CALIFORNIA NORTHSTATE UNIVERSITY

2026 ANNUAL RESEARCH SYMPOSIUM BOOKLET

Friday, April 10th, 2026

California Northstate University

9650 West Taron Dr.

Elk Grove, CA 95757

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2026 CNU Annual Research Symposium Schedule

Event	Time
Registration/Check-in/Poster setup (coffee)	9.00am- 9.30am
Welcome Remarks from the CNU President, Dr. Alvin Cheung	9.30am- 9.40am
Overview of CNU Research Dr. Catherine Yang (VP of Academic Affairs and Research)	9.40am- 10.00am
Speaker Introduction	10.00am- 10.05am
Keynote Speaker Presentation- Dr. Ashish Atreja	10.05am- 11.00am
Oral Presentation Group I	
O1 College of Dental Medicine - Nikhita Vanama "Assessing Dental Practitioners' Perceptions and Preparedness Regarding the Integration of Artificial Intelligence (AI) in Dental Practice"	11.00am- 11.15am
O2 College of Medicine- Catherine Li **"**Activation of Toll-Like Receptor 7 Enhances Neuronal Activity in the Spinal Dorsal Horn via Glial Activation and Upregulation of IL-1β, IL-18, and N-Type Voltage-Gated Calcium Channels**"**	11.15am- 11.30am
O3 College of Graduate Studies- Riley Danna "Extracellular Vesicle Supplementation as a Novel Therapeutic Strategy for PGRMC2-Related Cardiac Dysfunction"	11.30am- 11.45am
O4 College of Health Sciences- Bibi Zahra Aziz Zada "Exploring Corbicula fluminea as a Bioindicator Species for Environmental Health"	11.45am- 12.00pm
Lunch	12.00pm- 12.30pm
Poster Session	**12.30pm- 2.30pm**
Oral Presentation Group II	
O5 College of Medicine - Paul Buclez "Determining Lung Cancer Subtype at Diagnosis Using Clinical and CT Features"	2.30pm- 2.45pm
O6 College of Pharmacy- Bing Lyu "Decoding the Silent Crisis: Using Explainable AI (SHAP) to Uncover Hidden Drivers of Suicide Risk in the 2023 National Youth Risk Behavior Survey (YRBS)"	2.45pm- 3.00pm
O7 College of Psychology- Devin Eastman "The Association Between Nicotine Use and Anxiety Symptoms in Young Adult Men: A Brief Behavioral Nicotine-Reduction Case Study"	3.00pm- 3.15pm
Awards (Posters)/ Concluding Remarks- Dr. Catherine Yang	3.15pm- 4.00pm

Message from the Vice President of Research

Catherine F. Yang, Ph.D.
Vice President of Academic Affairs & Research
Dean of College of Graduate Studies
California Northstate University

I am delighted to welcome you to the CNU 2026 Annual Research Symposium. This event celebrates the creativity, innovation, and dedication of the CNU research community, while providing a platform for students and faculty to showcase their scholarship and foster connections across disciplines. I am especially proud of the Faculty Planning Committee for creating opportunities for our students, the next generation of scientists, clinicians, and scholars, to gain valuable experience presenting their work, receiving constructive feedback, and building relationships that will support their future careers. I invite you to explore the remarkable projects presented here and to be inspired by the impact of research at CNU.

Keynote Speaker

Dr. Ashish Atreja
M.D., M.P.H., F.A.C.P., A.G.A.F.
Physician Executive and AI Innovation Leader
Former CIO and CDHO, UC Davis Health
Founder, GVX Venture Accelerator and GenServe.AI

Dr. Ashish Atreja, widely known as "The App Doctor," is a nationally recognized physician executive, intrapreneur, and founder of the GVX Venture Accelerator and GenServe.AI. He coined the term "evidence-based digital medicine (EBDM)" and is considered one of the leading voices in healthcare transformation through AI Centers of Excellence.

As a healthcare executive, Dr. Atreja most recently served as Chief Information Officer and the inaugural Chief Digital Health Officer at UC Davis Health, where he unified and transformed enterprise IT as Innovation Technology, established revenue-generating centers of excellence, and led the institution to become the first in California to achieve Level 10 Most Wired status for both inpatient and ambulatory care in 2023.

Previously, he served as Chief Innovation Officer for Medicine at Mount Sinai Health System, where he founded one of the first academic innovation hubs, AppLab, and pioneered the creation of an EHR-integrated digital health platform in 2015 that enabled clinicians for the first time to prescribe mobile apps and AI bots very much they would prescribe medications or recommend surgery. This work was featured in NPR and earned him two patents and the nickname "The App Doctor."

At the Cleveland Clinic, where he began his leadership journey, Dr. Atreja served as Associate Program Director for the Informatics Fellowship, led inpatient electronic health record implementation, and developed one of the first virtual pager and messaging systems—successfully adopted and licensed.

As a digital health intrapreneur and entrepreneur, Dr. Atreja has received multiple innovation awards, successfully licensed technologies, and founded companies originating from academic medical centers. He was the founding CEO of Rx.Health, a venture-backed spinout from Mount Sinai that automated digital care delivery for major organizations including UnitedHealthcare and five of the top ten health systems in the U.S., ultimately impacting over 30 million patient lives before its successful acquisition.

In 2023, Dr. Atreja launched VALIDAI.Health, a national initiative uniting more than 58 health systems and health plans to drive value through the responsible implementation of generative AI in healthcare. This mission also aligns with and serves as a core focus of the GVX Venture Accelerator, where he is a founding partner committed to supporting startups with soul.

Dr. Atreja holds a medical degree and a Master of Public Health, and he is a fellow of the American College of Physicians (ACP) and the American Gastroenterological Association (AGA). He has served in advisory and leadership roles for numerous national bodies and Fortune 100 companies, including the Centers for Disease Control and Prevention (CDC), the California State Health Department, the American College of Cardiology, and leading life science companies. He has served on the executive board of the Office of the National Coordinator for Health IT (ONC) and the HL7 FHIR at Scale (FAST) Accelerator, and is a board member of NODE.Health, a nonprofit organization dedicated to sharing best practices in evidence-based digital medicine across health systems, payers, and industry.

Dr. Atreja has been recognized with numerous national honors, including being named one of the Top Digital Health Officers by Becker's, a Top 40 Healthcare Transformer in 2017, a Top 50 Healthcare Leader by HIMSS in 2021, a Top 30 Health IT Influencer by Health Tech Magazine in 2022, a Top 150 Business Transformer Across global industries by Constellation Research and a top 35 Digital Health officer by Beckers in 2023.

He has authored over 105 peer-reviewed publications, has received continuous NIH research funding since 2014, and is a highly sought-after keynote speaker on open innovation, the future of AI in medicine, and the scientific journey from Innovation to Transformation (FIT).

PODIUM PRESENTATIONS ABSTRACTS

Podium Presentation: O1

Assessing Dental Practitioners' Perceptions and Preparedness Regarding the Integration of Artificial Intelligence (AI) in Dental Practice

Keya Bajaria; Aysha Shamim; Nikhita Vanama; Dr. Nisha Manila

Background: Artificial intelligence (AI) is increasingly incorporated into diagnostics, treatment planning, and patient management in dentistry. However, while educational initiatives have expanded, the knowledge, attitudes, and preparedness of practicing dental professionals the primary end-users remain insufficiently documented, limiting effective, ethical implementation. This study addresses that gap by evaluating current perceptions and readiness among licensed dental practitioners.

Objective: To investigate dental practitioners' understanding, attitudes, and perceived preparedness concerning the integration of artificial intelligence (AI) in current clinical practice.

Methods: A cross-sectional survey of licensed practitioners yielded 24 consenting respondents. Key outcomes included AI use, familiarity, preparedness, and attitudes. AI-use prevalence was estimated with a 95% Wilson confidence interval, attitudes were summarized using mean ± SD and 95% t-intervals, preparedness using median (IQR), and associations tested via chi-square for Familiarity × AI usage. A planned Spearman correlation between familiarity and preparedness was not estimable due to limited paired responses. IRB approval #2505-05-202.

Results: AI use was 33.3% (7/21), 95% CI 17.2%–54.6%. Preparedness was moderate (median = 3.0, IQR = 3.0–3.5; n = 7). Attitudes were strongly positive: agreement that AI improves diagnostics (4.40 ± 0.55, n=5) and patient care (4.50 ± 0.58, n=4). The Familiarity × AI usage association was not significant (χ^2 $p = 0.219$).

Conclusions: Dentists reported high perceived benefits of AI but limited adoption and moderate preparedness, indicating a gap between enthusiasm and practical readiness. The lack of association between familiarity and use suggests barriers beyond knowledge, such as workflow or medico-legal concerns. Findings support the need for vendor-neutral, hands-on continuing education to promote confident and responsible AI integration.

Podium Presentation: O2

Activation of Toll-Like Receptor 7 Enhances Neuronal Activity in the Spinal Dorsal Horn via Glial Activation and Upregulation of IL-1β, IL-18, and N-Type Voltage-Gated Calcium Channels

Catherine Li; Sujin Lim; Saumya Bipin; Han-Rong Weng

Study Aims: We previously demonstrated that excessive activation of Toll-like receptor 7 (TLR7) in the spinal dorsal horn contributes to chronic pain by enhancing glutamatergic synaptic activity in lupus mice. Glial activation and the release of proinflammatory cytokines, such as IL-1β and IL-18, are known to amplify neuronal excitability along the pain pathway. N-type voltage-gated calcium channels (Cav2.2), which are highly expressed in primary nociceptive afferents terminating in the spinal dorsal horn, mediate calcium influx into presynaptic terminals and trigger glutamate release at the first synapse of the pain pathway. In this study, we investigated the downstream signaling mechanisms by which TLR7 regulates chronic pain.

Methods: MRL/lpr mice (an established SLE model) with chronic pain and control mice were used. Immunohistochemistry, Western blotting, and in vivo intrathecal drug administration were performed.

Results: Lupus mice with chronic pain exhibited increased protein expression of spinal c-Fos and phosphorylated ERK (p-ERK), two well-established markers of neuronal activation, indicating enhanced spinal dorsal horn neuronal

activity. TLR7 expression was significantly elevated in the spinal dorsal horn and was primarily localized to microglia. Spinal administration of a TLR7 agonist increased TLR7 expression and induced neuronal activation. Activation of spinal TLR7 in control mice enhanced microglial and astrocytic activation, p38 MAPK phosphorylation, and the production of IL-1β and IL-18. Furthermore, TLR7 activation significantly increased protein expression of the N-type voltage-gated calcium channel (Cav2.2) in the spinal dorsal horn.

Conclusions: These findings demonstrate that spinal TLR7 activation drives chronic pain by promoting spinal neuronal activation through glial activation, proinflammatory cytokine signaling, and upregulation of Cav2.2. Targeting this TLR7–glia–Cav2.2 signaling axis may represent a novel therapeutic strategy for the treatment of SLE-associated chronic pain.

Podium Presentation: O3

Extracellular Vesicle Supplementation as a Novel Therapeutic Strategy for PGRMC2-Related Cardiac Dysfunction

Riley Danna; Chris Barnes; Ashraf Mohieldin

Background: Progesterone receptor membrane component 2 (Pgrmc2) is critical for ciliogenesis and biogenesis of ciliary extracellular vesicles (ciEVs). Extracellular vesicles (EVs) are being evaluated in eight clinical trials for cardiac remodeling, yet the role of ciEVs and their regulation via Pgrmc2 remains unexplored. This study investigates the impact of cardiac-specific Pgrmc2 knockout on cardiac function and proposes ciEV supplementation as a novel strategy for cardiac dysfunction, expanding the potential of EV-based cardiac therapies.

Methods: A cardiac-specific Pgrmc2 knockout mouse model was generated using the Cre–LoxP system. Control and knockout mice treated with saline or EVs (n = 24, equal sex ratio) were used to assess cardiac structure and function. Mice received weekly 200 µL IV injections of saline or EVs (1.6 million) from 2–17 weeks of age. $P < 0.05$ was considered statistically significant.

Results: Dot membrane analysis confirmed the presence of Pgrmc2 in injected EVs. Survival analysis demonstrated high mortality (50%) in knockout mice, while treadmill exercise-stress testing revealed reduced exercise capacity ($p < 0.00001$). Blood-pressure analysis showed greater declines in diastolic pressure ($p < 0.0001$ pre-exercise; $p < 0.00001$ post-exercise) and systolic pressure ($p < 0.0001$ post-exercise) in male knockout mice compared with females, suggesting cardioprotective effects of circulating progesterone. Pressure–volume loop analysis assessed cardiac performance under baseline, increased (epinephrine), and reduced (diltiazem) workload conditions, revealing reduced stroke volume at equivalent pressures in knockout mice. Histological analysis revealed left ventricular hypertrophy ($p < 0.0001$ females; $p < 0.001$ males) and increased cardiac fibrosis ($p < 0.001$ females; $p < 0.00001$ males). EV treatment significantly improved survival (75%), blood-pressure regulation, ventricular thickness, and fibrosis.

Conclusion: Loss of Pgrmc2 disrupts ciEV release, leading to structural and functional cardiac deterioration. EV supplementation rescues these deficits, highlighting the role of ciEVs and Pgrmc2 in cardiac homeostasis and therapeutic potential.

Podium Presentation: O4

Exploring Corbicula fluminea as a Bioindicator Species for Environmental Health

Bibi Zahra Aziz Zada; Shriya Vijay; Aamir Lateef; Damon Meyer

Freshwater quality plays an important role in human health and ecosystem stability. Asian clams, also known as Corbicula fluminea, found in Sacramento waterways are filter feeders, which are sensitive to chemical and physical environmental changes In this study, C. fluminea and water samples taken from Lake Natoma were analyzed to evaluate chemical and

microbial indicators of environmental health. In addition, molecular analysis was performed on clam tissue to verify genetic identify and examine sequence variation across samples. Finally, stress markers were evaluated through expression of Heat Shock Protein 70 (HSP70), a highly conserved protein that stabilizes proteins against stress-induced aggregation. Taken together, this information can provide information on current chemical and microbial hazards in Lake Natoma and how C. fluminea could be used as bioindicator species for future unknown hazards.

Podium Presentation: O5

Determining Lung Cancer Subtype at Diagnosis Using Clinical and CT Features

Paul Buclez, MS; Jessica Lubisch, BS; Jino Park, MD; Aaron Simon, MD PHD

Purpose: Management of patients presenting with newly diagnosed lung cancer and synchronous brain metastases is challenging because treatment decisions must be made before histologic and molecular results are available. Management strategies differ substantially by subtype: EGFR-mutant disease may favor early systemic therapy with deferral of cranial irradiation, whereas small cell lung cancer (SCLC) more commonly prompts consideration of whole-brain radiotherapy. Delays in subtype identification therefore create uncertainty during time-sensitive multidisciplinary decision-making. We sought to develop a predictive approach using available clinical and chest CT features to distinguish SCLC, EGFR-mutant non–small cell lung cancer (EGFR[+]), and EGFR-negative non–small cell lung cancer (EGFR[–]) at initial presentation.

Materials: We retrospectively analyzed 303 patients (2016–2025) with metastatic lung cancer and available initial CT chest and MRI brain reports. Clinical and imaging features were collected, and a firewalled large language model blinded to tumor subtype determined CT feature presence. Patients without brain metastases were used for training (n=180) and those with brain metastases for testing (n=123). Logistic regression with LASSO regularization and random forest models were evaluated using clinical features alone and combined clinical plus imaging features.

Results: Performance remained robust in the testing cohort, indicating generalizability. Prediction was highest for EGFR(+), with logistic regression achieving AUCs of 0.897, 0.781, and 0.799 for EGFR(+), SCLC, and EGFR(–), respectively. Incorporation of imaging features significantly improved performance for EGFR(+) and SCLC but not EGFR(–), with similar results across modeling approaches. Combined models achieved a PPV of 0.843 for EGFR(+) and an NPV of 0.889 for SCLC. Imaging features associated with EGFR(+) included pleural attachment and miliary metastases, while SVC and pleural involvement were associated with SCLC.

Conclusions: Integration of routinely available clinical and chest CT features into predictive models may enable discrimination of lung cancer subtypes and facilitate multidisciplinary management discussions.

Podium Presentation: O6

Decoding the Silent Crisis: Using Explainable AI (SHAP) to Uncover Hidden Drivers of Suicide Risk in the 2023 National Youth Risk Behavior Survey (YRBS)

Bing Lyu; David Tran; Tuan Tran

Background: Adolescent suicide is a critical public health crisis. Prevention is often hindered by failing to address the ""syndemic"" nature of risks, where overlapping biological, psychological, and social factors amplify harm. Uncovering these complex drivers requires advanced, explainable modeling.

Objectives: We utilized explainable artificial intelligence (AI) to examine biopsychosocial predictors of persistent sadness and suicide ideation, aiming to isolate and rank high-impact risk factors to inform precision screening.

Methods: A complete-case analysis of 9,030 respondents from the 2023 Youth Risk Behavior Surveillance System evaluated predictors spanning demographics, violence, and Adverse Childhood Experiences (ACEs). Logistic Regression and Random Forest models were assessed using accuracy and ROC-AUC, with SHapley Additive exPlanations (SHAP) applied for interpretability.

Results: Persistent sadness and suicide ideation were reported by 43% (n=3,879) and 22.3% (n=2,014) of students, respectively. Sadness disproportionately affected females (56.9% vs. 29.5% males) and was amplified by school bullying (68% vs. 36.6% not bullied) and domestic violence exposure (89.8% vs. 36%). Similarly, forced sexual intercourse increased suicide ideation risk (58% vs. 18.6%). “Difficulty concentrating” was the strongest correlation with sadness ($\rho=0.49$, $p<0.001$) and ideation ($\rho=0.38$, $p<0.001$), followed by parental mental illness ($\rho=0.34$ and $\rho=0.31$; $p<0.001$). Predictive models demonstrated excellent discrimination: Logistic Regression yielded ROC-AUCs of 0.840 (76.5% accuracy) for sadness, and 0.836 (75.8% accuracy) for ideation, and Random Forest achieved ROC-AUCs of 0.813 (75.14%) and 0.818 (81.6%), respectively. SHAP confirmed parental mental illness, forced sex, cyberbullying, and sexual identity as primary drivers. Additionally, interaction analysis revealed a ""Double Jeopardy"" effect, where discrimination compounds risk for LGBQ+ youth.

Conclusions: This study shows trauma exposure and parental mental illness are stronger predictors of adolescent suicide ideation and persistent sadness than digital or lifestyle factors. “Difficulty concentrating” emerged as the most consistent marker, offering a practical screening signal. Bullying increased risk, while school connectedness was protective. These findings support trauma-informed, family- and school-based prevention strategies.

Podium Presentation: O7

The Association Between Nicotine Use and Anxiety Symptoms in Young Adult Men: A Brief Behavioral Nicotine-Reduction Case Study

Devin Eastman; Dr. Jason Lillis

Adolescent and young adult nicotine use has been linked to increased risk for anxiety symptoms, potentially due to nicotine’s disruption to neurotransmitter functioning and reinforcement pathways. This case study describes a clinically rapid reduction in panic and anxiety symptoms following a targeted nicotine-reduction intervention in a 19-year-old male. Prior to therapeutic interventions, the patient reported vaping nicotine about twenty times per hour and endorsed moderate anxiety (GAD-7=14). He described symptoms as making functioning “very difficult” and reported experiencing panic attacks 2-3 times per day. A brief behavioral intervention was implemented over two months, focused on nicotine-use tracking, reduction goals, psychoeducation, coping strategies, and cognitive behavioral therapy interventions. By termination, vaping frequency decreased to approximately four uses per day, GAD-7 score decreased to 3 (minimal anxiety), and panic attacks were fully eliminated. These findings highlight a novel and practical treatment target for anxiety presentations in young adults. Nicotine reduction as a primary focus to reduce symptoms and cause clinically meaningful symptom improvement. Results support the importance of providers routinely assessing nicotine use in anxiety treatment and suggest that structured vaping reduction may be a feasible treatment approach. Further research is needed to evaluate causal mechanisms and replicate outcomes beyond a single-case analysis.

POSTER PRESENTATIONS ABSTRACTS

Poster: P8

Educational Barriers to the Adoption of Home Hemodialysis as a Primary Modality in the United States

Nishant Mistry; Daniel Moon; Emmanuelle Zakheim; Kenneth Thai; Malik Oda; Paul Buclez; Amidala Geetaumesh; David Pai

Background: Patients with chronic renal failure in need of dialysis have in-center hemodialysis (ICHD), peritoneal dialysis (PD), and home hemodialysis (HHD) as treatment options. Of the available options, HHD is largely underutilized compared to other modalities despite known advantages, including improved treatment outcomes and patient autonomy. In response, a greater emphasis was placed on home modalities via the Advancing American Kidney Health Initiative (AAKHI) in 2019 to increase government subsidization for HHD and overall exposure thereof. This literature review aims to explore barriers, focusing on education, which may improve HHD utilization.

Methods: PubMed, Embase, and Scopus were screened for relevant studies in accordance with preferred reporting items for literature review guidelines. All authors conducted a full-text review to assess relevance and extract key study characteristics, including study type, methods, country, purpose, identified barriers, and proposed or studied solutions.

Results: Many patients report inadequate pre-dialysis modality education, citing fears of isolation from care teams and needle-related anxieties as reasons for not electing HHD as their primary treatment. These concerns may be reduced through patient education on provider involvement in HHD and training to address needle fears. Knowledge gaps were also noted between senior and training physicians, with nephrology residents and fellows less familiar and less likely to offer HHD. Importantly, discrepancies between provider- and patient-perceived barriers highlight the need for standardized and continued modality education across all levels. Improving HHD education can facilitate comprehensive conversations of all treatment options, encouraging patient autonomy and addressing concerns promptly prior to treatment selection.

Conclusions: Educational gaps among both patients and providers remain a key barrier to HHD adoption, despite its well-established clinical benefits. Optimizing education strategies may empower patients and providers alike, fostering greater HHD utilization and improved long-term outcomes in end-stage renal disease.

Poster: P9

The Effect of CDDO-Me on THP1-Derived Macrophages undergoing ER stress

Jenibelle Hsu; Petros Martin Raygoza; Eslam Mohamed

Introduction: In the tumor microenvironment (TME), endoplasmic reticulum (ER) stress promotes immunosuppressive phenotypes in myeloid cells by impairing antigen presentation and the initiation of T cell responses, making ER stress a potential target for cancer treatment. CDDO-Methyl ester (CDDO-Me) is a synthetic triterpenoid that has been shown to inhibit proliferation and induce apoptosis of tumor cells. However, the effect of CDDO-Me on ER-stressed macrophages that highly infiltrate the TME is poorly understood.

Methods: A human monocytic cell line (Thp1) was differentiated into macrophages via a PMA-dependent protocol. ER stress was then induced in human macrophages with Thapsigargin (1 μM) or Tunicamycin (4 μg/mL). CDDO-Me was used to study its effect on the phenotype of ER-stressed macrophages. RT-PCR experiments were performed to assess the induction of gene targets. Western blots were used to determine the expression of cleaved gasdermin D. IL-10 bioluminescence immunoassays were performed to assess the levels of IL-10 in culture media. Flow cytometry was utilized to identify changes in the levels of surface PD-L1, Annexin V (AV), Propidium Iodine (PI), and Caspase-1 activity.

Results: In macrophages treated with Thapsigargin 1 μM or Tunicamycin 4 μg/mL, XBP1 and DDIT3 were upregulated, confirming induction of ER stress. In ER-stressed conditions, PD-L1 surface expression and IL-10 expression were upregulated. Relative to macrophages treated with either ER stressors or CDDO-Me alone, cells exposed to ER stress and CDDO-Me exhibited a significantly higher proportion of AV^+/PI^+ populations and increased Caspase-1 activity. Cleaved gasdermin D expression was most prominent with Tunica + CDDO-Me.

Conclusion: ER stress induction increases the expression of PD-L1 and IL-10, two key immunosuppressive mechanisms employed by macrophages to attenuate antitumor immune responses. CDDO-Me demonstrates potential anti-tumor action by inducing apoptosis of ER-stressed macrophages via Caspase-1-dependent pyroptosis. By reducing immunosuppressive macrophages in the TME, CDDO-Me exhibits potential for augmenting current immunotherapies."

Poster: P10

Patterns of Pediatric Pulmonary Emergency Department Visits: A US National Database Analysis

Nidhi Lakshmanan 1; Riley Danna 1; Ephrem Gerald 1; Myan Lam 1; Sofia Llacer Chamberlain 1; Ethan Winter 1; Mattew Herman 1; Dylan Cullinane 2; Pepe Puglisi 1

Objective: Pediatric pulmonary complaints represent a substantial proportion of emergency department (ED) visits. Identifying high-volume periods and common diagnoses is critical for optimizing staffing, minimizing wait times, and supporting evidence-based resource allocation. This study examines national data to evaluate seasonal trends, time-of-day variation, regional distribution, and sex-based differences among pediatric patients presenting to the ED for pulmonary complaints.

Methods: Data were obtained from the National Hospital Ambulatory Medical Care Survey (NHAMCS) and included 18,360 pediatric ED visits from 2018-2022, of which 5,740 were pulmonary-related. Cases were characterized by patient sex, age, visit urgency, season, wait time, and diagnosis. Microsoft Excel was used to calculate mean wait times by sex, month, and hour of presentation. Visit frequency was evaluated by season, acuity, diagnosis, and geographic region.

Results: Winter demonstrated the highest overall volume of pediatric pulmonary ED visits. Summer had the highest proportion of immediate visits; fall showed increased emergent and non-urgent cases; and, winter was the most common time for semi-urgent and urgent visits. Overall, White patients represented the majority of visits, followed by African American patients. Peak monthly wait times occurred in September for females and November for males. The longest hourly wait times occurred at 05:00 for both sexes, with females averaging 54.6 minutes compared to 46.1 minutes for males. The four most common pulmonary diagnoses were acute pharyngitis, acute obstructive laryngitis, acute upper respiratory tract infection, and asthma. Regional heat mapping demonstrated the highest cases of these diagnoses in the South.

