

Conclusions: Our preliminary results underscore the importance of studying isolated populations with low POAG burden to identify protective therapeutic targets and develop interventions. Further investigation in disease-affected tissue will be necessary to validate mechanisms for neuroprotection.

Multidisciplinary Development of Adaptive Care Plans for Patients with Disabilities to Improve Healthcare Equity

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Introduction/Background: Individuals with disabilities face under-recognized healthcare inequities, including discrimination, bias, statistically worse care, poorer outcomes, and manifestations of the "disability paradox." Medical professionals are frequently under-resourced and overwhelmed in the care of this population due to a variety of factors including a paucity of relevant medical education and the lack of a defined approach to care, particularly in the case of individuals with developmental disabilities.

Objective: To develop and implement an Adaptive Care Pathway for patients with disabilities to advocate for the dignity and unique needs of individuals with developmental disabilities (IDD) in the healthcare setting.

Methods: Adaptive Care Plans are developed with awareness of the unique needs of individual patients with considerations including functional status, cognitive capacity, ability to communicate and self-advocate, medical complexity, emotional and/or behavioral needs, and therapeutic interventions. The process emphasizes input from a multidisciplinary medical team and from the patient, family, and/or caregivers. This approach utilizes the patient's values, preferences, and support needs as a foundation for compassionate, intentional, and ethically appropriate goal-concordant care. Adaptive Care Planning addresses moral distress and increases equitable access to dignity-centered care.

Results: Through implementation of the Adaptive Care Pathway, patients with disabilities experienced expanded access to cancer-directed therapies that may not have been otherwise feasible. Patients and caregivers found that implementation of the Adaptive Care Pathway benefited the overall well-being of patients and decreased the stress levels of families and caregivers. Staff experienced decreased moral distress in challenging patient cases and particularly appreciated the increased support around complex shared decision-making. Staff also benefited from early proactive guidance surrounding the care of this complex patient population, including behavior management strategies and clinical guidance.

Conclusion: Implementation of the Adaptive Care Pathway improves healthcare equity and access to dignity-focused care for people with disabilities and decreases staff moral distress. Wider implementation of Adaptive Care Pathways will further increase healthcare equity for patients with disabilities.

Developing a Spontaneous Nanoliposome Antigen Particle (SNAP) Vaccine Against Severe Fever with Thrombocytopenia Syndrome Virus (SFTSV)

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Background: Severe fever with thrombocytopenia syndrome (SFTS) is an acute zoonotic disease caused by the SFTS virus (SFTSV), a recently identified bunyavirus that is transmitted primarily by the Asian long-horned tick (*Haemaphysalis longicornis*), with reports of human-to-human transmission. SFTS presents with nonspecific symptoms including fever, malaise, thrombocytopenia, leukopenia, and gastrointestinal distress. Since the first reported human case in China in 2012, SFTS has spread to Japan and South Korea. With a fatality rate of approximately 20%, lack of established prophylaxis or vaccines, and the logistical challenges of cold-chain-dependent vaccines, a thermostable and effective vaccine is urgently needed.

Objective: We aimed to develop a thermodynamically stable Spontaneous Nanoliposome Antigen Particle (SNAP) vaccine using cobalt-porphyrin-phospholipid (CoPoP) liposomes that targets the SFTSV envelope glycoprotein (Gn) that mediates host cell entry.

Methods: Mice were immunized intramuscularly with our CoPoP liposome vaccines on days 0 and 14. Serum collected on day 28 was analyzed for antigen-specific IgG titers by ELISA and for neutralizing activity. Simulated Gn mutations were evaluated for reactivity with monoclonal antibody MAb4-5 by slot blot. Thermostability was assessed at multiple temperatures with the addition of buffer additives.

Results: CoPoP liposomes irreversibly bound His-tagged GnSD123 and successfully incorporated MAb4-5 without degradation after 4 weeks at room temperature. Post-vaccination sera neutralized SFTSV antigen, and GnSD123 mixed with CoPoP generated the highest antigen-specific IgG titers compared with other adjuvants. The vaccine remained stable at 4 °C and room temperature for 4 weeks. The S298F Gn mutation demonstrated superior thermostability at 37 °C, which was further enhanced by buffer additives.

Conclusion: CoPoP nanoliposomes offer a rapid, stable, and immunogenic platform for thermostable SNAP SFTSV vaccine development and can have even broader applicability to other pathogens. Future work will quantify protein stability across temperatures and optimize adjuvant and buffer combinations.

Does Cytoreductive Nephrectomy(CN) confer survival benefit in the era of Immuno-Oncology(IO) therapy

Background
The therapeutic landscape of metastatic renal cell carcinoma (mRCC) has undergone substantial evolution over recent decades. Treatment paradigms are commonly categorized into three distinct eras: the cytokine era, the targeted therapy era, and the immunotherapy era. Previous landmark trials, such as **CARMENA**, have investigated the role of cytoreductive nephrectomy (CN) in the cytokine and targeted therapy eras; however, robust evidence regarding its value in the immunotherapy era remains limited.

Objective
This study aimed to evaluate the role and survival outcomes associated with cytoreductive surgery in patients with de novo mRCC treated with immune-Oncology(IO) therapy.

Methods
A retrospective review was conducted using our institutional database to identify patients diagnosed with de novo mRCC and treated with IO therapy between 2014 and 2025. Patients were stratified into three groups based on surgical timing: **upfront cytoreductive nephrectomy (UC)**, **deferred cytoreductive nephrectomy (DC)**, and **no cytoreductive nephrectomy (NC)**. Demographic, clinical, and pathological variables were collected and analyzed. Survival outcomes were assessed using Kaplan–Meier analysis.

Results
A total of 99 patients met inclusion criteria: 61 (62%) underwent UC, 16 (16%) DC, and 22 (22%) received no CN. Median age at diagnosis was 59 (IQR 56-64), 68 (IQR 66-69), and 67 (IQR 55-82) years for the UC, DC, and NC groups, respectively. Median ECOG performance status and IMDC risk categories were comparable across groups (ECOG = 1; intermediate IMDC). Immunotherapy was used as the first-line systemic therapy in 100% of DC, 95% of NC, and 54% of UC patients. The 5-year overall survival (OS) rates were 52.8% for DC, 32.6% for UC, and 11.7% for NC (p = 0.001). A statistically significant difference in overall survival was observed between patients who underwent cytoreductive surgery and those who did not (hazard ratio [HR] = 0.41; 95% confidence interval [CI], 0.14-0.58; *P* = 0.0005). No significant difference in OS was observed between the DC and UC groups (HR = 1.7; 95% CI, 0.89-3.36; P= 0.17).

Conclusions
Our institutional experience suggests that cytoreductive nephrectomy continues to confer a survival advantage in patients with de novo mRCC treated in the immunotherapy era. No statistically significant difference in survival outcomes was observed between upfront and deferred cytoreductive nephrectomy, supporting a selective and individualized approach to surgical timing in this patient population.

Title: Pre-existing Mental Health Diagnosis and Outcomes after Anterior Cruciate Ligament Surgery

Authors and Affiliations

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Background: Mental health (MH) has been linked to anterior cruciate ligament (ACL) reconstruction outcomes. This study explores the influence of age and work-related injury status on these relationships.

Objective: We hypothesized that pre-existing MH disorders negatively affect patient-reported outcomes, that new-onset MH disorders occur post-ACL reconstruction, and that age and injury mechanism play key roles.

Methods: In a retrospective case series, male and female adult (≥ 18 years) who underwent ACL reconstruction between October 2016 and October 2023 were included if they completed pre-surgery KOOS and SF-12 scores and at least three of five follow-up questionnaires over one year. Data were collected via the Outcomes Based Electronic Research Database. Of 636 reconstructions, 365 patients met criteria. Fifty (13.7%) had a pre-existing MH diagnosis: anxiety (n=13), depression (n=22), anxiety and depression (n=11), other (n=4).

Results: Patients with pre-existing MH diagnosis reported significantly worse pain, ability to perform ADLs and quality of life at 2 weeks post-surgery only. Among 315 patients without prior history of MH disorder, 8 (2.5%) developed a new MH diagnosis within one year. Younger patients (≤ 25 years) reported better on every KOOS subscale prior to surgery compared to older (> 25 years). Work-related injuries were associated with older age, worse pre-surgery outcomes, and a higher rate of new MH diagnoses compared to sport/recreation injuries (7% vs 1.6%, p=0.018)

Conclusion: This study observed a 2.5% rate of new MH diagnoses within one-year post-ACL surgery, consistent with existing studies. While age did not directly influence MH diagnoses, we did identify consistently lower KOOS scores in patients over 25. Unique to our study, work-related injuries were associated with a higher rate of new MH diagnoses and poorer PROMs when compared to sports/recreation-related injuries. Identifying this relationship between work-related injuries and new MH diagnoses informs targeted interventions and future research into psychosocial factors that may affect recovery scores.

Title: Operative Management of Perforated Diverticulitis: Identification of Patient Factors to Guide Management

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Introduction:
Acute diverticulitis, while common, may progress to severe disease requiring emergent surgery due to perforation or abscess. Hartmann's Procedure (HP), while historically the standard of care, is associated with reduced quality of life and risks related to permanent stoma or reversal surgery. Primary anastomosis (PRA), with diverting loop ileostomy (PADLI) or without, has emerged as a safe alternative, yet uncertainty remains regarding which patient populations are best suited for each procedure.

Objective:
To identify patient-specific demographic, laboratory, and physiologic factors associated with improved outcomes for postoperative emergent diverticulitis using National Surgical Quality Improvement Program (NSQIP) data. Ultimately, this data will inform the development of a clinical decision-making algorithm to guide operative selection between PRA and HP.

Methods:
Patients undergoing emergent surgery for perforated diverticulitis were identified within the NSQIP database using appropriate CPT codes. Surgical management was categorized into three cohorts: HP, PADLI, and PRA without diversion. Initial analyses include descriptives and univariate analyses comparing the three cohorts. Additional multivariate analyses and risk-adjusted regression modeling are underway.

Results:
Among 12,367 patients undergoing emergent surgery for diverticulitis, significant differences in baseline demographics and clinical characteristics were observed across operative strategies. Patients undergoing HP were older and had higher rates of preoperative sepsis, steroid use, bleeding disorders, and hypertension compared with those receiving PRA or PADLI ($p<0.0001$). HP patients exhibited higher rates of surgical site infection and pneumonia, while thirty-day mortality was significantly lower in the PADLI patients ($p<0.0001$).

Conclusion:
These findings suggest that age, comorbidity burden, and physiologic status could influence operative selection and may help identify patients who could safely benefit from PRA in the emergent setting in exchange for a better quality of post-operative life. Additional analyses are underway to create an evidence-based framework for the development of clinical decision support tools to guide operative management.

A bidirectional relationship exists between oral health and systemic co-morbidities. Evidence suggests a higher risk of adverse cardiovascular events and increased incidences of cognitive impairment and neurological conditions in patients with poor oral hygiene and periodontitis. Extracellular vesicles (EVs) are heterogenous population of lipid-enclosed membrane vesicles composed of bacterial (called outer membrane vesicles, OMVs) and host cell-derived vesicles (called exosomes). EVs are released in response to various stimuli and carry a variety of bioactive cargo such as proteins, DNA, lipids, and micro-RNAs (miRNA), that regulate biological responses and provide intercellular communication in both physiological and pathological processes. EVs represent a novel way for bacterial components and host-derived molecules to interact at both local and distant tissue sites to modulate cellular function. Oral microbial dysbiosis (including multiple *Treponema* species) occurs during clinical periodontitis, and the Visser laboratory group has shown that *Treponema*-derived OMVs promote a dysfunctional aortic and brain microvascular endothelial cell inflammatory environment in vitro. In this present study, we investigated how *Treponema denticola (TD)* exposure modifies exosome production from human gingival fibroblasts (HGFs) or telomerase-immortalized gingival keratinocytes (TIGKs), and how these EVs modify inflammatory production and signaling in a model cell endothelial cell line. Treatment of endothelial cells with Td- derived host-cell EVs decreased total cellular serine/threonine phosphorylation compared to sham-derived EVs along with a trend of increased IL-1B secretion. The results of our study suggest that TD bacterial exposure can alter EV cargo to modify endothelial cell signaling and promote inflammation. This provides feasibility for the basis of further optimization of protocols to explore inflammatory processes in the connect of vascular biology related to endothelial cell dysfunction, blood-brain-barrier physiology and neuroinflammation.