Conclusion: Pediatric pulmonary ED visits exhibit clear seasonal, diurnal, and regional patterns, with winter and early morning hours associated with the highest volumes and longest wait times. These findings provide actionable insights for ED optimization. Proactive alignment of respiratory care resources during predictable peak periods may help mitigate extended wait times and improve efficiency. "

Poster: P11

Fixing the Failing Heart in Friedreich's Ataxia: A Dual Redox and Sympathetic Signaling Therapy

Eliana Carney; Sydney Chen; Katherine Miao; Francisco Figueroa; Sherif Bahriz; Ryan Sellers; Claire B. Montgomery; Bing Xu; Yang K. Xiang; Elena N. Dedkova

Background: Friedreich's ataxia (FA) is an inherited mitochondrial disorder caused by deficiency of frataxin (FXN), resulting in impaired iron–sulfur cluster biogenesis, mitochondrial dysfunction, and progressive cardiomyopathy. Hypertrophic remodeling, arrhythmias, and heart failure are the leading causes of mortality in affected individuals. Although autonomic nervous system (ANS) dysfunction is increasingly recognized in FA, the mechanistic link between FXN deficiency, sympathetic dysregulation, and cardiac electrical instability remains unclear. We hypothesized that FXN loss disrupts compartmentalized β1-adrenergic receptor (β1AR) signaling through monoamine oxidase A (MAO-A)–dependent redox stress, thereby promoting arrhythmogenesis and cardiac dysfunction.

Methods: We employed a muscle-specific FXN knockout (FXN-cKO) mouse model that recapitulates severe FA cardiomyopathy. Cardiac sympathetic activity was assessed by measuring MAO-A and tyrosine hydroxylase expression. Compartmentalized β1AR signaling was evaluated using FRET-based biosensors targeted to the sarcoplasmic reticulum (SR) and plasma membrane (PM). Functional consequences were examined through calcium transient analysis, electrocardiography, echocardiography, and quantification of oxidative damage via 4-hydroxynonenal (4-HNE). Therapeutic efficacy was tested using the MAO-A inhibitor clorgyline, the Nrf2 activator omaveloxolone (OMAV), or their combination.

Results: FXN-cKO hearts exhibited elevated MAO-A and tyrosine hydroxylase expression, consistent with increased sympathetic drive. While PM-localized β1AR signaling was preserved, SR-restricted β1AR signaling was markedly impaired, leading to abnormal calcium handling and heightened arrhythmia susceptibility. Clorgyline restored SR β1AR signaling, reduced lipid peroxidation, lowered circulating norepinephrine levels, and partially improved cardiac conduction, as reflected by shortened QRS intervals. Although clorgyline alone did not fully rescue cardiac function, combined treatment with clorgyline and OMAV significantly improved echocardiographic indices and survival.

Conclusions: These findings identify SR-specific sympathetic signaling defects as a novel mechanism underlying arrhythmogenesis in FA and support dual targeting of MAO-A–dependent ANS dysregulation and Nrf2-mediated antioxidant defenses to restore cardiac conduction and function. "

Poster: P12

Evaluating the Efficacy and Safety of Dupilumab for Chronic Spontaneous Urticaria

Ryan Borden; Kasey Yu; Dana Aboukhalil; Andy Lee; Thomas Clark; Stephanie Zhang; Hannah Chang; Jasdeep K. Sharma

Objective: Dupilumab has been approved for the treatment of several inflammatory conditions, most notably moderate-to-severe atopic dermatitis. This systematic review evaluates the safety and efficacy of dupilumab for treating chronic spontaneous urticaria (CSU).

Methods: A systematic search of PubMed, Embase, and Scopus was conducted following Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) guidelines to identify published, peer-reviewed clinical studies. Eligible studies were full-text, English publications that evaluated hive severity in patients diagnosed with CSU who received any form or dosage of dupilumab. Study variables included patient age, initial and maintenance dosage of dupilumab, treatment duration, and treatment outcomes. Treatment outcomes and adverse effects were compared across studies.

Results: From 549 identified articles, six studies were included: two randomized controlled trials (RCTs), one case series, one observational study, and two case reports. Across these studies, dupilumab demonstrated effectiveness as a monotherapy for treating CSU with minimal side effects. Reported side effects are typically mild and include nasopharyngitis, CSU

exacerbation, and injection site irritation. A single case of severe eosinophilia was observed at week 24 of dupilumab treatment. Although findings indicate that dupilumab may be an effective monotherapy for CSU, current evidence is limited, with most of the literature consisting of small studies and case reports.

Conclusion: This systematic review identifies evidence supporting dupilumab's potential efficacy and safety for the treatment of CSU. However, additional randomized controlled trials are needed to determine whether dupilumab can be reliably used as a monotherapy or combination therapy for CSU."

Poster: P13

Systematic Review of Amniotic Membrane Injections for Degenerative Osteoarthritis

Niloufar S Tehrani, MTM; Jay Uppuluri; Jesse Wong; Dylan Cooper; Omid S Tehrani, MD, PhD; Adedji Okikiade, MD, PhD

Objective: To systematically review and synthesize available human clinical evidence evaluating the efficacy of intra-articular amniotic membrane–derived injections for pain reduction and functional improvement in degenerative osteoarthritis.

Methods: A systematic review was conducted in accordance with PRISMA guidelines. PubMed, EBSCOhost, Google Scholar, and ScienceDirect for human studies investigating intra-articular injection of allogeneic amniotic membrane–derived products in degenerative osteoarthritis. Eligible studies included randomized controlled trials and observational clinical studies reporting validated pain and/or functional outcomes. Animal studies, narrative reviews, graft transplantation studies, and investigations utilizing amniotic fluid, chorion, placenta, or umbilical cord–derived products were excluded. Study selection, data extraction, and eligibility assessment were performed using predefined criteria. Institutional review board or ethics committee approval was not required in this study, as it is a systematic review of publicly available studies.

Results: Eleven studies with a total of N=988 participants published between 2016 and 2025 met inclusion criteria, comprising randomized controlled trials and observational designs. Most studies evaluated knee osteoarthritis, with limited evidence for other joints. Across studies, intra-articular amniotic membrane injections were associated with improvements in pain and functional outcomes from baseline, measured by instruments including VAS, WOMAC, KOOS, and IKDC. Randomized trials demonstrated superiority or non-inferiority compared with hyaluronic acid or saline, with benefits persisting up to 12 months. Observational studies reported generally consistent trends, although some small studies did not show statistically significant differences versus corticosteroid injections. Reported safety profiles were favorable, with no serious treatment-related adverse events.

Conclusion: Current human clinical evidence suggests that intra-articular amniotic membrane–derived injections may offer meaningful symptomatic benefit in degenerative osteoarthritis, particularly of the knee, though larger standardized trials are warranted to compare to corticosteroids."

Poster: P14

Effect of Remimazolam on Perioperative Hemodynamics and Postoperative Outcomes for Laparoscopic Surgeries: A Scoping Review.

Taylor Rosen BS; Linda Liu BS; Derek Macatangay BS; Timothy Jeong BS; Sugamjot Kaur Badhan BS; Anjalee Chopra BS; Ashley Ko BS; Islam Mohamed PhD

Background: Remimazolam is an ultra-short-acting benzodiazepine designed to combine the hemodynamic stability and anxiolytic effects of midazolam with the rapid onset and offset characteristics of propofol. As its use expands from procedural sedation to short surgeries under general anesthesia, a mapping of current evidence on perioperative hemodynamics and postoperative outcomes of remimazolam versus

other sedatives in laparoscopic surgeries is needed.

Objective: To synthesize evidence from randomized controlled trials to provide a precise comparison of the perioperative hemodynamics and postoperative outcomes of remimazolam versus other sedatives in laparoscopic surgeries.

Methods: A scoping review followed PRISMA-ScR guidelines and was registered with the Open Science Framework (doi.org/10.17605/OSF.IO/NMSYB). PubMed, Embase, and Scopus were searched until October 2025. Randomized controlled trials of remimazolam for anesthesia in adult patients (≥18 years old) of ASA grade I-III undergoing laparoscopic surgery were included.

Results: Twenty-three randomized controlled trials met the inclusion criteria, encompassing 2,586 patients. Parameters analyzed included Mean Arterial Pressure (MAP), Heart Rate (HR), Post-Induction Hypotension (PIH), Extubation Time, and Postoperative Nausea and Vomiting (PONV). Induction dosages for remimazolam ranged from 0.1 to 0.4 mg/kg. Maintenance dosages ranged from 0.4 to 3 mg/kg/h.

Remimazolam demonstrated more stable hemodynamics, with higher or comparable MAPs and less fluctuation compared to other sedatives, primarily propofol. Most studies reported increased or comparable HRs and lower PIH incidence. While extubation time appears statistically prolonged, the delay was clinically minimal, averaging less than three minutes. Most studies found no significant difference in PONV, though some reported lower incidence rates.

Conclusions: Remimazolam is a promising anesthetic with favorable hemodynamic stability and fewer side effects in adult laparoscopic surgeries. While extubation time can be statistically prolonged, this delay is clinically minimal, and flumazenil allows for rapid reversibility. Future high-quality trials are needed to determine optimal dosing regimens."

Poster: P15

Immune Profiling Reveals Rich Populations of Activated Tissue Resident T Cells in Human and Mouse Adrenal Glands

Jay Uppuluri, Natalie M. Liu, Karleen M. Meiklejohn, Marshall J. Lammers, Cyrus J. Sholevar, Megan C. Purl, Sean J. Judge, Claire E. Graves, Michael J. Campbell, Robert J. Canter

Background: The adrenal glands are an important site of cancer metastasis with poor response rates to immunotherapy. Given limited data characterizing the adrenal immune microenvironment, we sought to evaluate the adrenal gland's role as a potential immune-privileged site that is resistant to immunotherapy.

Method: We collected matched non-tumor bearing adrenal tissue and peripheral blood from adrenalectomy patients. We also collected adrenal glands from C57BL/6 and BALB/C mice for cross-species analysis. Fresh samples were processed into single cell suspensions to assess immune phenotype and function.

Results: In 10 adrenalectomy patients, we observed that adrenal CD45+ live cells contained a notable population of CD3+ T cells (20.2%) that was similar to peripheral blood (17.3%). Adrenal T cells exhibited an increased expression of checkpoint marker PD-1 on both CD4+ and CD8+ T cells compared to peripheral blood (40% and 50% increase, respectively, $P < 0.05$). C57BL/6 and BALB/C mouse adrenal glands showed analogous results, with higher T cell expression of PD-1 when compared to splenic T cells ($P < 0.05$). Human adrenal CD4+ and CD8+ T cells also exhibited increased expression of activation marker CD69 (60% and 70% increase, respectively, compared to peripheral blood T cells, $P<0.05$).

Conclusion: Our analysis shows that adrenal tissue harbors a T cell rich population with increased expression of PD-1 and CD69 compared to peripheral blood. These findings suggest that the adrenal gland harbors a distinct

population of tissue resident T cells which are not classically exhausted despite high PD-1 expression.

Poster: P16

Medicaid Disparities in Rural Gastrointestinal Care: A 1,040-Referral Study in Rural California

Joy Youn1; Varuska Fonseka2; Jimmy Wen1; Sugamjot Kaur Badhan1; Eldo Frezza1

Background: Rural hospitals in the U.S. serve 12-17% of the population. Patients in rural regions compared to urban settings face longer travel distances and times, fewer available providers, and limited transportation options, reducing access to preventive services such as colorectal screenings. Colorectal cancer, the third leading cause of cancer-related death in the U.S., has a 90% survival rate when detected early. Financial hardship and poor colonoscopy adherence contribute to a 15.6% higher mortality rate in rural regions. Medicaid patients have less access to GI specialty care compared to those with private insurance, and these disparities are further magnified in rural areas. Understanding rural healthcare disparities is essential to achieving equitable access to GI services and improving long-term outcomes.

Aims: To examine Medicaid-related disparities in a single hospital-based GI practice in a rural region in California.

Methods: All GI referrals (n=1,040) from January 2024 to September 2025 were reviewed. Insurance type (Medicaid/Medical vs. other) served as a proxy for socioeconomic status. Key measures included referral volume, scheduling completion, cancellations, wait times, no-show rates, and procedural demand.

Results: Of 1,040 referrals, 724 patients (69.6%) were Medicaid/Medical. A total of 640 patients (61.5%) were scheduled; 30% canceled or did not complete care. Average wait times were 3 months for Medicaid/Medical versus 1 month for other insurance, with no-show rates of 30% versus 5%. 80% of scheduled patients required colonoscopy, primarily for cancer screening (70%), with IBD, constipation, and GI bleeding each representing 10% of cases. The hospital-based practice represents the only specialty GI resource for a 3,532-square-mile region.

Conclusions: Despite representing almost 70% of the referrals, Medicaid/Medical patients experienced longer wait times and higher no-show rates compared with privately insured patients. These disparities highlight the vulnerability of rural Medicaid populations in accessing timely cancer screening and continuity of care.

Poster: **P17**

Balancing Risk and Reward in Hip Resurfacing for Developmental Dysplasia of the Hip: A Systematic Review and Meta-Analysis

Maani Bahador, BS1; Jean Shanaa, BS1; Ethan Bernstein, BS1; Natalie Shanaa, BA1; Theodor Di Pauli von Treuheim, MD2; Scott Marwin, MD2

Introduction: As interest grows in expanding Hip Resurfacing Arthroplasty (HRA) to more complex pathologies, developmental dysplasia of the hip (DDH) has emerged as a challenging yet increasingly explored indication. While severe forms of DDH are contraindicated due to distorted anatomy, mild dysplasia (Crowe I and II) may provide suitable conditions. This review evaluates clinical outcomes of HRA in mild DDH, compares them to total hip arthroplasty (THA) for DDH and HRA for osteoarthritis (OA), and explores the potential of HRA to improve long-term function.

Methods: A systematic search identified studies on HRA in DDH. Articles were screened by title/abstract and full text. Data on demographics, outcomes, and radiographic findings were extracted. Risk of bias was assessed using the MINORS score. Complication rates and survivorship were calculated, and random-effects meta-analyses compared revision risk for HRA in DDH versus OA, and HRA versus THA in DDH. Significance

was defined as 95% CI excluding 1. A separate meta-analysis compared postoperative hip flexion between HRA and THA in DDH (significance: 95% CI excluding 0).

Results: Of 65 articles, 11 met inclusion, comprising 895 patients (1006 hips). Two studies were low risk of bias, nine moderate. Mean age was 45.3 years; average follow-up 7.1 years. Survivorship was 93% and complication rate 13%. Meta-analyses found no significant revision risk differences between DDH-HRA and OA-HRA, or between DDH-HRA and DDH-THA, though both trended toward favoring OA and THA. DDH patients treated with HRA had significantly greater hip flexion than those with THA (SMD -1.21, 95% CI -1.54 to -0.87).

Conclusion: Selective use of HRA in Crowe I-II DDH yields comparable mid-term outcomes to OA and THA cohorts, with superior range of motion. Despite anatomical challenges, HRA remains a viable bone-preserving option in appropriately selected patients using modern techniques and DDH implants.

Poster: **P18**

Hip Resurfacing Arthroplasty Is Associated with Lower Metal Ion Levels and Revision Risk Compared with Large-Head Metal-on-Metal Total Hip Arthroplasty: A Systematic Review and Meta-Analysis

Jean Shanaa ; Orr Amar ; Shaheryar Asad ; Theodor Di Pauli von Treuheim ; Vinay K Aggarwal ; Scott Marwin

Background: Large-diameter head total hip arthroplasty (LDH-THA) emerged in the late 1990s as a stemmed alternative to hip resurfacing arthroplasty (HRA). Both procedures use metal-on-metal (MoM) bearings to permit larger heads, lower dislocation risk, and optimize function in younger, active patients. While concerns over metal ion release and adverse local tissue reactions curtailed MoM use, long-term follow-up remains critical for the substantial population with these devices in situ. This review compares LDH-THA and HRA in clinical outcomes, metal ion levels, and revision rates to guide long-term management and future implant design.

Methods: PubMed, Embase, and Scopus were searched for studies reporting patient-reported outcomes, metal ion levels, or revision rates for both LDH-THA and HRA. The risk of bias was assessed using the Methodological Index for Non-Randomized Studies score. Random-effects meta-analysis evaluated revision risk; cobalt and chromium levels; University of California, Los Angeles (UCLA) activity; Harris-Hip Scores (HHS); Oxford Hip Scores (OHS); and Western Ontario and McMaster Universities Osteoarthritis Index.

Results: Of 221 studies, 21 met inclusion criteria, including 5,545 LDH-THAs and 3,197 HRAs. The unweighted pooled revision rate was 16% for THA and 7.8% for HRA. Meta-analysis showed higher cobalt (standardized mean difference [SMD] 1.07) and chromium (SMD 0.53) levels in THA. Revision risk (odds ratio 1.75), UCLA (-0.44), and HHS (-0.32) favored HRA, though not significantly.

Conclusion: Although the usage of large-head MoM THA is largely historic, our findings suggest that MoM hip resurfacing arthroplasty has a more favorable outcomes profile with reduced systemic metal ion exposure, reinforcing its role in younger, active patients, where conventional or large-head THA may fall short. Level of evidence: Level III, systematic review of Level I, II, and III studies. See Instructions for Authors for a complete description of levels of evidence."

Poster: **P19**

Integrating Critical Appraisal of Artificial Intelligence (AI) Tools in Pre-Clinical Medical Education: An Evaluative Study on Students' Awareness, Perceptions, and Skills

Katelynne Au; Nishant Mistry; Shaumik Patil MPS; Marcus Carrillo; Islam Mohamed, B. Pharm, MS, PhD

Introduction: The emergence of artificial intelligence (AI) presents new challenges for

medical educators, including concerns about academic integrity and the risk that over-reliance on AI may hinder the development of critical thinking, clinical reasoning, and evidence-based decision-making. This study investigates whether experiential, in-class use of AI tools improves students' self-perceived utilization, critical appraisal skills, attitudes, and beliefs towards proper evaluation and integration of AI into pre-clinical education and ongoing professional growth.

Methods: During their pre-clinical cardiovascular course, first-year MD students at California Northstate University College of Medicine completed in-class pharmacology and clinical application exercises designed to mimic board-style exam questions. Students were encouraged to utilize ChatGPT and other AI tools to conduct searches and critically evaluate AI-generated responses. A voluntary, blinded, pre- and post-intervention questionnaire assessed changes in students' utilization, skills, attitudes, and beliefs regarding AI. Responses were measured using a four-point Likert scale. Paired t-tests ($\alpha = 0.05$) and Cronbach's alpha were used to assess statistical significance and internal consistency.

Results: 43 students completed both questionnaires. Preliminary analysis demonstrated strong internal consistency (Cronbach's alpha > 0.7). Statistically significant increases were observed in post-test scores, including a 6.5% improvement in students' use of AI to create and practice board-style questions and a 15.75% improvement in using AI to simulate patient interactions for clinical skills practice. Students also reported increased ability to verify AI-generated responses using established literature (5%), greater perceived importance of requesting references from AI tools (7.5%), and improved critical evaluation of AI-provided information (6.25%). Additionally, students reported increased belief that AI may improve performance in didactic (3.75%) and practicum courses (7%).

Conclusion: Our preliminary findings suggest that structured, in-class exposure to AI can improve students' attitudes toward AI and their ability to critically appraise, refine, and verify AI-generated information, supporting responsible integration of AI into future clinical practice.

Poster: **P20**

Blocking SARS-CoV-2 Viral Entry by Peptides and Small Molecules

Jake Khalilieh; Frank Hoang; Leandra Morita; Edith Kamara; Leeanne Qussiny; Ghalib Alkhatib

Introduction: The coronavirus SARS-CoV-2 causes COVID-19. One key player in infection is the spike glycoprotein, which enables entry into the host cell by membrane fusion. The two proteases responsible for spike cleavage before fusion are Furin and the Type II Transmembrane Serine Protease (TMPRSS2). We recently developed a fusion assay to map the critical domains involved in the spike-mediated membrane fusion. Synthetic peptides corresponding to the proposed fusion domains of the spike glycoprotein have been examined for their effect on membrane fusion. Additionally, we report interesting results using this fusion assay to show that some antifungal drugs efficiently inhibit spike-mediated membrane fusion. The results have important therapeutic implications.

Method: 293 HEK cells were transfected with a SARS spike glycoprotein while HeLa cells were co-transfected with the ACE-2 and TMPRSS2 receptors. Following overnight incubation, the two cell populations were mixed and incubated with the addition of the predicted peptide sequence. Cell fusion between HeLa and 293 expressed β-galactosidase. Cell fusion was quantified by adding CPRG and measuring the amount of β-galactosidase under fluorescence. Fluorescent readings were taken with varying concentrations of peptide and antifungal along with positive and negative controls.

Results: The fusion peptide corresponding to the HR domain resulted in a moderate decrease

in the membrane fusion mediated by the spike glycoprotein. Itraconazole and Ciclopirox (1,3) showed no major effect compared to the negative control. Antifungal 2 (Clotrimazole) demonstrated efficient dose-dependent fusion inhibition.

Conclusion: The predicted fusion peptide shows a moderate decrease in membrane fusion, indicating that more than one domain is involved in the process. Itraconazole and Ciclopirox also demonstrate little interaction with fusion. Clotrimazole, however, shows dose-response inhibition of the spike-mediated fusion. We plan to further investigate the mechanism by which Clotrimazole acts as a fusion inhibitor. One possible mechanism under investigation is potential down-modulation of ACE-2.

Poster: **P21**

Grade II oligodendroglioma first presenting as treatment resistant major depressive disorder

Matthew L. Herman; For-Shing Lui; Amy Nuismer

Introduction: Low-grade (WHO grade II) oligodendrogliomas are slow-growing brain tumors that require both an isocitrate dehydrogenase mutation as well as a 1p/19q codeletion for diagnosis. Usually, masses located supratentorially first present with seizures or headaches not with mood symptoms. Oligodendrogliomas are uncommon, while major depressive disorder (MDD) is quite prevalent. Here we present the case of a patient with MDD as the first sign of an oligodendroglioma who, in retrospect, had subtle neurological signs for many years.

Case report: A 35-year-old Caucasian man had MDD for 9 years with mostly emotional and motivational symptoms. He had minimal response to treatment with a variety of medications including a selective serotonin reuptake inhibitor, bupropion and lithium. In 2021, he underwent electroconvulsive therapy (ECT), which had minimal benefit. Two years later he developed a focal onset aware seizure of his right arm. This would prompt a magnetic resonance imaging study of his brain that demonstrated a tumor in his left frontal lobe. After it was debulked, the tumor was confirmed to be a low-grade oligodendroglioma. Subsequently, he was able to discontinue his antidepressant medications and has not had a depressive episode since. In hindsight, the patient had noticed subtle visual signs of a brain mass long before his first seizure. Based on his tumor's location, he probably had an acquired deficiency in visual perception.

Discussion: In rare cases, patients with treatment-resistant MDD may have a brain tumor as the cause. While present, barely perceptible neurological signs may be overlooked. Therefore, before an expensive and invasive treatment like ECT is begun, all patients should be screened for neurologic symptoms.

Poster: **P22**

How do established and emerging pharmacological agents, including metformin, inositol, berberine, and GLP-1 receptor agonists, differ in their effects on reproductive outcomes in women with PCOS?

Pari Patel; Alyssa Long; Gratiana Chen; Megan Yu; Priya Ram; Jaesal Soma; Nicole Turk; Dr. Carol Conrad-Forrest

Polycystic ovary syndrome (PCOS) is a leading cause of anovulatory infertility, often diagnosed by the presence of at least two of the following criteria: oligo-amenorrhea, hyperandrogenism, and polycystic-appearing ovarian morphology as per the Rotterdam criteria. Although metformin remains the first-line therapeutic option, other emerging agents, such as inositol, berberine, and glucagon-like peptide-1 receptor agonists (GLP-1a), have been investigated for their reproductive and endocrine benefits. Studies including women aged 12–65 with PCOS that evaluated metformin, inositol, berberine, or GLP-1 receptor agonists and reported reproductive outcomes in eligible study designs published between 2010 and 2025 were included. Articles

were independently screened twice, followed by abstract review and exclusion of studies not meeting inclusion criteria, after which eligible articles underwent data extraction. Outcomes analyzed included menstrual regularity, ovulation rate, androgen levels (total testosterone, DHEAS, SHBG), and fertility outcomes. Metformin alone modestly improves ovulation and menstrual cycles, while combining it with GLP-1 agonists leads to greater weight loss and may further enhance reproductive outcomes in women with PCOS. Berberine (standard and phytosome) improves hyperandrogenism and ovulation with effects comparable or superior to metformin. Inositol, alone or with metformin, improves menstrual regularity, ovulation rates, and reduces androgen levels. Collectively, data from the included studies suggest that while metformin is an appropriate therapeutic for the treatment of PCOS, many emerging agents offer greater endocrine normalization and thus greater downstream fertility outcomes. Future research should evaluate live birth as a primary outcome and investigate dual-therapy approaches to identify which treatment combinations yield the greatest improvements in reproductive function. Optimizing effective therapies may significantly improve the quality of life among patients with PCOS and enhance their ability to achieve desired family-building.

Poster: **P23**

Pre-Coverage NPWT Burden and Debridement-to-Coverage Delay Predict 90-Day Readmission After Tibial Fractures: An Inpatient Dressing-Change Analysis

Lilly Mai; Katherine Lim

Negative pressure wound therapy (NPWT) is commonly used as a bridge to definitive soft-tissue coverage after severe tibial fractures, but the relative impact of coverage timing versus inpatient NPWT dressing-change burden on early outcomes is unclear. We performed a retrospective cohort study of tibial fractures treated with inpatient NPWT after first operative debridement at a Level I trauma center to evaluate whether debridement-to-coverage delay and pre-coverage inpatient NPWT metrics were associated with post-coverage infection and 90-day all-cause readmission. Coverage delay was defined as days from first debridement to definitive coverage and analyzed per week and by thresholds (>7 and >14 days). NPWT exposures were limited to inpatient, pre-coverage events and included event count and median interval between events. Amputations were excluded from coverage-delay analyses. Outcomes were 90-day readmission and post-coverage infection. Multivariable logistic regression adjusted for Gustilo–Anderson class and patient factors. Seventy-nine patients met inclusion criteria. Among 51 non-amputation patients with index-admission definitive coverage, median delay was 13 days and 14/51 (27.5%) had 90-day readmission. Longer delay was independently associated with higher odds of readmission (OR 1.47 per week, 95% CI 1.05–2.07; p=0.026). Post-coverage infection occurred in 11 patients and was not associated with delay (OR 1.04 per week, 95% CI 0.77–1.42; p=0.79). Greater pre-coverage inpatient NPWT event count was associated with readmission (OR 1.64 per event, 95% CI 1.17–2.29; p=0.004) and remained borderline after adjusting for delay (OR 1.43, 95% CI 1.00–2.04; p=0.050). Event count was also associated with infection after adjusting for delay (OR 1.53, 95% CI 1.01–2.33; p=0.045). Median NPWT interval was not associated with either endpoint. Longer delay increased odds of readmission, while NPWT event count may aid risk stratification. These results support efforts to expedite definitive coverage and to use NPWT “dose” as a potential risk stratification metric.

Poster: **P24**

Systematic Review of Health Outcomes for Cases of Campylobacter jejuni-associated Myocarditis in Adults.

Varun Kodur; Riley Danna; Nishant Mistry; Anna Li; Cole Florio; Adedeji Okikiade

Background: Campylobacter jejuni is a common cause of gastroenteritis but a rare cause of myocarditis. The underlying mechanisms remain debated, and while most cases are self-limiting, infections in high-risk patients are concerning. This review evaluates relationships between clinical characteristics and health outcomes in adult patients to better understand this rare manifestation.

Methods: A comprehensive literature search was conducted across Embase, Scopus, and PubMed: the search terms included combinations of “Myocarditis,” “Campylobacter,” “Campylobacter jejuni”. The database search yielded 234 records. After removal of 113 duplicates, 121 unique studies underwent title and abstract screening. Of these, 61 articles were selected for full-text review. Following application of predefined inclusion and exclusion criteria, 45 studies met criteria and were included in the final analysis. Eligible studies included case reports and case series of well-documented cases of C. jejuni-associated myocarditis. Outcomes that were evaluated include: demographics, c-reactive protein (CRP), peak troponin, antibiotics received during stay.

Results: Forty-five studies comprising 51 cases of Campylobacter jejuni–associated myocarditis were included. Patients were predominantly male (44/51, 92%). The largest proportion of cases occurred between ages 21–30 years (n = 22), with an overall age range of 18–60 years. Reports originated most commonly from the United Kingdom (8), United States (7), and Australia (6), while 19 cases did not specify country of origin. Peak troponin values were markedly elevated (mean 4256 mg/L, IQR 512–4515 mg/L). CRP levels were similarly increased (mean 96.13 mg/L, IQR 52–137 mg/L). Treatment strategies varied; azithromycin was the most frequently administered antibiotic (n = 12).

Conclusion: This review identifies distinct clinical patterns in adult C. jejuni-associated myocarditis, including a 90% male predominance and high prevalence among young adults. Despite significant biomarker elevation, outcomes remain generally favorable. These findings help identify at-risk populations and highlight the need for prospective studies to optimize management.

Poster: **P25**

Etiology and Risk Factors for Lung Cancer in Female Asian Never Smokers: A Systematic Review

Shreya Guha, BS1; Keza Levine, BA2; Elaine Liang, BA3; Alison S. Baskin, MD4; Michael Ou, MD4; Jeffrey B. Velotta, MD FACS2,3,5

Background: Lung cancer remains the leading cause of cancer-related mortality worldwide, with a growing proportion of cases occurring in female Asian never-smokers (FANS). Although tobacco exposure remains the predominant risk factor, emerging evidence highlights the substantial role of non-tobacco determinants. However, the relative contributions of these factors remain poorly defined. This systematic review aimed to synthesize existing evidence on biological, clinical, and environmental risk factors for lung cancer among FANS to identify consistent and potentially modifiable exposures to inform risk-stratified prevention strategies. Genetic and molecular determinants were excluded.

Methods: Following PRISMA-P guidelines, we systematically searched PubMed, Embase, CINAHL, and Web of Science for articles published between January 2000 and July 2025 to identify peer-reviewed observational studies reporting non-tobacco risk factors for lung cancer in FANS. Due to the heterogeneity in study designs, a narrative synthesis was performed on the final 42 studies.

Results: Indoor air pollution, such as high-temperature cooking oil fumes, prolonged solid-fuel use, and inadequate household or workplace ventilation, consistently conferred elevated risks (2-4x higher). Hazard ratios increased up to 12-fold for high cumulative exposures. This risk was also seen in

occupational exposures such as commercial cooking and International Agency for Research on Cancer (IARC)-classified industrial jobs. Family history of lung cancer, especially among first-degree relatives, nearly doubled risk in several large cohorts. Prior non-malignant lung diseases such as tuberculosis, asthma, and lymphangioleiomyomatosis were also significantly associated with increased risk.

Conclusion: Lung cancer in FANS may be driven by largely modifiable non-tobacco exposures. These findings underscore the need to expand risk assessments beyond smoking history to incorporate detailed household, occupational, and clinical exposures, and to develop targeted, culturally informed prevention and screening strategies for this high-risk population.

Poster: **P26**

Assessing the Risks and Benefits of Gasless Versus Conventional Laparoscopic Appendectomy: A Systematic Review and Meta-Analysis

Iyawnna Hazzard, MS; Mark Bachir, MS; Noorafsha Khan, BS; Dhiraj Ramireddy, BS; Eldo Frezza MD, MBA, FACS

Background: Both conventional laparoscopic appendectomy (CLA) and gasless laparoscopic appendectomy (GLA) provide benefits depending on resources, training, and patient eligibility. Whereas, GLA is performed under spinal anesthesia, CLA requires general anesthesia, which is associated with increased cost and a longer duration of hospital stay and operative time. We aim to systematically review CLA and GLA and each method's impact on these parameters.

Study Design: Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines were used to perform a search of the Cochrane, PubMed, and Scopus databases. Two independent reviewers screened studies for eligible criteria and extracted data on conversion rate, operative time, complications, length of hospital stay, and total hospital cost.

Results: 12 out of 887 studies identified from the databases were selected for our systematic review. A total of 1,082 patients underwent a laparoscopic appendectomy – 789 underwent GLA and 293 patients underwent CLA. The average total hospital cost of patients who underwent a GLA was $1,796.56, whereas the average total cost of patients who underwent CLA was $4,388.55 ($p = 0.074$). The duration of hospitalization in days was lower in the GLA group (4.11 ± 2.45) compared to the CLA group (7.15 ± 6.69, $p = 0.123$). The average operative time in minutes was significantly shorter in the GLA group (52.18 ± 14.43) compared to the CLA group (123.57 ± 123.41, $p = 0.04$).

Conclusion: GLA had a low conversion rate, showed a shorter hospitalization, and a significantly shorter operative time compared to CLA. These observations offer advantages to both patients and physicians in resource-limited settings while prompting further investigation to its integration into global health care systems."

Poster: **P27**

Divergent Epidemiologic Trajectories of Non-Hodgkin Lymphoma and Hodgkin Lymphoma from 1987–2017

Samhith Kambampati; Brian Wen; Dustin Pu; Mohammad Sheikh; Adedeji Okikiade

Background: Non-Hodgkin lymphoma (NHL) and Hodgkin lymphoma (HL) are lymphoid malignancies with differing epidemiology and outcomes. Despite advances in therapeutics for both, long-term comparative studies of population-level trends in incidence, mortality, and survival remain incompletely characterized.

Methods: Age-adjusted incidence, death, and five-year relative survival for NHL and HL were obtained from the Surveillance, Epidemiology, and End Results (SEER) database. Rates per 100,000 U.S. population were analyzed and log-transformed to assess proportional changes over time. Log-linear regression models were used to calculate annual percent change (APC) with 95% confidence intervals. Slope interaction coefficients (β) were calculated to assess

significant differences in trends between NHL and HL.

Results: From 1987-2017, NHL incidence increased (16.79 to 19.81 per 100,000; APC: 0.43%; $p=1.72\times10^{-5}$), while HL decreased (3.02 to 2.28; APC: -0.40%; $p=1.19\times10^{-3}$), demonstrating significant divergence (β: 0.0083; $p=1.58\times10^{-7}$). Mortality declined less rapidly (β: 0.016; $p=2.44\times10^{-11}$) for NHL (7.26 to 5.44; APC: -1.48%; $p=9.98\times10^{-10}$) than for HL (0.74 to 0.27; APC: -3.01%; $p=1.36\times10^{-25}$). Five-year relative survival improved for both NHL (53% to 78%; APC: 1.76%; $p=1.35\times10^{-17}$) and HL (78% to 93%; APC: 0.47%; $p=2.34\times10^{-12}$), but the trends diverged (β: 0.013; $p=6.75\times10^{-18}$). The incidence-to-death ratio increased less rapidly (β: -0.0073; $p=2.84\times10^{-5}$) for NHL (APC: 1.92%) compared to HL (APC: 2.65%).

Conclusion: NHL and HL demonstrate distinct epidemiologic trajectories. While outcomes have improved for both, divergent incidence and mortality trends likely reflect differences in underlying disease pathology and therapeutic impact. Further investigation into the drivers of increasing NHL incidence and subtype-specific survival patterns is essential to guide optimal prevention and treatment strategies.

Poster: **P28**

Prioritizing key genes for molecular diagnosis through gene expression profiling of patients and determining barriers for practice adoption.

Paulina Carmona-Mora

Complex acute diseases such as stroke involve rapidly evolving immune and inflammatory processes. Peripheral immune cells, particularly monocytes and neutrophils, exhibit distinct gene responses that reflect underlying pathophysiological changes happening at the site of injury, in this case the affected brain region. Prior studies in both ischemic stroke and intracerebral hemorrhage have demonstrated that profiling these dynamic molecular signals provides critical insight into disease mechanisms and identifies potential biomarkers with diagnostic and therapeutic relevance.

Through a multi-modal approach combining system-level analyses from RNA-sequencing data from peripheral blood samples (including differential expression and diverse bioinformatic tools for gene clustering), key genes were identified and subpanels with biomarker potential were refined. In parallel, a landscape scan of key barriers to adopt such molecular biomarkers in the clinic was developed using Implementation science methodologies. Implementation science examines the critical factors that determine the adoption of discoveries into real-world settings. These factors were assessed to evaluate feasibility and clinical integration of novel biomarker-based tools.

Altogether, immune cells show specific molecular patterns that can serve as biomarkers for early diagnosis. By integrating immune transcriptomics, dynamic biomarker discovery, and implementation science, this research program aims to build a translational pipeline that moves biomarkers from bench to bedside. Ultimately, aligning biological discovery with implementation frameworks accelerates the adoption of precision-health tools that can meaningfully transform patient care.

Poster: **P29**

Treatment With Daratumumab in Combination with Glucocorticosteroids as First Line Treatment Achieves a Complete Remission for a Patient with Multiple Myeloma and Resolves Neutropenia: A Case Report.

Jamie Cheung (1), Sarah Mettias (1), Jonathan Moore (1,2,3) , and James R. Berenson (1,2,3)

Introduction: Multiple myeloma (MM) is a bone marrow (BM) malignancy of plasma cells that can be treated with monoclonal antibodies (mAbs) including daratumumab. This monoclonal antibody binds to CD38 proteins expressed on MM cells, allowing the immune

system to recognize and kill these tumor cells. Neutropenia is a common complication in MM, often attributed to the disease itself or treatment with agents such as immunomodulatory drugs (IMiDs). However, its resolution with first-line monoclonal antibody therapy has not previously been reported.

Case Presentation: We report a case of a 32-year-old Filipino female with smoldering MM. She developed neutropenia and as a result was treated with a combination of daratumumab and glucocorticosteroids. She achieved a complete remission (CR) and her absolute neutrophil count normalized. The treatment was well tolerated with no adverse effects reported, and the patient remains in CR after more than three years of therapy.

Discussion: This case highlights the potential for daratumumab combined with glucocorticosteroids alone to effectively manage a patient's MM and severe neutropenia, suggesting a dual therapeutic benefit without treatment-related toxicity. Our findings support the consideration of daratumumab and glucocorticosteroids as a viable first-line therapeutic option for patients with MM who develop neutropenia.

Poster: **P30**

Non-Pharmacological Medical Interventions for Pediatric Refractory Epilepsy: A Systematic Review and Meta-Analysis of Seizure Reduction Outcomes

Jasjot Kaur Sandhu; Lexi May; Mohammad Sheikh; Anisha Narsam ; Melanie Julia; Riley Danna; ForShing Lui

Around 25% of pediatric patients with epilepsy develop refractory epilepsy. Refractory epilepsy is defined as unresponsive or insufficient response to at least two appropriately selected anti-epileptic drugs (AEDs) for a certain seizure type. Refractory epilepsy in children is associated with co-morbidities, including intellectual disability, poor psychosocial outcomes, and even complications such as sudden unexpected death in epilepsy (SUDEP). When medications fail, non-pharmacological treatments such as ketogenic diet, neurostimulation (transcranial direct current stimulation and vagus nerve stimulation), surgical intervention are therapeutic options. This systematic review and meta-analysis individually evaluated the effectiveness and safety of these three non-pharmacological treatments in reducing seizure events among children with refractory epilepsy under a unified investigative framework. A comprehensive search of Scopus, PubMed, CENTRAL and EMBASE (October 2025 – December 2025) was conducted. A total of 11 studies were classified into dietary (n = 8), neurostimulation (n = 2), and surgical (n = 1) interventions. Risk of bias was assessed using the Cochrane RoB-2 tool, and pooled estimates were generated using random-effects models. Ketogenic dietary interventions showed a statistically significant pooled effect compared to placebo (SMD= 0.477; 95% CI: (0.191, 0.7620), p=0.001, I2 = 72.99%). Pooled data in the neurostimulation did not show significant effects compared to placebo (SMD= -0.392; 95% CI: (-1.232, 0.447), p=0.359), whereas the one surgical intervention randomized-control trial found moderate efficacy (SMD= 0.627; 95% CI: (0.255, 1.00), p=0.001). Overall, we have moderate confidence in the effectiveness of ketogenic diet as a therapeutic option for patients with pediatric refractory epilepsy, but more well-designed, randomized trials are warranted to further elucidate the therapeutic potential of neurostimulation and surgical interventions.

Poster: **P31**

Antenatal Pulmonary Embolism Diagnostics in Pregnant Patients with SARS-CoV-2 Infection in Community Hospitals

Cole J. Florio; Grace V. Heringer; Madeline J. Somers; David R. Vinson

Background: The diagnostic evaluation of pulmonary embolism (PE) in pregnancy is challenging as the physiologic changes of pregnancy can mimic several PE symptoms. Acute respiratory infections introduce additional

diagnostic complexity by producing systemic inflammation, altering vital signs, and, in some cases, elevating D-dimer levels. As a case in point, we examined how SARS-CoV-2 infection affected presentation, pretest probability, and diagnostic testing in pregnant patients with possible PE.

Methods: We performed a retrospective cohort study across 21 community medical centers from 10/1/2021 through 3/30/2023. We included pregnant outpatients ≥18 years evaluated for suspected PE with D-dimer testing, compression ultrasonography, computed tomography pulmonary angiography (CTPA), or lung scintigraphy. We compared patients with and without COVID-19 using bivariate analysis.

Results: Among 860 patients, median age was 30.0 years; 39.1% were in the third trimester. COVID-19 was present in 147 (17.1%). Compared with non-COVID-19 patients, those with COVID-19 more often had fever (36.1% vs 4.2%), tachycardia ≥110 bpm (66.0% vs 34.2%), and oxygen saturation <95% (12.2% vs 4.8%), but less often reported chest pain (49.7% vs 65.5%) (all p<0.001). Nearly all patients had low-to-intermediate pretest probability, but intermediate classification was more common with COVID-19 patients (63.3% vs 39.0%; p<0.001). COVID-19 patients more often had elevated D-dimer >1.0 mg/L (49.1% vs 36.4%; p<0.001) and more commonly underwent chest radiography (61.9% vs 50.1%; p=0.004). Among patients who underwent advanced imaging (n=393), CTPA predominated in both cohorts. Overall, PE was rare (n=6; 0.7%), and mortality was low (n=3; 0.3%).

Conclusions: COVID-19 in pregnancy was associated with worse vital signs, higher pretest probability, higher D-dimer values, and increased diagnostic testing. These findings illustrate how acute respiratory infections may recalibrate PE risk assessment in pregnancy and highlight the need to refine diagnostic strategies when infection-related physiologic changes are present.

Poster: **P32**

Efficacy and safety of sugammadex versus neostigmine for neuromuscular block reversal in elderly patients: a systematic review and meta-analysis of randomized controlled trials

James Russell Palmer; Maani Bahador; Dustin Pu; Massie Gardizi; Ian Dailey; Audrey Dang; Jose L. Puglisi; Michael A. Vaninetti

Background: Neuromuscular blockade with rocuronium is routinely reversed with neostigmine or sugammadex, yet incomplete reversal can increase postoperative risks. Prior studies in broad populations show these agents differ in probabilities of adverse outcomes (Hristovska et al. (2017)). However, evidence remains limited in specific high-risk groups, with existing literature being focused on specific outcomes (Togioka et al. (2020)). Our study aims to generate generalizable evidence in older adults to better inform perioperative decision-making.

Methods: A PRISMA systematic review was performed using three databases: Scopus, PubMed, and Embase. Randomized controlled trials were screened for relevancy using Covidence. A study-level meta-analysis was conducted across five postoperative outcomes in patients >65. Pooled effects were estimated using random-effect models (DerSimonian-Laird), with heterogeneity assessed with Q, I^2, and τ^2.

Results: Across the five included studies (585 participants), sugammadex was associated with faster extubation and fewer respiratory complications compared with neostigmine. In the meta-analysis of extubation time (3 studies), sugammadex reduced time to extubation by a pooled mean difference of −9.53 minutes (95%CI −17.31 to −1.75), with moderate heterogeneity (I^2=46.3%). For postoperative residual neuromuscular blockade (PRNB; 4 studies), sugammadex significantly reduced risk (RR 0.232, 95%CI 0.144 to 0.373; I^2=0%). Sugammadex also reduced any postoperative

pulmonary complication (PPC; 3 studies) (RR 0.662, 95%CI 0.444 to 0.988; I^2=0%). There was no clear difference between groups for postoperative nausea and vomiting (PONV; 4 studies) (RR 0.828, 95%CI 0.602 to 1.140; I^2=0%) or hypoxemia (3 studies) (RR 0.641, 95%CI 0.393 to 1.048; I^2=0%).

Conclusions: In the elderly population, sugammadex may provide meaningful benefits by shortening the extubation times, reducing rates of PRNB, and having fewer PPCs than neostigmine. These results fill the existing gap in literature regarding elderly patients, indicating a significant impact on adverse outcomes in this population. Although further studies and trials are required, our results provide population-specific information that can help guide perioperative care.

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Poster: P33

Impact of Intranasal Oxytocin on Maternal Mood in Postpartum Depression: A Systematic Review and Meta-Analysis

Leah Schmirler; Elijah Vu; Christina Matalka; Avinash Rajamani; Anagha Math; Safia Iman; Isaac Wolfkind; Jose Puglisi, PhD

The prevalence of postpartum depression has been on the rise globally, with the latest analysis estimating 17.7% of new mothers affected. However, many mothers go undiagnosed, making this number a grave underestimate. While many symptoms of postpartum depression overlap with the diagnosis of major depressive disorder, its presentation is unique in that the patient is undergoing extensive changes physically, mentally, and socially during the transition to motherhood. Despite the pervasiveness and severity of postpartum depression, treatment options remain limited due to the side effects and high rates of resistance to first-line antidepressants. Previous research has suggested that a disruption to the oxytocinergic system may be linked to the development of postpartum depression, with studies revealing reduced endogenous oxytocin plasma levels and mutations in maternal oxytocin receptors as potential mechanisms. These findings position intranasal oxytocin as a prospective biologically relevant therapeutic option. Oxytocin is a hormone and neurotransmitter naturally released by the pituitary gland during the perinatal period to orchestrate labor, lactation, and maternal-infant connections. Furthermore, its inhibitory effects on the hypothalamic-pituitary-adrenal axis highlight oxytocin's anxiolytic potential. Our study aims to investigate the impact of intranasal oxytocin on maternal mood in women suffering from postpartum depression. A comprehensive search of PubMed, Scopus, Embase, and ScienceDirect yielded 6 randomized controlled trials, from which data on maternal mood and secondary outcomes were extracted for analysis. While final data analysis is not yet complete, preliminary results suggest inconsistent evidence to support oxytocin as an intervention for postpartum depression at this time. The variable influence of oxytocin across different aspects of maternal mood could be due to small sample sizes, nonuniform mood metrics, varying degrees of maternal depression, limited system exposure, or receptor dysfunction. The inconclusiveness of this meta-analysis emphasizes the need for more robust research surrounding maternal well-being in postpartum depression.

Poster: **P34**

Machine Learning Versus Traditional Trauma Scoring Systems for Predicting Clinical Outcomes: A Systematic Review and Meta-Analysis

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Introduction: Accurate risk stratification in trauma care is essential for guiding clinical decision-making and resource allocation. Traditional scoring systems, including the Trauma Injury Severity Score (TRISS) and Glasgow Coma Scale (GCS), are widely used but rely on linear models that may not fully capture the complex relationships present in modern trauma datasets. This systematic review evaluates whether machine learning (ML) approaches improve prediction of mortality, resource utilization, and post-traumatic complications compared with conventional scoring systems.

Methods: Following PRISMA guidelines, we conducted a comprehensive search of PubMed, Embase, and Scopus. Studies were included if they directly compared ML algorithms (e.g., Random Forest, XGBoost, Artificial Neural Networks) with traditional scoring systems (e.g., ISS, GCS, SOFA, TRISS) within the same cohort and reported Area Under the Receiver Operating Characteristic Curve (AUROC) values for both models. Primary outcomes included in-hospital mortality, massive transfusion, and post-traumatic complications.

Results (Preliminary): Thirty-nine studies met inclusion criteria. ML models, particularly artificial neural networks and tree-based ensembles, demonstrated strong discriminatory performance across outcomes, with AUROC values ranging from 0.85 to 0.96. For in-hospital mortality, ML models achieved AUROCs of 0.88–0.92, outperforming traditional systems such as the Revised Trauma Score and TRISS (0.78–0.89). While traditional regression performed adequately in smaller datasets, ML models better captured complex, non-linear interactions. Key predictive features included GCS, age, hemodynamic stability, and transfusion requirements.

Conclusion: ML-based models demonstrate superior predictive discrimination compared with traditional trauma scoring systems. Integration of artificial intelligence into trauma registries may enhance clinical decision support and optimize patient-specific management strategies.

Poster: **P35**

Reactive EEG With Preserved Sleep Architecture in Influenza-Associated Bilateral Thalamic Restricted Diffusion: A Diagnostic and Prognostic Case

Yevgeniy Sazhnyev, MD^1,2; Ahmed Mohamed, MD^1; Jake Sequeira, MD^1; ForShing Lui, MD, MRCP, FRCP^2; Gary Chu, MD^2; Marvin Braun, MD^1

Introduction: Influenza-associated encephalopathy can present with bilateral thalamic restricted diffusion, a pattern that raises concern for acute necrotizing encephalopathy (ANE) or artery of Percheron infarction. Physiologic biomarkers such as continuous EEG may help distinguish a potentially reversible encephalopathy from catastrophic structural injury when early imaging is alarming but clinical trajectory is evolving.

Methods: Retrospective review of a 15-year-old male admitted to the PICU with influenza A and acute encephalopathy requiring intubation. Clinical course, MRI with follow-up imaging, vascular imaging, CSF analysis, autoimmune and genetic evaluation, and continuous video-EEG findings were analyzed.

Results: Initial MRI demonstrated symmetric bilateral thalamic restricted diffusion without hemorrhage or mass effect. Follow-up MRI confirmed persistent thalamic diffusion restriction with new bilateral hippocampal involvement (Figures 1-3). CTA head/neck did not show large vessel occlusion; anatomic

vascular variants could not be fully excluded. CSF showed minimal pleocytosis with normal protein. Serum autoimmune testing (MOG-IgG, AQP4-IgG) and mitochondrial DNA testing were negative. Rapid trio whole-genome sequencing did not identify a causative variant. Continuous EEG on day 1 showed a continuous, symmetric delta-theta background with clear reactivity. With stimulation, there was emergence of faster activity, an anterior-posterior gradient, and a symmetric 7-8 Hz posterior dominant rhythm during brief maximal wakefulness. Sleep features included vertex waves, K-complexes, and symmetric sleep spindles. No seizures or epileptiform discharges were captured. EEG was interpreted as a mild-to-moderate diffuse encephalopathy of nonspecific etiology. Following initiation of pulse-dose corticosteroids, patient improved rapidly, was extubated within 24 hours, and discharged on hospital day 4 with near normalization of the neurologic exam aside from transient attention and short-term memory difficulty and hypersomnia.

Conclusion: In influenza-associated bilateral thalamic restricted diffusion, early EEG demonstrating reactivity and preserved sleep architecture with absence of seizures may support a reversible encephalopathy phenotype and add prognostic value when ANE-spectrum versus vascular mechanisms remain uncertain."

Poster: **P36**

Intra-Articular Platelet-Rich Plasma Versus Corticosteroid Injections for Adhesive Capsulitis: A Systematic Review and Meta-analysis

Leslie Yao; Yu-Tung Chen; Nathan To; Teresa Lee; Sahya Kabutogi; Orr Amar; Debra Karling, MD; David Pai, MD, FASN

Introduction: Adhesive capsulitis is a disabling shoulder condition characterized by progressive pain and restricted range of motion, affecting approximately 2–5% of the general population and up to 10–20% of individuals with diabetes. Corticosteroid injections are widely used for short-term symptom relief, while platelet-rich plasma (PRP) has emerged as a biologic alternative with potential longer-term benefits. However, heterogeneity in follow-up timing, imaging guidance, and disease staging across studies contributes to variability in comparative outcomes.

Objective: To conduct a systematic review of randomized controlled trials comparing intra-articular PRP and corticosteroid injections for adhesive capsulitis, evaluating treatment response at different timepoints and exploring how ultrasound guidance and disease stage may influence clinical outcomes.

Methods: A PRISMA-guided systematic review was conducted to identify randomized controlled trials evaluating intra-articular PRP versus corticosteroid injections. Screening was performed by two independent reviewers via Covidence. Planned analyses will evaluate pain, functional outcomes, and range of motion at approximately 4, 12, and 24-week intervals. Standardized mean differences will be calculated for visual analog scale (VAS) pain scores and functional measures (e.g., DASH, SPADI). Study characteristics such as ultrasound guidance and symptom duration at enrollment will be extracted to explore potential sources of clinical and methodological heterogeneity. Risk of bias will be assessed using Cochrane RoB-2, and certainty of evidence evaluated using GRADE.