Title of Project- Postpartum Lactation Support Among Patients Prescribed Buprenorphine During Pregnancy

2. Authors and Affiliations- Caleigh Loughran, BA[1]; Rachel Pak, BS[1]; Marissa Catanzaro, MD, MA[1,2]; Mackenzie Cronin, MD, MS Ed[1,3]; Nader Nader MD, PhD[1,2]

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3. Introduction/Background- Buprenorphine has become the preferred pharmacotherapy for the treatment of opioid use disorder in pregnancy for its efficacy and ease of use. The American College of Obstetricians and Gynecologists recommend breastfeeding in patients prescribed buprenorphine for benefits including decreasing the severity of neonatal abstinence syndrome, decreasing the risk of needing pharmacotherapy for the infant, and shortening hospital stays (1). This is not practiced consistently in clinical practice and currently in the Western New York region, there is no formally established protocol for the intrapartum and postpartum management of patients prescribed buprenorphine.

4. Objective- The goal of our research was to evaluate current management of patients on buprenorphine when admitted to labor and delivery at Kaledia Health facilities. After synthesizing this data, we will create an evidence-based protocol for this patient population to ensure equity in care provided.

5. Methods- A retrospective chart review was completed on 115 patients admitted to a Kaleida Health facility between 2017 and 2024. Variables collected included patient demographics, obstetric characteristics, documented intrapartum buprenorphine dosing and administration during labor, intrapartum analgesia and anesthesia modalities, and support services offered.

6. Results- Our data revealed that roughly 55% (63/115) of patients were discharged with plans to breastfeed. Of these patients who intended to breastfeed, only 48% (30/63) received a lactation consult.

7. Conclusion- Our results demonstrate that despite a considerable number of our patient population intending to breastfeed, less than 50% of patients who intended to breastfeed were offered a lactation consult. This disparity reinforces the need for an evidence-based protocol for the intrapartum care of patients prescribed buprenorphine within the Kaleida Health system. Future directions include the development and implementation of a protocol to ensure consistent care across this population.

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CHARACTERIZATION OF CORNEAL ENDOTHELIAL CHANGES IN SLC4A11 KNOCKOUT MICE USING HYPERION IMAGING MASS CYTOMETRY

Eric A. Lovett Jr., BS, MBA, Aniko Marshall, Mark D. Parker, PhD

The SLC4 family of transporters is involved in cellular ion homeostasis, and SLC4A11 plays an important role in maintaining corneal clarity. Loss of SLC4A11 function leads to corneal endothelial dysfunction and edema, although the associated cellular changes remain incompletely characterized.

This study evaluates the use of Hyperion imaging mass cytometry (Standard BioTools, South San Francisco, CA) to characterize corneal tissue through highly multiplexed, single-cell protein analysis while preserving tissue architecture, enabling simultaneous visualization of multiple corneal markers and identification of gross spatial expression patterns even in very small sample sizes.

Frozen sagittal cross-sections of corneal tissue from SLC4A11 knockout and wild-type mice were analyzed using targeted antibody panels against markers of cell architecture, fibrosis, and inflammation. Initial qualitative analyses revealed differences in marker expression between knockout and wild-type tissue, with the most prominent changes localized to the corneal epithelium. Most notably, decreased expression of CD31 (a marker commonly associated with vascular endothelium and neovascular processes) and CD44 (a marker of inflammation and cellular senescence), along with increased expression of the proprietary marker ICSK2, was observed in the epithelium of SLC4A11 knockout mice compared to wild-type controls.

These findings highlight the feasibility of applying Hyperion imaging mass cytometry to corneal tissue for spatially resolved, multiplexed protein analysis. However, important limitations were encountered in downstream data analysis, including challenges with automated cell segmentation, poor performance in acellular stromal regions, and difficulty accurately classifying squamous epithelial and endothelial cell types. As a result, analysis was most informative when performed through direct image-based inspection rather than reliance on numerical outputs alone. Quantitative analysis may instead be more appropriately performed using software such as ImageJ (National Institutes of Health, Bethesda, MD). Additionally, interpretation of proprietary control markers such as ICSK2 was limited, despite visually distinct signal pattern differences between the knockout and wild-type. Given the limited sample size, no disease-specific conclusions can be drawn at the present time, but additional samples will be tested in the future to explore this. Overall, this work underscores both the promise and current analytical challenges of Hyperion imaging for corneal research and emphasizes the need for optimized imaging-based analysis pipelines tailored to ocular tissues, which could open the door for better understanding of pathophysiology and alternative treatment modalities in the future.

HYPERTENSION MANAGEMENT: A QI PROJECT AIMED TOWARDS DEVELOPING A STANDARDIZED HYPERTENSION PROTOCOL IN A MED-PEDS PRIMARY CARE SETTING

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Introduction: Hypertension (HTN) is the most prevalent modifiable risk factor for premature cardiovascular disease, affecting nearly 115 million American adults. Although 47.7% of adults have a diagnosis of HTN, only 20.7% have their blood pressure (BP) controlled to goal of <130/80. Previous work found that using a standardized protocol improves BP management.

Objective: The purpose of this project was to develop an evidence-based HTN control protocol to be followed by all providers with the goal of enhanced BP control and reduction of premature cardiovascular morbidity for patients with HTN.

Methods: 2025 AHA/ACC HTN guidelines were reviewed to determine best practice and follow-up strategies for management of elevated BP and stage 1 or 2 HTN. Prior to initiating this project, the protocol for elevated BP on initial vitals entailed placing a *"Post-It note"* on the exam room door, alerting the provider to re-measure BP on their assessment. If BP remained elevated on second reading, the preference of the examining provider dictated further follow-up and therapy. Based on evidence, and recognizing the importance of BP control, a standardized HTN management protocol to be used by all providers in the clinic was developed and piloted.

Results: A presentation outlining the HTN control protocol was provided to all providers and staff. The protocol clearly defined elevated BP (120-129/<80mmHg), stage 1 HTN (130-139/80-89mmHg), and stage 2 HTN (>140/>90mmHg). Goals for lifestyle modification, steps to initiate and escalate medications from monotherapy to single-pill combination, logs for home BP monitoring, and timelines for expected follow up were included. The HTN control protocol was distributed and integrated into the electronic medical record (EMR) to increase ease of access and prompt initiation of recommended management.

Conclusion: Providers report satisfaction with the new protocol and the clarity it provides. Future steps will involve evaluating the effectiveness of the developed framework in management of patient HTN.

Title: Adverse Events in Cryoablation and Radioablation Treatment of Chronic Rhinosinusitis: A MAUDE Database Comparative Analysis

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Introduction: Cryoablation and radioablation of the posterior nasal nerve are two increasingly popular approaches to treatment-resistant chronic vasomotor rhinitis. They are marketed as convenient, in-office procedures with lower risks than traditional surgical options. However, there are limited studies evaluating adverse events with these procedures.

Objective: This study aims to analyze and compare adverse events (AEs) associated with cryoablation and radioablation.

Methods: The Food and Drug Administration's Manufacturer and User Facility Device Experience (MAUDE) database was queried for AEs associated with Clarifix (cryoablation) and RhinAer (radioablation) devices, using product codes GEH and GEI. These reports are volunteered by healthcare professional reporters. Reports from 3/2017 to 10/2025 were included. AEs were included if device problems were categorized as an “Adverse Event” and excluded if not. Duplicates were excluded. An established MAUDE complication-reporting stratification, based on the Clavien-Dindo scale, was used to grade complication severity. AEs were categorized by event date, manufacturer, patient problem, specific outcomes, and event onset.

Results: 31 Clarifix and 31 RhinAer AE reports met these criteria. Epistaxis was the most commonly reported AE for both Clarifix (n=28, 90.3%) and RhinAer (n=28, 90.3%) devices. Out of all of the reported AEs, RhinAer patients underwent significantly more related hospitalizations than Clarifix patients (n=23, 74.2% vs n=11, 35.5%, $p<.05$). RhinAer patients also underwent significantly more transfusions than Clarifix patients (n=16, 51.6% vs n=4, 12.9%, $p< .05$). The majority of AEs resulted in Grade 3-4 complications, requiring major intervention or posing life-threatening harm to patients (n=27, 87.1% Clarifix vs n=25, 80.6% RhinAer).

Conclusions: Both cryoablation and radioablation have the potential to result in AEs that cause significant harm to patients, particularly severe epistaxis. Further analysis must be completed to assess why patients experience these events and how to minimize negative patient outcomes.

PREOPERATIVE CRP AND ESR WITH PRIOR COVID-19 AS PREDICTORS OF VASCULAR INFLAMMATION AND OUTCOMES IN MICROSURGICAL BREAST RECONSTRUCTION

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Background: Patients who undergo surgery with a perioperative COVID-19 infection experience increased postoperative morbidity and mortality, including thromboembolic events. It is theorized that COVID-19 infection induces endothelial dysfunction and vascular inflammation, particularly microthrombi. This is particularly important in microsurgery, where anastomotic success depends on intact vascular functioning. However, it remains unclear whether vascular inflammatory changes persist beyond infection resolution and contribute to complications in microsurgical breast reconstruction in patients with previous COVID-19 infections that are resolved at the time of surgery.

Objective: This study aims to evaluate whether the timing and frequency of prior COVID-19 infections and preoperative inflammatory markers (CRP and ESR) are associated with vascular inflammation on pathology and postoperative complications following microsurgical breast reconstruction.

Methods: This is a prospective study at Erie County Medical Center within the Division of Plastic and Reconstructive Surgery, with a target enrollment of 30–50 patients undergoing microsurgical breast reconstruction. Eligible patients must have a history of COVID-19 infection or vaccination within the prior 3 years. Patients with underlying inflammatory conditions are excluded. Patients are recruited in their preoperative physical, where COVID-19 history is obtained and CRP/ESR are added to standard bloodwork orders. On the day of surgery, intraoperative vascular tissue that is typically discarded is sent for pathology. Complications are assessed through 3 months postoperatively. Specimen and data collection has begun and is ongoing, results are not yet available. Multinomial logistic regression will be used for analysis.

Conclusion: Characterizing the pathophysiologic mechanism of the vascular inflammatory process that COVID-19 induces, while defining preoperative screening measures regarding COVID-19 history and preoperative inflammatory markers, has the potential to significantly inform risk stratification and surgical timing in microsurgical breast reconstruction. This work may support incorporating targeted inflammatory screening into preoperative microsurgical evaluation to optimize outcomes and improve patient care.

DEVELOPMENT OF A COST-EFFECTIVE, ANATOMICALLY REALISTIC SKIN BIOPSY TRAINING MODEL USING PHOTOGRAMMETRY AND 3D PRINTING

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Medical professionals rely on a variety of simulation models to practice procedural and surgical techniques to enhance their skills. However, existing skin biopsy training models are limited by cost, accessibility, and inadequate anatomical realism. This study aims to develop an accessible, reproducible process to create realistic and cost-effective silicone-based training tools to practice skin biopsy techniques.

Anatomically realistic skin biopsy training models were generated using a multi-step process incorporating photogrammetry, digital manipulation, 3D printing, and silicon casting. Creation of the 3D printed mold began with identification and excision of human skin lesions from cadaveric donors. High-resolution, overlapping photographs were captured using a Nikon DSLR camera and processed in RealityCapture to construct 3D digital replicas of each lesion. Blender Software was employed to refine lesion topography and arrange five lesions on a single 5 x 2 inch base. The base was inverted and raised walls were generated on all sides to form a reservoir for the silicone rubber. Final designs were 3D printed to produce a reusable mold for silicone model creation.