Preliminary Results: Initial screening suggests most studies utilized intra-articular injections with follow up at approximately 4-, 12-, and 24-week intervals. Variability in injection preparation, ultrasound guidance, and reported symptom duration was observed, while disease stage was infrequently reported.

Conclusion: This study aims to clarify the comparative effectiveness of PRP and corticosteroid injections in adhesive capsulitis and identify methodological factors contributing to variability in outcomes, informing future study design and clinical decision-making."

Poster: **P37**

Scrolling for Answers: Public Perceptions of Newborn Vitamin K Prophylaxis on Reddit

Maya Chu, BA; Eliette Seo, BS; Katelyn Nelson, BS; Marketa Leisure, MD

Introduction: Vitamin K Deficiency Bleeding (VKDB) is a potentially fatal condition in infants that is preventable with a prophylactic intramuscular vitamin K injection at birth. Despite strong evidence and physician recommendations, some parents refuse this intervention. Today, social media platforms like Reddit are important sources of medical information and provide insight into public perceptions, concerns, and reasoning regarding VKDB management. This study examines Reddit users' perspectives on neonatal vitamin K prophylaxis to identify thematic trends and better understand factors contributing to parental refusal.

Methods: A custom Application Programming Interface (API) extracted posts, comments, and metadata from Reddit pages discussing vitamin K between 2013 and 2025. All content containing terms such as Vitamin K, Vit K, VitK, K1, K2, or VKDB were included. Extracted data were assigned thematic codes: positive perceptions, negative perceptions, neutral perceptions, confusion, alternative forms, and healthcare provider authorship.

Results: 2,477 posts and comments were analyzed. Of these, 48.93% were categorized under positive perceptions, 11.26% under negative perceptions, 9.89% under neutral perceptions, 6.45% under confusion, 15.05% under alternative forms, and 7.30% as indicating the poster was a healthcare provider. A positive correlation was identified between negative perceptions and alternative forms ($\phi = 0.13$, $p < 0.001$).

Conclusion: Many Reddit users expressed support for vitamin K prophylaxis, with negative perceptions often stemming from fear of judgment and a desire to act in the infant's best interest. Many posts also demonstrated confusion about the injection's contents, purpose, and risks, as well as interest in more "natural" alternatives like oral vitamin K drops. These findings support the need for targeted patient education and open communication to address misinformation and reduce vitamin K refusal.

Poster: **P38**

A Systematic Review of Post-Surgical Opioid-Induced Hyperalgesia: Neurological Consequences of Persistent Opioid Prescriptions

Raymond Chiang, Nikhila Reddy, Shobha Srinivasan, Sakina Rashid, Chance Aguiar, Han-Rong Weng

Opioid-induced hyperalgesia (OIH) is a paradoxical phenomenon where opioid exposure increases pain sensitivity. Existing reviews emphasize intraoperative opioid strategies, leaving limited synthesis on whether opioid prescribing at hospital discharge relates to OIH or downstream opioid harms. We aim to evaluate whether higher opioid prescribing at discharge versus lower exposure or opioid-sparing regimens is associated with (1) OIH or (2) clinically relevant downstream outcomes, including pain control efficacy, refill/unplanned care for pain, patient-reported outcomes, and new persistent opioid use 90–180 days post-operation. We conducted a systematic literature review that included peer-reviewed, U.S.-based English-language quantitative studies (published in 2020–2025; data collected ≥2015) of adults discharged after surgery with documented opioid prescribing at discharge. The primary comparison was higher versus lower/limited opioid exposure at discharge, defined by total prescribed MME, days' supply, or dose intensity; opioid-sparing/zero-opioid discharge pathways were included when available. Given heterogeneity in exposure definitions and study designs, findings were synthesized using a structured narrative, direction-of-effect approach. Results were summarized overall and within prespecified strata: Open Surgery versus Minimally Invasive Surgery, organ system

categories, and an OB/GYN-only sensitivity analysis. A total of eighteen studies met the inclusion criteria; however, only one study with a sample size of 22 presented direct clinical measurement of OIH. In contrast, the most consistent signals were observed for downstream outcomes: higher discharge opioid exposure was not associated with better pain control (three studies, sample size 20,985) and was more often associated with increased refills/unplanned care for pain (four studies, sample size 5,325), worse patient-reported outcomes (two studies, sample size 20,431), and increased new persistent opioid use 90–180 days post-operation (six studies, sample size 88,125) among opioid-naïve and previously exposed patients. These findings support the necessity of individualized opioid stewardship at discharge and prompt future research to clarify the linkage between discharge opioid prescribing and OIH.

Poster: **P39**

Vasopressor Administration in the ICU Following Geriatric Hip Fracture Surgery is Associated with Poor Outcomes

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Introduction: Geriatric hip fracture patients represent a medically vulnerable population with high postoperative morbidity and mortality. A subset of these patients require intensive care unit (ICU) management following surgery, often due to hemodynamic instability. The relationship between postoperative vasopressor administration and clinical outcomes in this setting remains poorly defined. This study aimed to identify risk factors and outcomes associated with vasopressor use among geriatric hip fracture patients requiring ICU admission.

Methods: A retrospective cohort study was conducted across three hospitals within a single urban academic institution from 2015 to 2023. Of 4,012 surgically treated geriatric hip fracture patients, 243 (6.1%) required postoperative ICU admission. Patients were stratified by vasopressor administration. Demographic, surgical, and perioperative factors were compared. Multivariate logistic regression identified predictors of 30-day and 1-year mortality, controlling for age, sex, BMI, Charlson Comorbidity Index (CCI), ASA classification, anesthesia type, and fracture pattern.

Results: Of 243 ICU patients, 91 (37.4%) received vasopressors. Baseline characteristics were comparable between groups except for higher general anesthesia use among vasopressor recipients (81.3% vs. 67.1%, P=0.016). Vasopressor use was independently associated with increased 30-day mortality (OR 10.07, P<0.001) and 1-year mortality (OR 4.09, P<0.001). No significant differences were found in aseptic (P=0.058) or septic (P=0.23) reoperation rates, or in readmission rates (26.4% vs. 19.7%, P=0.29). Vasopressor patients had prolonged hospitalizations (269 vs. 229 hours, P=0.039) and higher in-hospital mortality (19.8% vs. 0.7%) and hospice discharge rates (9.9% vs. 3.9%, P<0.001).

Conclusion: Vasopressor use following hip fracture surgery in geriatric patients requiring ICU admission is associated with a tenfold increase in 30-day mortality and fourfold increase in 1-year mortality. Although reoperation and readmission rates were similar, vasopressor recipients experienced longer hospitalizations and poorer discharge outcomes, underscoring the need for early identification and optimization of high-risk patients.

Poster: **P40**

Extraocular features of Leber hereditary optic neuropathy: A scoping review

Layla Ali; Iyawnna Hazzard; Niloufar S. Tehrani; Ubaid Ansari; Adam Ali; Preyasi Kumar; Nadia Ali; Gurkiranjeet Gakhal; Forshing Lui

Background: Leber hereditary optic neuropathy (LHON) is a rare inherited mitochondrial disease that leads to mitochondrial dysfunction, resulting in optic nerve damage and vision loss. Systemic

involvement has been reported in several LHON cases, referred to as LHON+ disorders. However, the causes and presentations of such conditions have been poorly studied. It is suggested that 90% of mitochondrial dysfunction is caused by one of three primary point mutations in mitochondrial DNA that affect respiratory complex I (referred to as mtDNA LHON), with unresolved cases of LHON being caused by other variants, known as autosomal recessive LHON. The cardiac, musculoskeletal, neurological, and auditory systems are commonly affected in LHON. For example, hypertrophic cardiomyopathy and sudden cardiac death have been linked to specific mutations. Neurological effects – such as dystonia, epilepsy, polyneuropathy, and ataxia – as well as hearing loss, have also been observed in patients with specific mitochondrial mutations. These findings highlight the need for a more comprehensive evaluation beyond standard ophthalmic assessments. LHON is typically diagnosed based on a combination of ophthalmic imaging, patient age and gender, clinical course (bilateral, rapidly progressive, and sequential visual loss), family history, maternal inheritance, and fundus appearance. However, the advent of genetic testing has significantly expanded the recognized phenotype. In terms of treatment, idebenone is the only FDA-approved therapy for LHON; however, intravitreal gene therapy yields promising improvement, especially for the most common m.11778G>A mutation, which accounts for 70% of causative mutations. At present, these therapies are confined to ocular treatment. Objective: This review highlights the importance of recognizing systemic manifestations of LHON, which are frequently overlooked in clinical practice. **Conclusion**: Early detection of these systemic manifestations, especially in cardiac and neurological systems, could help with prompt intervention and improve patient outcomes. Further research into gene therapy and mitochondrial replacement techniques holds promising potential for developing more effective treatment strategies.

Poster: **P41**

Endoscopy-Guided Subtotal Pancreatic Necrosectomy With En Bloc Removal of a 16-cm Necrotic Tissue Segment: A Case Report

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Background: Walled-off necrosis (WON) develops in approximately 10% of patients following acute necrotizing pancreatitis. Endoscopic ultrasound (EUS)–guided drainage with necrosectomy is the preferred approach for symptomatic or infected collections. Large, complex WONs may require multiple interventions and are traditionally managed surgically. We present a rare case of en bloc endoscopic removal of an exceptionally large necrotic segment.

Case Description: A 28-year-old obese Latin American female with gallstones and no alcohol use presented with severe gallstone-induced necrotizing pancreatitis. CT imaging revealed a 16.6 × 12.7 × 8.2 cm walled-off necrotic collection involving the pancreatic body and tail. The patient underwent EUS-guided cystogastrostomy with partial necrosectomy and was treated with intravenous antibiotics. Follow-up imaging showed interval improvement; however, she re-presented three weeks later with abdominal pain, nausea, vomiting, and mild diabetic ketoacidosis. Imaging demonstrated a rim-enhancing collection extending into the perihepatic space. A second endoscopy revealed a large WON cavity with a lumen-apposing metal stent obstructed by necrotic debris. One week later, the patient returned with fever, chills, and leukocytosis, prompting a third endoscopic intervention. Dense necrotic tissue obstructed advancement of the therapeutic gastroscope through the stent. Necrosectomy was attempted using a snare, rat-tooth forceps, and three-prong forceps. After multiple attempts, a cohesive necrotic mass was successfully captured with a snare and removed en bloc as a single 16-cm segment along with the gastroscope.

Conclusion: This case demonstrates the feasibility of en bloc endoscopic necrosectomy for large, complex WON and highlights the effectiveness of advanced endoscopic techniques in managing severe pancreatic necrosis. Successful removal of a 16-cm necrotic segment in a single piece may reduce the need for surgical intervention in select patients.

Poster: **P42**

Metal Toxicity Induced Acute Heart Failure with Preserved Ejection Fraction: A Case Report

Prithvi Valentine Setty, B.S.1, Samone Alexander, B.S.1, John-Paul Kelada, M.D.2

Background: Metal-on-metal (MoM) hip implants have been associated with local and systemic complications, including heavy metal toxicity from cobalt and chromium. While adverse local tissue reactions are well-documented, systemic cardiotoxicity leading to heart failure remains rare and underrecognized.

Case: We report the case of a 37-year-old male with bilateral MoM hip resurfacing arthroplasty performed for osteoarthritis, who developed exertional dyspnea and fatigue four years postoperatively. Echocardiography demonstrated a reduced ejection fraction (EF 40–50%) consistent with heart failure with reduced ejection fraction (HFrEF). Extensive evaluation excluded common cardiac etiologies including ischemia. Serum cobalt and chromium levels were markedly elevated, peaking at 234.0 mcg/L and 105.0 mcg/L, respectively. Chelation therapy was attempted. Bilateral revision surgeries led to a steady decline in metal levels and clinical improvement. Subsequent echocardiograms showed recovered cardiac function (EF 55–60%) and resolution of symptoms with guideline-directed medical therapy.

Conclusion: This case illustrates a reversible cardiomyopathy due to systemic metal toxicity from MoM implants. Clinicians should maintain a high index of suspicion for heavy metal-induced heart failure in patients with MoM prostheses who present with unexplained cardiac symptoms. Early diagnosis, removal of the source, and appropriate medical therapy can result in full cardiac recovery.

Poster: **P43**

Differential Susceptibility of Pancreatic and Skeletal Muscle Blood flow to FK506 Explain its Association with Diabetes Mellitus

Daniel Moon; Emmanuelle Zakheim; Malik Oda; Sonal Sachdeva; Juwon Lim; Maani Bahador; Nishant Mistry; Andy Lee; Mohamed Ahmed

Background: Post-transplant diabetes mellitus (PTDM) is a significant clinical complication associated with immunosuppressive agent tacrolimus. While its diabetogenic effects are acknowledged, the specific pathogenicity is poorly understood.

Objective: This study investigates the mechanism of impaired glucose homeostasis after tacrolimus administration and whether pancreatic and skeletal muscle blood flow might have an impact on developing PTDM.

Methods: Thirty-six Sprague Dawley rats were separated into six groups of six and acclimatized for one week prior to intervention. Groups one, three, and five acted as controls for their respective experiment groups, with daily injection of subcutaneous castor oil (0.5 mg/kg/day). Group two received 0.15 mg/kg/day tacrolimus for 15 days. Group four received 0.15 mg/kg/day tacrolimus, until day 21. Group six received 1.5 mg/kg/day tacrolimus, until day 45. All rats were euthanized after 45 days. Blood and organ tissues (pancreas, skeletal muscle, kidney) were collected. Microspheres were vortexed and infused into the left ventricle. Saline was simultaneously administered via the left femoral vein. Reference blood was collected from the femoral artery. Results will be presented as mean ± standard error. Statistical comparisons will be performed using SPSS version 19. Mann-Whitney U-Test will be used for comparing hemodynamic parameters among

groups. P-values less than 0.05 are considered significant.

Significance: This study will shed light on the mechanism of PTDM due to the administration of tacrolimus following solid organ transplant. Two players will be included in this study, pancreatic and skeletal muscles to better understand the mechanism and the pathophysiology of impaired glucose homeostasis. The proposed mechanism will involve insulin manufacturing (islet perfusion) and delivery (skeletal muscles).

Results: This study is currently in phase 2. Additional data will be available at the time of presenting this work

Conclusions: Conclusions will be drawn and provided following completion.

Poster: P44

Elevated Lipid Peroxidation Biomarkers as an Indication of Hypervitaminosis D in NZW Rabbit Model

Emmanuelle Zakheim; Daniel Moon; Mohamed Ahmed

Background: This study examines the effect of hypervitaminosis D on serum and tissue oxidative stress biomarkers in New Zealand White (NZW) rabbits.

Materials and methods: 24 NZW rabbits were divided into four groups of six each. Group I, received regular diet, Group II received regular diet +10,000/day vitamin D2; Group III, received 0.25% cholesterol diet; and Group IV received 0.25% cholesterol diet plus 10,000 IU. At the end of the study, blood and tissue samples were examined for serum and tissue lipid peroxidation aldehydes, using Gas Chromatography-Mass Spectrometry (GC-MS).

Results: Compared to Group II, significant atherosclerotic changes of the intimal surfaces of aortas from Group III (37.77 ± 6.33%) and IV (51.80 ± 7.11%) respectively were shown. Serum malondialdehyde from groups II, III and IV showed significant differences when compared with Group I ($p<0.05$) at 1- and 2-month time. Aortic MDA from groups II, III and IV also showed significant differences when compared with Group I ($p<0.05$) at 2-month time. Hepatic and Renal Butanal were significantly different among Groups II, III and IV when compared with control ($p<0.05$). Renal MDA values from Groups II, III and IV were significantly different from those from Group I ($p<0.05$). Only Hepatic MDA and Hexanal values Groups IV were significantly different from those from Group I ($p<0.05$).

Conclusions: High dose of vitamin D may have a proatherogenic effect through lipid peroxidation mechanism.

Poster: P45

Clinical Applications of Bioabsorbable Magnesium Screws in Orthopedic Surgery: A Scoping Review

Eliana Carney, BS; Megan Kou, BS; Shreya Guha, BS; Jimmy Wen, BA; Gisel Alegria; Corina Brown, MD

Introduction: Bioabsorbable magnesium screws (BMS) have emerged as an alternative to traditional titanium or stainless steel fixation in orthopedic surgery, offering improved biocompatibility, osteoconductivity, and potential reductions in implant-related complications and secondary hardware removal. Challenges include rapid corrosion and hydrogen gas formation. This study provides a comprehensive overview of current clinical applications of BMS by anatomic region and evaluates associated complications.

Methods: A scoping review in accordance with Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines was conducted to evaluate the clinical applications of BMS in orthopedic surgery. PubMed, Embase, and Scopus were systematically searched for original clinical studies. Extracted data included surgical indication, fracture or osteotomy union rates, functional and patient-reported outcomes (AOFAS, VAS, DASH, MEPS, Lysholm, IKDC),

radiographic patterns of implant degradation, and implant-related complications such as screw failure, nonunion, infection, and reoperation.

Results: Of 529 identified studies, 48 met inclusion criteria, including 5 randomized controlled trials and 43 non-RCTs (9 case reports, 16 retrospective case series, 6 prospective case series, 11 cohort studies, and 1 case-control study). The most common applications were hallux valgus correction and medial malleolar fixation. Across all anatomical regions, BMS demonstrated high union rates and favorable functional outcomes, comparable to traditional titanium fixation in 14 studies. Early peri-implant lucency and gas formation were commonly observed but resolved over follow-up. Complications were uncommon and primarily included isolated screw breakage, delayed union, and superficial wound issues. Several studies reported reduced rates of secondary hardware removal in magnesium cohorts compared to titanium fixation.

Conclusion: Bioabsorbable magnesium screws have been applied across a broad range of orthopedic procedures. Existing studies suggest favorable functional recovery, predictable radiographic patterns, and reliability across multiple anatomical regions. Higher-quality prospective studies are needed to confirm these findings and establish long-term effectiveness."

Poster: P46

Elucidating the Physiological Significance of RELT and FLNA Interactions in Breast Cancer Cells

Ashley Ko; Samantha Wong; Yashar Pourmoghadam; Hunter Hudgins; Maryann Batiste; Bethany Joy; Ashley Christensen; Anna Li; Priya Ram; Maihan Phan; Raj Ramsamooj; Eslam Mohamed; John Cusick

Introduction: Receptor Expressed in Lymphoid Tissues (RELT) is a member of the Tumor Necrosis Factor Receptor Superfamily that contains two homologs, collectively known as RELTfms, that bind and co-localize at the plasma membrane. Previous studies indicate that RELT is upregulated in breast cancer (BC). Filamin A (FLNA), an actin-binding scaffold protein, was identified as a potential RELT-interacting partner, and is implicated to have an important role in BC. This study investigated the interaction between RELT and FLNA and their physiological significance. **Methods:** A proteomic screen identified the carboxy-terminal fragment of FLNA (C-FLNA) as a potential RELTfms binding partner. Western blots of co-immunoprecipitations (co-IP) were used to test binding between recombinant C-FLNA and RELTfms. Immunofluorescence (IF) microscopy examined the co-localization of RELT with FLNA in MDA-MB-231 (231) and COS-7 cells. 231 cells, a model for triple-negative BC, were transfected with RELT and C-FLNA; flow cytometry using Annexin V/Propidium Iodide (AV/PI) staining determined the relation of this interaction to apoptosis induction. Immunohistochemistry (IHC) was done on healthy spleen biopsies to localize RELT in lymphoid tissue. **Results:** C-FLNA was confirmed to interact with all RELTfms through co-IP. The binding site for RELT was identified to be within 340-400 AAs of the RELT intracellular domain. IF studies indicate RELT and C-FLNA colocalize predominantly in the cytosol. Flow cytometry demonstrated that RELT and C-FLNA co-expression resulted in significantly greater AV/PI staining than either construct alone. RELT expression was observed to be predominantly localized near splenic blood vessels. **Conclusion**: These results identify a novel interaction between FLNA and RELTfms and identify the binding site of FLNA. The increased level of apoptosis in BC cells co-expressing these proteins suggests a synergistic effect. Current efforts are investigating the role of RELT in BC cell migration. These findings warrant further investigation as RELT and FLNA are well-documented in BC.

Poster: P47

Psychiatric Manifestations of Oropharyngeal Carcinoma - A Literature Review

Cameron Ostroot ; Shannon Dwyer ; Anthony Kelada

Background: Oropharyngeal carcinoma (OPC) is a functionally debilitating cancer, despite improved survival in recent years with increasing rates of Human Papilloma Virus-positive disease, as patients experience substantial burden from dysphagia, pain, and treatment-related morbidity. This review analyzes the current knowledge of psychiatric disorders common amongst patients with OPC along with the intervention strategies that lead to ideal treatment outcomes.

Methods: A literature review was conducted using PubMed and EBSCO to identify studies published between 2015 and 2025 examining the relationship between psychiatric conditions and oropharyngeal carcinoma.

Results: Through the studies analyzed, patients with head and neck cancers (HNC) were shown to have markedly elevated psychiatric morbidity, with the greatest burden in oropharyngeal and hypopharyngeal tumors. Depression was highly prevalent, with up to 40% screening positive. Suicide risk was also up to threefold higher in patients with OPC than in the general population. Inadequate symptom control, hypopharyngeal cancer site, male sex, and widowed status were all associated with increased suicide risk, whereas strong patient-provider relationships were protective. Cognitive Behavioral Therapy was proven to significantly decrease anxiety symptoms in patients with HNC, while conjunctive pharmacologic management has been particularly shown to improve severe depressive symptoms. Prophylactic escitalopram initiated at time of diagnosis was also shown, in one study, to improve psychiatric outcomes for patients with baseline depressive symptoms.

Conclusions: Overall, patients with oropharyngeal carcinoma experience a substantial burden of psychiatric disorders, and understanding this is important for providers when managing long term treatment outcomes in their patients. This review also elucidates aspects to the field that need further study including how prior psychiatric comorbidities can affect long-term OPC treatment outcomes.

Poster: P48

Post-Colonoscopy Splenic Injury: A Rare Complication in a Patient with Prior Abdominal Surgery and Tobacco Use

Amy Lynn Chan; Garrett Osaki Mark; Emily Tseng; Nalin Ranasinghe; Leonard Ranasinghe

Introduction: Although colonoscopy is a commonly performed and low-risk procedure vital for colorectal cancer screening, it can lead to fatal complications such as hemorrhage, perforation, and post-colonoscopy splenic injury (PCSI). Due to PCSI's nonspecific symptoms, such as left upper quadrant abdominal pain or referred shoulder pain, it often goes unrecognized. Awareness of risk factors for PCSI is essential for timely diagnosis and management.

Case Presentation: This case report details a 53-year-old man with a history of hypertension, a 30 pack-year smoking history, and prior abdominal laparotomy, who presented to the ED two days after a routine colonoscopy. He reported acute-onset left-sided chest and upper abdominal pain. Thus, he was given aspirin for suspected acute coronary syndrome. Within hours, he developed hypotension and tachycardia, with hemoglobin declining from 13.2 g/dL to 6.8 g/dL. Contrast-enhanced CT revealed a large subcapsular splenic hematoma with active extravasation. The patient was treated emergently with intravenous fluids, blood transfusion, and successful coil embolization of a ruptured splenic artery branch. His hemodynamics stabilized, and he was discharged after a three-day ICU stay.

Discussion: This case highlights the diagnostic challenge of PCSI, particularly when symptom onset is delayed and mimics cardiopulmonary pathology. The patient's history of prior laparotomy likely resulted in splenocolic adhesions, predisposing the spleen to traction injury during colonoscope advancement through

the splenic flexure. Chronic tobacco use may have weakened vascular integrity, while concurrent NSAID exposure and aspirin administration likely compounded bleeding through platelet dysfunction. Together, these mechanical, vascular, and pharmacologic factors contributed to the patient's presentation severity. This case report aims to raise awareness of PCSI among endoscopists, emergency physicians, and primary care providers to promote earlier recognition and timely intervention. Further research is needed to better define patient-specific risk factors and inform procedural strategies to mitigate the risk of PCSI."

Poster: P49

Geographic Disparities in Obesity Prevalence: A comparison of the factors that influence Health in the United States

Agnes Chidimma Diala; James Russell Palmer; Adedeji Okikiade

Introduction: Obesity prevalence has increased, varying across racial, ethnic, socioeconomic, and regional groups. Obesity is associated with digestive system diseases and cancers, and its distribution is influenced by social and economic factors, education, and access to nutritious food and healthcare. This study evaluates obesity trends by region, income, gender, and race/ethnicity.

Methods: Data was obtained from NHANES and contextualized with peer-reviewed literature to portray the impacts of obesity on GI disorders such as GERD, NAFLD, and colorectal cancer.

Results:

Table 1: Obesity Prevalence by Race/Ethnicity

Asian populations demonstrated the lowest obesity rates across regions, while non-Hispanic Black and Hawaiian and Pacific Islander populations had the highest median rates.

Figure 1. Distribution of Obesity Rate by Gender

Female obesity rates showed mean=30.842, median=30.600, mode=27.100, with right skew (skewness = .198). Male obesity rates showed mean=30.625, median=30.700, mode=32.300, with left skew (skewness = -.262).

Figure 2. Obesity Rate Trends Across Different Income Groups from 2011-2023

From 2011–2023, obesity rates increased across income groups, highest among individuals earning under $15,000 in nearly all years except 2022, demonstrating an inverse relationship between income and obesity.

Figure 3. Average Obesity Rate by Region over Time

Between 2012 and 2022, regional obesity rates rose from 33% to 35% in the South, 32% to 34% in the Midwest, and 33% to 35% in the Territories, which fluctuated.

Conclusion: The South, Midwest, and lower socioeconomic groups exhibited the highest obesity rates. Asian populations had the lowest rates, while non-Hispanic Black and Hawaiian and Pacific Islander populations had the highest, with rising rates among non-Hispanic Black populations in the South. Mean obesity rates were similar between females (30.843) and males (30.625). National increases underscore the need for region-specific interventions targeting social determinants of health."