Ecoflex™ 00-30 Platinum Cure Silicone Rubber (Smooth-On, Inc.) was poured in sequential layers to simulate the layered structure of human skin. The resulting silicone replicas provide a durable and anatomically realistic model for practicing skin biopsy techniques. The 3D printed mold is reusable, enabling repeated production of silicone training models.

In the future, the .OBJ and .STL files of the 3D mold will be shared, allowing other medical institutions and personnel to print their own molds and increasing access to realistic dermatologic training tools. This project will increase the availability of realistic, low-cost training tools, improving medical professional's confidence in technical biopsy skills and supporting higher-quality patient care in dermatology.

Title of Project
Multifactorial Dyspnea in a Medically Complex Patient: A Case Study Highlighting Diagnostic Uncertainty

Authors:
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Introduction / Background
Dyspnea is a common presenting complaint with a broad differential, especially in patients with multiple comorbidities. When several potential etiologies coexist, overlapping and evolving disease processes can obscure diagnosis and challenge traditional algorithms. This case illustrates the complexities of evaluating dyspnea in medically complex patients.

Objective
To present a case of multifactorial dyspnea in a patient with complex comorbidities and to examine a structured approach to diagnosis and management under clinical uncertainty.

Methods
We conducted a retrospective single-patient case analysis using chart review, diagnostic testing, imaging studies, and hospital course evaluation. A focused literature review contextualized strategies for evaluating dyspnea with multiple contributing etiologies.

Results
A 77-year-old man with multiple cardiovascular comorbidities (heart failure with a reduced ejection fraction, aortic stenosis with a transcatheter aortic valve replacement, coronary artery disease with prior coronary artery bypass graft, bilateral carotid stenosis with prior bilateral carotid stenting) and chronic kidney disease presented with progressive dyspnea and functional decline. Initial treatment for suspected heart failure exacerbation provided only transient improvement. Given the complex clinical dilemma, further investigation conducted with transthoracic echocardiogram revealed severe right ventricular dysfunction which raised concern for pulmonary embolism. Limited confirmatory imaging options for this patient scenario led to the start of empiric heparin therapy, which resulted in marked clinical improvement. A follow up echocardiogram showed subsequent recovery of right ventricular systolic function, supporting the diagnosis of pulmonary embolism. He later developed recurrent respiratory symptoms, and evaluation identified a concurrent chronic obstructive pulmonary disease (COPD) exacerbation and multifocal Pseudomonas aeruginosa pneumonia.

Conclusion
This case illustrates that dyspnea in medically complex patients is often multifactorial and dynamic. A structured yet adaptable diagnostic approach, guided by clinical probability, imaging appropriateness, and longitudinal follow-up, is essential for accurate diagnosis and effective management. Such cases offer important insight into navigating diagnostic uncertainty in real-world clinical practice.

MEDICINE FOR TOMORROW: INSPIRING UNDERREPRESENTED YOUTH TO PURSUE CAREERS IN MEDICINE

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Introduction/Background

Persistent healthcare disparities disproportionately affect racial and ethnic minorities and individuals from disadvantaged socioeconomic backgrounds. Increasing diversity within the medical workforce has been associated with improved health outcomes and equity, yet the majority of U.S. medical students come from the highest income quintile, with continued underrepresentation of Black, Hispanic, American Indian, and Alaska Native individuals. Prior studies suggest that early STEM exposure can positively influence interest in health related careers.

Objective

Medicine for Tomorrow (M4T), a UB Pediatrics Resident founded program, aimed to evaluate whether early, hands-on medical exposure through after school workshops increases youth interest in pursuing medical careers. A secondary objective was to assess opportunities for medical trainee engagement within the community.

Methods

Three age tailored workshops focused on basic medical skills, CPR, and bleeding management were developed and delivered by trained medical trainees to youth ages 5–18 at community centers and schools in the Greater Buffalo area. Youth interest in medical careers was assessed using verbally administered pre- and post-workshop surveys collected via raised-hand responses. Medical trainee experiences were evaluated using a cross-sectional survey.

Results

Data collection and statistical analysis is still ongoing. Participants represented various demographic backgrounds. Post-intervention interest in medical careers increased by 30.9 percentage points (185% relative increase) among youth under 12 years old and by 5.7 percentage points (7.9% relative increase) among those over 12 years old. Medical trainees reported meaningful community engagement through participation in the program.

Conclusion

Preliminary findings suggest that early, interactive medical exposure may increase youth interest in healthcare careers. Expansion of trainee recruitment and curriculum development, including career focused sessions for older youth, may further strengthen M4T’s impact on workforce diversity and health equity.

Title of Project
Bridging the Gap: National Patterns of Telehealth Utilization in Urology

2. Authors and Affiliations
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3. Introduction/Background
Telehealth (TH) utilization in urology has expanded over the past decade, particularly following the COVID-19 pandemic. However, national patterns of adoption across geographic regions and sociodemographic groups remain incompletely characterized.

4. Objective
To evaluate national trends in urologic telehealth utilization from 2018–2025, with emphasis on rural–urban differences and sociodemographic disparities.

5. Methods
We performed a retrospective analysis of adult urology encounters recorded in the Epic Cosmos database from January 1, 2018 to August 1, 2025. Encounters were classified as in-person or telehealth. Patient demographics, insurance status, socioeconomic status (SES), geographic location, diagnoses, and prescribed medications were analyzed using descriptive statistics and compared across encounter types.

6. Results
Among 192,286,922 total urology encounters, 2,030,582 (1.1%) were conducted via telehealth. Telehealth use was highest among males and adults aged 40–64 years, and lowest among patients older than 85 years. White patients comprised the majority of both encounter types; Black patients were slightly underrepresented in telehealth use, while Asian and Hispanic patients were modestly overrepresented. Telehealth utilization was highest among commercially insured patients, followed by Medicare and Medicaid beneficiaries. Across SES quartiles, telehealth use generally mirrored in-person care, with slightly higher participation in the lowest SES group. Metropolitan regions accounted for most telehealth encounters, with the highest proportional use observed in California, Ohio, and Wisconsin, and the lowest in Alaska, Wyoming, and South Dakota. Common diagnoses addressed via telehealth included benign prostatic hyperplasia, erectile dysfunction, and urinary tract infections, with alpha-blockers and phosphodiesterase-5 inhibitors most frequently prescribed.

7. Conclusion
Telehealth remains underutilized in urology, accounting for approximately 1% of encounters nationwide. Disparities persist among older adults, racial minorities, rural populations, and certain insurance groups, underscoring opportunities to improve equitable access and adoption of urologic telehealth services.

Study Title: Detecting Cannabis Intoxication and Impairment Using Wearable Sensors

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Background: As recreational cannabis use has expanded following policy changes that broadened public access, the lack of a reliable, objective way to determine cannabis-related intoxication or impairment has become increasingly problematic. Unlike alcohol, where impairment can be easily measured, assessment of cannabis intoxication remains largely subjective. Physiologic data collected by wearable devices may offer a new approach to identifying intoxication-related changes in real time.

Objective: To evaluate whether wearable-derived physiologic data can be used to detect changes associated with cannabis intoxication and to assess the feasibility and acceptability of wearable sensors for this use.

Methods: This observational study followed adults who consumed cannabis products obtained from licensed dispensaries in Colorado. Participants were recruited online and completed baseline testing and device placement at Colorado State University. Continuous physiologic monitoring was performed using a wrist-worn sensor (Empatica EmbracePlus) measuring heart rate (HR), electrodermal activity (EDA), temperature, and movement. Participants were monitored remotely via videoconferencing. Assessments occurred at three time points (T0, T1, T2), approximately 25 minutes apart, and included the DRUID impairment application, a 2-minute sit/stand/walk test, and the Subjective High Assessment Scale (SHAS). Cannabis was self-administered during smoking sessions occurring prior to T1 and T2. Changes in physiologic and impairment measures were analyzed over time. Device acceptability was assessed via post-study survey.

Results: Twenty participants completed the study (mean age 32.1 years; 55% male). DRUID and SHAS scores increased significantly over time ($p=0.003$ and $p<0.001$). HR increased from baseline and correlated with DRUID ($r=0.75$) and SHAS scores ($r=0.57$; $p<0.001$). EDA decreased between T1 and T2 ($p<0.05$). No significant changes were observed in skin temperature or accelerometry. Over 75% of participants reported the wearable as acceptable.

Conclusions: Wearable biosensors are feasible and acceptable for detecting physiologic changes associated with cannabis intoxication, with HR and EDA showing the strongest associations with impairment measures.

Title

Impact of Universal Screening on Management of Blunt Cerebrovascular Injury at a Level I Trauma Center

Authors and Affiliations

a. Names

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Background

Blunt cerebrovascular injury (BCVI) is an uncommon but serious complication of blunt trauma with significant stroke risk. Selective screening using the expanded Denver criteria may miss injuries, prompting adoption of universal CT angiography (CTA) neck screening. The impact of universal screening on BCVI detection remains uncertain.

Objectives

To evaluate the impact of implementing universal CT angiography neck screening on the detection rate and incidence of blunt cerebrovascular injury among adult blunt trauma patients at a Level I trauma center. We also aim to compare BCVI incidence before and after universal screening.

Methods

We conducted a retrospective cohort study of adult trauma patients diagnosed with BCVI at a single Level I trauma center between 2018 and 2025. Universal screening was implemented in 2023. Collected variables included demographics, injury mechanism, Glasgow Coma Scale, BCVI risk factors, imaging findings, treatment strategies, ischemic events, and outcomes. BCVI incidence was defined as the number of BCVI diagnoses divided by total blunt trauma admissions. Incidence rates were compared between the pre-universal screening period (2020–2022) and the universal screening period (2023–2024) using Poisson regression with blunt trauma volume as the offset.

Results

A total of 7,403 blunt trauma admissions occurred during the pre-universal screening period and 7,270 during the universal screening period. BCVI incidence increased from 0.80% (59 cases) prior to universal screening to 1s.16% (84 cases) following implementation. Universal screening was associated with a significantly higher BCVI detection rate (incidence rate ratio 1.45, 95% CI 1.04–2.02; p = 0.03). Final analyses will evaluate diagnostic yield, non–Denver criteria injuries, and secondary outcomes.

Conclusions

Universal screening was associated with increased detection of BCVI at a Level I trauma center. Ongoing analyses will further clarify its diagnostic yield and clinical impact, informing optimal BCVI screening and treatment strategies.

Title:
Self-reported Compliance of Chlamydia Treatment Based on New CDC STI Treatment Guidelines Among Adolescent and Young Adult Patients

Authors:
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Introduction:
Chlamydia is the most commonly reported sexually transmitted infection in the United States, with the highest rates among individuals aged 15–24. In July 2021, the CDC updated treatment guidelines from azithromycin 1 g orally once to doxycycline 100 mg twice daily for seven days.

Objective:
Given prior studies reporting barriers to medication adherence in adolescents, this study aimed to assess treatment rates for those diagnosed with chlamydial infections.

Methods:
We conducted a prospective observational study of adolescents aged 13–21 with gonorrhea/chlamydia/trichomonas testing between November 2022 and April 2025 at an urban, academic pediatric emergency department or an urban public health STI clinic. Eligible patients provided consent, and positive chlamydia results were managed per standard practice. Several weeks after enrollment, patients were contacted to assess prescription pickup, completion, reasons for noncompliance, and side effects. Statistical analyses used chi-squared and two-sample t-tests ($\alpha = 0.05$).

Results:
Of 147 consented patients, 29 tested positive; 25 completed follow-up. Mean age was 17.9 years; 48% were female, 84% Black. Nine patients (31%) received azithromycin due to prior doxycycline intolerance or provider concern for adherence; all (9/9, 100%) completed treatment. Sixteen received doxycycline, with 14/16 (87.5%) completing treatment. Side effects occurred in 1/9 (11%) azithromycin patients and 6/14 (37.5%) doxycycline patients (not statistically significant).

Conclusions:
Based on these results, compliance did not differ significantly between azithromycin and doxycycline. All patients treated with doxycycline at the STI clinic completed therapy, supporting this delivery model. Early findings support CDC guidelines recommending doxycycline for chlamydia in adolescents.

Title: Validation of the Risk of Delayed Recovery (RDR) Score in predicting Persisting Symptoms after Concussion in the Outpatient Setting

Author: Faizan Munir, BS

Co-authors: Cullan Donnelly, MD; Jeffrey C Miecznikowski, PhD; Nathaniel Foster, BS; Jorden T Komm, MD; John J Leddy, MD; Mohammad N Haider, MD, PhD

Introduction:
Concussion symptoms include persisting or episodic headaches, vision and oculomotor problems, vestibular problems, cognitive dysfunction and mood dysfunction. In 50-70% of patients, recovery is seen within four weeks of injury without individualized treatment. However, 30% of these patients develop Persisting Symptoms after Concussion (PSaC, >4 weeks). Early identification of risk for delayed recovery may improve outcomes. The purpose of this study was to validate the Risk of Delayed Recovery (RDR) score in an outpatient setting.

Methods
Data was extracted from EMRs (June 2024-May 2025). Within 2 weeks of injury, patients were seen weekly. RDR score was calculated at visit 1. Patients symptomatic >4 weeks were followed for up to 6 months. RDR score accuracy for risk of PSaC was measured using receiver operating characteristic (ROC) curves.

Results
227/356 patients were included from chart extraction in the analysis (81% were athletes with sport-related concussion). 127 (55.9%) were Low Risk (RDR = 6.4 +/- 2.56); 49 (21.6%) were Medium Risk (RDR = 12.4 +/- 1.1); and 51 (22.5%) were High Risk (RDR = 20.8 +/- 4.4) for PSaC at the initial visit (5.8 +/- 3.6 days since injury). Mean recovery time for Low Risk was 19.1 +/- 29.5 days (median = 12, PSaC = 11.2%); Medium Risk was 41.3 +/- 49.5 days (median = 22, PSaC = 38.8%); and High Risk was 85.9 ± 68.8 days (median = 64, PSaC = 78.4%), which was significantly different on a Log rank test ($p < 0.001$). The RDR score was 84.5% accurate in predicting PSaC (ROC $p < 0.001$). Sensitivity and specificity for the Low-Medium (<10) cut-off were 80.8% and 73.4%, respectively ($p < 0.001$ for both) with a positive predictive value (PPV) of 56.5% (49.5, 63.4) and negative PV (NPV) of 89.9% (84.7, 93.5). Sensitivity and specificity were 54.8% and 92.9%, respectively for the Medium-High (>14) cut-off ($p < 0.001$ for both) with a PPV of 76.7% (64.2, 85.8) and NPV of 82.7% (78.8, 86.1).

Conclusion
Utilizing clinical decision tools such as the RDR score, PSaC can properly be managed within one week of concussion and alert clinicians to intervene earlier, leading to more positive outcomes in the long-term. Our findings indicate that the RDR score tool provides useful clinical insight into patients at risk for PSaC or delayed recovery.

Significance
RDR score calculated within 14 days is a valid predictor of a patient's risk of PSaC. Patients at medium-high risk may be considered for early prescription of evidence-based therapies (e.g., aerobic exercise, vestibular) to reduce the risk of PSaC.

Title: Importance of Follow-Up Calls on Social Determinants of Health in Student-Run Free Clinics

Authors:
Jeremy Nguyen, Kristina Morris, Cynthia Mercedes, Gina Mersereau, Jessica Kruger

Abstract for Research Forum:
Background: Student-run free clinics (SRFCs) provide essential care to underinsured, low-income individuals. While SRFCs are effective at providing initial care, they often fall short of ensuring long-term care due to a myriad of social factors. One of the goals of SRFCs is to assist patients in addressing social determinants of health (SDOHs) (e.g., finding health insurance; preventative health visits). While many SRFCs, including Lighthouse Free Medical Clinic (LFMC), administer SDOH screenings and referrals, a standardized protocol to track referral adherence has not been established. One study showed that 89% of SRFCs usually or always had a referral process, but only 37% of SRFCs indicated referral adherence.[1] This data indicates a need among SRFCs to develop their follow-up processes further.

Methods: To assess the importance of follow-up care, a comprehensive review of existing literature was conducted using electronic databases such as PubMed and Google Scholar with keywords including follow-up care, referrals, student-run free clinics, continuity of care, and SDOHs. Studies that evaluated the impact of at least two of these three topics were included. Preliminary data from LFMC was conducted via a retrospective chart review, identifying the number of patients who received follow-up care calls and the number of calls answered between January and April 2025. This study has been IRB approved.

Results: The literature indicates limited data on standardized follow-up and referral processes within SRFCs, despite their critical role in continuity of care and improved health outcomes. While few studies highlighted how interventions such as patient navigators, referral coordination, and post-encounter phone calls can significantly enhance referral completion rates and care outcomes, these strategies are not standardized nor consistently implemented across SRFCs.[2,3,4] Moreover, systemic barriers such as lack of health insurance, limited access to transportation, low health literacy, and high healthcare costs hinder follow-up completion and referral adherence.[2,5,6,7] Further limiting referral adherence is patient engagement and self-directed transfer of care to secondary facilities, affirming the importance of follow-up phone calls.[2] Collectively, these findings underscore an urgent need for SRFCs to adopt standardized, evidence-based protocols for referral and follow-up processes.

From January to April 2025, LFMC held 12 clinic dates, seeing a total of 111 patients. Of these, 82 patients (73.9%) requested a follow-up care call with referrals. Follow-up care calls were completed for 40 patients, representing 48.8% of those who requested follow-ups and 36.0% of the total cohort. Referral adherence was not documented.

Conclusions: The literature review highlights that follow-ups remain under-investigated in SFRCs, with many clinics lacking a follow-up process. SRFCs should implement follow-up calls to improve continuity of care. Preliminary findings show patient appreciation for follow up calls, though call answer rate is low. To address this, LFMC plans to ask patients their preferred contact time. Moreover, expanding the current follow-up model will include additional calls to determine and assist with referral adherence. Lastly, LFMC aims to track patient retention and health literacy, improving the longitudinal care of patients seen by SRFCs.

VARYING FUSION CRITERIA FOR ANTERIOR CERVICAL DISCECTOMY AND FUSION: IS A 1-MM OR 2-MM INTERSPINOUS MOTION THRESHOLD ASSOCIATED WITH MORE FAVORABLE PATIENT-REPORTED OUTCOMES? A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: Radiographic criteria for assessing spinal fusion after cervical surgery vary, with interspinous motion thresholds of ≤1-mm or ≤2-mm on flexion-extension radiographs commonly used. This lack of standardization complicates cross-study comparisons and may influence outcome reporting. Establishing a universally accepted, evidence-based fusion assessment standard is essential to ensure consistent evaluation, guide treatment decisions, and promote optimal patient outcomes.

Methods: PubMed and Embase were systematically searched for studies published between database inception and August 1, 2025 that reported cervical fusion outcomes using 1-mm and 2-mm thresholds. Data extracted included sample sizes, radiographic fusion criteria, and modified Japanese Orthopedic Association, Neck Disability Index (NDI), arm visual analog scale (VAS), and neck VAS scores. Study quality was assessed using the Murad scoring system. A random-effects meta-analysis was performed with subgroup and heterogeneity analysis on outcomes reported in ≤3 studies.

Results: Seven studies reporting NDI and neck VAS outcomes, and six studies reporting arm VAS outcomes were included. NDI improvement did not differ significantly between the 1-mm and 2-mm group in fused (n=357; 1-mm:–18.56,95% CI:–32.45 to –4.68; 2-mm:–20.24,95% CI:–29.82 to –10.66; p=0.85) or non-fused patients (n=142; 1-mm:–13.70, 95% CI:–27.77 to 0.36; 2-mm:–12.69,95% CI:–20.20 to –5.17; p=0.90). Neck VAS improvement in fused patients (n=391) was comparable across thresholds (1-mm:–3.36,95% CI:–3.97 to –2.76; 2-mm:–3.57,95% CI:–5.69 to –1.45; p=0.85) while in non-fused patients (n=129), significance was approached but not reached between groups (1-mm:–3.72,95% CI:–4.84 to –2.60; 2-mm:–2.17,95% CI:–3.28 to –1.05l p=0.05). Arm VAS improvement did not differ significantly across thresholds in fused (n=370; 1-mm:–4.53,95% CI:–5.03 to –4.03; 2-mm:–3.74,95% CI:–5.99 to –1.49; p=0.5043) or non-fused patients (n=121; 1-mm:–3.91,95% CI:–5.11 to –2.72; 2-mm:–2.59,95% CI:–3.68 to –1.51; p=0.1093). Heterogeneity was high across studies.

Conclusions: Using the 1-mm interspinous motion threshold, a higher proportion of patients were identified as non-fused, but PROMs did not differ significantly. Limited data suggests further studies are needed to clarify clinical impact and support standardizing fusion assessment criteria.

Title: Comparing Habituation Responses to Hyperpalatable Foods in the Pediatric Population

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Abstract:

Habituation is a process in which repeated exposure to a stimulus results in a diminished response over time, both physiologically and behaviorally. This study focused on habituation in relation to hyperpalatable foods (HPFs). Hyperpalatable foods are defined as foods that have been modified from their naturally occurring forms by adding excessive amounts of fats, sugar, carbohydrates, and sodium to cause a maximum food-rewarding experience during consumption. This study was a secondary analysis of data from a larger longitudinal study to examine habituation to sweet, salty, and savory foods in 8–12-year-old children. The data were re-categorized using hyperpalatable food definitions. We hypothesized slower habituation and greater responding for foods meeting multiple HPF criteria compared to foods meeting one HPF category. Within-subject comparisons between each hyperpalatable food category and foods meeting all three HPF criteria were conducted to examine responding on a habituation task using ANOVA and mixed-effect regression models (MRMs). ANOVA compared total responding between foods meeting all HPF criteria (HPF-all) and foods meeting each HPF subtype (fat–sodium; carbohydrate–sodium; fat–sugar). The HPF-all category had significantly greater responses compared to fat-sodium and fat-sodium-carb ($p<0.05$), but not carb-sodium ($p=0.053$). MRMs analyzed HPF-all against each HPF subtype on the rate of change in responding over each session. Age and sex were included as covariates to account for individual differences. The fat-sodium and fat-sodium-carb showed very similar decline in rate of habituation response compared to the HPF-all category, whilst the carb-sodium showed a more rapid decline in response to habituation compared to the HPF-all category. This suggests that greater levels of palatable tastes slow habituation processes; however, the properties of each HPF category may attenuate the rate at which responding declines. Future research should examine whether individual differences (e.g weight status, dietary restraint, or food insecurity) moderate habituation to HPF-all foods.

Prolonged Interhemispheric Differences in the Electroencephalogram Alpha:Delta Ratio Precede Neurologic Injury During Neonatal Cardiac Surgery

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Background: Neurologic injury is a known complication following neonatal aortic arch reconstruction, though the intraoperative detection of cerebral ischemia remains challenging. An interhemispheric difference in the electroencephalogram (EEG) Alpha:Delta ratio (A:D) can suggest cerebral ischemia during carotid surgery. The progression of A:Ds during absent cerebral blood flow (Deep Hypothermic Circulatory Arrest) (DHCA) or selective right-hemispheric cerebral perfusion (Antegrade Cerebral Perfusion) (ACP) in aortic arch reconstruction is not well characterized.