Poster: P50

Fluoride Varnish Application by Home Visitors

Maria Cortez; Dr. Heather Hawkins; Dr. Paul Glassman; Valerie Phillips

Introduction: Childhood dental caries is a significant public health concern. Contributing factors include inadequate access to preventive dental care among underserved populations including effective and safe measures such as topical fluoride varnish (FV). In California, state law permits non-licensed personnel to apply FV under the supervision of a licensed dental provider. In Riverside County, CNU, with funding

from First 5 Riverside, trained and supported home visitors (HVs) to incorporate application of FV into home-based care. CNU evaluated the feasibility, safety, and acceptability of FV application in the home setting by non-dental professionals.

Methodology: Using IRB approved protocols, HVs completed a structured training program and applied FV during their scheduled home visits with families. Data collected, over 6 months, included the following:

-Number of children receiving fluoride varnish, by age.

-HV feedback on self-reported confidence and ease of FV application.

-Observational feedback from supervising dental providers.

Findings: HVs reported that the training adequately prepared them for FV application. HVs have trusted relationships with families, reducing concerns about fluoride and resulting in a high acceptance rate. Selection criteria for HV application of FV included not applying it when children received fluoride varnish through their medical or dental care providers. However, in this program area few families had other sources of FV.

Conclusion: This pilot project demonstrates that HVs can safely and confidently provide FV, which can expand access to preventive care for young children, particularly in underserved communities. This model's success underscores the need to reimburse non-dental professionals, such as HVs and community health workers, for delivering preventive services like FV. Legislative initiatives such as California Assembly Bill 350 (AB 350) could play a crucial role in advancing this goal by promoting a funding framework that supports the delivery of oral health services in community-based settings.

Poster: P51

Controllable Factors Affecting Cleft Lip and Palate in Vietnam

Cat-Quynh Nguyen, Ian Marion

Background and Objective: To review literature for studies evaluating environmental, nutritional, and genetic factors contributing to the high prevalence of orofacial clefts in Vietnam. The objective is to identify controllable risk factors for targeted public health prevention and to emphasize prevention to reduce reliance on surgical intervention.

Method of Review: Search with key terms regarding cleft lip and palate and its potential associations in Vietnam on PubMed and California Northstate University Library OneSearch. Searches specifying Vietnamese populations include "cleft lip and palate prevalence", "Malnutrition Pregnant Women", "Micronutrient deficiency in pregnant Vietnamese women", ""Zinc deficiency causing cleft lip and palate", "Smoking prevalence", "Caffeine and cleft lip and palate", and "Second hand smoking women". A total of 14 articles were selected for full review.

Findings: Research indicates that indoor cook smoke exposure, prevalent in 80% of rural households, increases cleft risk by approximately 50%. While passive smoking is not a significant factor for CLP specifically, primary paternal smoking is associated with an increased risk. Maternal coffee consumption shows a dose-dependent correlation, with risk increasing by 7% per cup. Nutritional deficiencies, particularly zinc deficiency, is strongly linked to increased risk of cleft lip and palate, with a prevalence ranging from 29–84% in Vietnam. However, foliage-based folic acid intake is relatively stable among the population. Genetically, the IRF6 gene is a primary marker, with novel mutations like rs845810 identified in the Vietnamese population. Furthermore, significant gene-sex interactions exist, such as the protective WNT3 variant in males and the MEOX2 risk variant in females.

Conclusions: Orofacial clefts in Vietnam are a complex pathology influenced by both genetic factors and environmental triggers. Targeted interventions for Vietnamese populations could include reducing indoor smoke exposure, zinc fortification, and targeted educational programs and may lower the regional burden of this condition.

Poster: P52

Controllable Fluoride Varnish as a Public Health Prevention Strategy to Decrease National Dental Expenditures

Isabella Kellermeier; Hugh Byoun; Suyashi Shodan, Dr. Paul Glassman; Dr. William Kusher; Professor Valerie Phillips

Objective(s): Dental caries remains one of the most prevalent yet preventable chronic diseases and is a primary driver of restorative dental treatment, tooth extractions, and complex rehabilitation procedures. Fluoride varnish prevents dental caries, promotes remineralization of enamel, and if applied early in the disease process, reduces the development and consequences of dental caries. This literature review focused on the impact of fluoride varnish on reduction of caries and costs of reparative procedures.

Methods: This review used a comprehensive literature search using Google Scholar, PubMed, and Ovid MEDLINE databases. The search included 2 major topics – contribution to expenditures by dental caries and potential prevention of expenditures by fluoride varnish. Articles published within the last 10 years were included with no additional inclusion or exclusion criteria.

Results: Systematic reviews and randomized controlled trials on the impact of fluoride varnish application report 35–40% reductions in caries incidence, with even greater benefit observed among high-risk pediatric populations when applied early and at regular intervals. In addition, the review indicated that approximately 85% of restorations placed on previously unrestored tooth surfaces and 68% of extractions could be attributed to dental caries.

Discussion: Data from the California Medi-Cal Dental Program indicated that in 2024 $295 million was spent on repair of disease attributable to dental caries for children ages 0-20. Using the data from this literature review, a cost savings of $118 million could be realized with widespread application of fluoride varnish. This data supports Assembly Bill 350, currently being considered by the California Legislature which would mandate payment for application of fluoride varnish without cost-sharing for individuals under 21 years of age in medical, dental, and community-based settings. "

Poster: P53

Measure of Student Confidence Level in the CNUCDM Cohort of 2027: Clinical Application of Oral Pathology & Medicine

Moe Aye Maung, Rashidah T. Wiley DDS

Study Objectives: Oral pathology and medicine are integral to dental training and bridge the gap between biomedical sciences and clinical practice to enable dental students to recognize, diagnose, and manage diseases of the oral and maxillofacial region. California Northstate University College of Dental Medicine offers a two-semester course comprised of problem-based learning (PBLs), student-driven case study presentations, and a flipped classroom model to develop these skills. This cross-sectional causal research survey assesses the cohort's confidence level for preparedness in clinical diagnoses in oral and maxillofacial pathology.

Methods: The cohort of 2027 was asked to complete two IRB-approved surveys (#2308-05-126): (1) comprised of ten closed-ended quantitative questions and three exploratory questions, and (2) comprised of eleven closed-ended quantitative questions and two exploratory questions. Survey one was provided after the completion of oral pathology and one week prior to the differential diagnosis exercise and hands-on biopsy simulation using pig

tongues. Survey two was provided after the completion of the hands-on exercise.

Results: A total of 29 participants of cohort 2027, n=42, provided a 69% participation rate for survey one and 25 participants for 60% participation rate on survey two, with an 86% retention rate. Strongly Agree and Agree were selected a total of 191 times in survey one and 179 times in survey two, resulting in over 60% of positive selections for confidence level on both surveys.

Conclusion: Students feel adequately prepared with the provided teaching modalities as established by curriculum design; however, they feel limited by the number of hands-on and real clinical experiences to practice these skills, such as determining differential diagnoses, writing referrals, and performing biopsies. Integration of these skills into interdisciplinary capstone courses may offer increased confidence for future studies."

Poster: P54

Dental Students' Perceptions and Preparedness for Artificial Intelligence Integration

Dilnoor Bains; Lauren Farias; Dr. Nisha Manila

Background: As artificial intelligence (AI) continues to reshape healthcare, understanding dental students' perceptions and preparedness for its integration is vital. It facilitates designing curricula that foster competence and confidence in future practitioners. This survey contributes to the evolving conversation on AI's role in dentistry and offers insights into how dental schools can better prepare students for its adoption.

Objective: To evaluate dental students' understanding, attitudes, and perceived readiness regarding AI integration in dental education across dental schools in California.

Methods: A cross-sectional survey was conducted among dental students from various California institutions. A structured, anonymous questionnaire was distributed electronically, gathering data on students' familiarity with AI, perceived benefits and concerns, and their preparedness to use AI in clinical settings. The study was approved by the California Northstate University Institutional Review Board (2505-05-210).

Results: Students demonstrated positive perceptions of AI, particularly regarding its clinical benefits (mean = 3.86) and overall perception (3.60). However, confidence in using AI tools and applying AI diagnostically remained low (2.41–2.46). Students who felt their education prepared them to use AI reported greater confidence with AI tools. Network analysis further revealed a strong association between AI understanding and educational preparedness.

Conclusion: Overall, this study highlights the pressing need for structured AI education in dental curricula. We recommend integrating foundational courses on AI concepts and ethics with both mandatory and elective options to suit diverse interests. Practical training through workshops and simulations should build competence, while dedicated modules address ethical concerns like data privacy and bias. AI must be framed as a supportive tool, not a replacement for clinical judgment. This work was accepted for poster presentation at the International Association for Dental, Oral and Craniofacial Research (IADR) General Session in San Diego, March 2026. "

Poster: P55

Evaluation of Accessibility and Quality of Oral Health Resources

Katherine Valencerina, BS; Paul Glassman, DDS, MBA; Valerie Phillips, RDHAP, MS

Objective: This study evaluated literature and resources on oral health instructional materials for patients and caregivers.

Methodology: A literature review was conducted using the MedLine (OVID) database for publications that evaluated the oral health

resources available for patients. In addition, a Google search for “oral hygiene resources” and “pediatric oral hygiene"" was conducted. Based on a preliminary screening for resources based on availability, including publications by national organizations and global companies, and additional criteria that included accessibility, quality, and usability, 15 resources were selected for further evaluation. The additional evaluation of these resources used a 5-point Likert Scale rubric, which the authors created. The rubric had ratings in three categories: Educational Quality & Accuracy, Audience, and Accessibility.

Results: The literature review did not reveal any comprehensive evaluation of accessible oral health resources for patients and caregivers. Current research primarily compares specific educational delivery styles rather than assessing overall accessibility, readability, inclusivity, and quality. Evaluation of the 15 selected resources using the 5-point Likert Scale rubric demonstrated notable variability in the selected measures. While some materials scored well in accuracy and patient focus, many showed weaknesses in readability, caregiver engagement, limited English proficiency accessibility, and commercial neutrality.

Discussion: The literature review highlights a gap in standardized tools to evaluate whether oral health materials are truly patient-centered and accessible to diverse populations. These results support the need for structured assessments to guide the proper development and selection of oral health resources for all patients.

Conclusions: Although numerous oral health resources are readily available, their accessibility, quality, and usability greatly vary, highlighting the importance of more consistent evaluation and standards in the development and creation of these resources.

Poster: P56

Methods of Utilizing 3D Printing in Dental Education: A Review

Huvane S; Milov E; Javadi S, DDS, MS; Farhangi S, DDS

Objectives: Dental students experience difficulties during the transition from the preclinical to clinical setting. Three-dimensional printing has been utilized extensively in dental education. Printable teeth with different layers for enamel, dentin, and carious lesions have been developed. 3D printed models were created for crown and bridge preparations, endodontic training, and practicing gingival flaps. There is a growing demand for more realistic and individualized clinical simulations. 3D printing of real clinical cases prior to treatment not only integrates up-to-date teaching methods but also significantly contributes to students’ preparedness in producing better clinical outcomes. This pedagogical review study aims to describe the methods of utilizing 3D-printed models for unskilled dental students to enhance their learning.

Methods: A comprehensive search was conducted using PubMed, Cochrane Library, and Google Scholar in December 2025 using the following keywords: 3D printing, dental education, simulation training.

Results: 3D printing is efficient, reproducible, and affordable. Designing and printing realistic simulation models can significantly improve students’ training. Patient-specific and cost-efficient 3D printed models can assist students to improve their practical skills compared to regular typodonts. Models printed according to clinical cases provide a practice opportunity before the clinical session to optimize complex treatments. Impacts include clinical preparedness, technical skills development, self-assessment improvement, enhanced manual dexterity, reduced student anxiety, and increased confidence. Introducing CDM Models: 3D printing has been successfully utilized for dental anatomy, orthodontics, and pedodontics courses. This serves as a replicable framework to advance patient-centered training.

Conclusions: 3D-printed models are relevant, realistic, and economical alternative tools for

undergraduate dentistry training which can effectively bridge the gap between theoretical learning and clinical practice."

Poster: P57

Dual Role of F. nucleatum and P. gingivalis in Periodontitis and Oral Cancer: A Literature Review

Sahejveer Bagri, B.S.; Avery Shuler, B.S.; Manal Rasheed, B.S.; Wiley R, DDS; Javadi S, DDS, MS; Bilasy S, PharmB, Ph.D

Study Objectives: This research explores the complex relationship between Fusobacterium nucleatum and Porphyromonas gingivalis, and their role in the development and progression of periodontal disease and oral cancer. Both species are commonly found in the mouth, specifically in dental plaque and the gingival sulcus in periodontal disease. Periodontitis, a chronic inflammatory condition, is a global public health problem that arises in response to the disruption of microbial homeostasis within the oral cavity and has been widely associated with systemic health conditions. Emerging evidence suggests their potential involvement in oncogenesis in the oral cavity. An emphasis is placed on chronic inflammation, immune dysregulation, and direct interactions with epithelial cells that create a pro-tumor microenvironment. This review aims to connect current literature on bacterial signaling pathways and their progression to periodontitis and oral cancer.

Methods: A comprehensive search using databases such as ScienceDirect, EBSCO, and PubMed using the following keywords: oral cancer, periodontitis, bacterial pathogenesis, signaling pathways, and preventative dentistry was conducted. Relevant studies examining the interaction between bacterial-induced virulence factors and the host response were selected.

Results: Mounting data indicate a higher incidence of oral malignancy in patients with chronic periodontitis. Our findings indicate that certain bacterial species actively contribute to inflammatory environments that facilitate tissue damage and promote cancer formation. Evidence indicates that P. gingivalis and F. nucleatum may act synergistically, amplifying inflammation, immune evasion, and tumor-promoting pathways. In saliva and tumor tissue samples, both species were abundant. The findings indicate that certain bacteria actively contribute to an inflammatory environment that facilitates tissue damage and promotes cancer formation.

Conclusion: While growing evidence links periodontal pathogens to oral cancer progression, additional studies are necessary to establish causality. Understanding these microbial host interactions may improve early risk assessment and preventive strategies in dental practice.

Poster: P58

The Impact of Non-Pharmacological Desensitization Techniques in Dental Care for Patients with Special Needs

Dalia Lopez-Pelayo, BS; Sai Vishnu Pokala, MS, BS; Katherine Valencerina, BS; Paul Glassman, DDS, MBA; Valerie Phillips, RDHAP, MS

Objective: This literature review evaluated the use of non-pharmacological desensitization techniques used in patients with special needs and assessed their impact on patient satisfaction, cooperation, and the need for general anesthesia.

Methodology: A literature review of studies published within the last five years was conducted using the MedLine (OVID) database. This review focused on studies evaluating desensitization techniques used for patients with special needs without the use of pharmacological support and general anesthesia.

Results: The literature review identified 15 publications on desensitization of children and young adults with varying disabilities, behavior modification techniques, or the use of general anesthesia. The publications generally showed

an improved tolerance of dental procedures after desensitization, shortening the latency time between preparation and treatment. In addition, many studies focused on the positive parental perspective for dental desensitization for their children with disabilities.

Discussion: Patients with special needs often have anxiety, sensitivities, and communication challenges that complicate dental treatment. These difficulties may lead to negative patient experiences in the dental office and complicate the patient-caregiver relationship. In addition, time constraints, inadequate funding, and lack of provider training for structured non-pharmacological desensitization techniques, also contribute to an increased reliance on general anesthesia.

Conclusion: Non-pharmacological desensitization techniques have demonstrated effectiveness in improving tolerance and satisfaction during dental care for patients with special needs, while also reducing reliance on general anesthesia. Despite these promising outcomes, implementation is minimal due to limited time, funding, and insufficient training. Continual research on expanding education and standardizing protocols may enhance access to non-pharmacological based dental care for this patient population."

Poster: P59

Cost-Effective Three-Dimensional Printed Teeth for Endodontic Education and Preclinical Simulation

Ariga Sarkissian; Yahya Alaswad; Abdelrahman Elsemary; Jatin Arora; Jose Puglisi

Background: Three-dimensional (3D) printing enables fabrication of anatomically accurate dental training models at reduced cost. In endodontic education, commercially available training teeth are effective but expensive, limiting opportunities for repeated practice. A low-cost, reproducible model that maintains tactile and visual realism is needed for preclinical simulation and student skill development in contemporary dental curricula.

Objectives: To develop a single-resin 3D-printing workflow for realistic endodontic training teeth. The models were integrated into standard laboratory exercises as supplemental training tools to enhance hands-on learning experiences.

Methods: Forty molar teeth were fabricated from STL files using a Formlabs Form 3B printer and a single dental resin. Models were washed, post-cured, and refined using a high-speed handpiece. Pulp chambers and canals were filled with red-dyed wax to simulate pulp tissue, and access cavities were sealed with composite resin. Teeth were painted gold to eliminate visual cues. Preclinical students used both printed and commercial teeth during laboratory exercises. Informal verbal feedback was gathered from students and supervising faculty regarding realism, usability, and overall educational practicality.

Results: Initial informal feedback suggested that the printed teeth were realistic and effective for access preparation, instrumentation, and obturation practice. Reported limitations included sticky wax affecting canal cleaning and radiolucency from the mounting material influencing radiographic appearance compared with commercial models.

Conclusions: This workflow provides a feasible, cost-effective alternative for preclinical endodontic simulation. This method increases accessibility to repeated simulation while maintaining practical educational value and supporting skill development.

Poster: P60

Evaluating BC ERRM as an alternative to MTA in Vital Pulp Therapy: A Literature Review

Jaspreet Singh; Ian Marion

Objective: This study aimed to review the literature evaluating the efficacy of Endosequence Bioceramic Root Repair Material (BC ERRM) as an alternative to Mineral Trioxide Aggregate (MTA) for treating permanent mature teeth diagnosed with irreversible pulpitis using

Vital Pulp Therapy (VPT). MTA is the gold standard of material used for VPT, but it has limitations, including difficulty in handling and tooth discoloration. BC ERRM is a possible alternative to MTA, which addresses some of its identified flaws. The study compared the available literature addressing biocompatibility and clinical usage of the two materials and assessed whether ERRM is an appropriate alternative to address the limitations of MTA.

Methods: Search was conducted using NCBI, PubMed, Google Scholar, Wiley Online Library, JENDODON, and Science Direct databases using terms “ERRM”, “MTA”, “VPT”, “Irreversible pulpitis”, “RRM”, “Endosequence Bioceramic”. 23 articles were selected for final review.

Results : ERRM and MTA exhibited similar physiochemical and biocompatible properties. BC ERRM showed comparable success rates to MTA in vital pulp therapy. A clinical study showed a success rate of 93.3% for a sample of mature permanent teeth diagnosed with irreversible pulpitis treated with VPT using ERRM. No significant difference in success rate was observed in performing pulpotomy using MTA and ERRM in primary molars. ERRM lacks bismuth oxide, which causes tooth discoloration. ERRM Putty showed better handling and faster setting time than MTA.

Conclusion: BC ERRM is an appropriate alternative to MTA for VPT. BC ERRM addresses the limitations of MTA by exhibiting less discoloration and better handling while showing a similar success rate when used for VPT. Though MTA remains the gold standard material in VPT, BC ERRM presents a promising alternative that addresses the limitations of MTA without sacrificing success. Further high-quality studies are needed to substantiate BC RRM as a material for use in VPT.

Poster: P61

Intra-oral Biomarkers to Evaluate Remodeling and Resorption During Fixed Orthodontic Treatment

Shannon Isabel Caymo; Samantha Gong; Shadi Javadi; Shymaa Bilasy

Objective(s): Current methods of evaluating orthodontic treatment include clinical evidence, X-rays, and intraoral scanners, none of which yield precise information regarding alveolar bone and periodontal ligament movements during treatment. Biomarkers could provide valuable information about the remodeling and resorption processes in the absence of clinical signs of tooth movement, allowing optimization of treatment and timing for each patient. Our research aims to explore the current feasible methods to evaluate intra-oral biomarkers during orthodontic tooth movement.

Methods: A comprehensive literature review using EBSCO, ResearchGate, and PubMed databases was conducted utilizing the targeted keywords. Eligible studies were analyzed to assess biomarkers’ levels during orthodontic tooth movement.

Results: Evidence indicates that orthodontic tooth movement is driven by controlled inflammation and bone remodeling, assessed via biomarkers in saliva and gingival crevicular fluid. When fixed orthodontic forces are applied, levels of inflammatory cytokines, enzymes and bone turnover markers increase. These levels reflect the activation of osteoclast-mediated bone resorption and osteoblast-mediated bone formation. Biomarker levels tend to rise early after applied force, peak during active tooth movement, and decline as tissues adapt.

Conclusions: Research suggests that developments should prioritize studies with standardized biomarker assessment to improve diagnostic care. Collectively, studies indicate that saliva and GCF as biomarkers can provide reliable, non-invasive diagnostic media for monitoring biologic activity during orthodontic treatment. Potentially these results introduce future clinical applications of improved mechanical loading, predicting treatment response, optimizing progress and supporting personalized orthodontic care to each patient.

Keywords: Biomarkers, Bone resorption, Bone remodeling, Saliva, Gingival crevicular fluid, Inflammatory mediators, Fixed orthodontics.

Poster: **P62**

Effects of Diet on the Management of Pemphigus Vulgaris and Pemphigoid: A Survey-Based Study

Rashidah T. Wiley, DDS; Boh Kyeong Suh, DMD MPH; Becky Strong, RN; Marc Yale; Mirella Bucci, PhD

Study Objectives: Pemphigus vulgaris and pemphigoid (mucous membrane and bullous types) are autoimmune conditions which cause blistering and ulceration of the skin and mucosal tissues. One of the goals of this study was to discover what dietary practices and nutritional supplements are most helpful in the management of pemphigus vulgaris and pemphigoid. The study also focused on whether or not discussions on the value of dietary adjustments and referrals to dietary specialists occurred at the time of diagnosis.

Methods: A dietary survey consisting of 24 questions (18 close-ended and 6 open-ended questions) was created and submitted to the International Pemphigus and Pemphigoid Foundation (IPPF) Natural History Study. The survey was posted electronically on the IPPF website for individuals in IPPF Natural History database.

Results: 45 participants over the age of 18 completed the questionnaire. 31 participants (81.6%) experienced oral lesion with symptoms (pain when eating, speaking, and performing oral hygiene). Avoiding specific types of food and beverages (crunchy, acidic, citrus fruits, processed foods, and alcohol) helped manage symptoms. 4 individuals (8.9%) found that supplements such as vitamin B3, nicotinamide and niacinamide provided management of the conditions. 10 participants (22.2%) had discussion with their treating clinicians regarding dietary changes post diagnosis. Most patients did not receive a referral to a dietary specialist (95.6%). A small number of participants found that education from a dietary specialist (4.4%) or clinician (2.2%) helped them develop best dietary practices. Trial and error (33.3%) were the most common way to develop a sustainable diet.

Conclusion: Diet plays a critical role in patients with autoimmune diseases such as pemphigus vulgaris and pemphigoid. The study showed that avoiding certain food items can help alleviate symptoms, however there is not a specific type of food item, diet, vitamin, or supplement that will help manage autoimmune conditions overall.

Poster: **P63**

Preparing Future Dentists for Culturally Responsive, Patient Centered Care

Pinelopi Xenoudi, DDS, MS, MHA; Marie Miranda, RDH, MBA; Shymaa Bilasy, PharmB, Ph.D; Shadi Javadi, DDS, MS

Objectives: Patient-centered care is essential in dentistry, as beliefs, practices, and backgrounds strongly influence acceptance of treatment, compliance, and outcomes. Addressing health disparities is a foundational component of holistic oral health care. However, cultural differences can create barriers that reduce patient trust and compliance. Although pre doctoral dental students receive didactic, simulation, and clinical training, they enter programs with varied cultural experiences which influence clinical encounters. In alignment with Commission on Dental Accreditation standards, dental curricula should integrate cultural competence training throughout dental training. This project has three aims: (1) to review existing literature that support the development of cross-cultural skills in dental education. (2) to introduce CDM's cultural responsiveness and patient centered care training, including curriculum mapping. (3) to establish a foundation for future research evaluating students' clinical performance after receiving didactic instructions and offer recommendations.

Methods: A comprehensive literature review using EBSCO, ResearchGate, and PubMed databases was conducted. Eligible

studies were reviewed. The developed educational objectives were mapped across the pre-doctoral dental curriculum.

Results: Studies highlight key themes: identifying domains and learning objectives for cultural competence, examining curricular content that builds cross cultural skills, and assessing dental students' attitudes and beliefs regarding cultural competence. Additional tools have been developed in medical education to evaluate cultural competence.

Conclusions: Identifying gaps in students' cultural knowledge and clinical skills will guide recommendations for curriculum enhancement at CDM. During the assessment phase, we will evaluate students' cross-cultural competence, attitudes, and clinical communication skills through a cross-sectional behavioral study, pending necessary approvals. Findings will inform improvements in cultural competence training, strengthen patient centered care, and support alignment with CODA expectations.

Keywords: cultural competency, social determinants of health, accreditation, dental education

Poster: **P64**

Factors Influencing Dentists to Pursue Careers in Community Health Centers: A Survey of California FQHC Providers

Bethany Cheng; Anushka Shalia, Mironda Frankenberger

Study Objective: This study aims to analyze factors that influence dentists who work at FQHCs (Federally Qualified Health Centers) to pursue a career in community health dentistry.

Methods: This study utilized a survey-based methodology to collect data from FQHC dentists practicing in California. An anonymous survey was distributed through Microsoft Forms, containing both multiple choice and free response questions. Participation was voluntary.

Results: Most respondents, 66.7%, identified their personal values and upbringing as the primary factor influencing their decision to pursue community dentistry. Public service loan forgiveness was the second most frequently reported motivator, with 33.3% of participants selecting it as their first choice. In contrast, community-based dental education (CBDE) experiences during dental school were among the least cited influences on career choice, with 0% of participants placing it in their top three factors. Only 33.3% of participants listed their pre-doctoral dental education as having an influence on their career decision. When asked how CBDE could be improved, respondents suggested increasing the focus on public health through lengthening student rotations, enhancing understanding of barriers to care, and fostering greater compassion toward patients in community clinics. Additionally, 66.7% of participants stated that loan repayment would be a strong motivator for attracting new dentists to work at FQHCs, and 66.7% also reported that increased salaries would serve as an incentive.