Objective: To compare EEG A:D patterns under DHCA vs. ACP and determine whether interhemispheric differences precede neurologic injury.

Methods: Left and right anterior EEG A:Ds were recorded at baseline and every 5 minutes throughout cardiopulmonary bypass, ACP, and DHCA. Interhemispheric A:D differences > 25% were defined as ischemia, and the cumulative duration was calculated. The loss of the A:D signal for > 2 minutes constituted signal dropout. Neurologic injury was defined as postoperative stroke or seizure.

Results: Among 86 neonates, 16.2% (14) underwent DHCA and 83.8% (72) ACP. Preoperative demographics and baseline A:Ds were similar. After 15 minutes, the right (ACP:0.51±0.18 vs DHCA:0.39±0.06; p=0.001) and left (ACP: 0.53±0.16 vs. DHCA:0.42±0.06; p=0.002) A:Ds were significantly lower in the DHCA vs. ACP group. Signal dropout occurred exclusively in neonates during DHCA (DHCA: 21.4% vs. ACP: 0%; p=0.003). Eleven neonates developed neurologic injury (ACP-7; DHCA-4). Injured neonates had a longer duration of an interhemispheric A:D difference > 25% (25 [IQR: 0–65] vs. 5 [IQR: 0–15] minutes; p<0.001). Multivariate analysis confirmed that the duration of A:D differences >25% (OR: 1.081, 95% CI: 1.025–1.141; p=0.004) was an independent predictor of neurologic injury.

Conclusion: The A:Ds were significantly lower in the DHCA group, and signal dropout occurred more frequently during DHCA. Only a prolonged interhemispheric A:D difference was independently associated with neurologic injury, underscoring the relevance of intraoperative EEG monitoring.

Title of Project - Evaluating Patient Understanding of the Labor Induction Process

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Introduction and Background - There are many misconceptions regarding the labor process, specifically the process of labor induction, and the various routes that can be taken to ensure a safe and healthy delivery. Access to educational materials remains limited and as a result, patients frequently seek information online, increasing the risk of misinformation despite a strong preference for guidance from trusted healthcare providers. Notably, little research has examined patients' baseline knowledge of labor induction, highlighting a critical gap as induction rates rise and underscoring the need for targeted educational interventions to support informed decision-making and reduce negative birth experiences.

Objective - This study aims to evaluate patient knowledge and experiences related to labor induction to inform the development of an effective, patient-centered educational intervention that supports informed decision-making during childbirth.

Methods - A cross-sectional study was conducted using surveys administered through REDCap to assess patients' understanding and experiences related to labor induction. Statistical analyses evaluated overall knowledge levels and compared differences between multiparous and nulliparous patients, as well as histories of labor inductions.

Results - There was no statistically significant difference in understanding of the labor induction process between multiparous and nulliparous patients. Similarly, no significant difference in understanding was observed between patients with a prior induction of labor and those without prior induction. No correlation was present between patient's confidence of understand of the labor induction process and parity or previous labor induction.

Conclusion - Given the absence of differences in understanding based on prior labor induction experience or parity, it is essential that all patients receive thorough, consistent education regarding the process, steps, and potential outcomes of labor induction. Comprehensive patient education not only improves understanding but also enhances patient satisfaction and supports patient autonomy, particularly during the inherently stressful experience of labor and delivery.

Title of Project – Barriers and facilitators to treatment of pain and anxiety at time of IUD insertion: A survey of providers

Authors and Affiliations –
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Introduction/Background – Pain during intrauterine device (IUD) insertion remains a barrier to uptake, source of patient anxiety, and has historically been undertreated. Local anesthesia reduces procedural pain and oral anxiolytics diminish anxiety. Despite evidence to support use of these methods, data suggests implementation is limited. Little is known about the factors influencing provider use of local anesthesia and oral anxiolytics during IUD insertion.

Objective – To describe current practice patterns and identify barriers and facilitators to provider use of local anesthesia and oral anxiolytics during IUD insertion.

Methods – We conducted a cross-sectional survey of U.S.-based physicians and advanced practice providers who perform IUD insertions. Participants were recruited via listservs, social media, and convenience sampling. Survey items assessed frequency of local anesthesia and oral anxiolytic use, perceived barriers and facilitators, educational background, practice environments, and personal IUD use. Descriptive statistics and bivariate analyses compared "utilizers" and "non-utilizers."

Results – Among 446 respondents, 44% reported routine use of local anesthesia and 50% reported routine use of oral anxiolytics. Local anesthesia use was strongly associated with fellowship training, academic affiliation, use of blocks for other gynecological procedures, and personal IUD use (all $p<0.05$). The most frequently-cited facilitator of both pain control options was patient request or interest (local anesthesia 90%, oral anxiolytic 96%). Frequently-cited barriers to local anesthesia use were perceived lack of clinical benefit (52%) and concern that risks outweigh benefits (49%). Frequently-cited barriers to oral anxiolytic use were logistical barriers such as transportation (66%) and medication availability (49%).

Conclusion – Use of local anesthesia and oral anxiolytics during IUD insertion is widely variable. High quality data supporting clinical benefit and improving provider confidence in management of adverse effects are promising targets to increase implementation of local anesthesia. Logistical barriers to use of oral anxiolytics are less amenable to intervention.

Title:
Mental Health and Social Risk Factors in Patients undergoing Arthroscopic Partial Meniscectomy

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Background:
Arthroscopic partial meniscectomy (APM), performed over 500,000 times annually in the United States, is typically evaluated through mechanical and biological factors. Accumulating evidence suggests that mental health (MH) comorbidities and social determinants of health (SDOH) may influence preoperative symptom burden and recovery, though their role in APM populations remains poorly characterized.

Objective:
To evaluate the relationship between MH diagnoses, SDOH risk factors, and baseline knee-related function in patients undergoing APM.

Methods:
A retrospective chart review was conducted on 746 adult patients who underwent APM between 2018 and 2022 at a single academic medical center. MH diagnoses were manually extracted from the electronic medical record and categorized as None, Anxiety, Depression, Anxiety and Depression, or Other. SDOH variables, including insurance status and ZIP-code-linked census data, were combined with chart-derived variables such as body mass index and injury context. The Knee Injury and Osteoarthritis Outcome Score (KOOS) subscales assessed baseline function. Statistical comparisons used analysis of variance with post-hoc Tukey correction.
Results:
192 patients (25.7 percent) had a pre-existing MH diagnosis. These individuals were more likely to be female, have higher body mass index, lack private insurance, and present with non-sport-related injuries. Patients with MH diagnoses, particularly those with co-occurring anxiety and depression, reported significantly lower KOOS scores in activities of daily living, physical function, symptoms, and quality of life ($p < 0.05$). No significant differences were observed in KOOS pain or sports subscales after correction.
Conclusion:
Pre-existing MH conditions and adverse SDOH profiles are independently associated with significantly reduced baseline knee function in patients undergoing APM, with the most pronounced impairments observed in those with co-occurring anxiety and depression. These findings underscore the importance of incorporating psychosocial evaluation into preoperative care to improve risk stratification, optimize patient-centered care, and promote equitable surgical outcomes across diverse orthopaedic populations.

Characterization of lipid biosynthetic genes in gut *Parabacteroides* that increase tolerance to bile acids

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Introduction/Background: A large portion of bacteria in the human gut include the genera *Parabacteroides* and *Bacteroides*, which fall under the phylum Bacteroidota (formerly known as Bacteroidetes). These are gram-negative strict anaerobes, most of which are considered to be commensals in their relationship with the host. The human gut environment is dynamic, and microbes encounter numerous stressors such bile acids, which are host synthesized compounds that have antimicrobial properties in the gut and play a key role in host metabolism. They can become modified by bacteria into secondary bile acids to further influence the microbiome by providing nutrients or energy. We identified an uncharacterized lipid biosynthetic gene cluster from *Parabacteroides johnsonii* and *P. merdae* involved in bile acid tolerance, which was highly conserved across *Parabacteroides* species but absent in *Bacteroides*. When the lipid biosynthetic gene cluster was heterologously overexpressed in *Bacteroides thetaiotaomicron*, we observed a greater tolerance to certain bile acids.

Objective: We sought to further characterize the lipid biosynthetic genes and assess whether the expression of these genes will confer tolerance to different species of *Bacteroides*.

Methods: We performed growth experiments using overexpression strains of *Bacteroides caccae, B. ovatus, B. uniformis*, *Phocaeicola vulgatus*, as well as several *Parabacteroides* deletion mutant strains. Growth was measured across different conditions, including primary bile acids cholate and taurocholate, as well as the secondary bile acid taurodeoxycholate. Finally, we tested concentrations of varying inhibition for both primary and secondary bile acids present in the human gut.

Results: In our overexpression assays, we found there was a growth benefit in *B. ovatus* strains which had the lipid gene cluster compared to an empty vector control. No consistent patterns were observed across *B. caccae, B. uniformis* and *P. vulgatus*. In our deletion mutant strains, we observed a growth benefit in *Parabacteroides merdae* in the native strain compared to a strain without the lipid gene cluster.

Conclusion: We observed growth benefit in *B. ovatus* across different bile acids. Further assays are required to verify phenotype effect in *B. caccae, B. uniformis* and *P. vulgatus* due to inconsistencies. In our deletion mutants, growth benefit observed in cholate, taurocholate and taurodeoxycholate. Growth curves in deoxycholate will require AUC normalization compared to a growth control.

Title
Does body mass index predict complication rate after surgery for buried penis? A surprising retrospective review of patient-specific risk factors.

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Introduction/Background
In adult acquired buried penis (AABP), concealment of the penis typically occurs due to excess of surrounding soft tissue. While obesity is the foremost risk factor, weight loss alone is often inadequate, and surgical repair may be considered. Complication rates as high as 75% have sparked interest in identifying high-risk traits.

Objective
To investigate whether the degree of obesity, among other patient-specific characteristics, modifies risk profile in AABP repair.

Methods
We retrospectively reviewed patients who underwent AABP repair at our institution by two GURS trained surgeons from 2019 to 2024, with at least 30 days of follow-up. Patient data including body mass index (BMI), diabetes mellitus (DM), smoking status, and presence of lichen sclerosus (LS) were extracted. We performed analysis using BMI strata (30-40, 40-50, >50). The primary endpoint was complication rate, secondarily examining recurrence rate.

Results
Thirty patients were included, with an average follow-up of 19.1 months. Average patient age was 54, and average BMI was 42. Fifty-three percent of patients had DM, 57% were smokers, and 40% had LS. Univariate analysis found no statistically significant difference in complication rate between BMI strata. Rather, we detected a trend toward increased complications with decreased BMI (50% for BMI 30-40, 45% for BMI 40-50, 40% for BMI >50). We detected no difference in recurrence when stratifying by BMI. We found an increased rate of complications among patients with DM, which approached statistical significance ($p=0.14$). Other analyzed risk factors were not associated with increased complications or recurrence.

Conclusions
We observed that BMI was not predictive of complication risk following AABP repair, but we interestingly detected a trend toward increased postoperative complications with decreased BMI. Additionally, patients with DM may face a greater risk of complications. A larger cohort of patients is required to help elucidate the roles of these risk factors.

A Novel Modified-SITE Score for Enhanced Prediction of Surgical Candidacy in Spinal Infections

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OBJECTIVE
The Spinal Infection Treatment Evaluation (SITE) score was developed to assist in determining appropriate medical versus surgical management for spinal epidural abscess, but its predictive performance is limited. This study introduces and validates a Modified SITE Score to improve prediction of surgical intervention.
METHODS
A retrospective review was performed of 147 consecutive adult patients treated for spontaneous spinal epidural abscess at a single center. A Modified SITE Score was developed incorporating imaging findings, neurological status, presence of osteodiscitis, age, microbial etiology, and anatomic level of involvement. Variables were weighted based on clinical significance. The primary outcome was surgical intervention. Predictive performance of the original and modified scores was assessed using area under the receiver operating characteristic curve analysis. A separate validation cohort of 50 patients was used to evaluate a simplified version of the Modified SITE Score.
RESULTS
Of the 147 patients, 111 (75.5 percent) underwent surgical intervention. The Modified SITE Score demonstrated improved discriminatory performance compared with the original SITE Score, with an area under the receiver operating characteristic curve of 0.79 versus 0.66, respectively. On multivariable analysis, worsened neurological status (odds ratio 0.50, 95 percent confidence interval 0.26 to 0.96, $p = 0.036$) and increased radiologic severity (odds ratio 0.49, 95 percent confidence interval 0.26 to 0.93, $p = 0.028$) were independent predictors of surgical management. Additional variables, including age, presence of osteodiscitis, microbial etiology, and spinal level, contributed to improved risk stratification. In the validation cohort, C-reactive protein greater than 10 mg per liter, white blood cell counts greater than 10,900 per microliter, and multilevel infection were each assigned one point to create a simplified score ranging from 0 to 3. The simplified score demonstrated good discriminatory ability.
CONCLUSIONS
The Modified SITE Score demonstrates superior predictive accuracy compared with the original SITE Score for identifying patients who require surgical intervention for spinal infection. Integrating this tool into clinical workflows may improve treatment selection and optimize patient outcomes.

Title of Project
"Having people to rely on makes all the difference": Supporting providers of abortion and gender-affirming care

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Introduction/Background
Abortion and gender-affirming care promote bodily autonomy, are subject to societal stigmatization, and are targets of political interference. Providers of this care face unique challenges due to these factors. Prior studies have documented parallels between these two groups of providers, but this study is the first, to our knowledge, that discusses both.

Objective
Understand the shared and diverse experiences of gender-affirming care and abortion care providers and explore challenging and supportive factors of their work.

Methods
This qualitative study involved semi-structured focus groups and individual interviews with 15 physicians who provide abortion care, gender-affirming care, or both, in the US from December 2024 to February 2025. Recruitment was conducted using convenience and snowball sampling. Focus groups and interviews were conducted online, recorded, and transcribed. Data was analyzed using deductive and inductive coding and thematic analysis. This study was approved by the University at Buffalo IRB (ID: STUDY00008840).

Results
Fifteen providers participated (7 abortion providers, 4 gender-affirming care providers, and 4 who provide both). Participants identified as cis, trans, and nonbinary and represented every major region of the United States. Most participants were actively pursuing or recently completed subspeciality training. Providers of both kinds of care share similar challenges and supportive factors. Isolation and stigmatization emerged as major challenges, and professional networks, interprofessional collaboration, and relationships with providers of non-clinical services were identified as valuable supportive factors.

Conclusion
Strategies that promote professional networks and foster interprofessional collaboration with team members, including mental health clinicians, social workers, and lawyers, may help overcome some of the unique challenges that providers of abortion and gender-affirming care face. Institutions, hospitals, and organizations can improve both patient care and provider support systems through creating multidisciplinary teams and fostering these connections.

Subtyping ovarian cancer based on mRNA seq suggests prognostic and treatment directives

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Introduction: Ovarian cancer accounts for over 200,000 deaths per year worldwide; however, its characteristics and therapeutic practices remain largely unknown and unspecified to tumor features. Ovarian carcinoma is comprised of a heterogenous collection, including subtypes differing in origins, clinical behavior, and molecular profile. Moreover, current data analysis of ovarian cancers does not allow for its comprehensive understanding, as subtyping is not optimized. We hypothesize that subtyping is crucial to personalized treatment approaches and improving ovarian cancer patient outcomes.

Methods: This project utilized analysis techniques including MATLAB feature selection, dimensional reduction, and clustering algorithm as well as Panther Classification System to further understand ovarian cancer subtypes and treatment investigating mRNA seq samples from TGCA Firehose database. Cancer multi-omics, analysis using integrated aspects of biological tumor information, was applied to provide a more comprehensive review of certain tumor types, ultimately increasing the precision of cancer subtyping and producing standardized protocols. Additionally, tumor microenvironment analysis through landscape mapping allowed for not only single cell, but also spatial transcriptomics, furthering the understanding of various tumor subtypes and subsequent treatment options.

Results: We determined that tumor subtyping provided significant data findings in ovarian cancer. Additionally, clustering based on mRNA seq provides opportunities to further understand tumor characteristics and progression. Importantly, Cluster 2 was found to indicate statistically significant poorer prognosis ($p=0.00939$) with increased molecular transducer and cargo receptor activity compared to other cluster types.

Conclusion: These results indicate that utilization of cluster analysis may be a useful prognostic indicator in a subset of patients with ovarian carcinoma. Further investigation into ovarian tumor subtyping, namely through multivariate survival analysis, tumor microenvironment observation, and clinical plan cross-reference is necessary to determine optimal therapeutic options.

Oral Mucositis after Hematopoietic Stem Cell Transplantation: A Systematic Review and Meta-analysis of Outcomes and Risk Factors.

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Background:
Oral mucositis (OM) is a primary dose-limiting toxicity of hematopoietic stem cell transplantation (HSCT), characterized by inflammation and ulceration of the oral mucosa. Despite OM's significant prevalence and deleterious effects, we have an inadequate understanding of its risk factors and outcomes.
Objective:
This study aimed to evaluate the association between oral mucositis severity and infectious complications among HSCT recipients, while also identifying patient-level and clinical risk factors for OM development.
Methods:
Following PRIMSA guidelines, we conducted a systematic review and meta-analysis through PubMed and EBSCO. Data were extracted from eligible studies using a pre-specified data extraction form. The Newcastle-Ottawa Scale was used for assessing data quality for non-randomized, observational studies and the Cochrane Collaboration Tool for randomized controlled trials. Risk factors were analyzed through pooled odds ratios where available. Risk of bias was assessed using validated cohort and case series tools.
Results:
1,677 articles were identified, of which 36 were used; 30 for qualitative assessment of clinical risk factors in OM development, and 6 for meta-analysis assessing the relationship between OM and post-HSCT infectious complications. Across allogeneic and autologous HSCT and cancer cohorts, female sex and high-intensity conditioning were common OM risk factors. For allogeneic HSCT patients, Methotrexate, younger age, and longer duration of neutropenia had increased OM risk. For autologous HSCT patients, renal dysfunction, HSV-1 reactivation, and longer neutrophil engraftment increased risk. Longer neutrophil engraftment was a common risk factor across cancer cohorts; however, renal dysfunction was a distinct risk factor for OM in multiple myeloma patients. Additionally, HSCT patients with OM had an increased risk of developing infectious complications with an odds ratio of 3.84 (95% CI: 2.51–5.86).
Conclusion:
Knowledge of these risk factors and outcomes will help clinicians identify high-risk individuals, prevent OM, and protect an immunocompromised population from subsequent life-threatening complications.

Title: Impact of Publication Count and Characteristics on Neurological Surgery Residency Match Results.

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Introduction:
Over the past several years there has been an increase in publication count amongst residency applicant, as reflected in NRMP data, to the most competitive specialties such as neurosurgery.

Objective:
We sought to evaluate the relationship between publication count and characteristics on Neurosurgery Residency Match outcomes.

Methods:
Publications reported by across two residency applicant cohorts to single institution across were retrospectively analyzed and using PubMed and Google Scholar. Full-length articles published in peer reviewed journals were analyzed. Publications were categorized as neurosurgical or non-neurosurgical, basic science or clinical, and further categorized as reviews or case reports if applicable. Authorship position on publications was also recorded. A regression analysis between the number of publications in each of these categories and match outcome was run in sass.

Results:
A total of 300 applicants included in the analysis with 148 applicants successfully matching into neurosurgery. The number of neurosurgical publications had significant positive association with matching (p=.009) while total number of publications had no significant associated with matching (p=.257). Further, there was no significant association in the total number or neurosurgical specific first author publication and matching (p=.530, p=.853 respectively). There was no significant association between the number of basic science, review, or case report publications and matching (p=.907, p=616, p=.344 respectively) while the number of clinical publications had a significant negative association with matching (p=.009).

Conclusions:
Amongst the analyzed neurosurgical residency applicant reported publications, only a higher number of neurosurgical specific publications demonstrated a significant association with matching. Interestingly a higher overall number of clinical publications carried a negative association with matching. These findings draw into scrutiny the narrative that a general high number of reported publications make a competitive applicant and indicate that quality, rather than quantity, may play a more significant role in successfully matching into neurosurgery.

Title of Project
Analysis of Provider Monthly Averaged Length of Stay and 30-day Readmission Rates at Two Different Hospital Settings in Buffalo, NY

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Introduction / Background
Length of stay (LOS) is a commonly used hospital quality metric and has been associated with adverse outcomes, including hospital-acquired infections, mortality, and readmissions. However, the relationship between LOS and 30-day readmission rates remains inconsistent across prior studies.

Objective
To evaluate the association between averaged monthly provider LOS and 30-day readmission rates within an academic internal medicine hospitalist group across two distinct hospital settings.

Methods
We conducted a retrospective analysis using 2024 calendar-year data from the UBMD Internal Medicine Hospitalist billing system. The study included 65 providers from Buffalo General Hospital (BGH) and 17 providers from Erie County Medical Center (ECMC). For each provider, averaged monthly LOS and corresponding 30-day readmission rates were collected and de-identified prior to analysis. Data analysis was performed using Microsoft Excel 2019 and STATA 12.1. Pearson's and Spearman's correlation coefficients were calculated, with statistical significance defined as $p < 0.05$.

Results
At BGH, a weak positive correlation was observed between provider averaged monthly LOS and 30-day readmission rates (Pearson $r = 0.17$; Spearman $r = 0.15$), suggesting an association between longer hospital stays and increased readmission likelihood; however, this did not reach statistical significance ($p = 0.17$ and 0.24, respectively). At ECMC, a moderate negative correlation was observed (Pearson $r = –0.26$; Spearman $r = –0.41$), suggesting an association between longer stays and decreased readmission likelihood, which was also not statistically significant ($p = 0.30$ and 0.09, respectively).

Conclusion
Our findings align with prior literature demonstrating no consistent association between LOS and 30-day readmission rates. Differences in patient populations and institutional roles between hospitals may contribute to observed variability. These results highlight the need for future studies focusing on diagnosis-specific populations and patient-level analyses.

Title: Association Between Recent Otorrhea and Persistent Tympanic Membrane Perforation After Tympanoplasty

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Introduction
Tympanoplasty (TP) is performed to repair tympanic membrane (TM) perforations, yet persistent perforation remains a clinically important failure outcome. This study assessed whether otorrhea within three months prior to TP is associated with increased risk of persistent TM perforation ≥6 months after surgery.

Methods
A retrospective cohort study was performed using the TriNetX research network. TP without mastoidectomy or ossicular chain reconstruction was identified using CPT 69631 (index date = procedure). Patients were categorized by the presence or absence of otorrhea within 3 months prior to the index event using ICD-10-CM codes H92.10–H92.13. Persistent TM perforation ≥6 months after TP was identified using ICD-10-CM codes H72.0–H72.9. Propensity score matching was conducted 1:1 based on age, sex, race, and ethnicity.

Results
Prior to matching, patients with preoperative otorrhea had a similar mean age compared with those without otorrhea (33.5 ± 23.3 vs 33.0 ± 22.9 years), and sex distributions were comparable between groups (female: 1,200 [51.2%] vs 15,628 [52.6%]). After propensity score matching, 2,345 patients were included in each cohort with well-balanced baseline characteristics. Persistent TM perforation occurred in 488 patients (20.8%) with otorrhea and 386 patients (16.5%) without otorrhea. Otorrhea was associated with a significantly increased risk of persistent perforation following TP (risk difference 4.35%, 95% CI 2.12–6.58%; risk ratio 1.26, 95% CI 1.13–1.42; $p<0.001$).

Conclusion
These findings suggest that recent preoperative otorrhea may serve as a clinical risk marker when planning perioperative management for TP. This has implications for patient counseling and shared decision-making.