Conclusion: The findings suggest that personal motivators, such as individual values and upbringing, play a greater role than educational experiences in influencing dentists to pursue careers in community health clinics. Financial incentives also represent significant motivating factors. The limited influence of CBDE highlights an opportunity for curricular improvement. Lengthening community rotations, strengthening public health curricula, increasing exposure to barriers to care, and fostering empathy may better prepare and inspire future dentists to serve in underserved settings.

Poster: **P65**

Impact of Oil Pulling on Oral Health: A Systematic Review of Literature

Dasha Deviatykh; Orshena Loay; Yuan Der Su; Ahmed Elshamy; Shymaa Bilasy

Background/ Objectives: Dental plaque biofilm is composed of multiple microbial species including Streptococcus mutans, Actinomyces sp & Porphyromonas gingivalis. Plaque dysbiosis is an initiating factor for dental caries, gingivitis, and periodontitis. Oil pulling, a traditional oral hygiene practice, has gained renewed interest as a low cost, accessible, and biocompatible adjunct to conventional dental care. Coconut and sesame oils have been

proposed to reduce oral microbial load and improve periodontal outcomes. This study aims to evaluate clinical trials assessing the effects of coconut and sesame oil pulling on measurable oral health outcomes, including plaque accumulation and gingival inflammation, in comparison with standard oral hygiene practices or control interventions.

Methods: A comprehensive search was conducted in several databases including Cochrane, EBSCOhost, Google Scholar, Medline, PubMed and SCOPUS using the following keywords: coconut oil, sesame oil, pull or swirl or mouthwash or mouthrinse, plaque index or gingivitis, xerostomia, periodontitis. All authors conducted the initial search and screened articles for duplicates. One author (YDS) performed data extraction.

Results: Our initial search yielded 169 articles focused on coconut or sesame oil pulling techniques. Following applying inclusion and exclusion criteria, 32 articles were included in the final analysis. Eligible studies demonstrated modest improvements in plaque index and gingival inflammation among participants practicing oil pulling, particularly when used as an adjunct to routine oral hygiene maintenance. Coconut oil was more frequently associated with reductions in plaque scores, while sesame oil showed comparable anti-inflammatory effects.

Future direction: Future research should prioritize randomized controlled trials with larger patient cohort, standardized outcome measures and longer study durations. In addition, in vitro studies enable analyzing microbial and biochemical impact of different oils in a controlled environment. Therefore, our research group will conduct microbiological analyses to clarify the biological basis of oil pulling and define its value in oral healthcare. "

Poster: **P66**

Vitamin-D deficiency, microplastic pollution, and their effects on the Wnt/beta-clatenin pathway in non-syndromic Hypodontia: A review of literature.

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Background/Objective: Congenitally missing teeth or tooth agenesis, including hypodontia or oligodontia, is a relatively common developmental anomaly of the craniofacial complex with multifactorial etiologies. Hypodontia can affect the primary or permanent dentition, and its global prevalence ranges from 1.6 % - 6.5%, with substantial intrapopulation variability. Its impact can span multiple domains including growth, aesthetics, speech, development of the craniofacial complex as well as social well-being, particularly in children. In this study, we aim to review the etiology of hypodontia and analyze the correlation between Vitamin D deficiency, microplastic pollution, and their effect on Wnt signaling, a pathway involved in non-syndromic hypodontia.

Methods: A comprehensive search using PubMed and EBSCO databases as well as Open Evidence, a HIPAA-compliant artificial intelligence search engine, available through CNSU library resources. The search aimed to investigate epidemiology and etiology of non-syndromic hypodontia.

Results: Owing to the notable high rates of hypodontia in Nigeria, this review focused on examining factors related to hypotonia in the Nigerian population. Interestingly, reports indicated a high prevalence of vitamin-D deficiency (around 45 %) among pregnant women in urban Nigerian populations. Mechanistically, vitamin D signaling through vitamin D receptor (VDR) can modulate beta-catenin-dependent Wnt pathway. VDR can mediate the Wnt signaling pathway to regulate odontoblasts differentiation. On another note, evidence demonstrates extensive microplastic pollution in the Nigerian main waterways. Bisphenol A (BPA), an environmental toxicant found in hard plastics, can also alter the Wnt pathway.

Conclusion: Taken together, our results indicate that vitamin D deficiency and

downregulation of VDR activity, alongside microplastic pollution, can alter the WNT gene signaling pathway. This triad can contribute to the high prevalence of non-syndromic hypodontia in Nigeria. Future population-based and mechanistic studies will be warranted to clarify this relation and hence develop preventive strategies.

Poster: **P67**

Educational Attainment and its Association With Non-Violent Criminal Behavior

Vanessa Ramirez

Educational attainment is widely recognized as a protective factor against criminal behavior. However, its specific association with non-violent criminal activity remains underexplored. The present study examined whether completion of formal education is associated with involvement in non-violent crime and whether this relationship differs by biological sex. Data were drawn from the National Longitudinal Study of Adolescent to Adult Health (Add Health, 2008), including 5,114 participants aged 24–32 years. Non-violent crime was measured using a composite sum score of self-reported non-violent criminal behaviors. Educational attainment was operationalized as completion of a college degree or higher (yes/no), and biological sex was self-reported as male or female. One-way ANOVAs were conducted to examine associations between educational attainment, biological sex, and non-violent crime, with stratified analyses used to assess moderation by biological sex. Results indicated that individuals without a college education reported significantly higher levels of non-violent criminal behavior compared to those with a college degree. Males also reported significantly higher non-violent crime scores than females. Stratified analyses demonstrated that the association between educational attainment and non-violent crime was significant for both males and females, indicating that biological sex did not moderate this relationship. These findings suggest that higher educational attainment is associated with reduced involvement in non-violent criminal behavior across sexes, highlighting education as a potentially modifiable factor relevant to prevention and policy efforts.

Poster: P68

Association between depression and non-violent criminal activities: Examining gender differences

Ghizlane Guisser

The study is examining the association between depression and non-violent criminal activity. If depression is linked as an associative factor, the study examines if this relationship differs by gender. Cross-sectional data is utilized based on AddHealth, with a sample of 5,114 adults aged 24 to 32, containing 2,353 males and 2,761 females. The two variables used were depression and non-criminal activities, which were both based on composite scores of self-reported data from participants. The data analysis done was a simple regression with a one-way ANOVA to strengthen findings. The results suggest a statistically significant outcome but a small association between the two variables. Data revealed that higher depression scores are likely linked with slightly higher levels of engagement in non-violent crimes. The effect size was rather small ($R^2 = .01$), accounting for only about 1% of the variance. The modest effect size proves depression as a weak contributor in the overall study. Clinically, this warrants more attention to the multiple contributors that could play a role, and early intervention that can support an individual with coping skills for targeted management.

Poster: P69

Developmentally Adapted Cognitive Processing Therapy (D-CPT) for Adolescents with Post-Traumatic Stress Disorder and Abuse History

Smyrna Agib

Childhood physical and sexual abuse is prevalent in America and produces high rates of post-traumatic stress disorder (PTSD) and

complex psychological distress or symptoms in children and adolescents. When children experience this abuse and trauma in early life, many symptoms can become prominent throughout development. Developmentally adapted cognitive processing therapy (D-CPT) is an intensive, manualized, and trauma-informed intervention that works to target these symptoms and relieve their effect. This form of therapy lasts approximately 16 weeks and moves through four phases: preparation and planning, emotion regulation training, intensive trauma-focused cognitive processing, and developmental tasks. This study is a narrative literature review that evaluated pilot studies and randomized controlled trials to evaluate the collective efficacy of D-CPT for adolescents experiencing PTSD and the effects of childhood trauma. Participants from four studies include adolescents 14-21 years of age (N=112) with a trauma history that includes documented childhood physical or sexual abuse. The CPT interventions in the assessed studies lasted, on average, 16 weeks with the session length lasting 30 sessions. Typically, data collection occurred at pre and post treatment. Most participants met criteria for PTSD and presented with additional complex comorbidities. Collective research suggests that participants receiving D-CPT have demonstrated strong results in symptom reduction. The collective evidence suggests that participants receiving D-CPT demonstrated clinically meaningful symptom reduction, thus suggesting D-CPT as a strong clinical option for adolescents suffering from PTSD secondary to an abuse history.

Poster: P70

Personality traits account for significant variance in relationship satisfaction outcomes

Sarah DuBois

This research shows that differences in personality traits have a role in relationship functioning. Using data from the Add Health Wave IV dataset, this study examined the associations between Big Five personality traits and relationship dissatisfaction. Pearson correlation analysis was conducted in SPSS to assess the strength of these relationships. The results showed that neuroticism was significantly and positively correlated with relationship dissatisfaction (r=.198, 4% of variance explained) but the other personality traits had a slightly negative to no correlation relationship. The results show that personality assessment might be useful in relationship-focused clinical settings but further research is needed to explore these associations.

Poster: P71

Examining the Association Between Marijuana Abuse, Anxious Personality Traits, and Depression in Young Adults

Sonel Kedia

With the legalization of marijuana in California and its increasing use nationally, understanding the relationship between marijuana abuse and mental health remains critical. Prior research has linked cannabis use to anxiety and mood symptoms; however, less is known about its association with anxious personality traits and whether these relationships differ by gender. This study examined whether marijuana abuse is associated with anxious personality traits and depressive symptoms among young adults using Wave IV data from the National Longitudinal Study of Adolescent to Adult Health. Regression analyses indicated that marijuana abuse was not significantly associated with anxious personality traits overall ($B = .080$, $p = .219$), but it was significantly associated with depressive symptoms ($B = .240$, $p < .001$). Gender-stratified analyses revealed small but significant positive correlations between marijuana abuse and anxious personality traits for both males ($r = .042$, $p = .041$) and females ($r = .048$, $p = .012$). Marijuana abuse was also significantly associated with depressive symptoms in both genders, with stronger effects observed among females. Findings suggest marijuana abuse is more consistently associated with depressive symptoms than anxious personality traits, with minimal gender

differences. Longitudinal research is needed to clarify causal pathways.

Poster: P72

A Systematic Review of Acceptance and Commitment Therapy for Pediatric Depression

Ken Schultze

Objective: Pediatric depressive disorders have become much more prevalent in child and adolescent populations and is expected to continue to rise. Despite being one of the most commonly diagnosed children and adolescent mental health disorders, treatment outcomes are often poor; not always outperforming placebo in clinical trials. One burgeoning form of treatment in this population is acceptance and commitment therapy. This study aimed to examine the efficacy of this intervention in this population.

Method: A systematic review was conducted by searching the literature across PubMed, PsycINFO, and clinicaltrials.gov. Studies were included or excluded on the basis of examining the pediatric population, utilizing the proper intervention, and measuring changes in depression/depression symptoms as the primary outcome.

Results: Five studies were selected for inclusion in this systematic review. Across the five studies, 87 participants were treated with acceptance and commitment therapy and overall experienced reductions in depressive symptoms over control groups. Effect sizes ranged from small to large effect sizes.

Conclusion: While included studies suggested a largely positive effect on depressive symptoms, there is a significant lack of evidence on more distal outcomes. Further research is needed to corroborate the use of this intervention over others due to its increasing popularity as a treatment option.

Poster: P73

Personality Traits and Their Impact on Reported Depression Levels

Ren E. Alberton

Personality and psychopathology have been thoroughly researched, especially between the big five personality traits and affective disorders. However, in looking for association, studies have largely focused on clinical presentations of depression or depressive symptoms. Using data from Wave IV of the National Longitudinal Study of Adolescent Health (N = 5,111), this study aims to explore the correlation between depressive symptoms and Big 5 Personality traits, optimism, anger/hostility, and anxiousness in a generalized population. Bivariate correlations on the population and these traits, and multiple regressions on the population (Ftotal(4, 5068) = 497.870, p <.001, R2 = .282). and separated by gender, were conducted. It was found that optimism (t=-11.168, p<.001) was negatively correlated with depressive symptoms, both neuroticism (t=18.650, p<.001), and anxiousness (t=10.035, p<.001), were positively correlated with depressive symptoms, and these three could be good predictors of symptoms (Ffemale (4,2735) = 293.177, p<.001, R2 =.300; Fmale(4,2328) =189.215, p<.001, R2 =.245). While the majority of the AdHealth sample is not clinically depressed, these results could provide insight for treatment planning for providers who have clients or patients who do not meet full criteria for depressive disorders and are seeking services or provide insight into potential risk factors.

Poster: **P74**

DBT Informed Legal Readiness

Payton Lee

Competency restoration programs are increasingly burdened by high demand and limited resources, often offering minimal treatment to meet legal standards without addressing the emotional and cognitive challenges faced by defendants with serious mental illness (SMI) and cognitive impairments. This review synthesizes current literature on dialectical behavioral therapy (DBT), psychoeducational models, and forensic group

interventions, highlighting the critical need for structured, accessible interventions that integrate emotional regulation, legal comprehension, and interpersonal effectiveness. Drawing from empirical studies and theoretical frameworks, this review proposed the implementation of a DBT-informed psychoeducational group model designed to enhance legal readiness and sustain competency beyond pharmacological stabilization.

Poster: **P75**

Praising and Anxiety: The effects of parental praise and teacher praise on youth generalized anxiety severity levels

Hada-Guadalupe Magaña Michel

Generalized anxiety disorder affects an estimated 2.2% of adolescents in the United States, with social and environmental factors playing a critical role in symptom development and maintenance. Praise from key adults, such as parents and teachers, represents a common form of positive social feedback that may influence youths' emotional regulation and perceptions of competence. While praise is often assumed to be protective, its impact on anxiety may vary depending on the source and context in which it is delivered. The present study examined the association between youth-reported parental and teacher praise and levels of anxiety among U.S. youth using ordinal logistic regression analyses.

Data were drawn from the 2024 National Survey on Drug Use and Health (NSDUH), a nationally representative sample of 58,633 U.S. individuals aged 12 and older. Analyses focused on youths' GAD-7 symptom severity scores. An ordinal logistic regression was conducted with anxiety severity as the dependent variable and parental and teacher praise as predictors.

Results indicated that parental and teacher praise jointly predicted anxiety severity, $\chi^2(2) = 58.34$, $p < .001$. Greater parental praise was associated with slightly lower odds of reporting more severe anxiety symptoms (OR = 0.99, $p < .001$), whereas greater teacher praise was associated with slightly higher odds of greater anxiety severity (OR = 1.005, $p < .001$). Odds ratios were close to one and may not reflect clinically meaningful effects considering the large sample size, however findings highlight the importance of further exploration on the effects of praise on anxiety.

Parental praise may reflect secure attachment and emotional validation, serving a protective function, whereas teacher praise may be perceived as performance-based or evaluative, potentially heightening performance pressure. These findings underscore the importance of considering the relational context of praise in prevention and intervention efforts aimed at reducing youth anxiety.

Poster: **P76**

Does childhood maltreatment predict alcohol abuse?

Saniya Singh

Childhood maltreatment poses significant long-term health concerns, which has been backed up by much evidence showing behavioral and substance use-related outcomes. Research shows that higher adverse childhood experiences (ACEs) increase vulnerability to alcohol abuse, but there are fewer studies regarding the difference in gender. This study examined whether self-reported childhood maltreatment predicts alcohol abuse symptoms in adulthood using Wave IV data from a nationally representative longitudinal sample of U.S. young adults aged 24–32 ($N \approx 5,114$). Regression studies that accounted for gender and age showed a significant positive correlation ($p < .001$) between adult alcohol abuse symptoms and childhood maltreatment. Alcohol addiction symptoms were strongly predicted by childhood maltreatment for both males ($B = 0.065$, $SE = 0.010$, $\beta = .141$, $p < .001$) and females ($B = 0.028$, $SE = 0.006$, $\beta = .094$, $p < .001$), with a greater effect shown in males, according to gender-stratified analyses. These results emphasize the need for early screening

and prevention initiatives and confirm previous research that links early negative experiences to substance abuse in adulthood.

Poster: **P77**

The Impact of Parental Relationships on Sexual Behavior in Young Adulthood

Lynette Polyansky; Dr. Jason Lillis

Sexual behavior in young adulthood is influenced by a range of relational and developmental factors, including the quality of parent child relationships. This study examined how closeness to parents relates to the number of sexual partners reported by young adults, with particular attention to the differences between mother and father relationships. Data was collected from Wave 4 from Add health and included 3,131 U.S. young adults. Multiple linear regression analyses were conducted to examine whether parental closeness, frequency of parental contact, and parental incarceration predicted the number of vaginal sexual partners; while controlling for age, biological sex, race and ethnicity.

Results indicated a statistically significant relationship, in which greater closeness to a father figure was associated with fewer reported sexual partners. Age and gender were also significant predictors, as older participants and male participants reported fewer sexual partners. However, closeness to mother, frequency of parental contact, and parental incarceration were not significant predictors.

These findings emphasize the unique role that a father child relationship may plan in shaping sexual decision making in young adulthood. Emotional closeness to a father figure may act as a protective factor, potentially reducing sexual risk-taking behaviors. The results highlight the importance of considering family dynamics, particularly paternal relationships in sexual research and preventative efforts.

Overall, this study supports the use of family centered sexual health education interventions. Strengthening parent child relationships, specifically those involving father figures, may contribute to healthier long term sexual behavior.

Poster: P78

Integrating Psychological Approaches in Pediatric Chronic Pain: Trends, Limitations, and Future Directions

Mira Sridhar

Pediatric chronic pain is complex and influenced by emotional, behavioral, cognitive, and physiological factors. Although psychological interventions such as psychoeducation, Acceptance and Commitment Therapy (ACT), Emotional Awareness and Expression Therapy (EAET), and mindfulness-based approaches have shown promise, no single method fully addresses the diverse needs of youth with chronic pain. This literature review examines current psychological treatments to identify strengths, limitations, and opportunities for developing more comprehensive, developmentally sensitive care models.

A structured review of peer-reviewed literature was conducted using major health and psychology databases, including PsychINFO, PubMed, and Google Scholar. Sources focused on pediatric chronic pain, psychological interventions, and biopsychosocial models of treatment. Priority was given to systematic reviews, randomized controlled trials, and foundational theoretical texts spanning approximately the past two decades, with additional seminal sources included to provide historical context.

The literature suggests that psychoeducation improves understanding but does not consistently change behavior; ACT supports psychological flexibility and functioning; EAET targets emotional awareness and expression; and mindfulness-based approaches enhance regulation skills. However, studies consistently indicate that these interventions, when used independently, tend to produce domain-specific improvements rather than comprehensive outcomes. Key themes across studies highlight the need for approaches that address multiple

mechanisms simultaneously and incorporate developmental and family-system considerations.

Findings support the development of integrated, mechanism-focused psychological protocols that combine complementary strategies rather than relying on a single modality. Advancing multidisciplinary, developmentally tailored models may improve clinical care and guide future research in pediatric chronic pain treatment. nt.

Poster: P79

The Emotional Cost of Parental Incarceration

Paola Ochoa; Dr. Jason Lillis

Parental incarceration is a well-recognized adverse childhood experience that can leave lasting emotional and mental health effects. Previous research suggests that parental incarceration is recognized as a serious childhood stressor and has been linked to emotional problems such as depression-like symptoms, anxiety, and post-traumatic stress. The current study examined whether parental incarceration predicts suicidal thoughts among emerging adults while considering the role of depression and socioeconomic status. The Data came from Wave IV of the Add Health National Longitudinal Study, which included 5,074 participants. Of this sample, 16.4% reported having an incarcerated parent. Participants were asked if they had seriously considered suicide during the past year. A binary logistic regression was conducted to test how maternal and paternal incarceration predicted suicidal ideation while taking income and depression into consideration. Results showed that maternal incarceration significantly increased the odds of suicidal thoughts (B = 0.65, p = .024). Emerging adults whose mother was incarcerated were almost twice as likely to report suicidal ideation compared to those without that experience. Parental incarceration and income were not significant on their own, although individuals in the middle-income group had slightly lower odds than those in poverty. Depression was found to be the strongest predictor (B = 0.32, p < .001). These findings emphasize the lasting emotional effects of maternal incarceration and reinforce the need for trauma-informed mental health support for people who have faced this kind of early adversity.

Poster: P80

Development and Design of a Culturally-Adapted Acceptance and Commitment Therapy (ACT) Intervention Protocol for Asian American College Students: A Single-Case Experimental Approach

Yuhan Jie

Asian American (AA) college students experience significant mental health disparities, driven by unique stressors such as acculturative stress, intergenerational conflict, and the ""model minority"" myth. Despite elevated distress, this population underutilizes mental health services due to cultural stigma and the lack of culturally responsive care. This study presents the development of a brief, culturally adapted Acceptance and Commitment Therapy (ACT) intervention protocol and outlines a pilot investigation using a single-case experimental design (SCED).

The protocol was developed by integrating ACT's core processes with Asian cultural values, such as collectivism and emotional restraint. The resulting protocol translates theoretical insights into clinical practice through four weekly modules: (1) Normalizing bicultural stress and introducing mindfulness; (2) Cultivating self-compassion and defusing from internalized stigma; (3) Exploring interdependent values within a collectivist context; and (4) Establishing committed action that honors both personal and familial goals. By explicitly incorporating cultural variables into the ACT ""Hexaflex,"" this protocol aims to reduce help-seeking barriers and enhance treatment engagement.

To evaluate the feasibility and clinical impact, a concurrent multiple-baseline SCED across participants will be employed. Participants (N = 6–8) will be recruited from California universities

and randomly assigned to varying baseline lengths (7–14 days).Clinical outcomes will be assessed through daily self-report ratings of shame, willingness to experience distress, and values-consistent behavior. Additionally, standardized measures including the Acceptance and Action Questionnaire-II (AAQ-II) and the Self-Compassion Scale (SCS-SF) will be administered at baseline and post-intervention.

By bridging the gap between Western therapeutic frameworks and Asian cultural contexts, this protocol development offers a standardized yet flexible tool for clinical practice. This research provides a critical foundation for evaluating the efficacy of brief, culturally tailored interventions in reducing mental health disparities on university campuses."

Poster: P81

The Price of Appearance: BMI and Income Disparities Among Young Adults

Muskan Virk ; Dr. Jason Lillis

In a society where appearance often carries social and professional consequences, body weight could have a significant effect on more than just health, it could also affect economic opportunity. While obesity has been linked to hiring and employment disadvantages, its direct impact on income during early adulthood remains less understood. This study explored the relationship between body mass index (BMI) and personal earnings among young adults, with a focus on possible sex differences. The aim was to determine whether there is an association between BMI category (healthy weight, overweight, or obese) and personal earnings in males and females aged 24 – 32 years. Data was collected from Wave IV (2008) of the National Longitudinal Study of Adolescent Health, in which 4,709 participants with valid BMI and earnings data. Mean personal earnings were calculated for each BMI category separately for males and females. Differences in earnings were analyzed using one-way ANOVA, and post hoc Bonferroni tests identified significant pairwise comparisons. For females, ANOVA revealed a significant effect of BMI on earnings. Post hoc tests revealed that obese women earned significantly less than both healthy (mean difference = $7,294, $p<.001$) and overweight peers (mean difference = $6,297, $p=.003$). In contrast, males showed no statistically significant differences across BMI categories. Overall, earnings decreased with higher BMI for women but remained relatively stable for men. The findings indicate that higher BMI is associated with lower earnings in women but not in men, suggesting sex-specific economic consequences of weight. These disparities may reflect weight-related stigma or bias in employment and highlight the need for workplace equity interventions. Early adulthood is a critical period for establishing long-term income trajectories, and addressing weight stigma may help reduce structural inequalities in earnings. Understanding these dynamics also underscores the broader psychological and social implications of body weight on economic outcomes.

Poster: P82

Relationship Dissatisfaction As A Moderator Between Substance Use & Depression In Young Adults

Kiran Sharma, Jason Lillis

Emerging adulthood (ages 18–30) is characterized by heightened vulnerability to both substance use and depressive symptoms. Although prior research has demonstrated independent associations among marijuana use, alcohol misuse, romantic relationship dissatisfaction, and depression, fewer studies have examined how relationship dissatisfaction may moderate the link between substance use and depressive symptoms during this developmental period. The present study investigated whether relationship dissatisfaction buffers or exacerbates the association between substance use and depression in emerging adults.

Using a cross-sectional correlational design, secondary data were analyzed from 5,114 participants in the National Longitudinal Study of Adolescent to Adult Health (Add Health). Depressive symptoms were measured using the CES-D, and substance use was assessed via self-reported marijuana abuse symptoms. Multiple linear regression analyses tested moderation effects, controlling for age.

Results indicated that marijuana use was significantly associated with higher depressive symptoms ($B = 0.501$, $p < .001$), and relationship dissatisfaction was also independently associated with greater depression ($B = 0.114$, $p < .001$). A significant interaction effect emerged between marijuana use and relationship dissatisfaction ($B = -0.024$, $p = .008$), suggesting that relationship dissatisfaction moderated this association. Specifically, the positive link between marijuana use and depression weakened as relationship dissatisfaction increased, indicating a buffering effect.

These findings highlight the importance of considering interpersonal relationship context when examining mental health and substance use in emerging adulthood. Clinicians working with this population should assess relationship quality when addressing co-occurring marijuana use and depressive symptoms. Future research should utilize longitudinal designs to clarify temporal relationships and explore these effects across more diverse populations.

Poster: P83

Cultural Validity of the Edinburgh Postnatal Depression Scale: A Literature Review

Allison Livesey

The Edinburgh Postnatal Depression Scale (EDPS) is a widely used screening tool to identify symptoms of perinatal depression (PPD) in women during or after their pregnancy. It is designed to have applicability in a variety of health care settings, such as home visits, pregnancy checkups, and infant checkups, and to be easily administered by a variety of health workers, such as OBGYNs, doulas, pediatricians, nurses, and front office staff (Kroh & Lim, 2021). A large criticism of the EDPS is that it may not accurately detect or reflect the postpartum experience in non-Western, indigenous, or diverse cultural groups where somatic symptoms may be more prominent than emotional experiences (Chui et al., 2017; Dosoni et al., 2022; Mutsio et al., 2023; Shrestha et al., 2016).

This literature review aims to evaluate the effectiveness of the EDPS across diverse populations and identify cultural factors that influence its accuracy and clinical utility. A thorough search of literature was completed via online databases such as Google Scholar, PubMed, SAGE publication and Science Direct. Search terms included the Edinburgh Postnatal Depression Scale, Factor structure, test-retest reliability, cultural validity, maternal mental health disparities, and screening in diverse populations.