Investigating the Mechanism of Air Pollutant-Mediated Lung Cancer

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Abstract

Although the overall incidence of lung cancer has been decreasing due to a decline in smoking rates, the proportion of lung cancer in individuals who have never smoked (LCINS) has been on the rise. One factor that is linked to the increase in LCINS is air pollution with particulate matter measuring ≤2.5 μm (PM2.5). Studies have demonstrated that PM2.5 correlates with an increased type 2 immune response driven by type 2 immune cells (T-helper 2 cells (Th2) and type 2 innate lymphoid cells (ILC2)) and the secretion of type 2 cytokines such as interleukin 13 (IL-13). Studies have also shown that type 2 immune cells and IL-13 can promote lung fibrosis, which is often associated with lung cancer. However, the relationship between the type 2 immune responses, lung fibrosis, and LCINS has not been extensively studied. We hypothesize that inhaled air pollutants measuring ≤2.5 μm will activate the type 2 immune response and promote lung fibrosis that will ultimately promote lung cancer driven by a mutation in the epidermal growth factor receptor (EGFR) gene, commonly found in never-smokers with lung cancer. We did in vivo modeling of EGFR mutant lung cancer with or without PM2.5 treatments. PM2.5 tumor bearing PM2.5 treated mice showed an increase in cancer-associated fibroblasts (CAFs) and variable increases in Th2 cells, whereas in vitro, there was a decrease in the expression of fibroblast markers following PM2.5 treatment of lung fibroblasts. Understanding the mechanisms behind air pollutant-mediated LCINS can help the development of preventative and therapeutic treatments for lung cancers in areas with high air pollution.

Title: Therapeutic Potential of a Transmembrane Protein 97 (TMEM97) Modulator in Age-Related Macular Degeneration (AMD)

Authors and Affiliations:

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Introduction: Age-related macular degeneration (AMD) is a common eye disease that causes vision loss and significantly affects quality of life in aging adults; however, current treatments are limited to advanced AMD. Transmembrane protein 97 (TMEM97) is a multifunctional protein involved in cellular processes including cholesterol homeostasis, lysosome-dependent autophagy, calcium homeostasis, and the integrated stress response (ISR). Genome-wide association studies (GWASs) identified TMEM97 as a genetic risk factor strongly associated with AMD. Thus, it is important to study TMEM97 modulation as a potential treatment for early AMD.

Objective: To investigate the effect of a small molecule TMEM97 modulator, EES-1686, on AMD-related cell signaling in cultured human induced pluripotent stem cell-derived retinal pigment epithelium (iPSC-RPE) cells.

Methods: Human iPSC-RPE cells were cultured and treated with NaIO3, a potent oxidant, in the presence or absence of EES-1686 at various concentrations. Immunocytochemistry was performed using an antibody against Zonula occludens-1 (ZO-1) to evaluate cell morphology and tight junction integrity. Quantitative RT-PCR (qPCR) was used to measure the expression of antioxidant genes. Mitochondrial energy metabolism was measured using Seahorse XF analyzer.

Results: NaIO3 treatment disrupted the tight junctions of iPSC-RPE cells resulting in abnormal cell morphology compared to control cells. Treatment with EES-1686 alleviated NaIO3-induced tight junction damage and partially preserved cell morphology. At the molecular level, NaIO3-treated cells exhibited increased expression of anti-oxidant genes SOD1, SOD2, and Nrf2, suggesting increased oxidative stress. Treatment with EES-1686 at 1000 nM, but not at 100 nM, prevented NaIO3-induced SOD2 upregulation. Furthermore, treatment with EES-1686 at 1000 nM decreased mitochondrial ATP production in NaIO3-treated cells.

Conclusion: Our preliminary results suggest that TMEM97 modulator EES-1686 may protect iPSC-RPE cells from oxidative stress. Future studies are needed to confirm these preliminary results.

Abstract

Background: Distal junctional kyphosis (DJK) and distal junctional failure (DJF) are severe complications following cervical deformity surgery and are associated with substantial morbidity, revision surgery, and diminished quality of life. Although increasingly recognized, the long-term incidence and temporal development of these complications remain poorly characterized due to heterogeneous definitions and limited follow-up across studies.

Methods: A systematic review and meta-analysis were conducted in accordance with PRISMA guidelines. MEDLINE, PubMed, and Embase were searched from database inception through September 20, 2025 for studies reporting DJK and/or DJF following cervical deformity surgery. Inclusion criteria required adult patients (≥18 years), radiographically defined cervical deformity, surgical intervention, and a minimum of 24 months of follow-up. Random-effects meta-analyses were performed to calculate pooled incidence rates with 95% confidence intervals (CI). Study quality was assessed using the Newcastle–Ottawa Scale.

Results: Fifteen studies encompassing 1,712 patients met inclusion criteria. The pooled incidence of DJK across 14 studies (1,629 patients) was 20.3% (95% CI: 16.0–25.4%; I^2 = 75.0%). The pooled incidence of DJF across 9 studies (1,094 patients) was 7.93% (95% CI: 5.19–11.99%; I^2 = 66.3%). Considerable heterogeneity was observed across studies, reflecting variability in patient characteristics, surgical techniques, alignment targets, and complication definitions.

Conclusion: DJK and DJF are common and clinically significant long-term complications following cervical deformity surgery. By focusing on studies with extended follow-up, this meta-analysis provides more accurate estimates of their true prevalence. Standardized definitions, radiographic criteria, and follow-up protocols are essential for improving risk stratification, surgical planning, and prevention strategies in future investigations.

Cadaveric Meniscal Cartilage for Ear Reconstruction: A Novel Reconstructive Case

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Introduction

The helical rim is among the most frequent sites of ear trauma and requires cartilage grafts to repair larger defects. Autologous cartilage is primarily used, but for patients without adequate reserves, cadaveric meniscal cartilage can provide a similar structure to the helical rim with no donor site morbidity.

Aims

This report aims to describe a novel approach to reconstruction of upper ear deformities, highlighting potential benefits over traditional techniques.

Methods

The case of a 73-year-old man who underwent left helical rim reconstruction following evaluation for basal cell carcinoma was reviewed. Preliminary literature search used PubMed and Google Scholar to research previous uses of cadaveric cartilage reconstruction.

Results

The patient's lesion was removed, and the defect was closed with a post-auricular scalp flap. A two-stage operation using a cadaveric meniscal graft was selected because the patient lacked adequate cartilage reserves, and the meniscal graft already resembled desired reconstructive shape. 6 months after initial resection, a pocket was created using the previous skin flap. The graft was banked and shaped using the contralateral ear as a guide, then placed in the pocket. Approximately 19 months later, the superior rim was incised, and the graft was elevated. Skin from the anterolateral thigh was harvested to repair the post-auricular defect. Postoperatively, there were no complications, and the graft showed good contour restoration.

Conclusions

Cadaveric grafts for ear reconstruction provide a reasonable alternative to autologous grafts among patients without proper cartilage reserves. Our case highlights promising potential for cadaveric meniscal cartilage in this setting due to lack of donor site morbidity and preformed anatomical benefits. Resorption complications are noted, but studies have shown that the use of low dose irradiated cartilage can help reduce incidence. More studies are needed to evaluate the potential beneficial effects of meniscal cartilage before widespread adoption in auricular reconstruction.

Title of Project: The Characterization of Phage Activity against *Acinetobacter* Species using Biofilm Analysis, Growth Curves, and Plaque Assays.

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Introduction: *Acinetobacter*, a gram-negative, aerobic, nonmotile bacterium, has become increasingly drug-resistant and poses a significant threat in clinical settings. With increasing rates of antimicrobial resistance, bacteriophages, the natural predators of bacteria, may be an adjunctive treatment in addition to currently available antibiotics. Despite the importance of this problem, a comprehensive method to assess phage activity has not been established. We hypothesized that understanding how phages disrupt biofilm development will help inform bacteriophage-based treatments.

Objective: This project aims to develop a comprehensive method of characterizing phage activity in different bacterial hosts, informing the development of alternative antimicrobial treatments.

Methods: Clinical *Acinetobacter* isolates, with *Shigella* as a non-*Acinetobacter* control, were studied in conjunction with 6 anti-*Acinetobacter* phages and 1 anti-*Klebsiella* phage. Double agar plaque assays enumerated phage activity in each combination. Biofilm development was studied after both immediate and delayed (3 hours) phage treatment. Biofilm quantified using crystal violet measured at 550 nm. The effect of the phages on planktonic growth kinetics was evaluated in two different growth media (LB and Acinetobacter Minimal Media) and data was analyzed via integration of the growth curves and one-way ANOVA.

Results: We tested six *Acinetobacter* isolates against seven bacteriophages. Phages were measurably active against 50% of isolates in plaque assays compared to varied activity in biofilms and 33% in growth kinetics. Biofilm activity varied between each isolate with specific phages. Significant activity differed between isolates and was strongly influenced by individual phage-isolate interactions, indicating isolate specific patterns. In planktonic growth kinetic assays, we tested the impact of both nutrient rich and nutrient poor media. This did not have any notable effect on phage activity.

Conclusion: Collectively, the data demonstrates that a comprehensive assessment of phage activity requires the combined use of multiple experimental assays, as an individual assay provides an incomplete representation of phage behavior.

Effect of Neoadjuvant Chemotherapy before Robot Assisted Radical Cystectomy on the Development of Uretero-Intestinal Strictures: Results from the International Radical Cystectomy Consortium (IRCC)

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Objective: To examine whether neoadjuvant chemotherapy (NAC) before robot assisted radical cystectomy (RARC) was associated with development of uretero-enteric stricture (UES).

Methods: We retrospectively reviewed our International Radical Cystectomy Consortium (IRCC) Quality Assurance Database. Patients were divided into those who received NAC and those who did not. Patients were matched for demographic and clinical variables with a ratio of 1:1. Cumulative incidence was used to depict the UES rate. Log-rank test was used to test significance.

Results: 286 (50%) patients who received NAC were matched to 286 (50%) who did not. Median age was 69 years (IQR 62-75), 22% were females, median BMI was 28 (IQR 25-32). 88% had cT2 and 25% of the patients had preoperative hydronephrosis. 85% of the patients received intracorporeal urinary diversion and 16% received neobladders. 49 (17%) in NAC group developed UES, vs 32 (11%) in RARC group (**Table 1**). The 5 years UES cumulative incidence rates were 22% for NAC group and 18% for no NAC group, p=0.039 (**Figure 1**).

Conclusion: Neoadjuvant chemotherapy was associated with a higher rate of UES after RARC.

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Death by Triglycerides:
A Multifaceted Case of Dyslipidemia, Obesity, and PCOS Resulting In Lethal Acute Pancreatitis

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Abstract:

A 22-year-old female was found unresponsive after three weeks of sickness and presenting to urgent care a day prior to her death with a complaint of nausea, vomiting, and abdominal cramping. She had a history of obesity and polycystic ovarian syndrome (PCOS).

At autopsy non-hemorrhagic acute pancreatitis and steatohepatitis were identified. During exam, areas of fat congealing within pooled blood were noted. Tubes of blood drawn during the examination became grossly lipemic at room temperature. Toxicological and laboratory testing showed a triglyceride level of 5440 mg/dL, 9 mg/dL HDL, 0.06% w/v acetone in peripheral blood, and therapeutic levels of fluconazole. Postmortem genetic testing revealed an LDLR mutation causing familial hypercholesterolemia.

Obesity, high cholesterol, and PCOS are all disturbances known to perpetuate further metabolic issues, including severe hypertriglyceridemia (HTG). Most causes of severe HTG are the result of multigenic or polygenic mutations and further exacerbated by exposure to non-genetic secondary factors.

The combination of the patient's familial dyslipidemia, PCOS, and obesity created a perfect storm of metabolic dysfunction leading to her sudden death. Overall, this case highlights the need for close follow-up in patients with these conditions and better education on the possible consequences of their interplay, which can prove lethal.