Although the EDPS is an efficient screening tool, its effectiveness varies across cultural and socioeconomic contexts. Findings suggested that the EDPS shows notable limitations in cultural validity, including inconsistencies in translation, cultural differences in symptom expression, and ongoing debate about cut-off scores across populations.

By identifying these limitations, this literature review attempts to bring greater attention to the need for cultural adaptations within PPD screenings and highlights the importance of integrating cultural context and clinical judgement when interpreting the EDPS scores. This is important as culturally informed assessment practices may improve early detection and reduce disparities in maternal mental health.

Poster: P84

Evaluating the integration of Behavioral Change Theories into CPD as a Model to Advance Pharmacy Practice Transformation

"Peter Tenerelli1";"Tibebe Woldemariam2";"Angela Osorio, PharmD

candidate3"; "Mahboubeh Padar Chermahini, PharmD Candidate3"; "Vanshpreet Singh, PharmD Candidate3";"Thai Lor, PharmD candidate3";" Joanna Jullien, CHCP4"

Background: Continuing professional development (CPD) is critical to advancing pharmacy practice; however, many programs fail to consistently translate learning into practice change. Integrating behavioral change theories and adult learning principles into CPD may enhance effectiveness by shifting participants from passive to active learners. To address this gap, theory-based behavioral change frameworks were intentionally incorporated into the Capital Leadership Forum (CLF) CPD platform as part of an innovative model designed to support practice transformation.

Objectives: To evaluate the impact of a theory-driven CPD model on participant outcomes and to benchmark its effectiveness against published CPD interventions using Moore's Outcomes Framework.

Methods: A mixed-methods evaluative approach was used to analyze participant data collected from post-session surveys administered following CLF sessions conducted between 2021 and 2024. Survey items were mapped to Moore's Outcomes Framework Levels 1–4; participation, satisfaction, learning, and competence (readiness to implement change). Descriptive statistics were used to assess trends. Outcomes were compared with benchmark data derived from three systematic reviews of CPD interventions.

Results: The theory-based CLF programming demonstrated consistently strong outcomes across Moore's Levels 1–4. Participant satisfaction reached 96% (Levels 1–2), exceeding published benchmark ranges (43%–86%). Knowledge gain (14%, Level 3) was comparable to reported benchmarks (11%–33%). Notably, competence 92% (Level 4), far surpassing benchmark ranges (7%–42%) reflecting a readiness to translate learning into action. While actual behavior change (Level 5) was not directly measured, the strength of responses across the preceding levels suggests a high probability that CLF participants are positioned to achieve performance improvements in practice.

Conclusions: Incorporating behavioral change theories into CPD is associated with superior satisfaction and competence outcomes compared with published benchmarks. These findings support CLF as a replicable, theory-driven CPD approach that facilitates the transition from passive to active learning as part of advancing pharmacy practice transformation

Poster: P85

Examining the Relationship Between Pharmacy School Characteristics and Student Outcomes

Nghi Tong; Dr. Eugene Kreys, Pharm.D., Ph.D., BCPS

The relationship between pharmacy school characteristics and student performance outcomes has been widely discussed, yet most prior studies employed short observation periods and limited variables. This study aimed to evaluate the association between selected institutional characteristics and long-term student outcomes across 141 U.S. pharmacy programs.

A retrospective analysis was conducted using publicly available data from 2017-2024 gathered from the NABP, ASHP, and PharmCAS to assess three primary outcomes: NAPLEX pass rates, MPJE pass rates, and PGY1 residency match rates. Independent variables included institutional status (private vs. public), establishment date (pre- vs. post-2000), program length (accelerated vs. traditional), geographic region, bachelor's degree prerequisite requirement, and affiliation with a healthcare center. Statistical analyses were performed using SPSS Version 29 and included descriptive statistics, repeated measures two-way ANOVA< and repeated ANCOVA to control for potential confounders.

Among the 141 pharmacy programs analyzed, private institutions, longer-established programs, and traditional four-year curricula showed statistically significant associations with student outcomes. In contrast, geographic region, bachelor's degree requirement, and healthcare center affiliation did not consistently show significant relationships. The COVID-19 pandemic likely influenced institutional performance during the study period, warranting future comparative analyses of pre-pandemic, pandemic, and post-pandemic outcomes.

This study contributes to the literature by examining multiple institutional variables over an extended time frame. The results may provide actionable insights for prospective pharmacy students evaluating educational programs and for pharmacy schools refining admission strategies."

Poster: P86

Medication Adherence Barriers in Patients With Hypertension

Ruaa N Abbas

Background: Hypertension is a common chronic condition requiring long-term pharmacologic therapy. Despite the availability of effective treatments, medication non-adherence remains a significant barrier to achieving optimal blood pressure control and reducing cardiovascular risk.

Objective: To identify common barriers to medication adherence among patients with hypertension and highlight the role of pharmacists in improving adherence.

Methods: A descriptive review of published literature was conducted to evaluate factors associated with medication non-adherence in patients with hypertension. Commonly reported barriers and pharmacist-led interventions were summarized.

Results: Frequently identified barriers to adherence included complex medication regimens, adverse drug effects, cost of medications, limited health literacy, and forgetfulness. Pharmacist interventions such as patient education, medication counseling, simplification of regimens, and use of adherence aids were associated with improved adherence and patient outcomes.

Conclusion: Medication non-adherence remains a major challenge in the management of hypertension. Pharmacists play a critical role in identifying adherence barriers and implementing interventions to improve medication-taking behavior. Further research is needed to evaluate the effectiveness of specific pharmacist-led strategies in diverse patient populations.

Poster: P87

Embedding Global Cultural Competencies and Enriching DEI through Service-Learning to Underserved, Immigrant, and Refugee Communities.

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Background: According to the UN, at least 82.4 million people were forcibly displaced worldwide by the end of 2020. Nearly 700,000 refugees resettled to the US between 2010-2020, facing language and cultural barriers and limited access to healthcare. Serving medically underserved immigrant and refugee communities offers service-learning opportunities for healthcare students to develop global-health competencies locally, including cultural, diversity, equity, and inclusion competencies.

Objective: This study evaluates the impact of service-learning programs on healthcare students' self-perceived cultural competence and DEIA-related knowledge, awareness, confidence, and attitudes through engagement with local migrant and refugee communities.

Methods: Health fair events are organized by Medical and Pharmacy students at California

Northstate University offering blood pressure/glucose screenings, chronic disease education, and vaccinations. A four-point Likert-scale modified SAPLCC anonymous questionnaire assesses students' self-perceived knowledge, awareness, confidence, and attitudes before their first event and project completion, with ongoing data collection as new students join. Cronbach's alpha evaluated the pre-questionnaire reliability, and paired t-tests will assess pre- to post-changes in self-perceived cultural competence ($p<0.05$) at project completion.

Results: Forty-three students from the Colleges of Medicine (n=25) and Pharmacy (n=18) completed the pre-SAPLCC questionnaire. Cross-sectional analysis demonstrated strong internal consistency for most items ($\alpha \geq 0.7$). Students rated knowledge of cultural healing traditions lowest (1.89±0.83) and awareness of their own racial, ethnic, or cultural stereotypes highest (3.6±0.52). Self-confidence in caring for patients of different cultural or religious backgrounds (3.2±0.77) and racial, ethnic, and/or national backgrounds (3.25±0.72) was high. Students strongly agreed that poverty (3.79±0.47), illiteracy (3.62±0.58), and classism (3.62±0.54) contribute most to health disparities and that participation in underserved migrant and refugee health events supports professional identity development (3.76±0.53).

Conclusion: Preliminary findings indicate the modified SAPLCC survey is a reliable tool for measuring cultural competence among healthcare students. Service-learning with underserved immigrant and refugee communities provides experiences that foster culturally responsive care and support professional identity formation.

Poster: **P88**

Understanding Tobacco Use Behaviors and Cessation Motivations: A Community-Based Survey Analysis of Smoked and Smokeless Tobacco Users

Dianna Vang1; Shane Desselle2, Ruth Vinall1

Objectives: The short-term goal of this study is to investigate reasons why people use tobacco products and their motivations to quit. The long-term goal is to use this data to help further guide tobacco use cessation outreach efforts within our community.

Methods: We conducted a cross-sectional survey consisting of 47 questions adapted from the publicly available Global Adult Tobacco Survey. Participants were required to be 18 years or older and current users of tobacco products. Respondents received a $5 gift card upon completion. Survey items evaluated demographics, the type of tobacco product used, frequency of use, quit attempts, motivations for use, motivations to quit, perceived challenges, and support needs.

Results: A total of 52 people completed the survey. Most respondents reported using smoked or vaporized products (38 vs. 10 smokeless users). Cigarette/e-cigarette users were more likely to be female (24 female vs. 13 male), while smokeless tobacco users were predominantly male (7 male vs. 2 female). Quit attempts in the past year were more common among smoked/vaporized product users (22 yes, 16 no) compared with smokeless users (6 yes, 3 no). Relaxation and pleasure were the most frequently endorsed reasons for tobacco use. Primary motivations to reduce or quit included health concerns, concern for family and others, financial cost, and encouragement from healthcare providers. Major challenges included stress, social environments, competing life demands, and perceived need for support from family, pharmacists, and physicians.

Conclusion: Smoked/vaporized tobacco products were more commonly used than smokeless forms, with notable demographic and behavioral differences between groups. Health-driven motivations to quit are strong, but stress and social contexts remain key barriers. Tailored cessation outreach addressing stress management and social support may improve community-based tobacco control efforts."

Poster: **P89**

Activation of GPX4 Is Critical for Survival of Human Cardiac Microvascular Endothelial Cells but Is Not Involved in Prevention of Doxorubicin-Induced Cardiotoxicity

Zhuqiu Jin; Sara Abbasi Monjezi; Katalina Vue

Objectives: Glutathione peroxidase 4 (GPX4) is a key enzyme that prevents lipid peroxidation by converting lipid hydroperoxides into non-toxic lipid alcohols. Glutathione biosynthesis and GPX4 function are essential for the regulation of ferroptosis, a form of regulated cell death driven by iron-dependent lipid peroxidation. Doxorubicin, an effective anticancer drug, is limited by its dose-dependent cardiotoxicity. The contribution of cardiac endothelial cells to doxorubicin-induced cardiotoxicity remains incompletely understood.

Methods: Human cardiac microvascular endothelial cells (HCMECs) were cultured in endothelial cell medium supplemented with 5% fetal bovine serum in a 5% CO_2 incubator. Cell viability and cytotoxicity were assessed using MTT assay, LDH release assay, and morphological assessment. Effects of doxorubicin on HCMEC viability were determined. To evaluate the role of GPX4 in cell survival, RSL3 (a GPX4 inhibitor) and erastin (a system xC^- inhibitor) were used to induce ferroptosis. Ferrostatin-1 and PKUMDL-LC-101-D04 (an allosteric GPX4 activator) were used to assess protection against doxorubicin-induced cytotoxicity.

Results: Inhibition of GPX4 with RSL3 reduced cell viability and increased LDH release. Pretreatment with ferrostatin-1 or PKUMDL-LC-101-D04 attenuated RSL3-induced cell death and LDH release. Doxorubicin induced dose-dependent cytotoxicity in HCMECs. However, pretreatment with ferrostatin-1 or PKUMDL-LC-101-D04 did not prevent doxorubicin-induced cell death.

Conclusion: Disruption of the system xC^-/GSH/GPX4 axis reduces HCMEC viability through ferroptotic mechanisms. This cytotoxicity can be reversed by GPX4 activation or lipid peroxidation scavengers. However, GPX4 activation does not protect against doxorubicin-induced cytotoxicity, suggesting that doxorubicin-induced endothelial injury occurs through mechanisms independent of ferroptosis.

Poster: **P90**

Exploring a Potential Link Between GLP-1 Receptor Agonists and Myodesopsia

Kaitlin Nunes; Sang Vuong; Rondelle Jordan; Dr. Tony J. Eid

Purpose: Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are widely used for type 2 diabetes mellitus and weight management, with most adverse effects involving gastrointestinal or endocrine systems. Emerging pharmacovigilance data have identified ocular events such as ischemic optic neuropathy, diabetic retinopathy, and retinal or vitreous complications. However, no published literature has described an association between GLP-1 RAs and myodesopsia (vitreous floaters). Given the widespread use of GLP-1 RAs in the United States, post-marketing surveillance of potential ocular adverse effects is essential. This case series explores a possible association between GLP-1 RA therapy and myodesopsia as a potential early clinical marker of ocular complications.

Methods: An observational case series was initiated in August 2025 at a Family Medicine Clinic and followed three adult patients who reported vitreous floaters while using injectable GLP-1 RAs. Patients ranked symptom severity and frequency on a four-point scale (0 = never to 4 = very severe/always). All were advised to obtain comprehensive eye examinations. The Naranjo Adverse Drug Reaction Probability Scale was used to calculate the probability of an adverse drug reaction.

Results: Three patient questionnaires were analyzed. The mean myodesopsia burden score was 1.7 (SD 0.3), with frequency reported most consistently (mean 2.3/4). Functional impairment varied, suggesting heterogeneity in presentation.

Comprehensive ophthalmologic data were limited: two patients had not completed follow-up exams at the time of writing, and one reported worsening unilateral vision without specifically reporting floaters to their optometrist.

Conclusion: Preliminary findings suggest a possible association between injectable GLP-1 RAs and new or worsening myodesopsia. An adverse event report was submitted to the FDA MedWatch system. Larger studies with longitudinal ophthalmologic follow-up are needed to clarify causality, characterize risk, and determine clinical significance. Proactive reporting may help identify whether myodesopsia represents an underrecognized ocular adverse effect of GLP-1 RA therapy."

Poster: **P91**

Targeting XRCC1-Mediated Replication Stress Tolerance to Overcome PARP Inhibitor Resistance in Ovarian Cancer Using Tumor-Directed RNA Nanomedicine.

Md Shahadat Hossain; Md Ibrahim

Ovarian cancer remains the most lethal gynecologic malignancy, with high mortality driven by late-stage diagnosis and frequent relapse. Poly (ADP-ribose) polymerase inhibitors (PARP inhibitors) are widely used for BRCA1/2-mutant and homologous recombination deficient ovarian cancer, where they improve progression-free survival; however, most patients ultimately develop acquired resistance, limiting durable clinical benefit. Our lab and others identified XRCC1, a non-enzymatic scaffold protein in replication-associated base excision repair (R-BER), as a key mediator of PARPi resistance and a novel synthetic lethal vulnerability.

Analysis of Clinical Proteomic Tumor Analysis Consortium (CPTAC) ovarian cancer proteomic data (n = 100 tumors, n = 25 normal samples) shows significantly higher XRCC1 protein expression in primary tumors compared with normal ovarian tissue ($p = 3.0 \times 10^{-11}$). In our recent study, we demonstrated that replication-dependent activation of PARP1 enhances PARP1/XRCC1 complex formation and facilitates interaction with key BER/SSBR factors POLB, LIG3, and APTX during replication stress. CRISPR-mediated XRCC1 knockout in PARPi-resistant, BRCA-proficient ovarian cancer models restores sensitivity to PARP inhibitors, induces persistent S-phase PARylation, destabilizes replication forks, and increases DNA damage accumulation. Split-TurboID proximity proteomics and single-molecule DNA fiber assays define an XRCC1-centered repair hub essential for resolving PARP-induced replication stress.

Since XRCC1 is a non-enzymatic scaffold protein lacking catalytic activity, we will develop a CD44-targeted, hyaluronan-coated siRNA-loaded lipid nanoparticle (LNP) platform to enable tumor-selective uptake via receptor-mediated internalization. In vitro and in vivo studies will evaluate whether XRCC1 knockdown restores sensitivity to PARP inhibition in BRCA1-complemented UWB1.289 cells, resulting in increased cell death and tumor regression.

Together, these studies will identify XRCC1 as a therapeutic vulnerability in PARP inhibitor–resistant ovarian cancer and support RNA-based targeting to overcome replication stress–driven resistance.

Poster: **P92**

Targeting XRCC1-Dependent Replication-Stress Tolerance to Overcome PARP Inhibitor Resistance in Triple-Negative Breast Cancer

Kenneth Okwuegbe; Md Ibrahim

Triple-negative breast cancer (TNBC) is an aggressive malignancy characterized by early metastasis and frequent therapeutic resistance. PARP inhibitors (PARPi) exploit synthetic lethality in tumors with homologous recombination deficiency, particularly those harboring BRCA1 or BRCA2 mutations. Despite initial responses, resistance commonly develops through restoration of homologous recombination, replication fork protection, or

adaptive rewiring of base excision repair (BER). XRCC1 is a non-enzymatic scaffold protein that coordinates PARP1, DNA polymerase β, and DNA ligase III during single-strand break repair. Elevated XRCC1 expression has been associated with enhanced BER capacity, stabilization of replication forks, and diminished sensitivity to PARP trapping. Because XRCC1 lacks catalytic activity and functions primarily through protein–protein interactions, it is not readily amenable to conventional small-molecule inhibition. We propose a tumor-directed strategy using transferrin receptor (TfR)-targeted lipid nanoparticles to co-deliver XRCC1-specific siRNA together with a PARP inhibitor. TfR is selected due to its increased expression in TNBC, facilitating receptor-mediated uptake and intracellular delivery. The therapeutic potential of this approach will be evaluated in both BRCA-mutated and BRCA-proficient TNBC models. Endpoints will include DNA damage accumulation, replication stress signaling, cell cycle distribution, apoptosis, and quantitative assessment of combination effects. We hypothesize that XRCC1 silencing will impair BER coordination, increase unresolved single-strand lesions, and heighten reliance on PARP-dependent repair. In BRCA-proficient TNBC, this may enhance sensitivity to PARP inhibition, whereas in BRCA-mutated settings it may further potentiate cytotoxicity. We will also assess whether baseline XRCC1 expression correlates with therapeutic response. This approach seeks to overcome PARPi resistance by targeting BER dependency and replication fork stability, while evaluating XRCC1 as a candidate biomarker for treatment stratification.

Keywords: Triple-negative breast cancer; PARP inhibitors; XRCC1; Base excision repair; Synthetic lethality; Lipid nanoparticles; siRNA delivery; Drug resistance; Biomarkers.

Poster: **P93**

Acanthamoeba Keratitis, a Sight-Threatening Eye Infection: An Analysis of Epidemiology, Microbiology, and Drug Chemistry

Candra Hall; Catherine Kim; Abdelbasset Farahat

Acanthamoeba is a free-living amoeba with a biphasic life cycle consisting of a trophozoite and a persistent cyst form that is highly drug-resistant. When this amoeba comes into contact with the eye, it can cause a sight-threatening infection known as Acanthamoeba keratitis (AK). Due to the stress tolerance of the amoeba, particularly in its cyst form, eradicating the infection is nearly impossible. Therefore, it is critical to evaluate and quantify reported AK cases in global epidemiology studies, infection trends, and risk factors to increase awareness and improve diagnosis and treatment. Analyses of current and emerging clinical treatments for AK indicate that early diagnosis, timely intervention, and strict adherence to treatment regimens are essential for preserving vision.

Poster: **P94**

A Targeted Evidence Map Comparing Sugammadex and Neostigmine for Neuromuscular Blockade Reversal in Ambulatory Surgery

Justin Hoang; Omid Rasulzad; Abdelbasset A. Farahat

In an ambulatory surgical setting, rapid and reliable reversal of neuromuscular blockade is essential for patient safety, efficient postoperative recovery, and timely discharge. Neostigmine has historically been the standard agent for reversal of non-depolarizing neuromuscular blockade following general anesthesia. Its indirect mechanism of action, variable onset, and associated cholinergic adverse effects have been linked to concerns regarding residual neuromuscular blockade and postoperative respiratory events. sugammadex is an alternative reversal agent that directly binds aminosteroid neuromuscular blocking agents, resulting in rapid neuromuscular recovery but introducing higher drug acquisition costs and distinct safety and implementation considerations. Existing evidence comparing these agents in outpatient surgical settings is

diverse, with inconsistent findings across clinical, operational, and economic outcomes.

The goal is to create a targeted evidence map to systematically identify, categorize, and visually organize the existing literature comparing sugammadex with neostigmine for neuromuscular blockade reversal in adult ambulatory surgery with same-day discharge intent. The evidence will be mapped across key outcome domains, including neuromuscular recovery, incidence of residual blockade, post-anesthesia care unit (PACU) respiratory and cardiovascular events, operational efficiency (length of stay and turnover time), and economic outcomes. Instead of synthesizing results to determine superiority, this approach focuses on mapping the distribution of evidence, highlighting areas of concentration, inconsistency, and limited or absent data.

This mapping approach will provide a clear overview of where current research supports clinical or operational advantages of each agent and where uncertainties persist, particularly regarding cost-effectiveness across different institutional and perioperative settings. With the clarification of the evidence landscape, this work aims to inform clinical decision-making and highlight priorities for future research in ambulatory anesthesia practice, without presuming superiority of either reversal strategy.

Poster: **P95**

Immune Modulators to Improve Dental Metal Implants

Raj Naik; Eslam Mohamed

Successful dental implant integration is controlled by dynamic interactions between biomaterial surface properties and host immune-mediated bone regeneration. Most Dental implants that are surgically inserted to the jaw are primarily constructed from titanium and zirconia due to their favorable mechanical performance and biocompatibility. However, clinical outcomes remain variable and are strongly influenced by early immune responses at the bone–implant interface. Immediately after implantation, adsorbed blood proteins form a temporary biological layer over the implant surface that directs macrophage adhesion and polarization. Implant surface chemistry and topography, as well as implant corrosion or biofilm formation, can sustain inflammation and contribute to peri-implant disease. This project explores different immune modulators to enhance the immune response to titanium implants by implementing surface-modified titanium as an immunomodulatory platform to bias Macrophage polarization towards a pro-regenerative M2 phenotype. In addition, we will discuss peptide-based M2 macrophage-activating surfaces which promote immune resolution and strengthen osteogenic coupling at the bone-implant interface. Finally, we will investigate anti-biofilm antimicrobial coatings to suppress chronic inflammation derived from the implant and improve long-term implant stability.

Poster: **P96**

Emerging viruses and Their Oral Manifestation: Oral manifestations in COVID-19

Gabriela Perez, Simirthi Kaur Singh, Dr. Ahmed El- Shamy

Since 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has presented significant global health challenges due to its high transmissibility through respiratory droplets and aerosols. Viral entry occurs primarily through angiotensin-converting enzyme 2 (ACE2) receptors, which are abundantly expressed in the oral mucosa, gingiva, and salivary glands, positioning the oral cavity as both a portal of infection and a target for viral-related pathology. This review aims to examine the association between SARS-CoV-2 infection and oral manifestations during active disease and the post-COVID phase, while highlighting the critical role of dental professionals in detection, monitoring, and prevention.

During active infection, viral binding to ACE2 disrupts local tissue homeostasis, elevates angiotensin II levels, and promotes inflammation

and vascular changes within oral tissues. Clinically, patients may present with mucosal ulcerations, gingival bleeding, dysgeusia, ageusia, and COVID tongue. Individuals with comorbidities such as diabetes, tobacco use, poor oral hygiene, or pre-existing periodontal disease appear more susceptible due to impaired immune responses and increased ACE2 expression.

Beyond the acute stage, persistent inflammation and possible craniofacial nerve involvement may contribute to prolonged taste disturbances, sensory dysfunction, and delayed tissue healing, suggesting that oral complications can extend well after viral clearance.

Dental offices play an essential frontline role in identifying these manifestations. Thus, biannual dental visits allow routine monitoring of oral tissues and overall health, supporting early detection and prevention of progressive COVID-19 related oral complications. However, the aerosol-generating nature of many dental procedures necessitates strict infection-control practices to minimize transmission risk.

Overall, recognizing the oral implications of SARS-CoV-2 infection supports the integration of dental care into comprehensive COVID-19 management and improves early detection and prevention of both acute and long-term oral complications."

Poster: **P97**

Transferrin-Mediated Iron Dysregulation Promotes Inflammation and Ciliary Dysfunction in Sickle Cell Disease

Gratiana Chen; Petros M. Raygoza; Ashraf M. Mohieldin

Objective: Sickle cell disease (SCD) is characterized by chronic hemolysis and dysregulated iron homeostasis. However, the mechanistic links between iron-handling pathways and vascular dysfunction remain unclear. This study aimed to determine how transferrin-mediated iron transport and storage contribute to cilia-associated vascular injury in SCD.

Methods: We employed complementary proteomic, biochemical, and translational approaches using Townes SCD mouse models and plasma samples from human patients with SCD. Comparative analyses of ciliary protein fractions were performed to identify iron-related signaling pathways associated with endothelial deciliation.

Results: Comparative ciliary proteomic analysis revealed a significant enrichment of transferrin receptor-1 (TfR1) in endothelial cilia from SCD mice compared to controls. Next, immunoblot analysis independently confirmed increased TfR1 levels in plasma from both SCD mice and individuals with SCD, supporting translational concordance between murine and human studies.

Elevated plasma TfR1 may indicates enhanced iron recycling secondary to hemolysis in SCD. We further identified TfR1 enrichment in circulating extracellular vesicles (EVs), suggesting a vesicular route for iron-associated signaling. Given that iron overload promotes reactive oxygen species (ROS) generation, we further examined whether iron-dependent oxidative stress contributes to the endothelial deciliation phenotype observed in SCD patients. Treatment with iron overload (1000 μM) has significantly increased ROS production in endothelial cells compared to controls (Iron (II) sulfate heptahydrate: mean 727.7 MFI, $p < 0.0002$; Ferric chloride hexahydrate: mean 883.3 MFI, $p < 0.0001$; Ferric Citrate: mean 860.7 MFI, $p < 0.0001$). As expected, the positive control showed high ROS levels (Phorbol 12-myristate 13-acetate (PMA): mean 967.0 MFI, $p < 0.0001$), whereas the negative control remained low (mean 90.7 MFI, $p = 0.8381$).

Furthermore, activation of the iron-dependent oxidative stress pathway resulted in significant endothelial ciliary loss, reflected by reduced cilia length (Ferric Citrate: mean 2.2□m, $p < 0.0001$; Iron (II) sulfate heptahydrate: mean 1.7□m, $p = 0.0001$) and decreased cilia frequency (Ferric

Citrate: mean 32.3%, $p < 0.045$; Iron (II) sulfate heptahydrate: mean 17.1%, $p = 0.003$) compared to controls.