Title of Project: Enhancing Photodynamic Therapy Response for Actinic Keratoses: A Systematic Review of Physical Pre-Treatment Modalities

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Introduction
Actinic keratoses (AKs) are common premalignant lesions of chronically sun-damaged skin and often require field-directed therapy to reduce progression and recurrence. Photodynamic therapy (PDT) is a cornerstone treatment for widespread AKs, but outcomes are variable, especially in thicker or hyperkeratotic lesions where photosensitizer penetration is limited. Physical pre-treatments have been proposed to enhance uptake and improve clearance.

Objective
Here we comprehensively reviewed literature to assess whether physical pre-treatment modalities reliably improve PDT by enhancing photosensitizer uptake and clinical clearance.

Method

A PRISMA-ScR–compliant scoping review of physical pre-treatment modalities prior to PDT for AKs/field cancerization was conducted. PubMed, Embase, and Scopus were searched (July 27–August 8, 2025). Two independent reviewers screened and deduplicated records in Covidence. Eligible English-language randomized and observational studies in adults comparing PDT with vs without physical pre-treatment (e.g., microneedling, curettage, microdermabrasion/dermabrasion, cryotherapy, occlusion) were included. Extracted outcomes included lesion clearance/clinical response, recurrence, preprotein translocase subunit x (PplX) fluorescence, and adverse events.

Conclusion
Physical pre-treatment can enhance PDT effectiveness for AKs, particularly in thicker or treatment-refractory disease. Microneedling appears most promising for future standardized comparative trials incorporating lesion stratification and long-term recurrence outcomes.

Title - Surgical Management of a Pediatric Brachial Plexus Lipoma

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Introduction/Background - Lipomatous tumors are not commonly encountered in the pediatric population, and rarer yet to encounter a lipoma of the cervical/supraclavicular region. Tumors of this location can impact surrounding vasculature as well as the brachial plexus. Complete surgical excision remains the mainstay of treatment for symptomatic lipomas.

Objective - To describe the resection of a slowly progressive mass along the neck, clavicle, and chest wall adjacent to the major vessels of the region and encasing the superior aspect of the brachial plexus in a young child.

Methods - A literature review was conducted exploring the context of brachial plexus lipomas in the pediatric and adult population, including diagnosis, management, and surgical nuances. Our patient's case is discussed, including details of her presentation, surgical case, and outcomes.

Results - Preoperative planning included careful radiographic assessment and neurosurgical evaluation. The patient underwent successful complete resection utilizing intraoperative neuromonitoring and early identification and preservation of components of the brachial plexus. The patient recovered well without neurologic deficit.

Conclusion - Pediatric brachial plexus lipomas are rare entities that have been sparsely described in existing literature. Despite benign pathologic findings, lipomas may adhere to and involve surrounding structures. Surgical resection can be safely achieved in these high-risk areas with careful preoperative planning, including detailed imaging and neurosurgical involvement as well as judicious use of intraoperative neuromonitoring.

Title: Cross-Population Analysis of Primary Open-Angle Glaucoma Identifies Nine Protective Loci in the Mayan Population from Guatemala

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Purpose:

Primary open-angle glaucoma (POAG) is the leading cause of irreversible blindness and often progresses without symptoms until vision loss occurs. In 2020, 76 million patients were affected and over 111 million will be affected by 2040. Pseudoexfoliation (PXF) contributes to 25% of POAG cases in adults over 60. Interestingly, the Mayan population of Guatemala has a high prevalence of PXF, but a reduced burden of POAG. This study is a cross-population comparison of POAG-associated single nucleotide polymorphisms (SNPs) to evaluate whether established POAG protective and risk SNPs identified in large cohorts are present in the Mayan population.

Methods:

A Mayan cohort of 126 participants (58 male) was characterized as outlined by Hicks et al. (2021). Summary statistics for 84 known protective SNPs were obtained from the Million Veteran Program, and 127 known POAG risk SNPs were obtained from a multi-ancestry GWAS meta-analysis (Gharahkhani et al., 2021). Overlapping SNPs in the Mayan cohort were identified and extracted. Allele count (2x2) tables were constructed to compare effect and non-effect allele counts between the Mayan population and each reference cohort (European, African, and Amerindian) from the NIH All of Us Research Program. Chi-square tests with Bonferroni correction were performed to assess population differences, and odds ratios with 95% confidence intervals were calculated.

Results:

Protective SNP analysis identified 9 SNPs with significantly higher protective allele frequency in the Mayan cohort versus at least one reference cohort ($p < 9.25x10^{-4}$). 4 SNPs were significant across all three reference cohorts at the loci of SIX1-SIX6 (rs10483727), ABCA1 (rs2437812, rs2472496), and ANKH (rs31916). Risk SNP analysis identified 16 SNPs at significantly lower risk allele frequency in the Mayan cohort relative to at least one reference cohort ($p < 5x10^{-4}$). 6 SNPs were associated with reduced risk in the Mayan cohort across all reference cohorts at the loci of SCFD2 (rs10517281), RELN (rs12667675), SMAD6 (rs2439386), ANKH (rs31916), SIX6 (rs33912345), and HLA-G (rs407238).

Conclusions:

Preliminary results emphasize that studying isolated populations with a low POAG burden can reveal protective therapeutic targets and diagnostic strategies. Follow-up studies in disease affected tissue are required to confirm neuroprotective mechanisms.

TITLE: Social Risk Factors and Advanced CKM Syndrome by Sex, Race/Ethnicity: NHANES 2005–2018

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Introduction: Although adverse social risk factors influence Cardiovascular-Kidney-Metabolic (CKM) syndrome development and progression, it is unclear whether specific social risks are differentially associated with CKM across individual demographics.

Objective: To examine the association between individual social risk factors and advanced CKM and to assess whether these relationships vary by age group, sex, and race/ethnicity.

Methods: We analyzed 28,218 adults aged ≥30 years from NHANES 2005–2018, representing 165.8 million U.S. adults. CKM stages were classified per American Health Association criteria and dichotomized into non-advanced (0–2) versus advanced (3–4). Five social risk domains were examined: economic instability, poor neighborhood environment, limited education, limited health care access, and poor social/community context. Following tests for interactions by age, race/ethnicity and sex, weighted logistic regression tested associations between social risks and advanced CKM, stratified by race/ethnicity and sex.

Results: Overall, 44.7% of participants had advanced CKM. No significant interactions were found for age. Economic instability was associated with higher odds of advanced CKM among Non-Hispanic White (OR = 1.22, 95% CI: 1.08–1.37) and Non-Hispanic Black adults (OR = 1.27, 95% CI: 1.08–1.50). Poor neighborhood environment was significant for Non-Hispanic Black (OR = 1.20, 95% CI: 1.03–1.38). Limited education was associated with advanced CKM among Non-Hispanic White adults (OR = 1.29, 95% CI: 1.13–1.48). Poor social/community context was associated across all groups, strongest among Hispanic (OR = 1.72, 95% CI: 1.43–2.08). By sex, social risks were more strongly associated with advanced CKM in women, with associations for men weaker and limited to economic instability, poor neighborhood environment, and poor social/community context.

Conclusions: Social risks are associated with advanced CKM with variation by race/ethnicity and sex. Screening and subgroup-specific interventions should be developed and tested to reduce disparities and slow CKM progression.

Shining a Light on Patient Awareness of UV Safety Measures at the Lighthouse Free Medical Clinic

Background: Skin cancer is the most diagnosed cancer in the United States, with an estimated rate of 1 in 5 Americans developing skin cancer in their lifetime.[1] The primary risk factor for developing skin cancer is exposure to ultraviolet (UV) radiation through sunlight exposure or use of indoor tanning beds.[2] While there are multiple methods to protect from harmful UV exposure, research has shown that using sunscreen can prevent the development of both non-melanoma and melanoma skin cancers.[3] A national study found that while sunscreen use was found to lower skin cancer prevalence, other sun protection methods, such as staying in the shade or wearing protective clothing, were not statistically associated with lower skin cancer prevalence.[4] The Lighthouse Free Medical Clinic (LFMC) is a student-run clinic in Buffalo, New York that offers free medical care and dermatology services to the community's uninsured and medically underserved population. A study was conducted in 2024 to improve our understanding of the barriers to dermatology care and skincare knowledge of the LFMC patient population.

Methods: Under IRB approval, we analyzed de-identified survey data of 131 patients. The survey was conducted during the check-in process at LFMC for all consenting patients over 18. Patients completed an 11-question survey regarding their access to dermatology care, the methods of sun protection they used, and the need/desire to schedule an appointment with our dermatology clinic.
Data analysis was performed using R with the Epitools package. Given the relatively small sample size of the "seen dermatologist" group (n = 29), the mid-p exact test was used to determine statistical significance, as it provides a less conservative and more powerful alternative to Fisher's exact test in small sample sizes. Odds ratios (ORs) with corresponding 95% confidence intervals (CIs) were calculated to quantify the strength of the association.

Results: A total of 131 patients at LFMC were surveyed regarding dermatologist visit status and sun protection behaviors. Sunscreen use was reported by 44.8% of individuals who had seen a dermatologist compared to 24% of those who had not (Figure 1). Seeing a dermatologist was significantly associated with greater sunscreen use (odds ratio (OR) 2.55, 95% confidence interval (CI) 1.06–6.13, p = 0.037) (Figure 2).

Conclusion: The results of this analysis emphasize the effects of access to dermatology care on patients' sun safety awareness behaviors. Improving access to dermatology care may enhance sun safety awareness and prevention efforts. We will host a Sun Safety Summer Kickoff event targeting the larger community. Timed to coincide with the peak season for skin cancer risk, this event will provide the community with comprehensive education and resources to promote skin protection and early prevention.

Title of Project:
Celiac Plexus Neurolysis vs Opioid Initiation as First-Line Therapy in Unresectable Pancreatic Cancer: Comparing Opioid-Induced Respiratory Failure and Symptom Burden

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Introduction:
Unresectable pancreatic cancer causes severe pain that affects daily activities. Opioids are the main treatment for cancer pain but can cause significant side effects and lower survival rates. Opioid-related respiratory failure is a serious, yet potentially preventable, complication. Celiac plexus neurolysis (CPN) is used as an additional treatment for refractory pain. However, its effect on respiratory failure has not been previously studied.

Objective:
To evaluate whether early CPN in patients with pancreatic cancer–related pain reduces the incidence of respiratory failure.

Methods:
A retrospective cohort study was performed using TriNetX comparing patients with unresectable pancreatic cancer who received early CPN with those managed exclusively with opioid therapy. Outcomes included respiratory failure with opioid use (primary), unrelated respiratory failure, constipation, and nausea/vomiting (secondary). Propensity score matching (1:1) was performed to balance baseline characteristics.

Results:
A total of 36,479 patients met the initial inclusion criteria. After applying all eligibility criteria, 33,156 patients were included in our analysis. Following 1:1 propensity score matching, 310 patients from each cohort were included. Early neurolysis did not significantly reduce rates of unrelated respiratory failure, opioid-associated respiratory failure (22.3% in CPN group vs. 23.2% of controls, RR: 0.958 / OR: 0.946; p=0.774), compared with matched controls. The CPN group had higher rates of nausea (14.8% in CPN vs. 9.7% in control, RR:1.533 / OR:1.626; p=0.050) and constipation (16.8% in CPN vs. 9% in control, RR:1.857 / OR:2.030; p=0.004). No significant difference was observed for opioid analgesic use (p=0.764) or the occurrence of unrelated respiratory failure (p >0.99).

Conclusion:
Early CPN did not decrease opioid-associated respiratory failure compared with standard opioid therapy but was associated with increased gastrointestinal adverse effects. These findings underscore the need for further research into symptom burden, autonomic dysregulation, and refined patient selection to identify individuals who may benefit from early neurolytic intervention.