Conclusions: These findings identify transferrin-mediated iron handling as a mechanistic driver of endothelial deciliation in SCD. Targeting transferrin-associated signaling may represent a novel strategy to mitigate iron-dependent oxidative injury and vascular dysfunction in SCD.

Poster: **P98**

Risk of Pregnancy and Fertility Complications in Sickle Cell Disease and Sickle Cell

Uzoamaka Okwuosa; Stella Yao

Objective: Sickle cell disease (SCD) is an autosomal recessive disorder caused by genetic variants in the hemoglobin β-globin (HBB) gene, leading to polymerization of hemoglobin S and the formation of crescent-shaped red blood cells. Sickle cell trait (SCT) is the heterozygous carrier state for the same mutation and is clinically benign, though it may be associated with specific stress-related complications. SCD causes severe multi-organ morbidity, whereas SCT is generally milder, with fewer and less severe health impacts. Although both SCD and SCT have been linked to an increased risk of pregnancy and fertility-related complications compared with the general population, the full extent and underlying mechanisms of maternal and fetal risks associated with sickle cell genotypes remain unclear. In this meta-analysis, we examine and identify pregnancy and fertility-related complications associated with SCD and SCT.

Methods: This meta-analysis analyzed data from 67 studies (Maternal and Fetal Complications / Pain Crises = 38 articles; Alloimmunization = 7 articles; Fertility = 17 articles; Blood Transfusions = 5 articles), using t-scores and z-tests to compare pregnancy complications across all groups.

Results: Our results indicate a higher prevalence of maternal complications, including pre-eclampsia and pain crises, in SCT and SCD compared to the control group. Similarly, fetal complications, including low birth weight (LBW) and intrauterine growth restriction (IUGR), are more common in SCT and SCD pregnancies compared to controls. Alloimmunization, fertility complications, and treatments are also analyzed to provide a wholistic view of the impact that sickle cell gene(s) have on an individual's life.

Conclusion: In summary, this meta-analysis offers a comprehensive review of previously understudied populations, identifying risk factors, and providing insights to improve clinical management for mothers and fetuses affected by SCT and SCD.

Poster: **P99**

The changing dynamics of NK cells with age and exploring their therapeutic role in elderly stroke patient population

Nivedita Ghosh; Eslam Mohamed

As individuals age, the immune system undergoes changes that affect the body's ability to manage inflammation, fight infections, and handle disease progression. A key change is the accumulation of senescent cells; cells that stop dividing but do not die. These cells release harmful substances known as senescence-associated secretory phenotypes (SASP), leading to chronic inflammation and the worsening of age-related diseases. Natural Killer (NK) cells are an innate immune subset known for their surveillance activity against these senescent cells to control their numbers and deleterious effects. NK cells eliminate their targets using various mechanisms; however, aging significantly impairs NK cell functionality. While their numbers may increase with age, there is a decline in the effective cytotoxic CD56 bright NK cells along with an increase in CD56 dim NK cells, but with lower killing capabilities. These age-related changes increase older adults' susceptibility to life-threatening diseases like stroke, further exacerbated by

"inflammaging," which raises the risk of atherosclerosis. Worldwide, stroke is the second leading cause of death and a major contributor to long-term disability, emphasizing the need for innovative treatments. Adoptive cell therapy with NK cells shows promise in aging diseases like Alzheimer's, but its application in stroke remains limited. This project explores the changes in NK cells with aging and their role in ischemic stroke, arguing that NK cell therapy could offer effective treatments for stroke patients, ultimately improving patient outcomes and enhancing elderly care.

Poster: **P100**

The Oral Virome and Its Role in Oral Microbiome Homeostasis

Derik Kodabakshian

Rapid advances in microbiome research have transformed our understanding of how microbial communities shape human health and disease, particularly within the gut and oral cavity. While much attention has focused on bacteria, the oral virome, the viral component of the oral microbiome, remains comparatively understudied despite its potential biological significance. This review aims to synthesize current evidence and provide a comprehensive overview of the oral virome, emphasizing its composition, ecological roles, and emerging clinical relevance. The oral virome consists of diverse populations. It does this by influencing microbial balance through mechanisms such as bacterial lysis, horizontal gene transfer, lysogenic conversion, and modulation of immune responses, thereby shaping oral ecosystem stability and modulating virulence, metabolic capacity, and antibiotic resistance. Additionally, viral genomic analyses have revealed extensive amounts of genetic diversity, indicating rapid viral evolution and adaptation within the oral niche. Recent studies suggest that disruptions in the oral virome are associated with dysbiosis and inflammatory oral diseases, including periodontitis and dental caries, implicating viral communities as contributors to disease pathogenesis rather than passive bystanders. Importantly, the oral virome demonstrates substantial diversity and variability across individuals and throughout the lifespan, reflecting developmental, environmental, and behavioral influences. However, despite these early insights, its functional roles, host interactions, and systemic implications remain poorly characterized. Developing improved virome-targeted sequencing approaches, longitudinal sampling, and integrative multi-omics analyses will prove to be critical for defining causal mechanisms. From a clinical perspective, the oral virome represents a promising source of key biomarkers for early disease detection, risk stratification, and monitoring of oral and systemic health. This review highlights the oral virome as a distinct and influential component of the oral microbiome. Recognizing its contributions may expand our understanding of oral health, uncover novel diagnostic markers, and inform future preventive and therapeutic strategies targeting the broader oral ecosystem.

Poster: **P101**

Roles of Primary Cilia and Extracellular Vesicles in Multiple Sclerosis

Joshua Segales; Ashraf M. Mohieldin

Objective: Multiple sclerosis (MS) is a heterogeneous neuroinflammatory disorder marked by immune dysregulation, demyelination, and progressive neurodegeneration. Primary cilia are specialized sensory organelles that regulate signaling pathways controlling immune cell activation, glial function, and central nervous system (CNS) homeostasis. Extracellular vesicles (EVs) mediate intercellular communication by transferring bioactive cargo that influences inflammation and neurodegeneration. This study investigates how disruptions in ciliary signaling and alterations in EV biogenesis and cargo contribute to immune activation and impaired remyelination in MS.

Methods: A literature review (2003-2025) examined primary cilia structure/signaling and

EV biogenesis/cargo in MS, analyzing human, animal, and in-vitro studies. Data were categorized by cell type, ciliary pathways, EV source/cargo, and translational relevance. Figures and statistical summaries were generated using Excel and BioRender applications.

Results: Primary cilia control signaling pathways essential for immune activation, cytokine responses, and glial homeostasis, notably through cAMP/CREB-dependent mechanisms. Loss of ciliary integrity, such as IFT88 deletion, impairs oligodendrocyte progenitor cell (OPC) proliferation and reduces remyelination following white matter injury. Concurrently, EVs from activated immune cells and microglia carry immunomodulatory cargo, including miR-150-5p and miR-142-3p. Markedly, elevated miR-150-5p and miR-142-3p in myeloid-derived EVs were associated with cognitive impairment, increased inflammation, and impaired oligodendrocyte function in MS, highlighting their potential as clinical biomarkers.

In experimental models, these EVs promoted peripheral immune infiltration, blood-brain barrier disruption, and further oligodendrocyte impairment. In human studies, altered EV-associated microRNAs in plasma and cerebrospinal fluid correlated with disease activity, lesion burden, and clinical disability, supporting their translational biomarker potential.

Conclusion: Primary cilia and EVs act together to regulate neuroinflammation in MS. Ciliary signaling supports glial regeneration, while EV-associated microRNAs reflect immune and cognitive alterations. Evidence that cilia can release EVs highlights a mechanistic link and underscores their potential as biomarkers and targets for precision therapies.

Poster: **P102**

The Association of Extracellular Vesicles with Complications of Perioperative Cardiovascular Surgery

Amaan Sandhu; Ander Der Sarkissian; Ashraf M. Mohieldin

Objective: Coronary artery bypass grafting (CABG) accounts for approximately 400,000 procedures annually in the United States and is associated with significant postoperative complications, including acute kidney injury, pulmonary dysfunction, arrhythmias, and systemic inflammation. Current biomarkers, such as cardiac troponin, primarily reflect established myocardial injury rather than the underlying biological mechanisms driving postoperative complications. Extracellular vesicles (EVs), as mediators of intercellular communication carrying inflammatory and tissue-injury signals, may provide mechanistically informative biomarkers. This study aims to evaluate EVs as predictive indicators to improve postoperative risk stratification following CABG.

Methods: Adult human studies evaluating EVs after cardiac surgery with cardiopulmonary bypass were identified (N=22). Studies which did not identify protective or pathogenic roles of EVs following cardiopulmonary bypass were excluded. Subsequently, adult human studies evaluating the association between troponin concentration and EVs after cardiac surgery were identified and analyzed (N=3). Studies lacking comparable plasma troponin and EV sampling points were excluded. Missing numerical data were estimated via digitization and AI-assisted extraction, and pooled data were analyzed using Pearson correlation.

Results: Myocardial ischemia reperfusion injury induced oxidative stress-driven activation of heat shock factor 1 (HSF1), leading to robust transcriptional upregulation of intracellular HSP70 (HSPA1A). Markedly, HSP70 was selectively enriched in circulating EVs, consistent with stress-responsive EV release. These HSP70-containing EVs activated Toll-like receptors 2 and 4 (TLR2/4), triggering downstream NF-κB signaling, which promoted proinflammatory cytokine production and endothelial activation. Following cardiac

ischemia reperfusion, these EV-mediated mechanisms were associated with acute kidney injury (AKI) and acute lung injury (ALI), supporting a role for EVs in remote organ dysfunction. Plasma EV concentrations correlated significantly with postoperative troponin levels measured 0-72 hours after surgery ($r = 0.78$, $p \leq 0.004$).

Conclusion: Despite variability in study design and EV characterization, EVs represent robust, mechanistically informative biomarkers with significant potential to predict and monitor postoperative complications following cardiovascular surgery.

Poster: **P103**

Primary Cilia as Regulators of Salivary Gland Development and Regeneration

Monica Morales ; Nimrat Poonia

Objective: Primary cilia function is well-established in renal pathologies like Polycystic Kidney Disease (PKD) but remains under-explored in salivary gland physiology, despite shared epithelial characteristics. Recent evidence links ciliary dysfunction to similar cystic phenotypes in the parotid gland. This study examines this link, investigating how primary cilia modulate epithelial-mesenchymal signaling networks (Wnt and Sonic Hedgehog) to guide secretory tissue formation. Additionally, while previous studies have focused on the submandibular gland due to its dominance in saliva production, this project evaluates parotid salivary extracellular vesicles (EVs) as noninvasive diagnostic biomarkers and their regenerative potential for radiation-induced xerostomia.

Methods: A mechanistic literature review was performed using PubMed, Google Scholar, and CDC sources (1972–2026). Studies were grouped into: (1) salivary gland morphogenesis and Wnt/SHH signaling, (2) ciliary mechano-transduction and calcium regulation (Polycystin-1/2), and (3) EV biogenesis and diagnostics. Included studies focused on how ciliary signaling or EV cargo function in salivary glands or similar epithelial tissues. Studies that were non-epithelial or lacked mechanistic insight were excluded. Data were organized in Excel by model, pathway, and function. Figures were generated using BioRender and AI tools.

Results: Prenatal salivary gland morphogenesis relies on cilia-mediated SHH signaling, where IFT140 expression identifies essential stem/progenitor cell populations. Postnatally, the primary cilium acts as a sensory hub, where ciliary transmembrane protein Polycystin-1 and -2 regulate calcium signaling required for fluid secretion and EV biogenesis, mechanisms paralleling renal ciliary function. Disruption of these pathways impairs Wnt/β-catenin signaling, driving structural deterioration, cystic transformation, and reduced regenerative capacity. Furthermore, sex based transcriptomic dimorphism and estrogen deficiency, which triggers RbAp48-mediated apoptosis, create a pro-inflammatory environment in female salivary glands. This physiological state compromises ciliary mechanotransduction and regenerative capacity, correlating with the female predominance in clinical hyposalivation disorders. Analysis further confirms that parotid salivary EVs carry distinct molecular cargo mirroring glandular physiology, supporting their use as biomarkers for monitoring systemic health and radiation injury.

Conclusion: Loss of ciliary function disrupts calcium signaling and EV release, leading to hyposalivation and impaired repair. Targeting ciliary pathways may treat cystic and degenerative salivary diseases, while parotid-derived EVs offer a noninvasive diagnostic tool.

Poster: **P104**

Exploring the Connection Between the Oral Microbiome and Cancer

Braelyn Krosschell; Anoopa Patel; Ohm Patel; Eslam Mohamed

The oral cavity houses many complex organisms: bacteria, fungi, viruses, and parasites that interact with the host tissues to maintain homeostasis. Over 700 microbial

species form biofilms on oral surfaces, regulate the immune system, and participate in innate defense against pathogens, and digest food products. Disruption of the microbial composition in the oral cavity is a mechanism known as oral dysbiosis, which can lead to inflammation, autoimmune diseases, or even cancer. There are numerous environmental factors that cause oral dysbiosis, including smoking tobacco, alcohol consumption, inappropriate dietary habits, long term medication use, and poor oral hygiene practices. Understanding how the oral microbiome is affected by these factors is essential for elucidating their roles in diseases such as cancer. Mechanistically, cancer resulting from oral dysbiosis is not fully understood. There are, however, several impacts of oral microbial imbalance that are known to contribute to carcinogenesis. Herein, this study aims to review the different environmental determinants that foster oral dysbiosis. Moreover, the dysregulation in the oral microbial ecosystem will be further explored pertaining to the causes of oral cancer, as well as preventive measures and possible therapeutic options.

Keywords: oral dysbiosis, immunity, oral carcinogenesis, inflammation, biofilm formation, smoking, oral hygiene

Poster: **P105**

The Impact of Neurotoxin Proteins Trafficked by Primary Cilia and Extracellular Vesicles in Neurodegenerative Diseases

Riley Danna; Soham Kondle; Orr Amar; Michayla Mabourakh; Gratiana Chen; Wala B. Fadol and Ashraf Mohieldin

Neurodegenerative diseases (NDDs), including Alzheimer's Disease (AD), Parkinson's Disease (PD), and Huntington's Disease (HD), share convergent pathologic mechanisms including oxidative stress, mitochondrial dysfunction, and protein aggregation. However, they differ in their age of onset and clinical progression. Emerging evidence highlights primary cilia (PC) as a key regulator of neuronal aging in the progression of these diseases. Dysfunctional PC may impair key signaling pathways, such as Sonic Hedgehog (Shh) and Wnt, promote oxidative stress, mitochondrial damage, and epigenetic instability. PC may also influence intercellular communication by regulating the biogenesis of exosomes and modulating tunneling nanotube (TNT) formation, both of which propagate toxic proteins between neurons. Mechanistically, the regulation of ciliary length is disrupted in AD, which leads to ciliary dysfunction that interferes with signaling pathways and promotes the aggregation of amyloid-beta. This amyloid-beta is then propagated through TNTs and exosomes, spreading neuronal damage. In PD, the accumulation of alpha-synuclein also impairs cilia function, compromising the cell's response to oxidative stress. This results in the formation of abnormal TNTs and defective exosome-mediated clearance, ultimately contributing to neurodegeneration. Similarly, the mutant huntingtin protein aggregates within primary cilia in HD, morphologically disrupting them by obstructing in-traflagellar transport. Damaged cilia are also associated with increased TNT formation and the exosomal release of toxic proteins, which leads to mitochondrial and epigenetic instability, ultimately promoting neuronal aging. Together, targeting ciliary function and its downstream regulation of TNTs and exosomes may provide a novel approach for slowing or halting disease progression across neurodegenerative diseases.

Poster: **P106**

PGRMC2 Knockdown Disrupts Ciliary Extracellular Vesicle Biogenesis, Cellular Regeneration, and Induces Reactive Oxygen Species in Acute Kidney Injury

Chris Barnes; Riley Danna; Ashraf Mohieldin

Objective: Acute kidney injury (AKI) is characterized as a rapid decline in renal proximal tubular epithelial cell (PTECs) function due to disruption of mitochondrial oxidative phosphorylation and ciliary extracellular vesicle (ciEV) biogenesis caused by ischemic or nephrotoxic injury. Progesterone receptor membrane component 2 (Pgrmc2) is an

intracellular chaperone protein identified in primary cilia with no exploration of its role in reactive oxygen species (ROS) production. The study's objective is to investigate the effects of Pgrmc2 knockdown on ciEV biogenesis, PTEC regeneration, and ROS production in AKI.

Methods: A stable LL-CPK1 mouse renal proximal tubular epithelial cell line with Pgrmc2 knockdown was generated via shRNA lentiviral transduction. Immunofluorescence confirmed Pgrmc2 in ciEVs and assessed cilia formation, length, and ciEV biogenesis under normoxic conditions. Protein-protein interaction (PPI) network analyses were evaluated with Cytoscape. Cell migration and proliferation were assessed using wound-healing method and MTT assays, respectively. We will use an established in vitro ischemic acute tubular necrosis (ATN) model, then quantify ROS via CM-H2DCFDA flow cytometry.

Results: Pgrmc2 knockdown efficacy was confirmed with GFP-fluorescence, flow cytometry, and immunoblotting. The dot blot assay confirmed that Pgrmc2 in EVs was significantly reduced in knockdown cells compared to control. Under normoxic conditions, ciEV formation and biogenesis were markedly impaired in Pgrmc2 knockdown cells ($p \leq 0.05$ and 0.001, respectively), whereas ciliary length remained unchanged. PPI analysis revealed that Pgrmc2 interacts with ciEV proteins such as a ciliopathy-associated protein Transmembrane Protein 216 (TMEM216), whose expression was significantly diminished ($p \leq 0.001$) in Pgrmc2 knockdown cells. Pgrmc2 knockdown cells exhibited significantly impaired proliferation and wound closure ($p \leq 0.001$). Our preliminary data suggest that Pgrmc2 knockdown cells will generate higher levels of ROS, linking Pgrmc2 deficiency and oxidative stress.

Conclusion: Pgrmc2 is relevant for the regulation of PTEC mitochondrial redox pathways, cellular regeneration, and ciEV biogenesis under normoxic conditions.

Poster: **P107**

Safe Spaces and Mental Health Access in Ghana: An Integrative Review

Abigail B. Addopleh, B.S; Dr. Elizabeth B. Lozano

This integrative review employs attachment theory as a conceptual lens to synthesize empirical research on the psychosocial benefits of safe spaces and the complex role of religion and spirituality in shaping mental health help-seeking behaviors. Drawing from both qualitative and quantitative studies, the review critically examines how attachment dynamics may influence individuals' perceptions of safety, trust, and accessibility within both secular and faith-based contexts. A comprehensive literature search and systematic data evaluation guided the inclusion and analysis of studies, resulting in a synthesized understanding of how attachment security may foster openness to support, while insecure attachment may serve as a barrier to help-seeking. A new integrative theoretical framework is proposed, bridging attachment theory with sociocultural and spiritual factors that affect mental health behaviors. This framework provides a foundation for developing attachment-informed interventions that promote psychological safety and social support, particularly within culturally diverse and religiously embedded settings. The review offers implications for clinical practice, community mental health strategies, and policy development in global and multicultural contexts.

Poster: **P108**

ADAPT: An Assessment-Driven AI Tutoring Framework for 2 Personalized Learning and Predictive Analytics in 3 Pharmacy Education

Ashim Malhotra

While generative AI becomes increasingly available in higher education, faculty lack empirically grounded guidance on how to design, implement, and evaluate AI-enabled personalized learning systems within

accreditation-constrained professional curricula. This method paper describes ADAPT (Assessment-Driven AI for Personalized Tutoring), a home-grown, diagnostic-triggered AI tutoring ecosystem implemented in a required PharmD immunology course. Using standard learning-management (Canvas) and assessment (ExamSoft) platforms, a 20-item diagnostic quiz mapped to six immunology mastery domains (N = 34; mean 69.1%, SD 17.9; Cronbach's α = 0.73) was used to trigger tiered, structured generative-AI remediation at both individual student and cohort levels. Instructional impact was evaluated using reliability indices, item-level difficulty analyses, and paired pre-/post-assessment comparisons. Following AI-guided remediation, mean mid-term performance increased to 79.8% (+10.7 percentage points), variability decreased (SD 20 14.4), and assessment reliability improved (ExamSoft KR-20 0.87). Item difficulty stabilized (mean ≈ 0.80), with sustained retention of targeted concepts on the final examination. ADAPT provides a replicable, low-cost methodological blueprint for constructing assessment-driven AI tutoring systems and establishes the instructional backbone for future predictive analytics in health professions education.

Poster: **P109**

Elucidation of In Vitro Anticancer Properties of Rosemary (Rosmarinus Officinalis L.) Extract

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Rosmarinus officinalis, commonly known as Rosemary, is a common household perennial shrub, best known for its strongly aromatic, needle-like evergreen leaves. The plant is widely used in traditional medicine for its tonic, carminative, and antispasmodic properties. The essential oil extracted from the seeds and leaves of Rosemary have been demonstrated to possess antioxidant, antibacterial, antifungal, and antiviral activities.

In the present study, several compounds derived from a Rosemary methanolic extract were isolated and assessed for possible in vitro cytotoxic activity against a panel of pancreatic cell lines and non-small cell lung cancer cell line A549 and PANC-10.

Bioactivity-guided fractionation of the methanol extracts afforded several fractions and compounds which showed significant reductions in cell viability were observed. The major compounds, rosmarinic and ursolic acids, were found to be significantly active against both lung and pancreatic cell lines with the strongest inhibitory effect being observed against pancreatic cell lines. The results of these studies include chemical and physical data for the active compounds, cytotoxic activity and the bioassay-guided fractionation of the methanolic extracts will be presented.

These findings highlight the importance of the use of herbs and spices as potential lead sources for prevention and treatment of cancer.

Poster: **P110**

Targeting C3a and C5a signaling- a game changer for cancer therapy?

*Hunter D. Hudgins#1; Valeria Molina#1; Stanley Wiernicki1; Kenneth Okwuegbe2; Xiaodong Feng3; and Hongbin Wang1,2,3**

Emerging evidence reveals a significant shift in understanding the complement system's role in cancer, where activation of complement within the tumor microenvironment (TME) fuels tumor growth and metastasis instead of suppressing it. Research highlights C3a and C5a anaphylatoxins as key drivers of cancer progression, showing that the blockade of their signaling pathways can inhibit tumor growth and metastasis. By interacting with immune cells in the TME, including tumor-associated macrophages (TAMs), T cells, and myeloid-derived suppressor cells, C3a and C5a promote immunosuppression, thereby driving cancer cell

proliferation, angiogenesis, and metastasis. However, conflicting findings persist despite growing evidence supporting the role of C3a and C5a in tumor progression and the potential therapeutic benefits of targeting pathological complement activation.

This paper presents a systematic review of studies examining the activation of complement system and the role of C3a and C5a signaling pathways in the TME, focusing on their effects on tumor progression, their interactions with TME components, and the potential for targeting these signaling pathways to boost anti-tumor immune responses.

Poster: **P111**

Assessing Pharmacy and Dental Students' Performance in Managing Chronic Kidney Disease Interprofessional Case in the Ambulatory and Acute Care Educational Setting

Welly Mente, Ashim Malhotra, Rashidah Wiley

Introduction: Chronic Kidney Disease (CKD) is a significant health condition occurring in a variety of patient settings and associated with several comorbidities. We created an interprofessional case conference and presented a case conference on CKD in the ambulatory and acute care setting to 85 first-year CDM and first-year PharmD students. The goal of CKD simulation was to lead interprofessional student teams in the case management of CKD, with dental students providing initial dental office visit screening, evaluation and collaborating with pharmacy students in developing a pharmacotherapeutic care plan. Pharmacy and dental school faculty presented a CKD case in three stages, stopping to teach and question students, accompanied by a post review summary on CKD.

Methods: A pre-/post- self-confidence survey, pre-/post-quiz, and pre-/post- perception survey all were administered to CNUCOP students. Then, comparison of pre- vs post-confidence 12-question surveys using Microsoft Copilot tested whether there are differences. Rank values assigned to Likert scale survey question selections ranged from 1 being not at all confident to 5 being completely confident. Comparison of pre-vs post-perception surveys 15-question surveys Likert responses (Strongly Disagree=1 ... Strongly Agree=5) were mapped to 1–5 for each respondent and the mean was computed to test whether there are differences. Descriptive statistics as non-parametric two independent samples statistical analysis using Mann-Whitney U test was calculated as the pre-/post- test statistical comparison. Nonparametric statistics (Mann–Whitney U) and effect sizes (rank-biserial correlation, Vargha–Delaney A12, Hodges–Lehmann median difference) are reported.

Results: Both groups show strong upward confidence shift: Mean up +0.75 (to 3.96/5). COP section leads improvement: +0.80 vs +0.69 for T. "Not confident at all" nearly eliminated (5.3% → 0.1%). Both groups show small upward shifts from Pre- to Post-perception; however, neither change is statistically significant (two-sided Mann–Whitney U). Rank-biserial correlations (|r_rb| » 0.15–0.18) indicate

small effects; Vargha–Delaney A12 values (~0.41–0.42 for Pre>Post; equivalently ~0.58–0.59 for Post>Pre) are consistent with a slight tendency for higher Post scores. Hodges–Lehmann estimates suggest a typical shift of about +0.07 Likert points (on a 1–5 scale).

There was a statistically significant improvement from the CDM pre-quiz to post-quiz. The average learner answered about 0.61 more items correctly (≈ 8.7% of the 7-item quiz), and the effect is large in magnitude. The non-parametric test confirms the result is not driven by assumptions of normality. On average, COP learners answered about 1.3 more questions correctly on the post-quiz, a statistically and educationally meaningful gain.

Conclusion/Implications: Faculty provided patient case and discussion helped bring together concepts from courses involving renal pathophysiology and pharmacotherapy courses. Students experienced how patient case

management occurs around general course content they have already learned in COP and CDM courses. This event allowed students to connect clinical decision-making dots.

Acknowledgment

Members of 2026 CNU Research Symposium

Planning Committee (CNU-RSPC26)

Special thanks and sincere gratitude to the members of 2026 Research Planning Committee for their dedication, time, and thoughtful efforts in organizing the 2026 Annual Research Day. Your commitment to excellence and collaboration has been instrumental in bringing this event to life. Thank you for your leadership and for fostering an environment that celebrates research, innovation, and scholarly engagement.

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